CRESCENT 1, 16 & 24 SANDY UTAH CRESCENT SOUTH STAKE VESTIBULE AND CONCRETE REPLACEMENT

PROJECT MANUAL MAY 23, 2018



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INTRODUCTORY INFORMATION

Sandy FM Group Crescent 1, 16 & 24

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BIDDING REQUIREMENTS,

SAMPLE FORMS, ETC.

FOR MAINTENANCE PROJECT (U.S.)

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INVITATION TO BID (U.S.)

1. CONTRACTORS INVITED TO BID THE PROJECT:

Bidding is by invitation only. List available upon requeste

2. PROJECT:

New Vestibule and Concrete Replacement

3. LOCATION:

275 East 10600 South, Sandy, Utah

4. OWNER:

Corporation of the Presiding Bishop of The Church of Jesus Christ of Latter-day Saints, A Utah Corporation Sole 50 East North Temple Street Salt Lake City, Utah 84150

5. CONSULTANT:

Douglas Oldham, Architect 2264 North 390 East Provo, UT 84604

6. DESCRIPTION OF PROJECT:

- A. Addition of entry vestibule on south at existing concrete slab and foundation. Replacement of concrete stairs and sidewalk on north.
- B. Products or systems may be provided under a Value Managed Relationship (VMRs) the Owner has negotiated with the supplier. VMR products and systems are indicated as such in the Specifications.
- 7. TYPE OF BID: Bids will be on a lump-sum basis. Segregated bids will not be accepted.
- **8. TIME OF SUBSTANTIAL COMPLETION:** The time limit for substantial completion will be as noted in the Agreement.
- **9. BID OPENING:** Sealed bids will be received at time and place as shown on Bid Information Sheets. Bids will be publicly opened at time as shown on Bid Information Sheets.

10. BIDDING DOCUMENTS:

- A. Bidding Documents will be provided digitally to each contractor
- 11. BIDDER'S QUALIFICATIONS: Bidding by the Contractors will be by invitation only.
- **12. OWNER'S RIGHT TO REJECT BIDS:** Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DOCUMENTS:

- A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
 - 1. Contractor's Bid Proposal and Maintenance Project Agreement
 - 2. Other documents included by reference
 - Addenda.
- B. Bidding Requirements are those documents identified as such in proposed Project Manual.
- C. Addenda are written or graphic documents issued prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Contractor's Bid Proposal and Maintenance Project Agreement upon execution of the Agreement by Owner.

2. BIDDER'S REPRESENTATIONS:

- A. By submitting a bid proposal, bidder represents that
 - Bidder has carefully studied and compared Bidding Documents with each other.
 Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
 - 2. Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect contract work, and has correlated its personal observations with requirements of proposed Contract Documents, and
 - 3. Bid is based on materials, equipment, and systems required by Bidding Documents without exception.

3. BIDDING DOCUMENTS:

- A. Copies
 - 1. Owner will provide the Bidding Documents as set forth in the Invitation to Bid.
 - 2. Partial sets of Bidding Documents will not be issued.
- B. Interpretation Or Correction Of Bidding Documents
 - 1. Bidders will request interpretation or correction of any apparent errors, discrepancies, and omissions in the Bidding Documents.
 - 2. Corrections or changes to Bidding Documents will be made by written Addenda.
- C. Substitutions And Equal Products
 - Equal products may be approved upon compliance with Contract Document requirements.
 - 2. Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding documents.
 - 3. Where a specified product is identified as a "quality standard", products of other manufacturers that meet the performance, properties, and characteristics of the specified "quality standard" may be used without specific approval as a substitute.
- D. Addenda. Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

4. BIDDING PROCEDURES:

- A. Form And Style Of Bids
 - 1. Use Owner's Bid Form titled "Contractor's Bid Proposal And Maintenance Project Agreement".
 - 2. Bid will be complete and executed by authorized representative of Bidder.
 - 3. Do not delete from or add to the information requested on bid form.

B. Submission of Bids

- 1. Submit bid in sealed opaque envelope containing only bid form.
- 2. It is bidder's sole responsibility to see that its bid is received at or before the specified time. Bids received after specified bid opening time may be returned to bidders unopened.
- No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

D. Modification Or Withdrawal Of Bid

- 1. Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
- 2. Prior to bid opening, bidders may withdraw bid by written request or by reclaiming bid envelope.
- 3. Prior to bid opening, bidder may mark and sign on the sealed envelope that bidder acknowledges any or all Addenda.

5. CONSIDERATION OF BIDS:

- A. Opening Of Bids See Invitation To Bid.
- B. Acceptance Of Bid
 - No bidder will consider itself under contract after opening and reading of bids until Owner accepts Contractor's Bid Proposal by executing same.
 - 2. Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

6. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Contractor's Bid Proposal and Maintenance Project Agreement" provided by Owner.

7. MISCELLANEOUS:

- A. Pre-Bid Conference. A required pre-bid conference will be held at a time to be announced by the Owner at the project sites.
- B. Examination Schedule for Existing Building and Site
 - 1. Contact Steve Smith, Sandy UT FM Group, (801) 562-8212
- C. Applicable Laws
 - Utah. Exemption from state sales tax The Church of Jesus Christ of Latter-day Saints is a Religious Institution exempt from state sales tax under Utah law prescribed by Tax Commission under Rule No. R865-19S-58. Use of an exemption certificate, Form TC-721, is necessary to claim the exemption.

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. ASBESTOS-CONTAINING MATERIAL (ACM)

A. Owner will provide information regarding ACM prior to bidding for each project. Owner will remove any ACM. Contractor to coordinate removal of ACM with Owner's ACM abatement contractor.

END OF DOCUMENT

EQUAL PRODUCT APPROVAL REQUEST FORM

Projed	t Name: _		Request Number:
TO:			
FROM	1:		
BID D	ATE:		
until it	appears ir		not legally be included in a bid or used in the Work odification as defined in the General Conditions. See additions, and Section 016000.
PROF	OSED EQ	UAL PRODUCT:	
Speci	fication Se	ection:	
·	fied Produ		
	sed Produ		
The U 1. 2. 3. 4.	respects t Same war Same ma Proposed progress s	equal product has been fully invest o specified products. ranty will be furnished for proposed intenance service and source of rep equal product will have no adverse	equal product as for specified products. lacement parts, as applicable, is available. effect on other trades and will not affect or delay
ATTA	CHMENTS	S:	
Includ 1. 2. 3.	Copy of the or red-line Identify concessary completed Complete results, ar	ed to include any changes necessary ompletely changes necessary to the details, elevations, cross-sections, or to show changes necessary to accept the changes from the original Dray product literature and technical data	and other elements of the Project Drawings redone as ommodate proposed equal product. Identify
SIGN	ED:		
	Cor	mpany	
	Add	dress	
	City	, State, Zip	
	Tel	ephone	FAX

REVIEW COMMENTS:		
Accepted. See Addenda Number		
Submission Not In Compliance With Instructions. Respond to attached comments and resubmit.		
Proposed Equal Product Not Acceptable. Use specified products.		
Not Reviewed. Submission received too late. Use specified products.		
ADDITIONAL COMMENTS:		
BY: DATE:		

CONSTRUCTION MATERIAL ASBESTOS STATEMENT MAINTENANCE PROJECTS (U.S.)

Building Na	ame:
Building Pla	an Type: Non-Standard
Building Ac	ddress:
Owner:	Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-days Saints, a Utah corporation sole
Property No	umber:
Completion	n Date:
and belief;	ACT CONSULTANT and principal in charge; based on my best knowledge, information, inspection I certify that on the above referenced Project, no asbestos containing building materials were a the construction documents or given approval in shop drawings or submittals.
Date	Contract Consultant and Principal in charge
Oldham Hir Company N	rst Design, PC Iame
	tor in charge of construction; based on my best knowledge, information, inspection, and belief; I on the above referenced building, no asbestos containing building materials were used in the on.
Date	Contractor in charge
Company N	lame_

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SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

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- 01 6200 PRODUCT OPTIONS
- 01 6400 OWNER-FURNISHED PRODUCTS
- 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS
- 01 7000 EXECUTION REQUIREMENTS
- 01 7400 CLEANING AND WASTE MANAGEMENT
- 01 7700 CLOSEOUT PROCEDURES
- 01 7800 CLOSEOUT SUBMITTALS

SECTION 01 1000 SUMMARY

A. Work Covered By Contract Documents:

- Provisions contained in Division 01 apply to all other sections and divisions of Specifications. All
 instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise,
 all obligations set forth in Specifications are obligations of Contractor.
- 2. Comply with applicable laws and regulations.

B. Work By Owner:

- 1. Owner will furnish and install some portions of the Work with its own forces. Complete the Work necessary to accommodate the Work to be performed by Owner before scheduled date for performance of such Work.
- 2. Owner may provide furnishings and/or equipment for Project. Contractor will receive, store, and protect such items on site until the date Owner accepts Project.
- 3. High Security Cylinders and Cores:

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

A. Separate Contracts:

- 1. Contracts may be issued by Owner for performance of certain construction operations at Project site.
- 2. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its work with theirs where applicable:

SECTION 01 1400 WORK RESTRICTIONS

A. Project Conditions:

- During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
 - Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
 - b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
 - c. Do not allow use of tobacco in any form on Project Site.
 - d. Do not allow pornographic or other indecent materials on site.
 - e. Do not allow work on Project Site on Sundays except for emergency work.

- f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
- g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
- h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
- i. Do not build fires on Project Site.
- j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.
- 2. Existing Facilities:
 - a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements:

- 1. Coordination:
 - a. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work.
 - b. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation.
 - c. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:

 Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

B. Project Meetings And Conferences:

- 1. Attend preconstruction conference and organizational meeting scheduled by Architect or Owner Representative at Project site or other convenient location.
- 2. Be prepared to discuss items of significance that could affect progress, including such topics as:
 - a. Construction schedule, equipment deliveries, general inspection of tests, preparation of record documents and O&M manuals, project cleanup, security, shop drawings, samples, use of premises, work restrictions, and working hours.
- 2. Pre-Installation Conferences.
 - a. Attend pre-installation conferences specified in Contract Document.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Submittal Procedure:

- 1. Coordination: Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
- 2. Process Time: Allow sufficient review time so installation will not be delayed by time required to process submittals.
- 3. Identification: Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
- 4. Transmittal: Package each submittal appropriately for transmittal and handling.

B. Action Submittals:

- 1. Product Data: Submit product data, as required by individual Sections of Specifications.
- 2. Shop Drawings: Submit shop drawings for review and designate (stamp) approval of shop drawings.
- 3. Samples: Samples used for comparison with actual component to be installed. Samples when accepted will be used for quality comparisons throughout course of construction.

C. Informational Submittals:

- 1. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations.
 - a. Return copies or PDF files marked with action taken and with corrections or modifications required.

D. Closeout Submittals:

1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

A. Quality Assurance:

- 1. Hot Work Permit (Available from Owner's Representative):
 - a. Required for doing hot work involving open flames or producing heat or sparks such as:
 - 1) Brazing.
 - 2) Cutting.
 - 3) Grinding.
 - 4) Soldering.
 - 5) Thawing pipe.
 - 6) Torch applied roofing.
 - 7) Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Administrative Requirements:

- 1. Conflicting Requirements:
 - a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
- 2. Minimum Quantity or Quality Levels:
 - a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
- 3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.

B. Quality Assurance:

- Testing and inspecting services are used to verify compliance with requirements specified or indicated.
 These services do not relieve Contractor of responsibility for compliance with Contract Document
 requirements.
- 2. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
- 3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

C. Quality Control:

- 1. Quality Control Services:
 - a. Quality Control will be sole responsibility of Contractor.
 - 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 performed by Contractor.
 - They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.
 - b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:

a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.

D. Repair And Protection:

- 1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- 2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
- 3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

- A. Qualifications: Qualifications in this Section establish minimum qualification levels required; individual Specification Sections specify additional requirements:
 - 1. Fabricator / Supplier / Installer Qualifications:
 - a. Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units:
 - Where heading 'VMR (Value Managed Relationship) Suppliers / Installers' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project. No other suppliers / installers will be acceptable. Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
 - Where heading 'Acceptable or Approved Suppliers / Installers / Fabricators' is used to identify list of specified suppliers / installers / fabricators, use only one of listed suppliers / installers / fabricators. No others will be acceptable.
 - 2. Factory-Authorized Service Representative Qualifications:
 - a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
 - 3. Installer Qualifications:
 - a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with record of successful in-service performance.
 - 4. Manufacturer Qualifications:
 - a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 5. Manufacturer's Field Services Qualifications:
 - a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
 - 6. 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 kind indicated:
 - 1) Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
 - 7. Specialists:
 - a. Certain sections of Specifications require that specific construction activities will be performed by entities who are recognized experts in those operations:
 - Specialists will satisfy qualification requirements indicated and will be engaged for activities indicated.
 - 2) Requirement for special will not supersede building codes and regulations governing the Work.
 - 8. Testing Agency Qualifications:
 - a. Independent Testing Agency with experience and capability to conduct testing and inspecting 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.
 - b. Testing Laboratory:
 - 1) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
 - 2) Cement and Concrete Reference Laboratory (CCRL).

- 3) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
- 4) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

SECTION 01 4523 TESTING AND INSPECTION SERVICES

A. Submittals:

- 1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
- 2. Tests and Evaluation Reports:
 - a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
- 3. Testing Agency:
 - a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
 - b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.

B. Quality Assurance:

- 1. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.
- 2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
- 3. Certification:
 - Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
 - b. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
- 4. Written Practice for Quality Assurance:
 - a. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
 - b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
 - c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

C. Quality Control:

- 1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
- 2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
 - Testing and Inspection Reports will be distributed as follows:
 - 1) 1 copy to Owner's Representative.
 - 2) 1 copy to Architect.
 - 3) 1 copy to Consulting Engineer(s) (Engineer of Record).
 - 4) 1 copy to Authorities Having Jurisdiction (if required).
- 3. Contractor's Responsibility:
 - a. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
 - b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.

- c. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
 - 1) Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
 - 2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
 - 3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - 4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
- d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
- e. All Work is subject to testing and inspection and verification of correct operation.
- f. Comply:
 - 1) Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
 - 2) Comply with Contract Documents in making such repairs.
- g. Data:
 - 1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
- h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
 - Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid work delays.
 - 2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
 - 3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
 - 4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
 - 5) Should test return unacceptable results, Contractor will bear all costs of retesting and reinspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
- i. Protection:
 - 1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
- j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
 - 1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
 - 2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
 - 3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
 - 4) Schedule sequence of activities to accommodate required services with minimum of delay.
 - Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.
- k. Test and Inspection Log:
 - 1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:
 - (a) Date test or inspection was conducted.
 - (b) Description of the Work tested or inspected.
 - (c) Date test or inspection results were transmitted to Architect or Owner Representative.
 - (d) Identification of Testing Agency or inspector conducting test or inspection.
 - 2) Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's or Owner's reference during normal working hours.
- D. Tests And Inspections General:

- 1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
- 2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
- 3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
 - a. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
 - b. Contractor must cooperate with persons and firms engaged in these activities.
- 4. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 50.
- 5. Taking Specimens:
 - a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
- 6. Scheduling Testing Agency:
 - a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
 - b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.

E. Testing Agency Services And Responsibility:

- 1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
 - a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
- 2. Testing and Inspection Services:
 - a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
 - b. Testing Agency will not give direction or instruction to Contractor.
 - c. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
 - d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.
- 3. Testing Agency Duties:
 - a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
 - b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
 - c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
 - d. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
 - e. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
 - f. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
 - g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.
- 4. Testing and Inspection Reports:
 - a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
 - 1) Description of method of test.
 - 2) Identification of sample and portion of the Work tested:
 - (a) Description of location in the Work of sample.
 - (b) Time and date when sample was obtained.
 - (c) Weather and climatic conditions at time when sample was obtained.

- 3) Evaluation of results of tests including recommendations for action.
- c. Inspection Reports:
 - 1) Testing Agency will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections.
 - 2) Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
- d. Reporting Testing and Inspection (Conforming Work):
 - 1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
- e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
 - Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
 - (a) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
 - (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
- f. Final Report:
 - Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.
- F. Architect's Responsibility:
 - 1. Architect Duties:
 - a. Notify Owner's Representative before each test and/or inspection:
- G. Field Quality Control:
 - 1. Field Tests And Inspections:
 - a. Field Test and Inspection requirements are described in detail in 'Field Quality Control' in Part 3 Execution' of individual Sections in Division 01 thru Division 49.

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

- A. Administrative Requirements:
 - 1. Contractor is responsible for security of materials, tools, and equipment. Do not permit others to use building keys provided by Owner. Safeguard building and contents while the Work is being performed and secure building when the Work is finished for day.
 - 2. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
 - a. Avoid use of tools and equipment that produce harmful noise.
 - b. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near site.
 - c. Protect the Work, materials, apparatus, and fixtures from injury due to weather, theft, and vandalism.
 - 3. Existing restroom facilities may be used by Contractor. Clean restrooms and portions of existing building used in accessing restrooms daily. If existing facilities are not usable, provide and maintain temporary sanitary toilet.
- B. Temporary Barriers And Enclosures:
 - 1. Protect existing trees and plants. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
 - 2. Erect adequate barricades, warning signs, and lights necessary to protect persons from injury or harm.
 - 3. Provide temporary enclosures at exterior building openings for security and protection from weather, theft, and vandalism. Erect and maintain dust-proof partitions and enclosures as required to prevent spread of dust and fumes to occupied portions of building.
 - 4. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
 - a. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.

- b. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
- c. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
- d. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same
- e. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

C. Utilities:

- 1. Electrical Power: Owner will provide electric power for construction activities within limits available at existing facility.
- 2. Fire Protection: Exercise caution to avoid fire damage: Do not build fires on site.
- 3. Heating, Cooling, And Ventilation:
 - a. Permanent mechanical system may be operated upon following conditions:
 - Do not interfere with normal set-back temperature patterns except as approved by Project Manager.
 - 2) Do not operate system when the Work causing airborne dust is occurring or when dust caused by such Work is present without first installing temporary filtering system.
- 4. Lighting: Existing lighting system may be used by Contractor.
- 5. Water Service: Contractor will use existing water supply for construction purposes to extent of existing facilities.

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

- A. Administrative Requirements:
 - 1. Provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

SECTION 01 6200 PRODUCT OPTIONS

- A. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
 - 1. Substitutions And Equal Products:
 - a. Generally speaking, substitutions for specified products and systems, as defined in Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
 - b. Approved Products / Manufacturers / Suppliers / Installers:
 - 1) Category One:
 - (a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - (b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
 - 2) Category Two:
 - (a) Owner has established National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - (b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
 - 3) Category Three:
 - (a) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.

- 4) Category Four:
 - (a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
 - (b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading 'Manufacturers' or 'Approved Manufacturers', this is intended as convenience to Contractor as listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.
- c. Acceptable Products / Manufacturers / Suppliers / Installers:
 - 1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect or Owner Representative by Addendum.
 - 2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect or Owner Representative in writing before installing or applying unlisted or private-labeled products.
 - Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections
- d. Quality / Performance Standard Products / Manufacturers:
 - 1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
 - 2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
 - 3) Products / manufacturers used will conform to Contract Document requirements.

SECTION 01 6400 OWNER-FURNISHED PRODUCTS

- A. Administrative Requirements:
 - 1. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

- A. Administrative Requirements:
 - 1. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
- B. Delivery, Storage, and Handling:
 - 1. Delivery and Acceptable Requirements:
 - a. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - b. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - c. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - d. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.
 - 2. Storage and Handling Requirements:
 - Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.
 - Store heavy materials away from Project structure so supporting construction will not be endangered.
 - c. Store products subject to damage by elements above ground, under cover in weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01 7000 EXECUTION REQUIREMENTS

A. Administrative Requirements:

- 1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
 - Notify Owner in writing of unsatisfactory conditions.
 - b. Do not proceed until unsatisfactory conditions have been corrected.

B. Common Installation Provisions:

- 1. Provide attachment and connection devices and methods necessary for securing the Work:
 - Secure the Work true to line and level.
 - b. Allow for expansion and building movement.
- 2. Recheck measurements and dimensions before starting each installation.
- 3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
- 4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.

C. Protection:

1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.

D. Completion Inspection:

- 1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
- 2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
- 3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

A. Disposal Of Waste:

- Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:
 - Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
- 2. Burning: Do not burn waste materials.
- 3. Disposal: Transport waste materials off Owner's property and legally dispose of them.

B. Progress Cleaning:

- 1. Keep premises broom-clean during progress of the Work.
- 2. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
- 3. Clean and maintain completed construction as frequently as necessary throughout construction period.
- 4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.

C. Final Cleaning:

- 1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
- 2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
- 3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

A. General:

- 1. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
- 2. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
- 3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.

B. Preliminary Closeout Review:

- When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
- 2. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
- 3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
 - a. Punch list of items requiring completion and correction will be created.
 - b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

C. Substantial Completion Inspection:

- 1. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
- 2. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
- 3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
 - a. Date of Substantial Completion.
 - b. Punch List Work not yet completed, including seasonal and long lead items.
 - c. Amount to be withheld for completion of Punch List Work.
 - d. Time period for completion of Punch List Work.
 - e. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
- 4. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

D. Final Acceptance Meeting:

- 1. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
- 2. Owner, Architect and Contractor execute Owner's Project Closeout Final Acceptance form, and verify:
 - a. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
 - b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
 - c. Final cleaning requirements have been completed.
- 3. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout Final Acceptance form.
- 4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

A. Administrative Requirements:

- 1. Project Record Documents:
 - a. Do not use record documents for construction purposes:
 - 1) Protect from deterioration and loss in secure, fire-resistive location.

- 2) Provide access to record documents for reference during normal Working hours.
- b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
 - Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - Mark new information that is important to Owner, but was not shown on Contract Drawings.
 - 3) Note related Change Order numbers where applicable.

2. As Built Record Drawings:

a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.

B. Operations And Maintenance Manual:

1. General:

- a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
- Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.

2. Project Manual:

- c. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
 - (1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
 - (2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
- 3. Maintenance Contracts: (digital format only).
- 4. Operations and Maintenance Data (digital format only):
 - a. Operations and maintenance submittals includies cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
- 5. Warranty Documentation: Digital format of final, executed warranties.
- 6. Record Documentation:
 - a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
- 7. Software: Audio and Video System software, programming and set-files.
- 8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
- 9. Landscape Management Plan (LMP):
 - a. Irrigation Section:
 - (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
 - b. Landscaping Section:
 - (1) Documentation required by Sections under 32 8000 Heading: Irrigation.

C. Warranties:

- 1. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
- 2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

SECTION 02 4113

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Demolish and remove portions of existing site facilities as described in Contract Documents.
- B. Related Requirements:
 - 1. New and replacement work specified in appropriate specification Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Scheduling:
 - 1. Include on Construction Schedule specified in Section 01 3200 detailed sequence of individual site demolition operations.

1.3 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Identify abandoned utility and service lines and capping locations on record drawings.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A.

3.2 PREPARATION

- A. Notify corporations, companies, individuals, and local authorities owning conduits running to property.
 - 1. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain on the property.
 - 2. Arrange for removal of wires running to and on property. Remove pipes and sewers in accordance with instructions of above owners.

3.3 PERFORMANCE

- A. Execute work in orderly and careful manner, with due consideration for neighbors and the public.
- B. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work. Coordinate with Owner for equipment and materials to be removed by Owner.

- C. Concrete And Paving Removal:
 - 1. Saw cut joints between material to be removed and material to remain to full depth.
 - Hand-excavate trench 12 inches (300 mm) wide and 16 inches (400 mm) deep along concrete or paving to be removed. Cut roots encountered with saw, axe, or pruner. Do not cut roots with excavating equipment. Remove roots under concrete and paving to be replaced down to 12 inches (300 mm) below finish grade.

3.4 CLEANING

- A. Keep streets and roads reasonably clean, and sweep daily.
- B. Sprinkle demolition rubbish and debris as necessary to lay dust.
- C. Promptly remove demolition materials, rubbish, and debris from property.

END OF SECTION

SECTION 02 4119

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

517-9971

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Salvage of existing items to be reused or recycled.

1.2 REFERENCES

- A. Reference Standards:
 - 1. National Fire Protection Association / American National Standards Institute:
 - NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2013 Edition.
 - 2. American Society of Safety Engineers:
 - a. ASSE A10.6-2006, 'Safety Requirements for Demolition Operations'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Storage or sale of removed items or materials will not be permitted on-site.
- B. Pre-Installation Conference:
 - Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.
- C. Scheduling:
 - Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, on Schedule specified in Section 01 3200.

1.4 SUBMITTALS

- A. Informational Submittals:
 - 1. Special Procedure Submittals:
 - a. Inventory:
 - After selective demolition is complete, submit list of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Comply with governing EPA notification regulations before beginning selective demolition.
 - 2. Comply with hauling and disposal regulations of authorities having jurisdiction.
 - 3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 FIELD CONDITIONS

A. Existing Conditions:

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

- 1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
 - a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Evaluation And Assessment:

- Hazardous Materials:
 - a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
 - If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
- 2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.
- 3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
- 4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
- 5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

A. Temporary Facilities:

- 1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- 2. Maintain fire-protection facilities in service during selective demolition operations.

B. Temporary Shoring:

- 1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- 2. Strengthen or add new supports when required during progress of selective demolition.

C. Utility Services:

- 1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
- 2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - a. Arrange to shut off indicated utilities with utility companies.

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b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 SELECTIVE DEMOLITION

A. General:

517-9971

- Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - d. Maintain adequate ventilation when using cutting torches.
 - e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - h. Dispose of demolished items and materials promptly.

B. Selective Demolition Procedures For Specific Materials:

- 1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- 2. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Removed and Salvaged Items:

- 1. 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 Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
 - a. Clean salvaged items as directed by Owner.
 - b. Pack or crate items after cleaning. Identify contents of containers.
 - c. Store items in a secure area until delivery to Owner.
 - d. Transport items to Owner's storage area designated by Owner.
 - e. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

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

E. Existing Items to Remain:

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

3.4 CLEANING

A. General:

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

B. Waste Management:

- 1. Disposal of Demolished Materials:
 - a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
 - 1) Do not allow demolished materials to accumulate on-site.
 - 2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

END OF SECTION

SECTION 03 1511

CONCRETE ANCHORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
 - 1. Cast-in place and post-installed concrete anchors including:
 - a. Adhesive anchors for concrete.
 - b. Expansion anchors for concrete.
 - c. J-bolts and headed cast-in-place bolts.
 - d. Screw anchors for concrete.
 - e. Concrete anchors and inserts not specified elsewhere.
 - 2. Installer responsible when inspection results of concrete anchors require corrective actions.

B. Related Requirements:

- Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
- 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
- 3. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation and inspection of cast-in-place anchors.
- 4. Section 06 1100: 'Wood Framing' for installation of drilled in anchors.

1.2 REFERENCES

A. Reference Standards:

- 1. American Concrete Institute:
 - a. ACI 355.4-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary'.
 - b. ACI 548.12-12, 'Specification for Bonding Hardened Concrete and Steel to Hardened Concrete with an Epoxy Adhesive'.
- 2. American National Standards Institute / American Welding Society (Following are specifically referenced for Structural Steel testing):
 - a. ANSI/AWS D1.1/D1.1M:2015, 'Structural Welding Code Steel'.
- 3. ASTM International:
 - a. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength'.
 - b. ASTM A563-15, 'Standard Specification for Carbon and Alloy Steel Nuts'.
 - c. ASTM A706/A706M-16, 'Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement'.
 - d. ASTM F1554-15, 'Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength'.
 - e. ASTM F3125/F3125-15a, 'Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions'.
- 4. International Code Council (IBC) (2015 or latest approved AHJ edition):
 - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

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- 1. Inspection shall be performed according IBC requirements.
- Notify Testing Agency and Architect one week before installing anchors so inspection may be scheduled.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's product literature for each item.
- B. Informational Submittals:
 - Certificates:
 - a. Adhesive Anchors:
 - Installer to provide current ACI/CRSI certification to Architect prior to installation of anchors.
 - Test And Evaluation Reports:
 - a. Provide ESR for products used indicating conformance with current applicable ESR Acceptance Criteria.
 - 3. Manufacturer's Instructions:
 - a. Manufacturer's published installation recommendations for each item.
 - 4. Qualification Statements:
 - a. All concrete anchors except Adhesive Anchors:
 - 1) Installer to provide record of installer installation training showing dates and those trained for all installed products when required when by Architect.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency inspection reports of all inspected anchors.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - Manufacturer:
 - Having sufficient capacity to produce and deliver required materials without causing delay in work.
 - 2. Installer:
 - Acceptable to Manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.
 - b. Adhesive Anchors:
 - Adhesive Anchors installed in horizontal to vertical overhead orientation to support sustained tension loads shall be installed by Certified Adhesive Anchor Installer (AAI) as certified through ACI/CRSI:
 - a) Refer to most current version of ACI 318 for certification requirements.
 - b) Proof of current certification shall be submitted to the Architect for approval prior to commencement of installation.
 - c. All other Concrete Anchors:
 - 1) Arrange for manufacturer's field representative to provide installation training for all products to be used, prior to commencement of work:
 - a) Provide installation training when required by Architect.
- B. Field Inspection:
 - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2. Owner will provide Inspection for post-installed concrete anchors:

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- a. Owner will employ testing agency to perform inspection for post-installed concrete anchors as specified in Field Quality Control in Part 3 of this specification:
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
 - Store materials protected from exposure to harmful weather conditions and as directed by Manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Anchors:
 - General:
 - Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
 - b. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch (6.4 mm) by 3 inch (76 mm) x 3 inch (76 mm) minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
 - c. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
 - d. Conform to requirements of ASTM F3125/F3125 for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
 - 2. Threaded rod for adhesive anchors and cast-in anchors:
 - a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
 - 3. Cast-In-Place Anchor Bolts:
 - a. J-Bolts:
 - 1) Non-headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
 - 2) Anchor hook to project 2 inches (50 mm) minimum including bolt diameter.
 - b. Headed Bolts:
 - 1) Headed type threaded 2 inches (50 mm) minimum conforming to requirements of ASTM F1554, Grade A.
 - 4. Reinforcing Bars:
 - Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60.
 - 5. Adhesive Anchors:
 - Products shall have current ESR conforming to current ICC Acceptance Criteria AC308 for concrete.
 - b. Rod diameter and embedment length as indicated on Contract Drawings.
 - c. Type Two Acceptable Products:
 - 1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.

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- 6. Expansion Anchors:
 - Products shall have current ESR conforming to current ICC Acceptance Criteria AC193 for concrete.
 - b. Type Two Acceptable Products:
 - KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.
- 7. Screw Anchors:
 - Provide anchors with length identification markings conforming to ICC Acceptance Criteria
 AC 193 for concrete.
 - b. Type Two Acceptable Products:
 - 1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) Titen HD by Simpson Strong Tie Co, Pleasonton, CA www.simpsonanchors.com.
 - Equals as approved by Architect through shop drawing submittal before installation.
 See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Embedded Items:
 - Identify position of reinforcing steel and other embedded items before drilling holes for anchors:
 - Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
 - 2) Take precautions as necessary to avoid damaging pre-stressing tendons, electrical and telecommunications conduit, and gas lines.
 - Notify Engineer if reinforcing steel or other embedded items are encountered during drilling.
 - Base Material Strength:
 - a. Unless otherwise specified, do not drill holes in concrete until:
 - 1) Concrete has minimum age of 21 days at time of anchor installation.
 - Concrete has achieved full design strength for load achievement.

3.2 PREPARATION

- A. Surface Preparation:
 - 1. Clean surfaces prior to installation.
 - 2. Prepare surface in accordance with Manufacturer's written recommendations.

3.3 INSTALLATION

- A. Post-Installed Anchors:
 - General:
 - a. Drill holes with rotary impact hammer drills using carbide-tipped bits.
 - b. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
 - c. Perform anchor installation in accordance with Manufacturer's published instructions.
 - 2. Adhesive Anchors:
 - Clean holes in accordance with Manufacturer's published instructions before installation of adhesive:

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 Follow Manufacturer's recommendations to ensure proper mixing of adhesive components.

b. Adhesive:

- 1) Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.
- 2) Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
- 3) Remove excess adhesive from surface and threads of anchor as necessary.
- c. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
- d. Temperature:
 - Observe Manufacturer's recommendations with respect to installation temperatures for adhesive anchors.
 - 2) Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.

3. Expansion Anchors:

- a. Protect threads from damage during anchor installation and prior to use.
- b. Set anchors to Manufacturer's recommended torque, using a torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.

4. Screw Anchors:

- a. Protect threads from damage during anchor installation and prior to use.
- b. Set anchor flush, collared.
- c. Do not exceed Manufacturer's maximum allowed torque when seating anchor.

3.4 FIELD QUALITY CONTROL

A. Field And Inspections:

- Civil and structural field inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
- 2. Expansion Anchors / Adhesive Anchors / Screw Anchors:
 - a. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
 - b. Inspections:
 - Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
 - a) The correct rod/anchor is used; size and type.
 - b) The correct hole size is used and prepared per Manufacturer's instructions.
 - That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
 - d) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
 - e) Torque applied to anchors does not exceed Manufacturer's allowable limits.
 - f) Torque applied to anchors is per Manufacturer's instructions.

B. Non-Conforming Work:

1. Contractor is to immediately notify Architect of incorrectly placed, misplaced or malfunctioning anchors and request instructions for corrective actions.

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3.5 CLEANING

- A. Waste Management:
 - 1. Disposal of rubbish, debris, and packaging materials.

3.6 PROTECTION

- A. General:
 - 1. Protect installed products from damage during construction.

END OF SECTION

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SECTION 03 2116

EPOXY - COATED REINFORCEMENT STEEL BARS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install epoxy coated reinforcement steel bars as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 0000: 'General Requirements':
 - Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 - b. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 - 2. Section 03 1113: Structural Cast-In-Place Concrete Forming'.
 - 3. Section 03 2100: 'Reinforcement Bars'.
 - 4. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
 - a. Reinforcement installed in concrete.
 - b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Concrete Institute:
 - a. ACI 'Detailing Manual' (2004 Edition).
 - 2. Concrete Reinforcing Steel Institute (CRSI):
 - a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).
- B. Reference Standards:
 - American Concrete Institute:
 - a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' (Reapproved 2015).
 - b. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.
 - ASTM International (Following are specifically referenced for reinforcement bars testing):
 - a. ASTM A615/A615M-16, 'Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.
 - b. ASTM A775/A775M-16, 'Standard Specification for Epoxy-Coated Reinforcing Bars'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 03 3111.
 - 2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
 - a. Installation scheduling and reinforcing placement.
 - b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.
- B. Schedulina:
 - Notify Testing Agency and Architect as directed in Section 03 3111.

1.4 SUBMITTALS

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- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Reinforcing placement drawings.
- B. Informational Submittals:
 - Certificates:
 - a. Mill certificates certifying mill tests for reinforcing in accordance with ASTM A775/A775M.
 - 1) Mill test is to be approved before fabrication begins.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency Inspection Reports of reinforcement bars.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
 - a. American Concrete Institute:
 - 1) ACI 318, 'Building Code Requirements for Structural Concrete and Commentary'.
 - b. Concrete Reinforcing Steel Institute:
 - 1) CRSI, 'Manual of Standard Practice'.

B. Qualifications:

- 1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
 - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.
 - b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.
- C. Testing And Inspection:
 - Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2. Owner will provide Testing and Inspection for reinforcement bars:
 - a. Owner will employ testing agencies to perform testing and inspection for reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
 - 2. Reinforcement steel bars shall be free of abrasions or other penetrations of epoxy-coating at time of delivery and placing.
- B. Storage And Handling Requirements:
 - 1. Properly protect rebar on site after delivery.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Epoxy Coated Reinforcement Steel Bars:
 - 1. Bars shall have grade identification marks and conform to ASTM A615/A615M with coating conforming to ASTM A775/A775M and comply with requirements of ACI 318.21.2.5:
 - a. Bar supports shall be completely coated with epoxy or vinyl, compatible with both concrete and epoxy coating on bars. Coating shall be at least 1/8 inch thick at tips.
 - b. Tie wire shall be nylon coated.
 - 2. Actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi and Ratio of actual ultimate stress (at breaking point) to actual tensile yield stress shall not be less than 1.25.
 - a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
 - 3. Bars shall be deformed type.
 - 4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

2.2 ACCESSORIES

A. Bar Supports:

- 1. Concrete masonry units or bricks are not acceptable.
- 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CSRI, Class 2).
- 3. Type Two Acceptable Products:
 - a. Concrete 'dobies' or blocks wired to reinforcing.
 - b. Manufactured chairs with 4 sq inch (25.8 sq cm) bearing surface with sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
 - c. Equals as approved by Architect before installation. See Section 01 6200.

2.3 FABRICATION

A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

- 1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- 2. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
- 3. Reinforcement shall not be bent after partially embedded in hardened concrete.

B. Placing Reinforcement:

- 1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
- Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
 - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.

- b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
- c. Install bar supports at bar intersections.
- 3. Bend bars cold.
- 4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
- 5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

C. Splices:

- Non-Concrete Structural System:
 - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
- 2. Concrete Structural System:
 - a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
 - b. Lap bars as follows:
 - 1) Compression Splices: 45 bar diameters minimum.
 - 2) Tension Splices: In accordance with ACI 318 Class B requirements.

D. Tolerances:

- Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M.
 Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
 - a. Concrete cast against and permanently exposed to earth:
 - 1) Exterior Slabs on Grade (where shown): 2 inches (50 mm).
 - 2) Sections other than Slabs: 3 inches (75 mm).
 - b. Concrete Exposed to Earth or Weather:
 - 1) No. 6 and Larger Bars: 2 inches (50 mm).
 - 2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches (38 mm).

3.2 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - 1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 - 2. Reinforcement Bars:
 - Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

END OF SECTION

SECTION 03 3112

CAST-IN-PLACE SIDEWALKS, CURBS AND GUTTERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install concrete work as described in Contract Documents including:
 - a. Concrete Formwork:
 - 1) Required formwork ready for placing of concrete.
 - 2) Strip and dispose of formwork.
 - b. Concrete:
 - 1) Concrete mix information and use of admixtures.
 - c. Concrete Sealer:
 - Sealer applied to new or existing exterior concrete surfaces exposed to freeze/thaw cycles and deicing salts or where exterior concrete is placed after about September 1st or as otherwise desired by Facilities Manager.
 - d. Elastomeric Joint Sealants for expansion joints.
 - e. Expansion Joint Filler Material.
 - f. Membrane Curing.
 - g. Site Materials:
 - 1) Aggregate base.
 - 2) Fill.
 - 3) Compaction requirements.

B. Related Requirements:

- 1. Section 01 0000: 'General Requirements':
 - a. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
 - b. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
 - a. ACI 305R-10, 'Guide to Hot Weather Concreting'.
 - b. ACI 306R-10, 'Guide to Cold Weather Concreting'.

B. Definitions:

- Cementitious Materials: Portland cement alone or in combination with one or more of following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
- Concrete Membrane Curing: Process by which hydraulic-cement concrete matures and develops hardened properties, over time, as result of continued hydration of cement in presence of sufficient water and heat. Also used to describe action taken to maintain moisture and temperature conditions in freshly placed concrete.
- 3. Concrete Sealers: As used in this specification, sealers are applied to new or existing exterior concrete surfaces to protect from surface damage, corrosion, and staining. Sealers either block pores in concrete to reduce absorption of water and salts or form impermeable layer which prevents such materials from passing. Concrete sealer, when selected and applied properly, will prevent intrusion of water and deicers, minimizing freeze/thaw damage.
- C. Reference Standards:

- 1. American Association of State and Highway Transportation Officials:
 - a. Membrane Concrete Curing:
 - 1) AASHTO M 148-05, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing'.
- 2. ASTM International:
 - a. Admixtures:
 - 1) ASTM C260/C260M-10a(2016), 'Standard Specification for Air-Entraining Admixtures for Concrete'.
 - 2) ASTM C494/C494M-16, 'Standard Specification for Chemical Admixtures for Concrete'.
 - 3) ASTM C618-15, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
 - 4) ASTM C1293-08b(2015), 'Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction'.
 - b. Concrete:
 - 1) ASTM C33/C33M-16, 'Standard Specification for Concrete Aggregates'.
 - 2) ASTM C94/C94M-16a, 'Standard Specification for Ready-Mixed Concrete'.
 - c. Concrete Sealer:
 - 1) ASTM C672/C672M-12 'Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals'.
 - d. Elastomeric Joint Sealant:
 - 1) ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
 - e. Expansion Joint Filler Material:
 - ASTM D1751-04(2013), 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)'.
 - f. Membrane Concrete Curing:
 - ASTM C309-11, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete'.
 - g. Site Materials:
 - 1) ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.
 - 2) ASTM D2487-11, 'Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)'.
- 3. CSA Group (Canadian Standards Association):
 - a. Admixtures:
 - CSA A23.1-14/A23.2-14, 'Concrete Materials and Methods of Concrete Construction / 'Test Methods and Standard Practices for Concrete'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with related specification included in this specification:
 - 2. In addition to agenda items specified in Section 01 3100, review following with Facilities Manager:
 - a. Review approved mix design requirements and use of admixtures.
 - b. Review placement, finishing, and curing of concrete including cold and hot weather requirements.
 - c. Review membrane curing requirements.
 - a. Review elastomeric joint sealant requirements.
 - b. Review expansion joint filler material requirements and joint layout for curbs and gutters.
 - c. Review location of sidewalk, curb, and gutter control joints and expansion joints. Contractor to provide layout plan showing locations if needed.
 - d. Review concrete sealer requirements.
 - e. Review site materials requirements.
- B. Scheduling:
 - 1. Elastomeric Joint Sealant:
 - Schedule work after Membrane Concrete Curing is placed and before Concrete Sealer is applied.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Concrete Sealer:
 - 1) Manufacturer's product literature or cut-sheets for specified products.
 - b. Elastomeric Joint Sealant:
 - 1) Manufacturer's product literature or cut-sheets for specified products.
 - 2) Material Safety Data Sheets (MSDS).
 - c. Expansion Joint Filler Material:
 - 1) Manufacturer's product literature or cut-sheets for specified products.
 - d. Membrane Concrete Curing:
 - 1) Manufacturer's product literature or cut-sheets for specified products.
 - 2) Material Safety Data Sheets (MSDS).

B. Informational Submittals:

- Design Data:
 - a. Mix Design:
 - Furnish proposed mix design to Facilities Manager for review prior to commencement of Work
 - Mix design shall show proposed admixture, amount and usage instructions.
 - b) Mineral: An amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty-five (25) percent of weight of cement may be substituted for cement. If substituted, consider fly ash with cement in determining amount of water necessary to provide specified water / cement ratio
 - c) Chemical: Specified accelerator or retarder may be used if necessary to meet environmental conditions.
- 2. Source Quality Control Submittals:
 - a. Concrete mix design: Submit mix designs to meet following requirements:
 - 1) Proportions:
 - a) Mix Type B:
 - (1) 4500 psi (31.03 MPa) minimum at twenty-eight (28) days.
 - (2) Water / Cementitious Material: 0.40 maximum by weight.
 - (3) Use twenty-five (25) percent Class F (or Class C where Class F is not available) fly ash as part of cementitious material.
 - b) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
 - c) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
 - 2) Slump:
 - a) 4 inch (100 mm) slump maximum before addition of high range water reducer.
 - Admixtures:
 - a) Mineral: An amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty-five (25) percent of weight of cement may be substituted for cement. If substituted, consider fly ash with cement in determining amount of water necessary to provide specified water / cement ratio.
 - Chemical: Specified accelerator or retarder may be used if necessary to meet environmental conditions.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Concrete Sealer:
 - a. Comply with applicable VOC standards and other local requirements.
 - 2. Membrane Concrete Curing:
 - a. Comply with applicable VOC standards and other local requirements.
- B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:

- 1. Installers and Installation Supervisor:
 - ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- 2. Ready-Mix Supplier:
 - Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. 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:
 - 1. Follow Manufacturer's written instructions for handling and storage of products.
 - 2. Concrete Sealer:
 - Store in unopened containers in clean, dry area between 35 deg F (2 deg C) and 110 deg F (43 deg C) or as directed by Manufacturer's instruction.
 - 3. Elastomeric Joint Sealant:
 - a. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
 - b. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
 - c. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
 - d. Do not use sealants that have exceeded shelf life of product.
 - 4. Expansion Joint Filler Material:
 - a. Store materials in clean, dry area in accordance with manufacturer's instructions.
 - b. Protect materials during handling and application to prevent damage.
 - 5. Membrane Concrete Curing:
 - Store in unopened containers in clean, dry area between 35 deg F (2 deg C) and 110 deg F (43 deg C) (Keep from freezing) or as directed by Manufacturer's instruction.
 - b. Shelf Life: Do not use curing compound that is over one (1) year from manufacturer date.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - Concrete:
 - For Cold Weather and Hot Weather Limitations, see Preparation in Part 3 of this specification.
 - 2. Concrete Sealer:
 - a. Follow printed Manufacturer's instruction for environmental hazards.
 - b. Follow printed Manufacturer's instruction for ambient conditions for application of product including:
 - 1) Minimum and maximum application temperatures.
 - 2) Application precautions when rain is expected.
 - 3. Elastomeric Joint Sealant:
 - Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
 - b. Follow Manufacturer's temperature recommendations for installing sealants.
 - 4. Expansion Joint Filler Material:
 - Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
 - 5. Membrane Concrete Curing:
 - a. Do not apply curing compound when temperature of concrete is less than 40 deg F (4.4 deg C).
 - 6. Site Materials (Aggregate Base and Fill):

- a. Do not perform work during unfavorable conditions as specified including:
 - 1) Presence of free surface water.
 - 2) Over-saturated sub base materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:

- Admixtures:
 - BASF (Construction Chemicals Division), Cleveland, OH www.master-builders-solutions.basf.us/en-us.
 - b. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
 - c. Fritz-Pak Concrete Admixtures, Dallas, TX www.fritzpak.com.
 - d. Grace Construction Products, Cambridge, MA www.graceconstruction.com and Grace Canada Inc, Ajax, ON (905) 683-8561.
 - Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
- 2. Concrete Sealer:
 - BASF (Construction Chemicals Division), Cleveland, OH www.master-builderssolutions.basf.us/en-us.
 - b. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
 - c. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
 - d. TK Products, Minnetonka, MN www.tkproducts.com.
- 3. Elastomeric Joint Sealant:
 - a. Dow Corning Corp., Midland, MI www.dowcorning.com.
 - b. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
- 4. Expansion Joint Filler Material:
 - a. W R Meadows, Hampshire, IL www.wrmeadows.com.
- 5. Membrane Concrete Curing:
 - a. Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
 - b. L & M Construction Chemicals, Omaha, NE www.lmcc.com.
 - c. W R Meadows, Hampshire, IL www.wrmeadows.com.

2.2 SYSTEM

- A. Design Criteria:
 - Concrete:
 - a. Conform to requirements of ASTM C94/C94M unless specified otherwise:
 - b. Capacities:
 - 1) For testing purposes, following concrete strengths are required:
 - a) At 7 days: 70 percent minimum of twenty-eight (28) day strengths.
 - b) At 28 days: 100 percent minimum of twenty-eight (28) day strengths.
- B. Materials:
 - Aggregates:
 - a. Cement: Meet requirements of ASTM C33/C33M.
 - 2. Water: Clear, apparently clean, and potable.
 - 3. Admixtures And Miscellaneous:
 - a. Mineral:
 - 1) Fly Ash: Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.
 - b. Chemical:

- 517-9971
 - No admixture shall contain calcium chloride nor shall calcium chloride be used as an 1) admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
 - 2) Air Entraining Admixture:
 - Meet requirements of ASTM C260/C260M (USA Projects).
 - Meet requirements of CSA A23.1/A23.2 (Canadian Projects).
 - Type Two Acceptable Products:
 - MasterAir VR 10 (formally MB-VR), Master AE 90 (formally MB-AE) or MasterAir AE 400 (formally EverAir Plus) by BASF.
 - Air Mix 200 Series or AEA-92 Series by Euclid. (2)
 - Air Plus or Super Air Plus by Fritz-Pak. (3)
 - (4) Sika Air by Sika.
 - (5) Daravair or Darex Series AEA by W R Grace.
 - Equal as approved by Facilities Manager before use. See Section 01 6200.
 - Water Reducing Admixture: 3)
 - Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
 - b) Type Two Acceptable Products:
 - MasterPozzolith (formerly Pozzolith) Series by BASF.
 - (2) Eucon WR 75 or Eucon 91 by Euclid.
 - (3) FR-2 or FR-3 by Fritz-Pak.
 - (4) Plastocrete 160 by Sika.
 - (5) Daracem, WRDA, or MIRA Series by W R Grace.
 - Equal as approved by Facilities Manager before use. See Section 01 6200.
 - Water Reducing, Retarding Admixture:
 - Meet requirements of ASTM C494/C494M, Type D and contain no more than 0.05 percent chloride ions.
 - Type Two Acceptable Products:
 - MasterPozzolith (formerly Pozzolith) Series by BASF. (1)
 - (2) Eucon Retarder 75 by Euclid.
 - (3) FR-1 or Modified FR-1 by Fritz-Pak.
 - (4) Plastiment by Sika
 - (5) Daratard Series or Recover by W R Grace.
 - Equal as approved by Facilities Manager before use. See Section 01 6200.
 - 5) High Range Water Reducing Admixture (Superplasticizer):
 - Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
 - Type Two Acceptable Products: b)
 - MasterRheobuild 1000 (formerly Rheobuild 1000) or MasterGlenium (formerly Glenium) Series by BASF.
 - Eucon 37 or Eucon 537 by Euclid.
 - (3) Supercizer 1 through 7 by Fritz-Pak.
 - Sikament 300 by Sika. (4)
 - (5) Daracem or ADVA Series by W R Grace.
 - Equal as approved by Facilities Manager before use. See Section 01 6200.
 - Non-Chloride, Non-Corrosive Accelerating Admixture: 6)
 - Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
 - b) Type Two Acceptable Products:
 - MasterSet AC 534 (formerly Pozzolith NC 534) or MasterSet AC 122 (formerly Pozzolith122HE) or MasterSet FP 20 (formerly Pozzutec 20+) by BASF.
 - Accelguard 80 by Euclid.
 - Daraset, Polarset or Lubricon by W R Grace.
 - Equal as approved by Facilities Manager before use. See Section 01 6200.
 - Alkali-Silica Reactivity Inhibiting Admixture:
 - Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
 - Type Two Acceptable Products: b)

- (1) Eucon Integral ARC by Euclid.
- (2) RASIR by W R Grace.
- (3) Equal as approved by Facilities Manager before use. See Section 01 6200.

2.3 COMPONENTS

A. Concrete Forms:

- 1. Wood, metal, or plastic as arranged by Contractor:
 - a. Forming material shall be compatible with specified form release agents and with finish requirements for concrete to be left exposed or to receive a smooth rubbed finish.

2.4 MATERIALS

A. Site Materials:

- General:
 - a. Required where new sidewalks, curbs, gutters, or stairs where new compacted aggregate base and fill are included in Project.
 - b. Required under replaced sidewalk, curb, gutters where unstable aggregate base and subgrade needs to be replaced.
 - c. Required under where site grades are revised.
 - d. Remove and replace existing soft or unstable aggregate base and subgrade with compacted fill and aggregate base.
- 2. Fill:
 - a. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
 - b. Fill shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches (150 mm) diameter and ninety-five (95) percent minimum of fill shall be smaller than 1-1/2 inch (38 mm) in any direction.
- 3. Aggregate Base:
 - a. Road Base to conform to State DOT Specifications or 3/4 inch (19 mm) open graded gravel.

2.5 ACCESSORIES

A. Concrete Sealer:

- Description: Concrete sealer that protects new or existing exterior concrete from freeze/thaw cycles and deicing salts.
- 2. Design Criteria:
 - a. Penetrating water repellent silane concrete sealers are to be used.
 - b. Silane Based Sealers:
 - 1) Protects concrete from freeze/thaw cycles and deicing salts.
 - 2) Resists penetration of water and deicing salts.
 - 3) One hundred (100) percent silane active ingredient content.
 - 4) Penetrating sealer.
 - 5) Water repellant.
 - 6) Clear (colorless, non-yellowing). Surface appearance after application: unchanged.
- 3. Limitations:
 - If Low VOC product are required or desired, use only those products listed as 'Low VOC' in acceptable products below.
- 4. Type One Acceptable Products. See Section 01 6200 for definition of Categories:
 - a. Silane Based Sealers:
 - MasterProtect H 1000 by BASF, Cleveland, OH www.master-builders-solutions.basf.us.
 a) Low VOC.
 - Weather Worker J29A by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
 - 3) Baracade Silane 100 by Euclid, Cleveland, OH www.euclidchemical.com.

- a) Low VOC.
- 4) Sikagard 705L by Sika Corporation, Lyndhurst, NJ www.usa.sika.com.
 - a) Low VOC.
- 5) TK-590-100 by TK Products, Minnetonka, MN www.tkproducts.com.
- Equal product meeting design criteria requirements as approved by Facilities Manager before use. See Section 01 6200.

B. Membrane Concrete Curing:

- 1. Description: Dissipating membrane curing agent that cures freshly placed concrete.
- 2. Design Criteria:
 - a. VOC-compliant compound.
 - b. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
 - Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
- 3. Type One Acceptable Products:
 - a. Exterior Concrete:
 - 1) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
 - 2) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
 - 3) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
 - b. Equal as approved by Facilities Manager before use. See Section 01 6200.

C. Elastomeric Joint Sealant:

- 1. Expansion Joints:
 - a. Design Criteria:
 - 1) Meet following standard for sealants: ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
 - b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Dow Corning:
 - a) Primer: 1200 Prime Coat.
 - b) Sealant: 790 Silicone Building Sealant.
 - 2) Sika:
 - a) Primer: Sikasil Primer-2100.
 - b) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.

D. Expansion Joint Filler:

- 1. Material:
 - a. Design Criteria:
 - 1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
 - 2) 1/2 inch (12.7 mm) thick.
 - 3) Resilience:
 - a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
 - b. Type Two Acceptable Products:
 - 1) Sealtight Fibre Expansion Joint by W. R. Meadows.
 - 2) Equal as approved by Facilities Manager before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Concrete Forms:
 - a. Verify dimensions and spot elevations for locations of forms for concrete sidewalks, curbs, gutters, and stairs if included are correct before concrete is placed.
 - Notify Facilities Manager of incorrect dimensions or spot elevations in writing.

- 2) Do not place concrete until corrections are made and verified.
- 2. Elastomeric Joint Sealant:
 - a. Examine substrate surfaces and joint openings are ready to receive Work.
 - 1) Verify joint surfaces are clean and dry.
 - 2) Ensure concrete surfaces are fully cured.
 - b. Notify Facilities Manager of unsuitable conditions in writing:
 - 1) Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. General:

1. Remove water and debris from space to be placed.

B. Site Materials:

- 1. Before placing fill, aggregate base, or finish work, prepare existing subgrade as follows:
 - a. Finish grade to match existing grades.

C. Concrete Forms:

- General:
 - a. Assemble forms so forms are sufficiently tight to prevent leakage.
 - b. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition.

D. Concrete Mixing:

- General:
 - a. All concrete shall be machine mixed.
 - b. Re-tempering partly set concrete will not be permitted.
- 2. Cold Weather Concreting Procedures:
 - a. As per ACI 306R 'Standard Specification for Cold Weather Concreting'.
 - b. Protect soil supporting concrete footings from freezing under any circumstances.
- 3. Hot Weather Concreting Procedures:
 - a. As per ACI 305R 'Specification for Hot Weather Concreting'.

E. Concrete Sealer:

- 1. Surface Preparation:
 - a. Take necessary precautions to protect adjoining property.
 - b. Do not contaminate any body of water by direct application, cleaning of equipment or disposal of wastes.

2. Cleaning:

- a. Clean concrete surface of membrane curing and all dirt, mud spots, silt spots, loose material, vegetation, grease or oil spots, and other objectionable and foreign material including any spillage of any material that has adhered to concrete.
- b. Remove debris, sand, dirt, and dust from concrete surface.
- c. Power brooms, power blowers, air compressors, water flushing equipment, and blowers are acceptable equipment for cleaning concrete surface.
- d. Concrete surface is to be dry, clean and sound.

F. Elastomeric Joint Sealant:

- Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions.
- 2. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
- Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.

3.3 INSTALLATION

- A. Site Materials:
 - 1. Fill and Aggregate Base:
 - a. General:
 - 1) Do not place aggregate base material when subgrade is frozen or unstable.
 - 2) Uniformly spread aggregate base material with equipment except in limited or restricted areas where use of hand spreading is allowed.
 - 3) Remove all standing storm water.
 - b. Fill: Material shall be well-graded granular material with maximum size less than 3 inch (76 mm) and with not more than fifteen (15) percent passing No. 200 sieve.
 - c. Aggregate Base: Place 4 inches (100 mm) minimum of aggregate base, level, and compact.
 - d. Compaction:
 - 1) Testing and Inspection is not required for site materials.
 - 2) Fill:
 - a) Place in 8 inch (200 mm) maximum layers, dampen but do not soak, and mechanically tamp to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1557.
 - 3) Aggregate Base:
 - a) Remove or repair improperly prepared areas as directed by Facilities Manager.
 - b) Compact to ninety-five (95) percent minimum density as determined by ASTM D1557.
 - c) Proof roll aggregate base using 35 ton roller with tire pressure of 120 psi (827 kPa) or by using comparable industry standard method to determine sufficient stability of subgrade surface.

B. Placing Concrete:

- 1. General:
 - a. Place as soon after mixing as possible.
 - b. Deposit as nearly as possible in final position.
 - c. No concrete shall be deposited in water.
 - d. Placing of concrete shall be continuous until panel or section is complete.
 - e. Consolidate concrete.
 - f. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
 - g. Do not embed aluminum in concrete.
 - h. Do not use contaminated, deteriorated, or re-tempered concrete.
 - i. Avoid accumulation of hardened concrete.
- 2. Concrete Sidewalks, Curbs and Gutters:
 - a. Sidewalks, Exterior Stairs, And Landings:
 - 1) Slope with cross slope of 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) in direction of intended drainage.
 - 2) Slope away from building 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) minimum.
 - 3) Do not dust with cement.
 - 4) Concrete walks shall be screeded to bring surface to grades and lines as indicated. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.
- 3. Joints:
 - a. Control Joints:
 - 1) Form control joints with early-entry, dry-cut saws as soon as final trowel operations are complete and joints can be cut without raveling.
 - 2) Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than one inch (25 mm).
 - 3) Control joints to be hand tooled in sidewalks, curbs and gutters.
 - 4) Table One:

Concrete Control Joint On-Center Spacing (+/-)		
Sidewalks	4 feet to 6 feet	1.2 meters to 1.8 meters

		_	,
Curbs and Gutters	10 feet	3.0 meters	

- b. Elastomeric Joint Sealant:
 - Install so top of expansion joint material is 1/4 inch (6 mm) below finished surface of concrete.
 - 2) No expansion joint required between curbs and sidewalks parallel to curb.
 - 3) Provide expansion joints at ends of exterior site concrete elements that are perpendicular to and terminate at curbs, building foundations or other concrete elements (i.e. sidewalks, mow strips, aprons).
 - 4) Provide expansion joints between sidewalks that are parallel, and adjacent, to storage building or main building.
 - 5) Table Two:

Concrete Expansion Joint (Isolation) On-Center Spacing (+/-)			
Sidewalks, Curbs and Gutters	40 feet to 100 feet	12 meters to 30 meters	

- 6) Seal expansion joints as specified in Section 07 9213 for following areas:
 - a) Between entryway slabs and building foundations.
 - b) Between sidewalks and building foundations.
 - c) Within curbs and gutters.
- 7) Expansion joints are not required to be sealed for following areas:
 - a) Within sidewalks.

C. Finishing:

- 1. General:
 - a. Meet requirements of CSA A23.1/A23.2 for concrete finishing (Canadian Projects).
- 2. Concrete Sidewalks, Curbs and Gutters:
 - a. After completion of floating, performed immediately after screeding and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 - 1) Provide fine hair finish where grades are less than six (6) percent 1-1/4 inch (32 mm).
 - 2) Provide rough hair finish where grades exceed six (6) percent 1-1/4 inch (32 mm).
 - 3) Broom finish, by drawing broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide fine line texture acceptable to Facilities Manager. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
 - 4) On inclined slab surfaces, provide coarse, non-slip finish by scoring surface with stiff-bristled broom, perpendicular to line of traffic. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
 - 5) Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Facilities Manager.
 - 6) Round edges exposed to public view to 1/2 inch (13 mm) radius, including edges formed by expansion joints.
 - 7) Remove edger marks.

D. Tolerances:

- 1. General:
 - a. Maximum Variation Tolerances:
 - Table Three:

Maximum Variation Tolerances			
Thickness, standard	plus 3/8 inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm	
Plan, 0 - 20 feet	1/2 inch	12.7 mm	
Plan, 40 feet or greater	3/4 inch	19 mm	
Consecutive Steps, treads	1/4 inch	6 mm	
Consecutive Steps, risers	1/8 inch	3 mm	
Flight of Stairs, treads	1/4 inch in total run	6 mm in total run	

		01000011t 1, 10 a 2 1
Flight of Stairs, risers	1/8 inch in total height	3 mm in total height

E. Concrete Forms: Remove forms.

3.4 APPLICATION

A. Concrete Sealer:

- General:
 - a. Apply concrete sealer after surface preparation has been completed as per Manufacturer's recommendations.
 - b. Follow Manufacturer's ambient conditions for minimum and maximum application temperatures and application precautions when rain is expected.
 - c. Stir material thoroughly before and during application if required by Manufacturer.
 - d. Do not apply sealer if standing water is visible on concrete surface to be treated.
 - e. Apply even distribution of sealer.
 - f. Do NOT over apply. All product should penetrate substrate with no surface build-up. Any excess or puddles of material must be removed.
- 2. Apply Concrete Sealer:
 - a. Silane Based Sealers:
 - 1) Do not apply below 32 deg F (0 deg C).
 - 2) Apply at rate of about 1 gallon (3.785 liters) per 300 sq ft (27.8 sq meters) or as per Manufacturer's recommendations depending upon absorbency of concrete surface.
- 3. Allow Concrete Sealer to dry as per Manufacturer's recommendations:

B. Elastomeric Joint Sealant:

- General:
 - a. Apply silicone sealant in accordance with Manufacturer's instructions.
 - b. Do not use damaged or deteriorated materials.
 - c. Install primer and sealants in accordance with Manufacturer's instructions.
 - d. Install sealants immediately after joint preparation.
- 2. Sealant:
 - a. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
 - b. Fill joint opening to full and proper configuration.
 - c. Apply in continuous operation.
 - d. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
 - e. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

C. Membrane Concrete Curing:

- 1. Follow Manufacturer's written instructions for preparation, application rates, placement, and cleanup including:
 - a. Apply as soon as brooming or finishing of exterior concrete is complete.
 - b. Spraying application is required.
 - c. Do not dilute or thin product.
 - d. Do not apply when temperature of concrete is less than 40 deg F (4.4 deg C).
 - e. Apply uniformly without puddles or ponding.
 - f. Do not apply before bleed water has dissipated.
 - g. Do not apply over standing water.

3.5 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - 1. Not Required:

B. Non-Conforming Work: Correct any work found defective or not complying with contract document requirements at no additional cost to Owner.

3.6 CLEANING

- A. General:
 - 1. Concrete Sealer:
 - a. Clean drips and over spray while still wet.
- B. Waste Management:
 - 1. Follow Manufacturer's recommendations for approved disposal of product and containers.
 - a. Do not reuse empty containers.

3.7 PROTECTION

- A. Concrete:
 - 1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.
- B. Membrane Concrete Curing:
 - 1. Restrict foot or vehicle traffic as curing membrane dries as recommended be Manufacturer.

END OF SECTION

SECTION 05 0523

METAL FASTENING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of structural metal-to-metal, wood-to-metal, and wood-to-wood bolts used on Project.
 - 2. Requirements and standards for site welded metal-to-metal connections.
- B. Related Requirements:
 - 1. Performance of welding specified under Section concerned.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute / American Welding Society:
 - a. ANSI/AWS D1.1/D1.1M:2010, 'Structural Welding Code Steel'.
 - b. ANSI/AWS D1.3/D1.3M:2010, 'Structural Welding Code Sheet Steel'.
 - ASTM International:
 - a. ASTM A36/A36M-14, 'Standard Specification for Carbon Structural Steel'.
 - b. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength'.

1.3 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to the following:
 - Welders shall be certified 30 days minimum before beginning work on Project. If there is doubt as to proficiency of welder, Architect may require welder to take another test, at no expense to Owner. Certification shall be by Pittsburgh Laboratories or other authority approved by Architect.
- B. Certifications:
 - 1. Maintain welder's certifications on job-site.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Arc-Welding Electrodes: Type E70XX AWS Iron and Steel Arc-welding electrodes and meeting current AISC Specifications.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Welding shall meet requirements of ANSI / AWS D1.1 and D1.3.

END OF SECTION

Metal Fastening - 1 - 05 0523

SECTION 05 5215

STAINLESS STEEL HANDRAILS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install stainless steel pipe handrails as described in Contract Documents.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Anchoring sleeves in concrete for stainless steel pipe handrails.
- C. Related Requirements:
 - Section 03 3112: 'Cast-In-Place Sidewalks, Curbs and Gutters' for installation of anchoring sleeves cast into concrete.
 - 2. Section 05 0523: 'Metal Fastening' for quality of welding.

1.2 REFERENCES

A. Definitions:

- Non-shrink Grout: Structural grout used for filling voids between elements that is formulated with cement, fine aggregates and admixtures. Admixtures are used to provide expansive properties of the material during curing. This expansion counteracts the natural tendency of cement grouts to shrink during curing.
- 2. Peened: Nonslip textured gripping surface that is much easier to hold on to.
- Stainless Steel Alloys:
 - a. Type 304 (UNS S30400): Austenitic stainless steel with non-magnetic properties in annealed condition that provide good corrosion resistance to both chemical and atmospheric exposures, with high resistance to oxidations. Most common and widely used stainless steel.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C1107/C1107M-14, 'Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Show fabrication and installation of handrails and railings including floor plans, elevations, sections, details of components, and attachments to other elements of The Work.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Materials:
 - Handrails And Railings:
 - a. 1-1/2 inch (38 mm) outside diameter non-magnetic satin finish 16 gauge (0.063) (1.6002 mm) type 304 stainless tubing.
 - b. Sizes and configurations as indicated on Contract Drawings.

B. Fabrication:

- Preassemble railing systems in shop to greatest extent possible to minimize field splicing and assembly.
- 2. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- 3. Grind smooth welded joints and buff welds to same appearance as remainder of railing.
- 4. Form curves by bending pipe in jigs to produce uniform curvature for each configuration required. Maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- 5. Return pipe ends of wall mounted handrails into wall.
- 6. Welded Connections:
 - a. Fabricate railing system and handrail connections by welding.
 - b. Weld corners and seams continuously to comply with following:
 - 1) Use materials and methods that minimize distortion and develop of metals.
 - 2) At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
 - At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and so contours of welded surfaces match adjacent surfaces.

2.2 ACCESSORIES

- A. Rail Setting Grout:
 - Commercial non-shrink grout conforming to requirements of ASTM C1107, Type B or Type C.
 - 2. Type Two Acceptable Manufacturers:
 - a. Normal Construction Grout A by Bonsal American, Charlotte, NC www.bonsal.com.
 - b. Advantage 1107 Grout by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
 - c. NS Grout by Euclid Chemical Co, Cleveland, OH www.euclidchemical.com
 - 5 Star Special Grout 110 by Five Star Products Inc. Fairfield. CT www.fivestarproducts.com.
 - e. Duragrout by L&M Construction Chemicals Inc, Omaha, NE www.lmcc.com.
 - f. Sonneborn / BASF Building Systems, Shakopee, MN www.chemrex.com.
 - g. Tamms Grout 621 by TAMMS Industries, Mentor, OH www.tamms.com.
 - h. U S Spec MP Grout by U S Mix Products Co, Denver, CO www.usspec.com.
 - i. CG-86 Grout by W R Meadows, Hampshire, IL www.wrmeadows.com.
 - j. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Touch up field welds to match finished material.

END OF SECTION

SECTION 06 0573

PRESERVATIVE WOOD TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of wood preservative treatment where specified.
- B. Related Requirements:
 - 1. Section 06 1100:
 - a. Characteristics of wood to be pressure-treated.
 - b. Furnishing and installing of pressure-treated wood.
 - 2. Section 06 0573.93: 'Insect Protection Wood Treatment' for more aggressive wood treatment protection if needed to protect wood.:

1.2 REFERENCES

- A. Definitions:
 - Preservative-Treated Wood: Wood exposed to high levels of moisture or heat susceptible to
 decay by fungus and other organisms, and to insect attack. The damage caused by decay or
 insects can jeopardize the performance of the wood members so as to reduce the performance
 below that required. Preservative treatment requires pressure-treatment process to achieve
 depth of penetration of preservative into wood to verify that the wood will be resistant to decay
 and insects over time.
 - 2. Treated Wood: Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects, or marine bores.
- B. Reference Standards:
 - 1. American Wood Protection Association:
 - a. AWPA U1-12, 'Use Category System: User Specification For Treated Wood'.
 - 2. International Building Code (IBC) (2015 or latest approved edition by AHJ):
 - a. Chapter 23, 'Wood':
 - 1) Section 2300, 'Minimum Standards and Quality':
 - a) 2303.1. 'General':
 - (1) 2303.1.8, 'Preservative-Treated Wood'.
 - 2) Section 2400, 'General Construction Requirements':
 - a) 2304.11, 'Protection Against Decay and Termites':
 - (1) 2311.2, 'Wood Used Above Ground'.
 - (2) 2311.4, 'Wood In Contact With The Ground'.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Certificate: Certificate of pressure treatment showing compliance with specification requirements and including information required under IBC Section 2303.1.8.1, 'Identification'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

- 1. Type One Acceptable Manufacturers:
 - a. Arch Wood Protection Inc, Atlanta, GA www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Thomson, GA www.frtw.com.
 - c. Osmose Inc, Griffin, GA www.osmose.com.
 - d. U S Borax Inc. Valencia, CA www.borax.com/wood.
 - e. Viance LLC, Charlotte, NC www.treatedwood.com.
 - f. Equal as approved by Architect before bidding. See Section 01 6200.

3. Performance:

- 1. Framing lumber grade and species shall be as specified in Section 06 1100 for particular use.
- 2. Interior Wood In Contact With Concrete or Masonry:
 - a. Preservatives:
 - 1) Disodium octoborate tetrahydrate (DOT / SBX) meeting requirements of AWPA U1 and with retention of 0.25 lbs per cu ft (4 kg per cu meter).
 - 2) Zinc borate meeting requirements of AWPA U1 and with retention of 0.17 lbs per cu ft (2.7 kg per cu meter).
 - 3) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, Georgia, http://www.koppersperformancechemicals.com/ (0.25 lb/cu ft minimum retention).
 - 4) DURA-GUARD by Hoover Treated Wood Products, Thomson, GA www.frtw.com (.40 lb/cu ft minimum retention).
 - b. Lumber: Treat in accordance with AWPA U1.
- 3. Exterior Wood Continuously Exposed To Weather:
 - a. Preservatives: Waterborne preservatives meeting requirements of AWPA U1 with retention levels as required by AWPA U1 for specific application.
 - b. Lumber: Treat in accordance with AWPA U1.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 1011

WOOD FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.
- B. Related Requirements:
 - 1. Section 03 1511: 'Concrete Anchors and Inserts' for Quality of Anchors and Inserts.
 - 2. Section 05 0523: 'Metal Fastenings' for Quality of bolts used for Rough Carpentry.
 - 3. Furnishing and installing of other fasteners are specified in individual Sections where installed.

1.2 REFERENCES

- A. Reference Standards;
 - ASTM International:
 - a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
 - b. ASTM D3498-03(2011), 'Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems'.
 - c. ASTM F1667-17, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature on framing anchors and powder actuated fasteners.
 - 2. Shop Drawings:
 - a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
 - 1) Adjusted fastener spacing where using proposed fasteners and,
 - 2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
 - b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
 - c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Description:
 - 1. Nail Terminology:
 - a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

B. Materials:

- 1. Wood fastener list:
 - a. Provide VMR Suppliers with wood fastener list.
- Fasteners:
 - a. General:
 - Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
 - b. Nails:
 - 1) Meet requirements of ASTM F1667.
 - 2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
 - c. Wood Screws:
 - 1) SDS Screws:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of categories.
 - (1) SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
 - 2) All Other: Standard type and make for job requirements.
 - d. Powder-Actuated Fasteners:
 - 1) Type One Quality Standard: Hilti X-DNI 62P8.
 - 2) Manufacturers:
 - a) Hilti, Tulsa, OK www.us.hilti.com.
 - b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.
 - c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.
- 3. Adhesives:
 - a. Construction Mastics:
 - Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498.
 - 2) Use phenol-resorcinol type for use on pressure treated wood products.
- Framing Anchors:
 - Framing anchors and associated fasteners in contact with preservative hot dipped zinccoated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.
 - b. Type Two Acceptable Products:
 - 1) KC Metals Inc, San Jose, CA www.kcmetals.com.
 - 2) Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
 - 3) United Steel Products Co Inc (USP), Montgomery, MN www.uspconnectors.com.
 - 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 ERECTION

A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

B. Provide washers with bolt heads and with nuts bearing on wood.

END OF SECTION

SECTION 06 1100

WOOD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install wood framing and blocking as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Roof related blocking, wood nailers, and curbs.
 - 2. Wood panel product sheathing.
- C. Related Requirements:
 - 1. Section 06 0573: 'Preservative Wood Treatment' for quality of preservative wood treatment.
 - 2. Section 06 1636: 'Wood Panel Product Sheathing' for:
 - a. Pre-installation conference held jointly with Section 06 1100.
 - 3. Sections in Division 07: Roofing membranes for related blocking, wood nailers, and curbs.
 - 4. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts':
 - a. Pre-installation conference held jointly with Section 06 1100.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
 - a. Voluntary Product Standard:
 - 1) PS 20-15, 'American Softwood Lumber Standard'.
 - 2. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
 - a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference held jointly with Section 06 1636.
 - a. Schedule pre-installation conference immediately before beginning framing work.
 - b. In addition to agenda items specified in Section 01 3100, review following:
 - 1) Nails and nailing requirements.
 - 2) Connections.
 - 2. Participate in pre-installation conference held jointly with Section 08 4113.
 - Schedule pre-installation conference for one (1) week before scheduled installation of storefront system.
 - b. In addition to agenda items specified in Section 01 3100, review following:
 - 1) Rough opening requirements.

1.4 SUBMITTALS

- A. Informational Submittals:
 - Test And Evaluation Reports:
 - a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.

Wood Framing - 1 - 06 1100

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Protect lumber and sheathing and keep under cover in transit and at job site.
 - 2. Do not deliver material unduly long before it is required.
- B. Storage And Handling Requirements:
 - 1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
 - 2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Dimension Lumber:
 - Design Criteria:
 - a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
 - Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
 - Lumber 2 inches (50 mm) or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
 - d. Preservative Treated Plates / Sills:
 - 1) 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
 - 2) 2x6 (38 mm by 140 mm) And Wider: No. 2 or or MSR 1650f 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).
- B. Posts, Beams, And Timbers 5 Inches by 5 Inches (125 mm by 125 mm) And Larger:
 - 1. Design Criteria:
 - a. No. 1 or better Douglas Fir or Southern Pine.
- C. Lumber Ledgers:
 - 1. Design Criteria:
 - a. No. 2 Douglas Fir-Larch, or Southern Pine.
- D. See Contract Drawings for additional requirements.

2.2 ACCESSORIES

- A. Blocking:
 - 1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch (13 mm).
- B. Furring Strips:
 - 1. Utility or better.
- C. Sill Sealer:
 - 1. Closed-cell polyethylene foam, 1/4 inch (6 mm) thick by width of plate.

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PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

 Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill, and ledger plates, door and window subframes and bucks, etc.

B. Interface With Other Work:

- Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.
- Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.

C. Tolerances:

- 1. Walls:
 - a. 1/4 inch (6 mm) in 20 feet (6 meters), non-cumulative in length of wall.
 - b. 1/8 inch (3 mm) in 10 feet (3 meters) with 1/4 inch (6 mm) maximum in height of wall.
 - c. Distances between parallel walls shall be 1/4 inch (6 mm) maximum along length and height of wall.

D. Floors:

- 1. Place with crown side up.
- 2. Provide accurately fitted header and trimmer joists of same size as regular joists around floor openings, unless detailed otherwise, and support by steel joist hangers.
- 3. Double joists under partitions that parallel run of joists.

E. Walls:

- 1. Openings: Single, bearing stud supporting header and one adjacent (king) stud continuous between top and bottom plates, unless shown otherwise.
- 2. Corners And Partition Intersections: Triple studs.
- Top Plates In Bearing Partitions: Doubled or tripled and lapped. Stagger joints at least 48 inches (1 200 mm).
- 4. Stud Walls To Masonry. Use one of the following methods:
 - a. Connect with 1/2 inch (13 mm) machine bolts 6 inches (150 mm) from top, 6 inches (150 mm) from bottom, and 48 inches (1 200 mm) maximum on center. Use three bolts minimum in height of 6 foot (1 800 mm) or higher wall.
 - Secure wood to masonry using continuous 1/4 inch (6 mm) minimum bead of construction adhesive and powder actuated fasteners installed at 32 inches (800 mm) on center minimum.

Firestops:

- a. Horizontal or vertical concealed spaces in walls, light coves, soffits, drop ceilings, and other features over 10 feet (3 000 mm) in length or height, and at stairs, ceiling levels, floor levels, and other junctures of horizontal to vertical concealed spaces.
- b. Within concealed spaces of exterior wall finishes and exterior architectural elements, such as trims, cornices or projections, at maximum intervals of 20 feet (6 000 mm), length or height.

6. Sill Plates:

- a. Shear Walls And Bearing Walls:
 - 1) Provide specified anchor 12 inches (300 mm) maximum and 4 inches (100 mm) minimum from each end of each plate.
 - 2) Shear Walls: Fasten with anchor bolts embedded in concrete or with screw anchors.
 - 3) Bearing Walls: Fasten with anchor bolts embedded in concrete, or with screw anchors or expansion bolts in drilled holes.
- b. Non-Structural Walls: Fasten with powder actuated fasteners.

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- c. In addition to requirements of paragraphs 'a' and 'b' above, set sill plates of interior walls measuring less than 36 inches (900 mm) in length in solid bed of specified construction adhesive, except where sill sealer is used.
- d. Install specified seal sealer under sill plates of exterior walls of main building and of acoustically insulated interior walls.

7. Posts And Columns:

Unless shown otherwise, nail members of multiple member columns together with 16d at 6 inches (150 mm) on center from each side.

Beams And Girders:

- a. Built-Up Members:
 - 1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
 - 2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches (300 mm) on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches (300 mm) on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
- b. Pre-Fabricated Members:
 - 1) Solid glu-lam, LVL, LSL, or PSL members may be used in place of built-up 2x (38 mm) framing members. Size shall be same as built-up member.
 - 2) Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.
- c. Wood shims are not acceptable under ends.
- d. Do not notch framing members unless specifically shown in Drawing detail.

9. Nailing:

a. Stud to plate (coordinate with Contract Drawings):

2 by 4 inch nominal	38 by 89 mm	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	38 by 140 mm	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	38 by 184 mm	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	38 by 235 mm	End nail, five 16d OR toe nail, six 8d
1-3/4 by 5-1/2 inch LVL	44 by 140 mm LVL	End nail, three 16d OR toe nail, four 8d
1-3/4 by 7-1/4 inch LVL	44 by 184 mm LVL	End nail, four 16d OR toe nail, six 8d
1-3/4 by 9-1/4 inch LVL	44 by 235 mm LVL	End nail, five 16d OR toe nail, six 8d
1-3/4 by 11-1/4 inch LVL	44 by 286 mm LVL	End nail, six 16d OR toe nail eight 8d

- b. Top plates: Spiked together, 16d, 16 inches (400 mm) on center.
- c. Top plates: Laps, lap members 48 inches (1200 mm) minimum and nail with 16d nails 4 inches (100 mm) on center
- d. Top plates: Intersections, three 16d.
- e. Backing And Blocking: Three 8d, each end.
- f. Corner studs and angles: 16d, 16 inches (400 mm) on center.

F. Roof And Ceiling Framing:

- 1. Place with crown side up at 16 inches (400 mm) on center unless noted otherwise.
- 2. Install structural blocking and bridging as necessary and as described in Contract Documents.
- Special Requirements:
 - a. Roof And Ceiling Joists: Lap joists 4 inches (100 mm) minimum and secure with code approved framing anchors.
 - b. Roof Rafters And Outlookers:
 - 1) Cut level at wall plate and provide at least 2-1/2 inches (64 mm) bearing where applicable. Spike securely to plate with three 10d nails.
 - 2) Attach to trusses or other end supports with framing anchors described in Contract Documents.
 - Provide for bracing at bearing partitions.
- 4. Installation of Wood Trusses:
 - a. Handle, erect, and brace wood trusses in accordance with TPI / WTCA Booklet BCSI.

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- b. Do not install damaged or broken wood trusses. Replace wood trusses that are broken, damaged, or have had members cut out during course of construction.
- c. Provide construction bracing for trusses in accordance with TPI DSB-89.
- d. Provide continuous 2x4 horizontal web bracing as shown on truss shop drawings.
 - 1) Secure bracing to each truss with two 10d or 16d nails.
 - Lap splice bracing by placing bracing members side by side on common web member.
 Butt splices are not acceptable.
- e. Unless directed or shown otherwise, provide diagonal 2x4 bracing between trusses at each line of horizontal web bracing.
 - 1) This diagonal bracing shall be continuous and extend from junction of web and top chord of one truss to junction of web and bottom chord of different truss.
 - 2) Install bracing at approximately 45 degree angle. Bracing will extend over three trusses minimum or more as determined by height of trusses and 45 degree installation angle.
 - 3) Install brace on side of web opposite horizontal web bracing and nail to each web with two 10d or 16d nails.
 - 4) Install one brace every 20 feet (6.1 m) as measured from top of brace to top of next brace
- 5. Installation of Glue-Laminated Structural Units:
 - Install work in accordance with Fabricators instructions and Glue-Lam Erection Safety Practices.
 - b. Adequately support and brace work until tied into building structure to insure against collapse due to wind or other forces.
 - c. Maintain protection of beams until roofing has been installed.
- 6. Installation of Structural Composite Lumber:
 - a. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
 - b. Install permanent bracing and related components before application of loads to members.
- 7. Installation of wood Web Joists:
 - a. Handle, erect, and brace sheathing wood web joists in accordance with Manufacturer's instructions.
 - b. Do not install damaged or broken wood web joists.
 - c. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
 - d. Cut holes through webs at locations or of sizes shown on Drawings and as recommended by Manufacturer.
- 8. Secure headers and header backing to structure as described in Contract Documents.
- G. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers) for Wood Framing):
 - 1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
- H. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers) for Metal Framing:
 - 1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
 - 2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.
- I. Furring Strips:
 - 1. On Wood or Steel: Nail or screw as required to secure firmly.
 - a. Ceiling:
 - 1) Attach furring strips to the underside of structural elements with #8 wood screws, of length to penetrate wood framing 1 inch (25 mm) minimum.
 - 2. On Concrete or Masonry:
 - a. Back up furring strips on exterior walls or walls in contact with earth with 15 lb (6.8 kg) felt strip.
 - b. Nail at 12 inches (300 mm) on center maximum.

END OF SECTION

Wood Framing - 5 - 06 1100

SECTION 06 1636

WOOD PANEL PRODUCT SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Furnish and install wood panel product sheathing required for walls, and roofs as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 0000: 'General Requirements':
 - 2. Section 06 1100: 'Wood Framing' for:
 - a. Pre-installation conference held jointly with Section 06 1636.

1.2 REFERENCES

- A. Association Publications:
 - 1. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
 - a. Voluntary Product Standard DOC PS 1-09. 'Structural Plywood'.
 - b. Voluntary Product Standard DOC PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
 - 2. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.
 - a. Performance Rated Panels, 'Product Guide' (for products bearing the APA trademark) December 2011.
 - b. Voluntary Product Standard:
 - 1) PS 1-09. 'Structural Plywood'.
 - 2) PS 2-04. 'Performance Standard for Wood-Based Structural-Use Panels'.
 - c. PRP-108 'Performance Standards and Policies for Structural-Use Panels'.
 - 3. TECO, Cottage Grove, WI www.tecotested.com.
 - a. TECO PRP-133: ('Fire Rated Assemblies OSB substitution for plywood in UL fire-rated assemblies that specify plywood).
- B. Reference Standards:
 - 1. International Code Council (IBC) (2015 or latest AHJ approved edition):
 - a. IBC Chapter 17, 'Special Inspections And Tests'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in pre-installation conference as specified in Section 06 1100.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 06 1100, review following:
 - a. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control inspection required of this section.
- B. Scheduling:
 - 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing sheathing.

1.4 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

- a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - Testing Agency Inspection Reports of sheathing.

1.5 QUALITY ASSURANCE

517-9971

- A. Testing and Inspection:
 - 1. Owner will provide Testing and Inspection for inspection of sheathing:
 - a. Owner will employ testing agencies to perform inspection for sheathing as specified in Field Quality Control in Part 3 of this specification.
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.
 - b. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control.
 - 1) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Do not deliver material unduly long before it is required.
 - 2. Protect sheathing and keep under cover in transit and at job site.
- B. Storage And Handling Requirements:
 - 1. Store sheathing on level racks and keep free of ground.
 - 2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Performance:
 - 1. Design Criteria:
 - a. Meet requirements of PS 1, PS 2, or PRP-133 (TECO). Except where plywood is specifically indicated on Contract Drawings, oriented strand board (OSB) is acceptable.
- B. Sheathing:
 - Sheathing:
 - Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.
 - b. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.
 - c. Sheathing 23/32 inch (18.3 mm) thick and thicker used for single-layer subflooring shall be tongue and groove.
 - d. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
 - e. Minimum span ratings for given thicknesses shall be as follows:

Thickness	Span Rating
3/8 inch	24 / 0
7/16 inch nominal	24 / 16
15/32 inch actual	32 / 16
1/2 inch nominal	32 / 16

19/32 inch actual	40 / 20
5/8 inch nominal	40 / 20
23/32 inch actual	48 / 24
3/4 inch nominal	48 / 24

2.2 ACCESSORIES

A. Nails:

1. As indicated on Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

- 1. Top of nail heads shall be flush with sheathing surface.
- 2. Use of edge clips to provide spacing between sheathing panels is acceptable.

B. Wall Sheathing:

- 1. Spacing:
 - a. Provide 1/8 inch (3 mm) space between sheets at end and edge joints.
- 2. Edge Bearing And Blocking:
 - a. Panel edges shall bear on framing members and butt along their center lines.
 - Back block panel edges, which do not bear on framing members, with 2 inch nominal (45 mm) framing.
- Nail Spacing:
 - a. As indicated on Contract Drawings.
 - b. Place nails not less than 3/8 inch (9.5 mm) in from edge.
- 4. Thickness:
 - a. As indicated on Contract Drawings.
- Do not install any piece of wall sheathing with shortest dimension of less than 12 inches (300 mm).

C. Roof Sheathing:

- Placing:
 - a. Lay face grain at right angles to supports. Provide blocking for support if framing turns at roof overhang.
 - b. Provide 1/8 inch (3 mm) space between sheets at end and side joints.
 - c. Stagger panel end joints.
 - d. Sheathing shall be continuous of two spans minimum.
- 2. Edge Bearing and Blocking:
 - a. As indicated on Contract Drawings.
- 3. Nail Spacing:
 - a. As indicated on Contract Drawings.
 - b. Place nails at least 3/8 inch (9.5 mm) in from edge.
- Thickness:
 - a. As indicated on Contract Drawings.
- 5. Do not install any piece of roof sheathing with shortest dimension of less than 24 inches (600 mm) unless support is provided under all edges.

D. Floor Sheathing:

- Floor Sheathing: 1 Layer Subflooring (floors accessible to public).
 - a. Apply bead of glue to structural supports. Lay face grain / strength axis across supports and with panel continuous over two supports minimum.
 - b. Allow expansion gap of at least 1/2 inch (12.5 mm) at walls.

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- c. Tongue and Groove.
- d. Nail Spacing.
 - 1) As indicated on Contract Drawings.
- e. Thickness:
 - 1) As indicated on Contract Drawings.
- f. Do not install any piece of bottom layer floor sheathing with shortest dimension of less than 24 inches (600 mm).
- 2. Subflooring: 2 Layers Subflooring.
 - a. Bottom layer:
 - 1) Glue subflooring layers together along lines of structural supports.
 - 2) Leave 1/32 inch (1 mm) gap at side and end joints.
 - 3) Nail as per floor sheathing nailing requirements.
 - 4) Thickness:
 - a) 19/32 inch actual (15 mm) minimum thickness, except where specifically noted otherwise.
 - 5) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).
 - b. Top layer:
 - Stagger joints of second layer subflooring so they do not line up with joints of first layer subflooring, but do align with intermediate structural member (for example, align with field nailing of bottom subflooring layer).
 - 2) Glue subflooring layers together along lines of structural supports.
 - 3) Leave 1/32 inch (1 mm) gap at side and end joints.
 - 4) Nail at 6 inch (150 mm) centers on ends and 12 inch (300 mm) centers on intermediate structural members.
 - 5) Thickness:
 - a) 19/32 inch actual (15 mm) minimum thickness, except where specifically noted otherwise.
 - 6) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).

3.2 FIELD QUALITY CONTROL

- A. Field Inspections:
 - Sheathing:
 - a. General:
 - Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2) Quality Control is sole responsibility of Contractor as specified in Section 01 4523 'Testing And Inspection Services'.
 - b. For walls and roof areas where nail spacing is 4 inches (100 mm) and less on center, Inspector shall verify wood panel sheathing, grade, thickness and nominal size of framing members, adjoining panel edges, nail size and spacing, bolting and other fastening of other components.

3.3 PROTECTION

A. Protect roof sheathing from moisture until roofing is installed.

END OF SECTION

BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Furnish and install faced thermal and acoustic batt insulation as described in Contract Documents.
 - 2. Quality of insulation used in speaker enclosures.

1.2 REFERENCES

- A. Reference Standards:
 - ASTM International:
 - a. ASTM C665-12, 'Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - Insulation shall be manufactured and installed in compliance with International Building Code (IBC) or other applicable building codes.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 - 1. Insulation:
 - a. Type One Acceptable Manufacturers:
 - 1) Certainteed Corp, Valley Forge, PA www.certainteed.com.
 - 2) FiberTEK, Salt Lake City, UT www.fibertekinsulation.com.
 - 3) Guardian Fiberglass, Greer, SC www.guardianbp.com.
 - 4) Johns Manville, Denver, CO www.jm.com.
 - 5) Knauf Fiber Glass, Shelbyville, IN www.knaufusa.com.
 - 6) Owens-Corning Fiberglass Corporation, Toledo, OH www.owens-corning.com.
 - 7) Thermafiber, Wabash, IL www.thermafiber.com.
 - b. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:

- Thermal And Acoustic Insulation:
 - a. Faced Insulation:
 - 1) Kraft faced meeting requirements of ASTM C665, Type II, Class C.
 - 2) Foil faced meeting requirements of ASTM C665, Type III.
 - a) Class A: Exposed insulation.
 - b) Class B: Enclosed insulation.
 - b. Order insulation by 'R' factor rather than 'U' factor, rating, or thickness, either 16 or 24 inches (400 or 600 mm) wide according to framing spacing.
 - c. 'R' Factor Required:
 - 1) Acoustically Insulated Ceilings:

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- a) Enclosed Spaces: Fill framed cavity with batt of appropriate thickness.
 -) Unenclosed Spaces: R19.
- 2) Wood or Metal Wall Stud Framing:

R11	3-1/2 inches deep	89 mm deep
R19	5-1/2 inches deep	140 mm deep
R26	7-1/2 inches deep	191 mm deep

- 3) Thermally Insulated Ceilings / Roof:
 - a) R38 Standard: All Other.

2.2 ACCESSORIES SYSTEMS

- A. Attic Baffles:
 - 1. Design Criteria:
 - a. Baffle can be used with spray foam, loose-fill, fiberglass, or other insulation materials.
 - 2. Type One Acceptable Manufacturers:
 - a. SB24 SmartBaffle by DCI Products, Inc., Clifton Heights, PA www.dciproducts.com.
 - b. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

- 1. Leave no gaps in insulation envelope.
- 2. If two layers of insulation are used to attain required 'R' factor, only layer towards interior of building shall have facing.
- 3. Provide minimum clearance around recessed lighting fixtures as approved by local code.

B. In Framing:

- 1. Install insulation behind plumbing and wiring, around duct and vent line penetrations, and in similar places.
- 2. Fit ends of batts snug against top and bottom plates.
- 3. Fit batts snug against stud framing at each side.

C. Attic Baffles:

- 1. Install in accordance with manufacturer's instructions.
- 2. Install baffles between trusses and rafters at ventilation spaces to prevent insulation from blocking airflow from soffit.
- 3. Install baffles to prevent insulation from blocking ventilation airflow from soffit.

END OF SECTION

PLASTIC SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Furnish and install air infiltration barriers on exterior side of exterior wall sheathing as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - ASTM International:
 - a. ASTM E1677-11, 'Standard Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls'.

1.3 SUBMITTALS

- A. Informational Submittals:
 - Test And Evaluation Reports: Copy of test results showing performance characteristics.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty (if available from Manufacturer).

1.4 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
 - 1. Manufacturer Qualifications:
 - a. Provide single source for all products of system.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's limited warranty (if available on product).

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Styrofoam Weathermate Plus by Dow, Chemical Co, Midland, MI www.dow.com
 - b. Tyvek HomeWrap by Du Pont Company, Wilmington, DE www.dupont.com
 - c. DriShield Housewrap by Protecto Wrap, Denver, CO www.protectowrap.com
 - d. Fortress Pro by Raven Industries, Sioux Falls, SD www.ravenind.com
 - e. Typar Housewrap by Fiberweb, Old Hickory, TN www.typar.com.

B. Materials:

- 1. Air Retarder:
 - a. Non-woven.
 - b. Meet requirements of ASTM E1677, Type I.
- 2. Sealing Tape:
 - Type Two Acceptable Products:
 - 1) DuPont Contractor Tape.
 - 2) Fortress Pro Seaming Tape.
 - 3) Typar Construction Tape.
 - 4) 3M Contractor Sheathing Tape.
 - 5) Protecto Wrap BT25 XL Window Sealing Tape.
 - 6) As recommended in writing by Air Retarder Manufacturer.
- 3. Fasteners:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Metal Framing: Corrosion resistant, self-tapping screws and plastic washers or Tyvek Wrap Caps. Screws to be 3/4 inch (19 mm) long minimum and washers one inch (25 mm) diameter.
 - 2) Wood Framing: Corrosion resistant roofing nails with 3/4 inch (19 mm) long shank minimum and one inch (25 mm) diameter plastic head or Tyvek Wrap Caps. Staples are only allowed to aid in installation with permanent fasteners installed immediately thereafter.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install over exterior wall sheathing.
 - 1. Apply specified fasteners along stud lines at 18 inches (450 mm) maximum on center. Lap horizontal joints 6 inches (150 mm) minimum, with upper layer placed over lower layer. Lap vertical seams 16 or 24 inches (400 or 600 mm) as necessary to match framing spacing. Do not fasten at bottom where necessary to allow for installation of flashing behind air infiltration barrier at base of masonry veneer.
 - 2. Seal joints and penetrations through air infiltration barrier with specified tape before installation of finish material. Air infiltration barrier shall be air tight and free from holes, tears, and punctures.

END OF SECTION

Plastic Sheet Air Barriers - 2 - 07 2719

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install Asphalt Shingle Roofing System as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Miscellaneous flashing and sheet metal:
 - a. Drip metal.
 - b. Valley flashing.
 - c. Wall flashings.
 - 2. Pipe and flue roof jacks.
 - 3. Ridge vent.

C. Related Requirements:

- 1. Section 07 6310: 'Steep Slope Roof Flashing: Asphalt Tile' for furnishing of roof flashing, pipe jacks, drip edge and miscellaneous flashing and sheet metal.
- 2. Section 07 7226: 'Ridge Vent.

1.2 REFERENCES

A. Definitions:

- Flame Spread Classification: Categories as per ASTM E84/UL 723 or CAN/ULC-S102:
 - a. Class A: Highest fire-resistance rating for roofing as per ASTM E108. Indicated roofing is able to withstand severe exposure to fire exposure to fire originating from sources outside building.
 - b. Class B: Fire-resistance rating indicating roofing materials are able to withstand moderate exposure to fire originating from sources outside of building.
 - c. Class C: Fire-resistance rating indicating roofing materials are able to withstand light exposure to fire originating from sources outside of building.
- Wind Uplift: Wind-induced forces on roof system or components in roof system. Wind uplift
 generally includes negative pressure component caused by wind being deflected around and
 across surfaces of building and positive pressure component from air flow beneath roof deck.

B. Reference Standards:

- ASTM International:
 - a. ASTM D226-09/D226M-17, 'Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing'.
 - b. ASTM D1970/D1970M-17, 'Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection'.
 - c. ASTM D3018/D3018M-11, 'Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules'.
 - d. ASTM D3019/D3019M-17, 'Standard, 'Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered'.
 - e. ASTM D3161/D3161M-16a, 'Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)'.
 - f. ASTM D3462/D3462M-16, 'Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules'.
 - g. ASTM D4869/D4869M-16a, 'Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing'.

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- h. ASTM D7158/D7158M-17, 'Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)'.
- ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
- ASTM E108-17, 'Standard Test Methods for Fire Tests of Roof Coverings'.
- k. ASTM F1667-17, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.
- Canadian Standards Association (CSA Group):
 - a. CSA A123.1-05/A123.5-05 (R2015), 'Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules / Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules'.
- 3. International Building Code (IBC) (2015 Edition or latest edition adopted by AHJ):
 - a. Chapter 15, 'Roof Assemblies And Rooftop Structures'.
- 4. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2015 Edition).
- 5. Standards Council of Canada:
 - CAN/ULC-S102-10: 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.
 - CAN/ULC-S107-10(R2016), 'Methods of Fire Tests of Roof Coverings'.
- 6. Underwriters Laboratories (UL):
 - a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
 - b. UL 723, 'Tests for Safety Test for Surface Burning Characteristics of Building Materials' (10th Edition).
 - c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
 - d. UL 2218, 'Standard for Impact Resistance of Prepared Roof Covering Materials' (2nd Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference:
 - a. Roofing Installer's Foreman and those responsible for installation of roofing to be in attendance. Include Shingle Manufacturer's Representative if available.
 - 2. Schedule pre-installation conference at project site after completion of the installation of roof sheathing but before installation of any roofing system component.
 - 3. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review if Project is in high wind area.
 - b. Review if Project could have ice dam problems.
 - c. Review if Project could have fungus-algae resistance problems.
 - d. Review Shingle Manufacturer's ventilation requirements.
 - e. Review Shingle Manufacturer's Ambient Conditions requirements.
 - f. Review existing roof conditions including moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
 - g. Review proper valley, flashing, penetrations, secondary underlayment, sealants, and nailing requirements.
 - h. Review racking installation method is not permitted.
 - i. Review Cleaning and Disposal requirements.
 - j. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
 - k. Review safety issues.

B. Sequencing:

- Sequence of Roofing Materials (see valley flashing detail in Contract Drawings):
 - Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes of secondary underlayment.
 - b. Metal drip edge.
 - c. Secondary underlayment.
 - d. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley.

- e. Install one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
- f. Install formed valley metal over strip of primary underlayment.
- g. Apply 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).
- h. Primary underlayment.
- i. Asphalt shingles.
- j. Counter flashings over step flashing.
- Coordinate seguencing of products furnished in Section 07 7226: 'Ridge Vents'.

1.4 SUBMITTALS

- A. Action Submittals:
 - Product Data:
 - a. Color and style selection.
 - 2. Samples:
 - a. Full size shingle.
- B. Informational Submittals:
 - Certificates:
 - a. Installers:
 - Provide current Certification for completion of certified training from Shingle Manufacturer.
 - 2) Installer's signed certificate stating roofing system complies with Contract Documents performance requirements and work only performed by trained and authorized personnel in those procedures.
 - 2. Tests And Evaluation Reports:
 - 3. Reports:
 - a. Manufacturer's test reports.
 - b. Wind speed coverage for warranted wind speed.
 - c. High wind reports and approvals if required by AHJ.
 - 4. Manufacturers' Instructions:
 - a. Shingle Manufacturer's installation instructions and details for installation of secondary underlayment at penetrations, dormers, eaves, rakes, etc, to fit environmental conditions at Project.
 - 5. Special Procedure Submittals:
 - a. Contact Owner's Representative (FM Group or Project Manager) for following information:
 - 1) Installer to include following mandatory information to be added to 'Roofing Manufacturer System Warranty' submitted with Closing Documents.
 - a) Name of Owner (name of FM Group) Sandy FM Group
 - b) Mailing Address (FM office address) 625 East 8400 South, Ste. A, Sandy, UT
 - c) Building Property ID (unique 7 digit identifier) 517-9971
 - d) Project site address: 10375 South Leilani Dr., Sandy, UT
 - e) Roof Completion Date
 - f) Any addition data required from Manufacturer.
 - 2) Installer to include following mandatory information to be added to 'Roof Installer Workmanship Warranty' submitted with Closing Documents:
 - a) Name of Owner (name of FM Group) Sandy FM Group
 - b) Mailing Address (FM office address) 625 East 8400 South, Ste. A, Sandy, UT
 - c) Building Property ID (unique 7 digit identifier) 517-9971
 - d) Project site address: 10375 South Leilani Dr., Sandy, UT
 - e) Roof Completion Date
 - f) Any addition data required from Manufacturer.
 - 6. Qualification Statement:
 - a. Installer:
 - 1) Asphalt Shingles:
 - a) Provide Qualification documentation.
- C. Closeout Submittals:

- 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Asphalt Shingles:
 - a) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
 - Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.
 - Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature.
 - b) Color selections.
 - c) Test and evaluation reports.
 - 2) Roofing Inspection Documentation:
 - a) Include copy of roof inspection report.
 - 3) Certificate: Installer statement of compliance for performance requirements.
 - 4) Certificate: Installer completion of certified training.
 - 5) Test And Evaluation Report: UL fire-resistance rating test report.
 - 6) Test And Evaluation Report: NFPA 101 Class A approval.
 - 7) Test And Evaluation Report: Wind resistance requirements required.
- D. Maintenance Material Submittals:
 - Extra Stock Materials:
 - a. Provide one (1) square minimum of bundled shingles.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Building Codes:
 - a. Meet requirements for NFPA 101 Class A roof assembly.
 - b. Roof system will meet requirements of all federal, state, and local codes having jurisdiction.
 - 2. Fall Protection: Meet requirement of fall protection as required by federal, state, and local codes having jurisdiction.
 - 3. Fire Characteristics:
 - a. Provide shingles and related roofing materials with fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency:
 - 1) Exterior Fire-Test Exposure: Class A; UL 790, CAN/ULC-S102, or ASTM E108, for application and roof slopes indicated.
 - Materials shall be identified with appropriate markings of applicable testing agency.
 - 4. Impact Resistance:
 - a. Meet UL 2218 impact resistant testing.
 - b. Meet UL 2218 Class 4 impact resistant rating for hail.
 - 5. Wind Resistance:
 - a. Meet ASTM D3161/D3161M for wind resistance.
 - 1) Installation shall comply with IBC Table 1507.2.7, 'Attachment'.
 - 6. Wind Speed:
 - a. As required to meet local codes having jurisdiction.
 - 7. Wind Uplift Resistance:
 - Meet UL 580 wind uplift of roof assemblies.
 - Meet UL 1897 uplift test for roof covering systems.
 - c. Meet ASTM D7158/D7158M for wind resistance for uplift force/uplift resistance.
- B. Qualifications:
 - Manufacturer:
 - a. Asphalt Shingles:

Asphalt shingles are required to be produced under quality control program administered by inspection agency currently accredited by ICBO ES or recognized by National Evaluation Service, Inc. Quality control manual developed in consultation with approved agency, and complying with ICBO ES Acceptance Criteria for Quality Control Manuals (AC10), must be submitted.

b. Underlayment:

- 1) Underlayment is required to be manufactured under approved quality control program with inspections by inspection agency accredited by International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.
- Quality documentation complying with ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for roof underlayment.
- 2. Roof Installer Foreman Qualifications:
 - a. Requirements of Section 01 4301 applies but not limited to the following:
 - 1) Provide documentation if requested by Architect.
 - a) Approved and authorized by Roofing Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's warranty before bid.
 - b) Completed Shingle Manufacturer's certified trained.
 - c) Have thorough knowledge of installing asphalt shingle roofing and have minimum of five (5) years roofing experience.
 - d) Current license for the city, county, and state where project is located and license for specific type of roofing work to be performed.
 - e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
 - f) Flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.
- Roof Installer:
 - a. Provide 'Roof Installer Workmanship Warranty' as specified in Warranty in Part 1 of this specification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Make no deliveries to job site until installation is about to commence, or until approved storage area is provided.
 - 2. Deliver products job site in Manufacturer's original unopened containers or wrappings with labels intact and legible bearing all seals and approvals.
 - 3. Deliver materials in sufficient quantities to allow continuity of work.
 - 4. Remove any material not approved from job site.
- B. Storage And Handling Requirements:
 - 1. Storage Requirements:
 - a. Follow Manufacturer's instructions and precautions for storage and protection of materials.
 - b. Protect roof materials from physical damage, moisture, soiling, and other sources in a clean, dry, protected location.
 - c. Stacking:
 - 1) Shingles: Bundles should be stacked flat.
 - 2) Underlayment:
 - a) Do not double-stack pallets.
 - b) Stack rolls upright until installation.
 - d. Temperature:
 - 1) Shingles:
 - a) Store in covered ventilated area at maximum temperature of 110 deg F (43 deg C).
 - b) Use extra care in handling shingles when temperature is below 40 deg F (4.4 deg C).
 - Underlayment: Store in area with temperature between 40 deg F and 100 deg F (4.4 deg C and 38 deg C).
 - e. Unacceptable Material:
 - Remove from job site materials that are determined to be damaged by Architect or by Roofing Manufacturer and replace at no additional cost to Owner.

- 2. Handling Requirements:
 - a. Handle rolled goods to prevent damage to edge or ends.
- 3. Roof Top Loading:
 - a. Lay shingle bundles flat.
 - b. Do not bend over ridge.

1.7 FIELD CONDITIONS

A. Ambient Conditions:

- General:
 - Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
- 2. Shingles:
 - Do not install shingles at lower temperatures than allowed by Shingle Manufacturer for application.
- 3. Underlayment:
 - a. Install self-adhering sheet underlayment within range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

- A. Special Warranty:
 - 1. Shingle Manufacturer's special forty (40) year minimum labor and material warranty written for VMR program, including but not limited to:
 - a. CertainTeed:
 - First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship.
 Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - b. GAF:
 - First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship.
 Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - c. Malarkey (Alaska or Canada projects only):
 - First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship.
 Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - d. Owens Corning:
 - 1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship.

 Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - 2. Standard Wind Areas:
 - Roofing system will resist blow-offs in winds up to 110 mph (177 kph) for ten (10) years when installed as specified below.
 - b. Meet requirements of ASTM D3161/D3161M UL Class D.
 - 3. Roof Installer Workmanship Warranty:
 - a. Provide ten (10) year workmanship warranty on roofing system and related components, including flashings, and responsible for all repairs to roofing system and related components due to roof installer's own negligence or faulty workmanship:
 - 1) In the event that, during ten (10) year period following installation, Roof Installer defaults or fails to fulfill its obligation in relation to workmanship warranty as specified in Manufacturer's Agreement, Manufacturer will assume that obligation for remainder of ten (10) year period following original installation and Owner shall have no obligation to make or pay for repairs to or materials for roofing system that are necessary due to Roof Installer's negligence or faulty installation during that period.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:

- Manufacturer Contact List:
 - a. CertainTeed Roofing Products, Valley Forge, PA www.certainteed.com.
 - 1) Contact Information: Wendy Fox, (800) 404-9880 wfox@dataworksintl.com.
 - b. GAF Materials Corp., Wayne, NJ www.gaf.com.
 - 1) Contact Information: John Arellano (office) (210) 896-1041 (fax) (210) 259-8050.
 - c. Malarkey Roofing Products, Portland OR:
 - 1) Contact Information: Joe Russo (425) 418-3456 Joe.Malarkey@outlook.com.
 - d. Owens Corning, Toledo, OH www.ownscorning.com.
 - Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under LDS Church contract. Request shingles through local distribution. Any distribution questions, contact Area Sales Manager.
 - 2) For all other questions, Contact: Sam Baroudi (419) 248-7754 sam.baroudi@owenscorning.com. or Robert Hill (801) 553-2417 Robert.Hill@owenscorning.com.

B. Components:

- 1. Shingles And Underlayment:
 - a. Fiberglass mat shingles meeting or exceeding requirements of:
 - UL Class A Fire Resistance.
 - 2) ASTM D3018/D3018M, Type I (self sealing).
 - 3) Standard Wind Areas: ASTM D3161/D3161M UL Class D.
 - 4) ASTM E108 Class A.
 - 5) CSA A123.1/A123.5 (Canada).
 - 6) ASTM D3462/D3462M where required by local codes.
 - 7) Impact Resistant Shingles: Meet requirements of UL 2218 Class 4 Impact, ASTM E108 Class A Fire Resistance, ASTM D3161/D3161M Class F Wind, ASTM D7158/D7158M Class H Wind, ASTM D3018/D3018M Type 1, ASTM D3462/D3462M, and UL 790 Class A Fire Resistance.
 - 8) Secondary Underlayment: Meet requirements of ASTM D1970/D1970M and UL 790 Class A Fire Resistance.
 - 9) Primary (Synthetic) Underlayment: Meet requirements of ASTM D226/D226M and ASTM D4869/D4869M (physical properties only) or ASTM D1970/D1970M and ASTM E108 Class A Fire.
 - 10) Color to match existing roofing.
 - b. Category One VMR Products And Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1) CertainTeed:
 - a) Shingles:
 - (1) Standard Wind: Hatteras / Landmark Premium.
 - (2) Impact Resistant: Landmark IR.
 - (3) Hip And Ridge Shingles: Shadow Ridge or Laminate Accessory for shingle used.
 - b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Diamond Deck.
 - c) Secondary Underlayment Under Shingles:
 - (1) WinterGuard Granular.

or

(2) WinterGuard Sand.

or

- (3) WinterGuard High Tack/High Temperature.
- d) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
- 2) GAF:

- a) Shingles:
 - Standard Wind: Timberline Ultra HD.
 - (2) Impact Resistant: Timberline ArmorShield II.
 - (3) Hip And Ridge Shingles: TimberTex or Ridglass.
- b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Tiger Paw.
- c) Secondary Underlayment Under Shingles:
 - (1) Weatherwatch.

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- StormGuard.
- d) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
- 3) Malarkey (Alaska or Canada projects):
 - a) Shingles:
 - (1) Standard Wind: Polymer Modified SBS Legacy.
 - (3) Impact Resistant: Polymer Modified SBS Legacy.
 - (4) Hip And Ridge Shingles: Modified SBS Hip and Ridge Strips #225 10 inches (254 mm) or #227 12 inches (305 mm).
 - b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Secure Start #1030.
 - (2) Polymer Modified SBS Underlayment: Right Start UDL.
 - c) Secondary Underlayment Under Shingles:
 - (1) Arctic Seal Self-Adhering underlayment #401.
 - Secondary Underlayment Under Shingles over Unheated Buildings:
 - Not required over unheated buildings such as Storage Shed and Stake Pavilions.
- 4) Owens Corning:
 - a) Note:
 - (1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under LDS Church contract. Request shingles through local distribution.
 - (2) Any questions, contact Manufactures Area Sales Manager.
 - b) Shingles:
 - Standard Wind: Duration Premium shingles.
 - (2) Impact Resistant: Duration Storm Impact-Resistant Shingles with Weather-Guard.
 - (3) Hip And Ridge Shingles: DecoRidge Hip & Ridge.
 - c) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Deck Defense High Performance Roof Underlayment.
 - d) Secondary Underlayment Under Shingles:
 - (1) Weatherlock G Granulated Self-Sealing Ice & Water Barrier.
 - (2) Weatherlock Specialty Tile & Metal for High Temperature.
 - (3) Weatherlock Cold Climate for cold weather adhesion and flexibility.
 - e) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

2.2 ACCESSORIES

- A. Elastomeric Roofing Sealant:
 - 1. Design Criteria:
 - Meet requirements of ASTM D3019/D3019M.
 - b. Non-asphalt roofing cement (not permitted).
 - c. Elastomeric.
 - d. Cold temperature pliability.

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- e. Compatible with roof penetration boots.
- 2. Category Four Products And Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. Flintbond SBS Modified Bitumen Caulk by CertainTeed.

B. Fasteners:

- 1. Primary Underlayment:
 - a. Corrosion resistant roofing nails with one inch (25 mm) diameter head and 3/4 inch (19 mm) long shank minimum.
 - If shingles applied as underlayment is laid, use metal or plastic head Simplex roofing nails.
 - 2) If shingles not applied as underlayment is laid, use plastic head only.
 - Staples not permitted.

2. Shingles:

- a. Design Criteria:
 - 1) Meet following requirements for nails:
 - a) Comply with ASTM F1667, Type I, Style 20-Roofing Nails.
 - b) Eleven gauge galvanized steel or equivalent corrosion-resistant roofing nail.
 - c) Nail head sizes: 3/8 inch (9.5 mm) nominal diameter.
 - d) Sufficient length to penetrate through roof sheathing 1/4 inch (6 mm) or 3/4 inch (19 mm) minimum into solid wood decking.
 - e) Hot-dipped galvanized or electroplated fasteners comply with requirements of ASTM A153, Class D.
 - f) Stainless-steel fasteners meet requirements of Type 304 (UNS S30400) or Type 316 (UNS S31600).

b. General:

- 1) Hot-dipped galvanized, electroplated non-corrosive gun-driver nails, or stainless-steel fasteners may be used.
- 2) Fasteners within 15 miles (24.1 km) of coastal areas (oceanside) applications must use hot-dipped galvanized or stainless steel.
- All exposed fasteners (including ridge shingles) must use hot-dipped galvanized or stainless steel.
- 4) Staples not permitted:
 - a) Architect/Roof Consultant may approve in writing, staple gun that installs exposed fasteners with staples.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. VMR Manufacture's Approved Roofing Installers: See Section 01 4301.
 - 1. Utah Area:
 - a. Approved Installers:
 - 1) CertainTeed:
 - American Roofing Co. (AMCO), Salt Lake City, UT Contact: Keith J Yorgason (801) 269-1276.
 - b) Far West Roofing, Bluffdale, UT Contact Douglas Cooper (801) 253-7799.
 - c) Heritage Roofing, Bluffdale, UT Contact: Russ or Jim (801) 576-8447.
 - d) Island Heights Construction Inc., Logan, UT Contact: Alan Ringer (435) 753-7403.
 - e) JTS Roofing Inc., Ogden, UT Contact: Todd Shupe (801) 627-6450.
 - f) Kendrick Bros Roofing Inc., Oaden, UT Contact: Greg Kendricki (801) 430-6060.
 - g) Mountain Peak Builders, Inc., Logan, UT Contact: Zane Rust (435) 232-1367.
 - h) North Face Roofing, Inc., Park City, UT Craig Peters (801) 455-8492.
 - i) Perkes Roofing, Ogden, UT Contact: Jon Bertagnolli (801) 430-4489.
 - j) Redd Roofing Co., Ogden, UT Lance Redd (801) 621-1363.
 - k) Skyline Roofing, Inc. Adam Stout, LaVerkin, UT (435) 635-3172.
 - I) Stout Roofing Inc., St George, UT Contact: Kelly Casey (435) 635-4288.
 - m) Stuart Roofing, Ogden, UT, Forest Stuart (801) 394 1923.

- n) VIP Roofing, Centerville, UT Contact: Max Ker (801) 631-6182.
- o) Warburton's Inc., Pleasant Grove, UT Contact: Greg Warburton (801) 785-9500.
- p) White Roofing Co., Nephi, UT Contact: Shannon White (435) 623-0241.
- 2) GAF:
 - a) American Roofing Co. (AMCO), Salt Lake City, UT Contact: Keith Yorgason (801 269-1276.
 - b) Aspen Roofing, Salt Lake City, UT Contact: Jon Brady (801) 483-1660.
 - c) Capital Roofing Service, Inc., Sandy, UT Contact: Paul Hitzman (801) 562-5568.
 - d) Fortress Roofing, Murray, UT Contact: Adam Cordon (801) 509-8625.
 - e) Knockout Roofing, Riverton, UT Contact Jared Gran (801) 604-4090.
 - f) Lifetime Roofing, West Point, UT Parker Cornably (801) 200-7426.
 - g) Parrish Construction, American Fork, UT Contact: Tyler Parrish (801) 787-3633.
 - h) RSW Plus, Nephi, UT Contact: Rick White (435) 623-1719.
 - i) Skyline Roofing Inc., La Verkin, UT Contact: Adam Stout (435) 635-3172.
 - j) Wesley Green Roofing, UT Contact: Scott Horsepool (801) 486-3411.
- 3) Owens-Corning:
 - a) American Roofing Co. (AMCO), Salt Lake City, UT Contact: Keith J Yorgason (801) 269-1276.

3.2 EXAMINATION

- A. Verification Of Conditions:
 - Examine deck to determine if it is satisfactory for installation of roofing system. Conditions
 include, but are not limited to, moisture on deck, protruding deck fasteners, specified gaps
 between sheathing, and other items affecting issuance of roofing warranty.
 - a. Report unsatisfactory conditions in writing to Architect.
 - b. Commencement of Work by installer is considered acceptance of substrate.
 - 2. Verify existing soffit and ridge vents meet ventilation code requirements.
 - a. Report inadequate ventilation conditions with recommendations in writing to Architect.

3.3 PREPARATION

- A. Protection Of In-Place Conditions:
 - Install only as much roofing as can be made weathertight each day, including flashing and detail work.
- B. Surface Preparation:
 - 1. Clean roof deck:
 - a. Remove dirt, protruding nails, shingle nails, and debris, before installation of underlayment.
 - Roof deck must be dry to help prevent buckling of deck, which can result in deck movement and damage to primary underlayment.
 - 3. Following Manufacturer's recommendations for placing materials on roof.
 - a. Prevent material from sliding off roof.

3.4 INSTALLATION

- A. General:
 - 1. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.
- B. Sequence of Roofing Materials as shown and noted on Contract Drawings:
 - 1. 12 inch strip Secondary Underlayment at Eave.
 - Metal Drip Edge.
 - 3. General Secondary Underlayment.
 - 4. Valley Secondary Underlayment (8' 6" (2.62 m) wide strip of Secondary Underlayment (3 strips) in Valleys applied over sheathing).

- Valley Secondary Underlayment (36 inch (915 mm) wide Primary Underlayment under Valley Metal).
- 6. Valley Metal (24 inch (610 mm) wide valley metal 10 ft (3.05 m) lengths).
- 7. 12 inch strip of Secondary Underlayment over nailed edges (of Valley Metal).
- 8. General Primary Underlayment.
- Asphalt Shingles, Step Flashings.
- 10. Counter Flashing.

C. Underlayment:

- 1. General:
 - a. Temporary Roof:
 - 1) Do not use permanent underlayment installation as temporary roof.
 - 2) If temporary roof is used, remove completely before installation of permanent underlayment.
 - Follow Shingle Manufacturer's recommendations for installation of primary and secondary underlayment, particularly at eaves, rakes, and penetrations, unless specified installation procedures and Contract Drawing details are more stringent.
 - c. Avoid scuffing underlayment that can compromise surface and cause leaking. If scuffing occurs, following Manufacturer's recommendation for repair.
 - d. Staples are not permitted.
 - e. Weather conditions:
 - 1) Do not leave underlayment exposed to weather more than thirty (30) days after beginning of underlayment installation even if Manufacture allows longer period of time.
 - If underlayment is exposed for more than thirty (30) days after beginning of underlayment installation, treat as temporary roof under first paragraph above.
 - 3) If moisture is deposited on exposed underlayment, obtain written approval from Shingle Manufacturer's Representative before installing shingles.
 - f. Install valley secondary underlayment, valley primary underlayment, and valley metal after installation of general secondary underlayment, but before installation of general primary underlayment.
- 2. Primary Underlayment:
 - a. Apply 48 inch (1 200 mm) wide courses over complete deck, including areas covered with secondary underlayment unless specified otherwise.
 - 1) Overlap underlayment before fastening.
 - 2) Maintain end laps of 6 inch (150 mm) and side laps of 3 inch (76 mm).
 - 3) Stop primary underlayment between 3 and 6 inches (75 and 150 mm) of inside edge of strip of secondary underlayment installed over edge of formed valley metal.
 - b. Nailing Synthetic Underlayment:
 - 1) Use low-profile plastic or steel cap corrosion resistant nails with 1 inch (25 mm) diameter heads to fasten underlayment in place. (Fastening underlayment without caps is not permitted).
 - 2) Nails must be driven properly. Improperly driven fasteners such as over-driving, underdriving and nails driven at an angle are not permitted.
 - 3) Fasteners should be long enough to penetrate at least 3/4 inch (19 mm) into roof sheathing. Fasteners must be lie flush to roof deck at 90 degree angle to roof deck and tight with underlayment.
 - 4) Do not nail through metal flashing, except drip edge, when installing primary underlayment.
 - 5) Follow Shingle Manufacturer's installation instructions for following:
 - Securing underlayment to roof deck adjusting for roof slope nailing requirements.
 - b) Side lap, end lap, and overlapping nailing requirements.
 - c) Rake and eave nailing requirements.
 - d) High wind condition nailing requirements.
 - e) Sealants recommendations.
- 3. Secondary Underlayment:
 - a. Under Shingles:
 - 1) Lap end joints 6 inches (150 mm) and side joints 3 inch (76 mm) minimum.
 - 2) Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes before installing drip edge.

- 3) Apply two (2) 36 inch (900 mm) wide courses along eaves and rakes as described in Contract Documents with first course overlapping drip edge and 12 inches (300 mm) wide previously applied strip.
- 4. Valley Underlayment:
 - a. Apply three (3) continuous 36 inch (900 mm) wide sheets of secondary underlayment in valley lapped to provide 102 inch (2 590 mm) wide covered area centered over valley.
 - b. Apply one (1) continuous 36 inch (300 mm) wide strip of primary underlayment atop secondary underlayment and centered over valley.
 - c. Install formed valley metal over strip of primary underlayment.
 - 1) Nail top of each section and lap 8 inches (200 mm) in direction of flow.
 - 2) Seal laps with continuous bead of elastomeric roofing sealant.
 - 3) Secure edges of valley metal with fasteners spaced at 12 inches (300 mm) maximum on center and approximately 1/2 inch (13 mm) in from edge of metal.
 - Install 12 inches (300 mm) wide strips of secondary underlayment lapping nailed edge of formed valley metal 3 inches (75 mm).

D. Shingles:

- 1. Before installing shingles, inspect underlayment and metal installation with Architect and Owner. Correct improperly installed and damaged material before beginning shingle installation.
- 2. Racking installation method is not permitted by Owner and will be considered non-conforming work.
- 3. Starter shingles:
 - a. Manufacturer's starter shingles are required for Shingle Warranty.
 - b. Install shingles at eve and rakes in accordance with Shingle Manufacturer's instructions.
 - Cut shingles in accordance with Shingle Manufacturer's instructions, or use approved starter course.
 - d. Nail to eave granule side up in continuous mastic bed with cut edge down-slope and edge overhanging eave 3/8 inch (9 mm) so sealing tabs are at edge of eave.
 - e. Install shingles with maximum exposure recommended by Shingle Manufacturer.
 - Lay first course directly over starter strip with ends flush with starter strip at eaves and so joints in starter strip are offset 4 inches (100 mm) minimum from joints in first course.
- 4. Lay shingles so end joints are offset in accordance with Shingle Manufacturer's installation procedures.
- Insure alignment by snapping chalk line at least each fifth course to control horizontal and vertical alignment.
- 6. Run courses true to line with end joints properly placed. Leave shingles flat without wave and properly placed.
- 7. Hip and ridge shingles:
 - a. Manufacturer's hip and ridge shingles are required for Shingle Warranty.
 - Install specified hip and ridge shingles in accordance with Shingle Manufacturer's instructions.
 - c. Run ridge shingles as directed by Architect.
- 8. Nailing:
 - a. General:
 - 1) Six (6) Nail Pattern as recommended by Shingle Manufacturer for Shingle Warranty in each shingle.
 - 2) Place in relation to top edge of shingle as required by Shingle Manufacturer.
 - 3) Place nails one inch (25 mm) from each end of shingle and remainder evenly spaced between.
 - 4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
 - b. Nailing guns:
 - Nails must be driven properly. Improperly driven fasteners such as over-driving, underdriving and nails driven at an angle are not permitted.
 - Adjust nail gun pressure for nailing flush and tight to deck without cutting shingle surface.
 - Drive nails perpendicular to shingle surface so nail head is flat against shingle.
 - 4) Should any nail fail to penetrate sheathing by 1/4 inch (6 mm) minimum, drive additional nail nearby.
- 9. Hand-Sealing:

- a. If ambient temperature or exposure to sun will not be sufficient to secure adhesive strip to under-lying shingle within one week, hand seal shingles with elastomeric roofing sealant.
- 10. Over valley metal:
 - a. Do not drive nails through valley metal.
 - b. Run chalk line so valley metal will be exposed 6 inches (150 mm) wide at top and diverge 3/32 inch (one mm) per ft (300 mm) down to eaves.
 - c. Neatly trim shingles to this line.
 - d. Seal trimmed shingle edges to valley metal with continuous bead of elastomeric roofing sealant applied within one inch (25 mm) of shingle edge.
- 11. Vent pipe sleeve flange:
 - a. Vent pipe sleeve flange as specified in Section 07 6310.
 - b. Fit shingles under lower edge and over sides and upper edge.
 - c. Set vent pipe flange in elastomeric roofing sealant.
 - d. Embed shingles in elastomeric roofing sealant where they overlap flange.
 - e. Apply bead of elastomeric roofing sealant at junction of vent pipe and vent flashing.
- 12. Furnished and installed in Section 07 7226 'Ridge Vents'.

3.5 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 - Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.
 - 2. Raking installation method is not permitted by Owner and will be considered to be not complying with Contract Document requirements and must be corrected at no additional cost to Owner.

3.6 CLEANING

- A. General:
 - All tools and unused materials must be collected at end of each workday and stored properly off finished roof surface and protected from exposure to elements.
 - 2. Leave metals clean and free of defects, stains, and damaged finish.
 - a. Replace fascia metal that is scratched through finish to base metal.
 - 3. Properly clean finished roof surface after completion.
 - 4. Verify drains and gutters are not clogged.
 - 5. Clean shingles and building of soiling caused by this installation.
 - 6. Clean and restore all damaged surfaces to their original condition.
- B. Waste Management:
 - Disposal:
 - a. All work areas are to be kept clean, clear and free of debris always.
 - b. Do not allow trash, waste, or debris to collect on roof. These items shall be removed from roof daily.
 - c. Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

3.7 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

ALUMINUM SIDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install siding as described in Contract Documents.

1.2 SUBMITTALS

- A. Informational Submittals:
 - Manufacturer Instructions:
 - a. Manufacturer's published installation instructions.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature.
 - b) Color selection.

1.3 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's written 20-year guarantee for finishes.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 - 1. Horizontal Lap Siding:
 - a. Type One Acceptable Manufacturers:
 - 1) Alcoa Architectural Products, Eastman, GA www.alcoaarchitecturalproducts.com.
 - 2) Alside Inc, Cuyahoga Falls, OH www.alside.com.
 - 3) Gentek Building Products, Akron, OH and Burlington, ON www.gentekinc.com.
 - 4) Equal as approved by Architect before bidding. See Section 01 6200.
- B. Materials:
 - 1. Description:
 - a. Aluminum: 0.024 inch (0.6 mm) thick minimum complete with accessories recommended by Manufacturer for proper installation.
 - b. Configuration: Horizontal Lap Siding.
 - Color:
 - a. As selected by Architect from Manufacturer's standard colors.
- C. Finishes: Double baked enamel or PVC with protective coating on reverse side.

2.2 ACCESSORIES

A. Fasteners: Unpainted one inch (25 mm) aluminum screws or 1-1/2 inch (38 mm) ring-shanked nails.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate dissimilar metals to prevent electrolytic action.
- B. Paint exposed fasteners to match siding.

END OF SECTION

Aluminum Siding - 2 - 07 4616

GALVANIZED STEEL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install miscellaneous flashing, counterflashing, and hold-down clips as described in Contract Documents and not specified to be of other material.
- B. Products Furnished But Not Installed Under This Section:
 - Gravel stops, copings, scuppers, and miscellaneous sheet metal specialties not specified to be of other materials.
- C. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wood base.
 - 2. Sections under 07 3000 heading: 'Steep Slope Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
 - 3. Section 07 9213: 'Elastomeric Joint Sealant'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-15, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
 - Federal Specifications:
 - a. TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Type Two Acceptable Manufacturers Of Metal:
 - a. CMG Coated Metals Group, Denver, CO www.cmgmetals.com.
 - b. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
 - c. Fabral, Lancaster, PA www.fabral.com.
 - d. Firestone Metal Producdts, Anoka, MN www.unaclad.com.
 - e. MBCI, Houston, TX www.mbci.com.
 - f. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
 - g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
 - h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
 - i. Ryerson, Chicago, IL www.ryerson.com.
 - j. Equal as approved by Architect before installation. See Section 01 6200.

B. Materials:

1. Sheet Metal:

- a. Galvanized iron or steel meeting requirements of ASTM A653/A653M, G 90 or Galvalume steel meeting requirements of ASTM A792/A792M AZ50, 50 ksi.
 - 1) 22 ga (0.792 mm) for hold-down clips.
 - 2) 24 ga (0.635 mm) for all other.

C. Fabrication:

- 1. Form accurately to details.
- 2. Profiles, bends, and intersections shall be even and true to line.
- 3. Fold exposed edges 1/2 inch (12.7 mm) to provide stiffness.

D. Finish:

- 1. Exposed to view:
 - a. Provide face coating of polyvinyledene Fluoride (PVF₂) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF₂ in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
 - b. Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
- 2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

- A. Sealants: Rubber base type conforming to Fed Spec TT-S-00230C.
- B. Fasteners:
 - 1. Of strength and type consistent with function.
 - 2. Nails: Hot-dipped galvanized.
 - 3. Screws, Bolts, And Accessory Fasteners: Galvanized or other acceptable corrosion resistant treatment.
- C. Roof Diverter:
 - 1. Roof Diverter (Kickout Diverter) required when vertical wall extends beyond lower roof.
 - 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
 - b. Size: 6 inch (150 mm) x 6 inch (150 mm) by 12 inches (300 mm) length.
- D. Step Flashing:
 - 1. Step flashing required for steep slope for roof to wall flashing.
 - a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
 - b. Size: 5 inch (125 mm) x 5 inch (125 mm) by 8 inch (200 mm) or 12 inches (300 mm) length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install with small, watertight seams.
- B. Slope to provide positive drainage.
- Provide sufficient hold down clips to insure true alignment and security against wind.
- D. Provide 4 inch (100 mm) minimum overlap.
- E. Allow sufficient tolerance for expansion and contraction.

- F. Insulate work to prevent electrolytic action.
- G. Roof Diverter (Kickout Diverter):
 - 1. Extend roof diverter 1 inch (25 mm) minimum beyond face edge of lower roof.
 - 2. Extend underlayment vertically up wall behind flashing.
 - 3. Solder all joints.
 - 4. Apply sealant.

3.2 CLEANING

A. Leave metals clean and free of defects, stains, and damaged finish.

END OF SECTION

PERFORATED METAL SOFFIT

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install perforated metal soffit system as described in Contract Documents.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Architectural Manufacturers Association:
 - a. AAMA 1402-09, 'Standard Specification for Aluminum Siding Soffit and Fascia'.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-15, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
 - ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.

1.3 SUBMITTALS

- A. Action Submittals:
 - Product Data:
 - a. Manufacturer's literature or cut sheet for products furnished.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire Characteristics Performance Requirement:
 - a. Meet requirements of ASTM E84 Class A fire rating.
- B. Qualifications:
 - 1. Installer:
 - a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
 - 2. Inspect delivered material for damage.

- B. Storage And Handling Requirements:
 - 1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
 - 2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's written 20-year guarantee for finish.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers

- 1. Type One Acceptable Manufacturers:
 - a. Alcoa Architectural Products, Eastman, GA www.alcoaarchitecturalproducts.com.
 - b. Alside Inc, Cuyahoga Falls, OH www.alside.com.
 - c. ATAS Aluminum Products, Allentown, PA www.atas.com.
 - d. Gentek Building Products, Akron, OH and Burlington, ON www.gentekinc.com.
 - e. Kaycan Ltd, Montreal, QB www.kaycan.com.
 - f. Norandex/Reynolds, Macedonia, OH www.norandexreynolds.com.
 - g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
 - h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
 - i. System 3-12L by Rollex, Elk Grove Village, IL www.rollex.com.
 - j. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance Requirements:

1. Capacities: Installed soffit system shall meet minimum required structural loading conditions when tested in accordance with Test Method No. 4 of AAMA Specification 1402-86.

C. Materials:

- 1. 0.019 inch (0.48 mm) thick minimum.
- 2. 'V' groove design complete with matching trim.
- 3. Panels shall be interlocked full length of panel.
- 4. Perforated full width of panel with holes designed so one dimension does not exceed 1/8 inch (3 mm).

D. Finish:

- Face finish shall meet performance requirements of Test Method No. 6 of AAMA Specification 1402-86. Reverse side coating shall pass requirements of paragraphs 1.1 through 1.4 of Test Method No. 6.
- Double baked enamel to meet or exceed specifications of MIL-DTL-5541F with protective coating on back side.
- 3. Color as selected by Architect from Manufacturer's standard colors.

2.2 ASSESSORIES

- A. Fastening Devices:
 - 1. 1-1/4 inch (32 mm) galvanized staples or as recommended by Soffit Manufacturer.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate and verify framing is suitable for installation of soffit system.
 - 2. Notify Architect of unsuitable conditions in writing.
 - a. Do not install soffit over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.
- B. Isolate from dissimilar metals to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

- A. General:
 - 1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.
- B. Waste Management:
 - 1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

Perforated Metal Soffit - 3 - 07 6312

ALUMINUM FASCIA

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Furnish and install aluminum fascia as described in Contract Documents.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM B209-14, 'Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate'.
 - ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature or cut sheet for products furnished.
- B. Closeout Submittals:
 - Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature.
 - b) Color selection.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire Characteristics Performance Requirement:
 - a. Meet requirements of ASTM E84 Class A fire rating.
- B. Qualifications:
 - 1. Installer:
 - a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
 - 2. Inspect delivered material for damage.
- B. Storage And Handling Requirements:
 - 1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
 - 2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

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1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's standard warranty against manufacturer defects.
 - 2. Manufacturer's written thirty-five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Type One Acceptable Manufacturers Of Metal:
 - a. AEP / Span, Dallas, TX www.aep-span.com.
 - b. ATAS Aluminum Products, Allentown, PA www.atas.com.
 - c. Fabral, Lancaster, PA www.fabral.com.
 - d. Firestone Metal Products, Anoka, MN www.unaclad.com.
 - e. Hunter-Douglas Canada Ltd, Brampton, ON www.hunterdouglas.com.
 - f. Jenisys Engineered Products, Goodlettsville, TN www.jenisysep.com.
 - g. Kaycan Ltd, Montreal, PQ www.kaycan.com.
 - h. MBCI, Houston, TX www.mbci.com.
 - i. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
 - j. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
 - k. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
 - I. Ryerson, Chicago, IL www.ryerson.com.
 - m. VicWest, Oakville, ON www.vicwest.ca.
 - n. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:

 Aluminum: 0.032 inch (0.813 mm) thick minimum complete with accessories recommended by Manufacturer for proper installation.

C. Finishes:

- 1. Face coating polyvinyledene Fluoride (PVF₂) Resin-base finish (Kynar 500 or Hylar 5000) for coil coating components containing 70 percent minimum PVF₂ in resin portion of formula. Thermocured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
- 2. Color as selected by Architect from Manufacturer's standard colors.
- D. Fabrication: Fascia may either be shop-fabricated using metal from a specified manufacturer, or a factory-fabricated standard system from a specified manufacturer.

2.2 ACCESSORIES

- A. Fastening Devices: One inch (25 mm) zinc or cadmium plated screws.
- B. Continuous Soffit Vent:
 - 1. Type Two Acceptable Products:
 - a. Aluminum 8.8 sq in (56.8 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2 inches (50 mm). Color: white or brown.
 - 1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
 - b. Aluminum 9.9 sq in (63.9 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2-1/4 inches (57 mm). Color: white or brown.
 - Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.

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c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate and verify framing is suitable for installation of fascia.
 - 2. Notify Architect of unsuitable conditions in writing.
 - a. Do not install fascia over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Conceal fasteners except where details might require a minimum number to be exposed. Paint heads of exposed fasteners to match background.
- B. Install with slip joints at each end. Screw to substrate through pre-drilled, over-size holes.
- C. Isolate from dissimilar metals not part of fascia system to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

- A. General:
 - 1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.
- B. Waste Management:
 - Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

Aluminum Fascia - 3 - 07 6321

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install sealants not specified to be furnished and installed under other Sections.
 - 2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.
- B. Related Requirements:
 - 1. Removing existing sealants specified in Sections where work required.
 - Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
- C. Products Furnished But not Installed Under This Section:
 - 1. Interior Ceramic Tile Joint Sealants:
- D. Related Requirements:
 - 1. Section 09 3013: 'Ceramic Tiling'.

1.2 REFERENCES

- A. Definitions:
 - 1. Sealant Types and Classifications:
 - a. ASTM Specifications:
 - 1) Type:
 - a) Type S: Single-component sealant.
 - b) Type M: Multi-component sealant.
 - 2) Grade:
 - a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
 - b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
 - 3) Classes: Represent movement capability in percent of joint width.
 - a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
 - b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
 - c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
 - d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
 - 4) Use:
 - a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
 - b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
 - c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
 - d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.

- e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
- f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
- g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.
- Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

B. Reference Standards:

- 1. ASTM International:
 - a. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
 - b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
 - c. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
 - d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
 - e. ASTM D5893/D5893M-16, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:

- 1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- 2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:

- Product Data:
 - a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - b. Manufacturer's literature for each Product.
 - c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:

- Certificates:
 - a. Manufacturer's Certificate:
 - 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
 - 2) Certificate from Manufacturer indicating date of manufacture.
- 2. Manufacturers' Instructions:
 - a. Manufacturer's installation recommendations for each Product.
 - Manufacturer's installation for completing sealant intersections when different materials are joined.

1.5 QUALITY ASSURANCE

A. Qualifications:

- 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- Applicator Qualifications:
 - a. Company specializing in performing work of this section.

- b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
- c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:

1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:

- 1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
 - a. Incorporate accepted mockup as part of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Deliver and keep in original containers until ready for use.
 - 2. Inspect for damage or deteriorated materials.
- B. Storage and Handling Requirements:
 - Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
 - 2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
 - 3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
 - 4. Do not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
 - 2. Follow Manufacturer's temperature recommendations for installing sealants.

1.8 WARRANTY

- A. Manufacturer Warranty:
 - Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
 - a. Manufacturer's standard warranty covering sealant materials.
 - b. Applicator's standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Dow Corning Corp., Midland, MI www.dowcorning.com.
 - b. Franklin International, Inc. Columbus, OH www.titebond.com.
 - c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).

- d. Laticrete International Inc., Bethany, CT www.laticrete.com.
- e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
- f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
- g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
- h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:

- Design Criteria:
 - a. Compliance: Meet or exceed requirements of these standards:
 - 1) ASTM C920: Elastomeric joint sealant performance standard.
 - 2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
 - b. Comply with Manufacturer's ambient condition requirements.
 - c. Sealants must meet Manufacturer's shelf-life requirements.
 - d. Sealants must adhere to and be compatible with specified substrates.
 - e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
 - f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
 - Adhesion Test:
 - a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
 - 2) If Primer required, shall not stain and shall be compatible with substrates.
 - 3) Allow primer to dry before applying sealant.
- 2. Sealants At Exterior Building Elements:
 - a. Description:
 - 1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
 - a) Aluminum entrance perimeters and thresholds.
 - b) Columns.
 - c) Connections.
 - d) Curtainwalls.
 - e) Door frames.
 - f) EIFS to metal joints.
 - g) Joints and cracks around windows.
 - h) Louvers.
 - i) Masonry.
 - i) Parapet caps.
 - k) Wall penetrations.
 - I) Other joints necessary to seal off building from outside air and moisture.
 - o. Design Criteria:
 - 1) Meet following standards for Sealant:
 - a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
 - 2) Limitations:
 - a) Do not use below-grade applications.
 - b) Do not use on surfaces that are continuously immersed or in contact with water.
 - c) Do not use on wet, damp, frozen or contaminated surfaces.
 - d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
 - 3) Color:
 - a) Architect to select from Manufacturer's standard colors.
 - b) Match building elements instead of window (do not use white that shows dirt easily).
 - c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- 1) Dow Corning:
 - a) Primer: 1200 Prime Coat.
 - b) Sealant: 791 Silicone Weatherproofing Sealant.
- 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
 - a) Primer: SS4044 Primer.
 - b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
- 3) Tremco:
 - a) Primer:
 - (1) Metal surface: No. 20 primer.
 - (2) Porous surfaces: No. 23 primer.
 - b) Sealant: Spectrum 1 Silicone Sealant.
- 3. Sealants At Exterior Sheet Metal And Miscellaneous:
 - a. Description:
 - Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
 - a) Flashings.
 - b) Gutters.
 - c) Penetrations in soffits and fascias.
 - d) Roof vents and flues.
 - e) Lightning protection components.
 - b. Design Criteria:
 - 1) Meet following standards for Sealant:
 - a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
 - 2) Limitations:
 - a) Do not use below-grade applications.
 - b) Do not use on surfaces that are continuously immersed or in contact with water.
 - c) Do not use on wet, damp, frozen or contaminated surfaces.
 - d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
 - c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Dow Corning: 790 Silicone Building Sealant.
 - 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
 - Tremco: Tremsil 600 Silicone Sealant.
- 4. Sealants At Expansion Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
 - a. Expansion Joints:
 - 1) Design Criteria:
 - a) Meet following standards for Sealant:
 - (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
 - 2) Sealant required at expansion for following areas:
 - a) Between entryway slabs and building foundations.
 - b) Between sidewalks and building foundations.
 - c) Miscellaneous vertical applications.
 - 3) Sealant NOT required at expansion joints for following areas:
 - a) Within aprons and where aprons abut building foundations and sidewalks.
 - b) Within mowstrips and where mowstrips abut building foundations and sidewalks.
 - c) Within sidewalks.
 - Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning:
 - (1) Primer: 1200 Prime Coat.
 - (2) Sealant: 790 Silicone Building Sealant.
 - b) Sika:
 - (1) Primer: Sikasil Primer-2100.
 - (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
 - b. Penetrations thru Concrete Walls:
 - 1) Design Criteria:
 - a) Meet following standards for Sealant:
 - (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- a) Dow Corning:
 - (1) Primer: 1200 Prime Coat.
 - (2) Sealant: 790 Silicone Building Sealant.
- b) Sika:
 - (1) Primer: Sikasil Primer-2100.
 - (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
- Sealants At Control Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
 - a. Control Joints:
 - 1) Design Criteria:
 - a) Meet following standards for Sealant:
 - (1) ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
 - 2) Sealant required at control joints in following areas:
 - a) Retaining walls.
 - b) Miscellaneous vertical applications.
 - 3) Sealant is NOT required at control joints, unless needed to protect moisture sensitive soils or by Contract Drawings, in following areas:
 - a) Within aprons.
 - b) Within mowstrips.
 - c) Within sidewalks.
 - d) Within entryway slabs.
 - 4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning:
 - (1) Primer: 1200 Prime Coat.
 - (2) Sealant: 890-SL Silicone Building Sealant.
 - b) Sika:
 - (1) Primer: Primer: Sikasil Primer-2100.
 - (2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.
- 6. Sealants At Exterior Concrete Waterways Flat Drainage Structures (Waterways:
 - a. Expansion Joints and Control Joints:
 - 1) Description:
 - a) One component (part) self-leveling silicon material that cures to ultra-low modulus silicone rubber upon exposure to atmospheric moisture.
 - b) Cured silicone rubber remains flexible over entire temperature range expected in pavement applications.
 - 2) Design Criteria:
 - a) Sealant is required at following areas:
 - (2) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
 - b) Meet following standards for Sealant: Self-leveling: ASTM D-5893; ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning:
 - (1) Primer: 1200 Prime Coat.
 - (2) Sealant: 890-SL Silicone Building Sealant.
 - b) Sika:
 - (1) Primer: Primer: Sikasil Primer-2100.
 - (2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.
- 7. Sealants At Curbs And Gutters:
 - a. Expansion Joints and Control Joints:
 - 1) Description:
 - a) Effective for sealing transverse contraction and expansion joints, longitudinal, center line and shoulder joints in Portland cement concrete.
 - b) One component (part) non-sag silicone material that cures to low modulus, silicone rubber upon exposure to atmospheric moisture. May be applied over wide temperature range.
 - 2) Design Criteria:
 - a) Expansion joint sealant is required in following areas:
 - (1) Within curbs and gutters at approved layout locations.

- b) Meet following standards for Sealant: Non-sag: ASTM C920: Type S, Grade NS, Class 100/50. Use T. NT.
- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning:
 - (1) Primer: 1200 Prime Coat.
 - (2) Sealant: 888 Silicone Joint Sealant.
 - b) Sika:
 - (1) Primer: Primer: Sikasil Primer-2100.
 - (2) Sikasil-728 NS Non-Sag Silicone Sealant.
- 8. Sealants At Precast Concrete Cap and Joint Covers (if Contractor Option ONE was selected in Section 03 4800):
 - a. Description:
 - 1) Soft lead strip, when set and bedded in sealant, form cap which assures permanent elastic seal for any masonry joint as specified in Section 03 4800.
 - b. Design Criteria:
 - 1) Meet following standards for Sealant:
 - a) ASTM C920: Type S, Grade NS, Class 50 Use A, G, M.
 - b) Strips should be of sufficient size to cover the joint width, plus percentage allowance for anticipated joint movement, plus 1/4 inch (6.4 mm).
 - c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Dow Corning:
 - a) Primer: 1200 Prime Coat.
 - b) Sealant: 791 Silicone Weatherproofing Sealant.
 - 2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
 - a) Primer: SS4044 Primer.
 - b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
 - 3) Sika:
 - a) Primer: Sikasil Primer-2100.
 - b) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
 - 4) Tremco:
 - a) Primer:
 - (1) Metal surface: No. 20 primer.
 - (2) Porous surfaces: No. 23 primer.
 - b) Sealant: Spectrum 1 Silicone Sealant.
- General Interior Sealants:
 - a. General:
 - 1) Inside jambs and heads of exterior door frames.
 - 2) Both sides of interior door frames.
 - 3) Inside perimeters of windows.
 - 4) Miscellaneous gaps between substrates.
 - o. Design Criteria:
 - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
 - 2) 100 percent silicone sealant.
 - c. Non-Paintable Sealant (Installer Option A):
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
 - b) Laticrete: Latasil Silicone Sealant.
 - Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
 - Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
 - e) Tremco: Tremsil 200 Silicone Sealant.
 - f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.
 - d. Paintable Sealant (Installer Option B):
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.
- 10. Sealants For Interior Joints:
 - a. General:
 - 1) Countertops and backsplash to wall.

- 2) Sinks and lavatories to countertops.
- 3) Joints between plumbing fixtures and other substrates.
- b. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
 - 1) Ceramic tile inside corners.
 - 2) Ceramic tile and paver tile joints.
- c. Description:
 - 1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.
- d. Design Criteria:
 - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
 - 2) 100 percent silicone sealant.
- e. Color: As selected by Architect from Manufacturer's standard colors.
- f. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
 - 2) Laticrete: Latasil Tile and Stone Silicone Sealant.
 - 3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
 - 4) Tremco: Tremsil 200 Silicone Sealant.

2.2 ACCESSORIES

- A. Bond Breaker Tape:
 - 1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
 - 2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.
- B. Joint Backing:
 - 1. Comply with ASTM C1330.
 - 2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
 - 3. Oversized 25 to 50 percent larger than joint width.
- C. Joint Cleaner:
 - 1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.
- D. Masking Tape:
 - Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate surfaces and joint openings are ready to receive Work.
 - a. Verify each sealant is compatible for use with joint substrates.
 - b. Verify joint surfaces are clean and dry.
 - c. Ensure concrete surfaces are fully cured.
 - 2. Sealants provided shall meet Manufacturer's shelf-life requirements.
 - 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not proceed until unsatisfactory conditions are corrected.
 - 4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:

- 1. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
 - a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
 - b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
 - c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
 - d. Primers:
 - 1) Primers enhance adhesion ability.
 - 2) Use of primers is not a substitution for poor joint preparation.
 - 3) Primers should be used always in horizontal application where there is ponding water.
- 2. Field test joints in inconspicuous location.
 - Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
 - b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
- Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:

- 1. Prepare joints in accordance with ASTM C1193.
 - a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
 - b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
 - c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:

1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:

- 1. Apply silicone sealant in accordance with Manufacturer's instructions.
- 2. Do not use damaged or deteriorated materials.
- 3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
- 4. Apply primer where required for sealant adhesion.
- 5. Install sealants immediately after joint preparation.
- 6. Do not use silicone sealant as per the following:
 - a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
 - b. Below-grade applications.
 - c. Brass and copper surfaces.
 - d. Materials bleeding oils, plasticizers, and solvents.
 - e. Structural glazing and adhesive.
 - f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:

- Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
- 2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
- 3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:

- 1. Install bond breaker where joint backing is not used or where backing is not feasible.
 - a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:

- 1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
- 2. Fill joint opening to full and proper configuration.
- 3. Apply in continuous operation.
- 4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
- 5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.
- E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.4 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

3.5 FIELD QUALITY CONTROL

- Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
 - Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
 - a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
 - b. For sealants applied between dissimilar materials, test both sides of joints.
 - Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and retesting performed.
 - 3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

- A. Remove masking tape and excess sealant.
- B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.
- C. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

END OF SECTION

SECTION 08 7108

STOPS AND HOLDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Products Supplied But Not Installed Under This Section:
 - 1. Door stops.
- B. Related Sections:
 - 1. Section 08 7101: Common Hardware Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - b. Hager, St Louis, MO www.hagerhinge.com.
 - c. Ives, Wallingford, CT www.iveshardware.com.
 - d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - e. Sargent, New Haven, CT (800) 906-6606 or (203) 562-2151 www.sargentlock.com.
- B. Stops:
 - 1. Use floor type stop.
 - 2. Provide model appropriate for substrate.
 - 3. Type Two Acceptable Products:

a.		Interior Wall	Exterior Wall	Floor Mount	Overhead.
b.	Hager	236W	255W	243F	
C.	lves	WS407CCV	WS447	FS438	
d.	Rockwood	409	474 / 475	440 / 441	
e.	Glynn Johnson				GJ 90S
f.	Sargent				590S Series
	_ ~ .				

g. Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: When using overhead stops, coordinate installation with door closer and other door hardware.

END OF SECTION

Stops And Holders - 1 - 08 7108

SECTION 08 8100

GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Quality of glazing used in entries, doors, and windows.
- B. Related Requirements:
 - Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for furnishing and installing of glazing in aluminum-framed storefront.

1.2 REFERENCES

- A. Definitions:
 - 1. Glass Surface:
 - a. Insulated glass unit:
 - 1) Surface 1: Exterior surface of outer lite.
 - 2) Surface 2: Interspace-facing surface of outer lite.
 - 3) Surface 3: Interspace-facing surface of inner lite.
 - 4) Surface 4: Interior surface of inner lite.
 - . Monolithic glass:
 - 1) Surface 1: Exterior surface.
 - 2) Surface 2: Interior surface.
 - 2. Insulated Glass: Two pieces of glass spaced apart and hermetically sealed to form single-glazed unit with air space between. Heat transmission through this type of glass may be as low as half that without air space. Also called double glazing, double pane, insulated unit, and thermal pane.
 - 3. Laminated Glass: Two or more sheets with inner layer of transparent plastic to which glass adheres if broken. Used for overhead, safety glazing, and sound reduction.
 - 4. Low-Emissivity Glass (Low-E): Reduces wintertime heat loss from interior with thin, almost colorless metallic coating that reflects heat back inside structure. Allows moderate solar heat gain while reducing harmful ultraviolet light in any season. Minimizes summertime air conditioning loss by reflecting radiated heat to outside. May be tempered for where safety glass is required. Available in single strength clear, gray and bronze (brown) color.
 - 5. Shading Coefficient: Ratio of solar heat gain passing through a glazing system to solar heat gain that occurs under the same conditions if the window was made of clear, unshaded double strength glass. Lower SC number, the better solar control efficiency of glazing system.
 - 6. Solar Heat Gain Coefficient (SHGC): Ratio of total solar heat passing through a given window relative to the solar heat incident on the projected window surface at normal solar incidence. (Percentage of solar energy directly transmitted or absorbed and re-radiated into a building). Lower SHGC, the better it is able to reduce heat.
 - 7. Solar Reflectance (R): Percent of incident solar radiation that is reflected by window film/glass system. Lower the number, the less solar radiation reflected.
 - 8. Tempered Glass: Glass strengthened through process of heating, creating tensile strength that causes glass to resist breakage, yet disintegrate into small pieces if break occurs. Tempered glass is type of safety glass.
 - 9. U-Value: Measurement of heat transfer through film due to outdoor/indoor temperature differences. Lower U-value, less heat transfers. When using performance data, the lower U-value, better insulating qualities of window film/glass system.
 - 10. Visible Light Transmitted (VLT): Percent of total visible light (380-780 nanometers) that passes through glass. Lower the number, the less visible light transmitted.

B. Reference Standards:

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- 1. American National Standards Institute:
 - a. ANSI Z97.1-2009, 'Safety Glazing Materials Used in Buildings Safety Performance Specifications and Methods of Test'.
- 2. ASTM International:
 - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
 - b. ASTM C1048-12, 'Standard Specification for Heat-Treated Flat Glass Kind H, Kind FT Coated and Uncoated Glass'.
 - c. ASTM C1172-14, 'Standard Specification for Laminated Architectural Flat Glass'.
 - d. ASTM C1281-16, 'Standard Specification for Preformed Tape Sealants for Glazing Applications'.
 - e. ASTM E2190-10, 'Standard Specification for Insulating Glass Unit Performance and Evaluation'.
- 3. Consumer Products Safety Commission (CPSC):
 - a. 16 CFR, Part 1201 CAT 1 and 11, 'Safety Standard for Architectural Glazing Materials'.

1.3 SUBMITTALS

- A. Action Submittals:
 - Product Data:
 - Manufacturer's data sheets for each glass product and glazing material.
- B. Informational Submittals:
 - Qualification Statement:
 - a. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - Glazing shall meet applicable requirements of Federal Consumer Product Safety Standard 16 CFR 1201.
 - 2. Comply with published recommendations of glass product Manufacturers and organizations, except where more stringent requirements are indicated.
- B. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Satisfactorily completed at least three (3) installations of similar size, scope, and complexity in each of past two (2) years and be approved by glass product Manufacturer before bidding.
 - b. Upon request, submit documentation.
- C. Certifications:
 - 1. Labels showing strength, grade, thickness, type, and quality are required on each piece of glass.
 - 2. Manufacturers/Fabricators certifying products furnished comply with project requirements.
 - 3. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Follow Manufacturer's instruction for receiving, handling, and protecting glass & glazing materials to prevent breakage scratching, damage to seals, or other visible damage.

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- 2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage And Handling Requirements:
 - 1. Follow Manufacturer's instruction for storing and protecting glass & glazing materials.
 - 2. Store materials protected from exposure to harmful environmental conditions and at temperatures and humidity conditions recommended by Manufacturer.
 - 3. Protect edge damage to glass, and damage/deterioration to coating on glass.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.7 WARRANTY

- A. Manufacturer Warranty:
 - 1. Insulating Glass Warranty:
 - a. Manufacturer's standard form, signed by insulating-glass product Manufacturer/Fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by obstruction of vision by dust, moisture, or film on interior surfaces of glass, for ten [10] years of date of installation.
 - Installer's Warranty:
 - a. Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, for two (2) years from date of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - Manufacturer Contact List for Low E Glazing:
 - a. AGC Flat glass North America, Kingsport, TN www.us.agc.com.
 - b. Carlex (subsidiary of Central Glass Co., Ltd., Nashville, TN www.carlex.com.
 - c. Guardian Industries Corp., Auburn Hills, MI www.guardian.com.
 - d. Oldcastle BuildingEnvelope, Santa Monica, CA www.oldcastlebe.com.
 - e. Pilkington North America Inc., Toledo, OH www.pilkington.com.
 - f. PPG Industries, Pittsburgh, PA www.ppgglass.com or PPG Canada Ltd, Glass Division, Toronto, ON (416) 789-3331.
- B. Storefront Glazing:
 - 1. Thickness: 1/4 inch (6 mm).
 - 2. Glazing shall have following characteristics:
 - a. Low-Emissivity (or Low E):
 - 1) Design Criteria:
 - a) Clear.
 - b) Insulated Glass: 1 inch (25 mm) units with 1/2 inch (13 mm) airspace and two (2) 1/4 inch (6 mm) lites.
 - c) Meet requirements of ASTM C1036, Type I, Class I, Quality Q3.
 - d) Location: Surface 2.
 - 2) Type Two Low-Emissivity (or Low E) Acceptable Product:
 - a) Performance Standard:

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- (1) 64 percent Visible Light Transmission (VLT).
- (2) 0.28 U-value winter.
- (3) 0.26 U-value summer.
- (4) 0.27 Solar Heat Gain Coefficent (SHGC).
- (5) 0.32 Shading Coefficient.
- (6) 12 percent Visible Light Reflectance.
- b) Quality Standard:
 - (1) Cardinal LoE³-366.
 - (2) Solarban 70 XL.
 - (3) Equal product by Acceptable Manufacturer as approved by Architect before bidding. See Section 01 6200.
- 3) Acceptable Manufacturers:
 - a) AGC.
 - b) Guardian.
 - c) PPG.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
- b. Glazing Below Door Height:
 - 1) Design Criteria:
 - a) Tempered.
 - Meet requirements of ASTM C1048, Kind FT, Condition A, Type I, Class I, Quality Q3.

C. Fabrication:

- Except where glass exceeds 66 inches (1 675 mm) in width, cut clear glass so any wave will run horizontally when glazed.
- 2. Sealed, Insulating Glazing Units:
 - Double pane, sealed insulating glass units. Install at exterior windows and exterior aluminum-framed storefront.
 - b. Unit Thickness: 5/8 inch (16 mm) minimum, one inch (25 mm) maximum.
 - c. Type Seal:
 - 1) Metal-to-glass bond and separated by 1/2 inch (12.7 mm) dehydrated air space.
 - 2) Use non-hardening sealants.
 - d. Category Four Approved Fabricators. See Section 01 6200 for definitions of Categories.
 - 1) Members of Sealed Insulating Glass Manufacturer's Association.

2.2 ACCESSORIES

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C1281 and AAMA 800 for application.

PART 3 - EXECUTION: Not Used

END OF SECTION

Glass Glazing - 4 - 08 8100

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile
 - 2. Furnish and install acoustical sealants as described in Contract Documents.

B. Related Requirements:

1. Section 09 9413: 'Interior Textured Finishing'.

1.2 REFERENCES

A. Definitions:

- 1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
- 2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
- 3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
- 4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.

B. Reference Standards:

- 1. ASTM International:
 - a. ASTM C11-16, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
 - b. ASTM C475/C475M-15, 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
 - c. ASTM C840-17, 'Standard Specification for Application and Finishing of Gypsum Board'.
 - d. ASTM C1002-16, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
 - e. ASTM C1047-14a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
 - f. ASTM C1178/C1178M-13, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
 - g. ASTM C1396/C1396M-14a, 'Standard Specification for Gypsum Board'.
 - ASTM E84-16, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - i. ASTM E119-16a, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
- 2. Gypsum Association:
 - a. GA-214-15, 'Recommended Levels of Gypsum Board Finish'.
 - b. GA-216-16: 'Application and Finishing of Gypsum Panel Products'.
 - c. GA-600-15, 'Fire Reference Design Manual'.

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- d. GA-801-07, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
- 3. International Building Code (IBC) (2015 or latest approved version):
 - a. Chapter 25, 'Gypsum Board And Plaster'.
- 4. National Building Code of Canada / Underwriters Laboratories of Canada:
 - a. CAN/ULC-S102: 'Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies' (7th Edition).
- 5. Underwriters Laboratories, Inc.
 - a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
 - b. UL 723: 'Test for Surface Burning Characteristics of Building Materials; (10th Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - Schedule MANDATORY pre-installation conference immediately before installation of gypsum wallboard.
 - 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

1.4 SUBMITTALS

- A. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
 - Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
 - 1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
 - Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 - Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
 - a. Do not install interior products until installation areas are enclosed and conditioned.
 - Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
 - 2) Provide ventilation to eliminate excessive moisture.
 - 3) Avoid hot air drafts that will cause too rapid drying.

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b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - Manufacturer Contact List:
 - a. American Gypsum, Dallas, TX www.americangypsum.com.
 - b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
 - c. Georgia Pacific, Atlanta, GA www.gp.com.
 - d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - e. Pabco Gypsum, Newark, CA www.pabcogypsum.com.
 - f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:

- 1. Interior Gypsum Board:
 - . General:
 - 1) Size:
 - a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 2) Class Two Quality Standard:
 - a) Core: Fire-resistant rated gypsum core.
 - b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
 - c) Surface paper: Face paper suitable for painting.
 - d) Long edges: Tapered edge.
 - e) Overall thickness: 5/8 inch (15.9 mm).

2.2 ACCESSORIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
 - b. Magnum Products, Lenaxa, KS www.levelcoat.com.
 - c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
 - e. United States Gypsum Co, Chicago, IL www.usg.com.
 - f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
 - g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
 - 2. Joint Compound:
 - Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
 - 1) Use Taping Compound for first coat to embed tape and accessories.
 - 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat
 - 3) Use Finishing Compound for final coat and for skim coat.
 - 3. Joint Reinforcing:
 - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
 - 4. Fasteners:
 - a. Bugle head screws meeting requirements of ASTM C1002:
 - 1) Gypsum Board:
 - a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch (15.9 mm) minimum.

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- B. Primer / Surfacer On Surfaces To Receive Texturing:
 - 1. Type Two Acceptable Products:
 - a. Sheetrock First Coat by USG.
 - b. Prep Coat by Westpac Materials.
 - c. Level Coat by Magnum Products.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate and verify framing is suitable for installation of gypsum board.
 - 2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
 - 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install board over unsuitable conditions.
 - 4. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Interface With Other Work:
 - 1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
 - 2. Do not install gypsum board until required blocking is in place.
- B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.
- C. Interior Gypsum Board:
 - 1. General:
 - a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over 1/8 inch (3 mm) wide before taping are acceptable.
 - b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
 - c. On walls over 108 inches (2 700 mm) high, apply board perpendicular to support
 - d. Butt edges in moderate contact. Do not force in place. Shim to level.
 - Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
 - f. Scribe work closely:
 - 1) Keep joints as far from openings as possible.
 - If joints occur near an opening, apply board so vertical joints are centered over openings.
 - 3) No vertical joints shall occur within 8 inches (200 mm) of external corners or openings.
 - g. Install board tight against support with joints even and true. Tighten loose screws.
 - h. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
 - Ceilings:
 - a. Apply ceilings first using minimum of two (2) men.
 - b. Use board of length to give minimum number of joints.
 - c. Apply board perpendicular to support.
 - 1) Single Layer Application:
 - a) Stagger end joints:
 - (1) End and edge joints of board applied on ceilings shall occur over framing members or be back blocked with 2x4 (38 mm by 89 mm) blocking.

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- (2) Edge joints of board vertically applied on walls shall occur over framing members.
- (3) 2x4 (38 mm by 89 mm) blocking is required at wall to ceiling transitions and at top of ceiling vault transitions.

3. Fastening:

- a. Apply from center of board towards ends and edges.
- b. Apply screws 3/8 inch (9.5 mm) minimum from ends and edges, one inch (25 mm) maximum from edges, and 1/2 inch (13 mm) maximum from ends.
- c. Spacing:
 - 1) Ends: Screws not over 7 inches (175 mm) on center at edges where blocking or framing occurs.
 - 2) Wood Framed Walls And Ceilings: Screws 7 inches (175 mm) on center in panel field.
 - 3) Metal Framed Walls: Screws 12 inches (300 mm) on center in panel field.
- d. Set screw heads 1/32 inch (0.8 mm) below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches (50 mm) away.
- e. Screws on adjacent ends or edges shall be opposite each other.
- f. Drive screws with shank perpendicular to face of board.

4. Trim:

- a. Corner Beads:
 - 1) Attach corner beads to outside corners.
 - a) Attach metal corner bead with staples spaced 4 inches (100 mm) on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
 - b) Set paper-faced trim in solid bed of taping compound.
- b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames 1/8 inch (3 mm) to allow for caulking.

Finishing:

- a. General:
 - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
 - 2) First Coat:
 - a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
 - b) Completely fill gouges, dents, and fastener dimples.
 - Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
 - 3) Second Coat:
 - a) Apply coat of specified joint compound over embedded tape extending 3-1/2 inches (88 mm) on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
 - b) Re-coat gouges, dents, and fastener dimples.
 - Allow to dry and sand lightly to eliminate high spots or excessive compound.
 - 4) Third Coat: Apply same as second coat except extend application 6 inches (150 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
 - 5) Fourth Coat: Apply same as second coat except extend application 9 inches (425 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
- Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:
 - Gypsum Board Surfaces to Receive: Painted Texturing Section 09 9413: 'Interior Textured Finishing':
 - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads

and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 - 1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - a. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 CLEANING

A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

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SECTION 09 6813

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But Is Not Limited To:
 - 1. Coordination, sequencing, and scheduling for installation of Owner-Furnished carpet tiles and carpet base used in entry vestibules using walk-off carpet tile as described in contract documents and including following:
 - a. Schedule Pre-Installation Conference held in conjunction with Section 09 6816.
 - b. Maintain Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
 - c. Protection of carpet after installation of carpeting as required.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Carpet Tiles.
 - 2. Section 09 0503: 'Flooring Substrate Preparation' for:
 - a. Floor substrate preparation.
 - b. Pre-installation conference for Sections under 09 6000 heading 'Flooring.
- C. Related Requirements:
 - 1. Section 01 0000: 'General Requirements':
 - a. Section 01 1200: 'Multiple Contract Summary'. Owner will furnish and install carpet and carpet base. This specification establishes quality of materials and installation for information of Contractor and Owner's Representatives.
 - b. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
 - 2. Section 09 6816: 'Sheet Carpeting' for:
 - a. Installation of Carpet Tile and Carpet Base.
 - b. Cleaning and Disposal requirements.

1.2 REFERENCES

- A. Association Publications:
 - 1. The Carpet and Rug Institute Inc. (CRI), Dalton, GA www.carpet-rug.org:
 - a. CRI Indoor Air Quality (IAQ):
 - 1) CRI Green Label Plus Certification.
- B. Reference Standards:
 - 1. The Carpet and Rug Institute (CRI):
 - a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
 - b. CRI TM-102, 'School Carpet Minimum Average Specifications'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate completion of flooring installation with other trades.
- B. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 09 0503 and held jointly with Section 09 6816 pre-installation conference.
 - 2. Schedule pre-installation conference after Concrete Moisture testing and before installation of flooring system.

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- 3. Conference may be held at project site or another convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
- 4. Schedule conference after substrate preparation and ONE (1) week before installation of flooring system.
- 5. In addition to agenda items specified in Section 01 3100 and Section 09 0503, review following:
 - a. Review Owner's Representative schedule for furnishing and installation carpet.
 - b. Review Flooring Manufacturer's installation conditions verification procedure and requirements.
 - c. Review Building Ambient Conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and carpet installation.
 - d. Review cleaning and disposal requirements.
 - e. Review protection requirements of carpet after installation of carpeting.

C. Scheduling:

- Notify Flooring Installer when Building Ambient Conditions requirements are met before installation of flooring system.
- 2. Notify Owner's Representative to coordinate installation of carpet.

1.4 SUBMITTALS

- A. Closeout Submittals:
 - Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Copy of Warranty.
 - b. Record Documentation:
 - Owner will provide Project Carpet Request Documentation forms in both hard copy and digital format:
 - a) Carpet Request Information Sheet.
 - b) Carpet Vendor Quotation.
 - c) Carpet Pre-installation Meeting Agenda.
 - d) Carpet Installation Notice to Proceed or Cancel.
 - e) Carpet Inspection and Completion.
 - f) Carpet Overage Report and Completion.
 - g) Carpet Quotation Change Request.

B. Maintenance Material Submittals:

- 1. Extra Stock Materials:
 - a. Leave carpet tiles equivalent to 15 percent of number installed as attic stock.
 - b. Tie securely and wrap in protective cover.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
 - 2. Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.
- B. Qualifications: Section 01 4301 applies, but is not limited to following:
 - 1. Carpet Manufacturer Qualifications:
 - a. Not less than five (5) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
 - b. VMR Approved Carpet Manufacturers:
 - 1) Approval subject to VMR agreement process approval.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Deliver materials and accessories necessary for completion of carpet installation to site before beginning installation of carpet.
 - 2. Do not deliver materials before date scheduled for installation.
- B. Storage And Handling Requirements:
 - 1. Store carpet and related materials in a climate-controlled, dry space.
 - 2. Protect carpet from soil, dust, moisture and other contaminants.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Building Conditions:
 - a. Conditions inside building shall be brought to levels to be normal at occupancy of building. Conditions include normal levels of humidity, lighting, heating, and air conditioning:
 - Carpet installation is not to begin until HVAC system is operational and following conditions are maintained for at least forty-eight (48) hours before, during and seventytwo (72) hours after completion:
 - Carpet is to be installed when indoor temperature is between 65° 95° F (18° 35° C) with maximum relative humidity of 65%.
 - b) Substrate surface temperature should not be less than 65° F (18° C) at time of installation.
 - c) Do not allow temperature of indoor carpeted areas to fall below 50° F (10° C), regardless of age of installation.
 - 2) Maintain fresh air ventilation after installation for seventy-two (72) hours minimum or until lingering odors are gone.
 - 2. Concrete Slab:
 - a. General:
 - Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive.

1.8 WARRANTY

- A. Manufacturer Warrantv:
 - 1. Provide Carpet Manufacturer's standard Warranty which includes following:
 - a. Warranty shall cover defects in installation, workmanship, and installation materials.
 - b. Warranty includes specific workmanship warranties for delamination, edge raveling, fuzzing, pilling, and other textural changes which can be controlled through proper manufacturing (no fraying, zippering, delamination, edge raveling, fuzzing, pilling in carpet is acceptable for any reason).
 - c. Warranty terms will include inspection of defective area within fifteen (15) days of receipt of written notice from Owner and completion of corrective work within forty-five (45) days, unless other arrangements are made in writing with Owner on case-by-case basis.
 - d. If carpet defect or installation defect continues to appear after two (2) separate notices for correction from Owner, replace carpet where defects have occurred.
 - e. If Carpet Manufacturer follows installation requirements of Section 09 0503 'Floor Substrate Preparation' Carpet Manufacture accepts liability of carpet installation for said given time as outlined in Special Warranty regardless of any climate or condition changes affecting RH levels of floor substrate.
 - 2. Special Warranty
 - a. Modular Carpeting:
 - 1) General:
 - a) Appearance Retention to be provided with Special Warranty requirements if not already included in Standard Warranty.
 - 2) Meetinghouse, Mission Office, S&I Module, and O&M / R&I:

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 Owner Carpet Program Product: Provide fifteen (15) year minimum or Carpet Manufacturer's better Warranty on carpet system.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

- A. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1. Lees, Division of Mohawk Carpets, Glasgow, VA:
 - a. Contact Information: Help Line (800) 523-5555 or (801) 397-5626.
 - 2. Mannington Commercial Carpets, Calhoun, GA:
 - a. Contact Information: Help Line Voice Mail (800) 241-2262, ext 8045 or Mannington Installation Services, email Ids@mannington.com or (855) 466-2664.
 - 3. Tandus Centiva, Dalton, GA www.tandus-centiva.com.
 - a. Contact Information: Tracy Riddle cell (801) 580-5147 fax (866) 861-7522 Tracy.Riddle@Tarkett.com..

B. Materials:

- Carpet Tiles (walk-off) Vestibules only:
 - a. Carpet:
 - 1) Size: 18 inch or 24 inch (457 mm or 609 mm) square, at Manufacturer's option.
 - 2) Category Four Approved Manufacturer and Color / Patterns. See Section 01 6200 for definitions of Categories:
 - a) Mannington: LDS Entry Guard, Color: Black.
 - b) Mohawk: StepUp Modular DD762: Color: 508 Mineral.
 - c) Tandus Centiva: Abrasive Action II, Color: Winter Gray 19103.
- 2. Carpet Base (entry vestibules using walk-off carpet tile):
 - a. 4-1/2 inch (115 mm) wide base without cushion backing:
 - 1) Top edge of base serged with 1-1/4 inch (32 mm) polyester binding fabric.
 - 2) Roll edges of binding fabric under and sew along top edge of carpet cove base.
 - b. Carpet:
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Mannington: APLDS (LDS Base) Ultrabac RE, Color: Black.
 - b) Bigelow Commercial (Mohawk): Spectrum V30, Color: 7234 Ebony Domino.
 - c) Tandus Centiva: Abrasive Action II, Color: Winter Gray 19103.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Verify required ambient conditions inside building for required normal levels of humidity, lighting, heating, and air conditioning have been maintained for at least forty-eight (48) hours before and during carpet installation and seventy-two (72) after installation of carpet.
- B. Evaluation And Assessment:
 - 1. Concrete Slab:
 - a. Variation In Grade: Plus or minus 1/8 inch(3 mm) in any 10 foot(3 meter) of floor slab and distance between high point and low point of slab of 1/2 inch(12 mm).
 - b. Testing Procedure: Place ends of straightedge on 3/8 inch(9 mm) high shims. Floor is satisfactory if 1/4 inch(6 mm) diameter steel rod rolled under straightedge will not touch anywhere along 10 foot(3 meter) length and 1/2 inch(12 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot(3 meter) length.

c. Notify Facilities Manager in writing if floor surface is not acceptable to install carpet. Do not lay carpet over unsuitable surface. Commencing installation constitutes acceptance of floor and approval of existing conditions.

3.2 PREPARATION

A. Flooring Preparation:

- 1. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements:
 - a. Concrete floor slab patching:
 - 1) Cracks, chips and joints must be properly patched or repaired.
 - b. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations.
 - 1) Removal of curing compounds.
 - 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
 - 3) Removal of overspray from painted walls (essential so glue will stick).
- 2. Vacuum and damp mop floor areas to receive flooring before flooring installation.

B. Carpet Accessories:

1. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

3.3 INSTALLATION

A. Carpet:

- General:
 - a. Install carpet and carpet base in accordance with CRI Carpet Installation Standard and manufacturer's written instructions supplied with product.
 - b. Install carpet under edge of metal thresholds where possible. Use specified carpet accessories at exposed edges.

B. Carpet Base:

- 1. Precut base so seams occur only at inside corners.
- Scribe base to floor.
- 3. Spread adhesive over back side of base up to bottom of serging on edge or apply three 3/16 inch (4.76 mm) minimum diameter beads of adhesive placed one inch apart on back of base with top bead placed 2 inch (50 mm) down from serged edge of base and spread adhesive over back surface of base up to bottom edge of serging.
 - a. Bird's mouth finish should only be required when door frame is flush with wall.
 - b. If bird's mouth is required, terminate at door frames or vertical trim with 45 degree angle, bird mouth cut so serged edge turns down to contact frame or trim.
- 4. Do not allow adhesive beyond edge of base. Remove excess adhesive.
- 5. Do not use staples, nails, screws or other mechanical fasteners.
- 6. Set carpet base on brick walls at height either above or below horizontal mortar joint line.

3.4 FIELD QUALITY CONTROL

A. Field Inspections:

- 1. Unacceptable carpet after installation shall include but not be limited to:
 - a. Delaminating carpet from backings.
 - b. Fiber loss less than specified.
 - c. Edge raveling.
 - d. Fuzzing of carpet fibers.
 - e. Pilling of carpet fibers.
 - Appearance retention less than control samples attached to Agreement.

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- g. Dye bleeding.
- h. Zippering fibers in carpet.
- i. Color streaking.
- j. Irregular tufts of fiber.
- 2. Unacceptable workmanship shall include but not be limited to:
 - a. Improper floor preparation before installation.
 - b. Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
 - c. Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
 - d. Use of unspecified carpet.
 - e. Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
 - f. Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
 - g. Carpet base that is not scribed to fit against floor with no gaps.
 - h. Carpet base attached by means other than acceptable carpet base adhesive.

B. Non-Conforming Work:

- 1. Basis of Acceptable Carpeting: Source Quality Control Testing:
 - a. Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
- 2. Unacceptable Carpeting:
 - a. Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet:

3.5 CLEANING

A. General:

- 1. Carpet Installer's Responsibility:
 - a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.
 - b. Carpeting:
 - 1) Remove any soiling and/or staining from carpet.
 - 2) Remove excessive adhesive with manufacturer recommended adhesive removers.

B. Damage to building:

- 1. Carpeting:
 - a. Carpet Installer's Responsibility:
 - Clean and repair of all damaged surfaces to their original condition from carpet installation.

C. Waste Management:

- 1. Carpet Installer's Responsibility:
 - a. All work areas are to be kept clean, clear and free of debris at all times.
 - b. Provide adequate waste receptacles and dispose of materials including all rubbish, wrapping paper, scraps, and trimmings from building and property in approved manner as specified in Section 01 7400 unless pre-arrangements have been made with Owner and estimated costs are included on estimate and Purchase Order (PO).

3.6 PROTECTION

- A. Protection of Carpeting:
 - Owner Representative's Responsibility:
 - No traffic of any kind on newly installed carpet for minimum of twenty-four (24) hours after installation is completed.

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- b. No wheeled traffic of any kind placement of furniture or equipment on carpet for minimum of forty-eight (48) hours after completion of carpet installation.
- c. Protect carpet from abuse, vandalism, or damage occurring after installation is complete.
- d. Protect carpet adequately from soil, dust, moisture and other contaminants after carpet installation.

END OF SECTION

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TILE CARPETING DESIGN CRITERIA

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- Design Criteria Requirements of Owner-Furnished carpet tiles and carpet base used in entry vestibules using walk-off carpet tile as specified in Section 09 6813: 'Tile Carpeting' in contract documents of Church Specifications:
 - a. Design Criteria Requirements are not included in Project Manual Specifications for site adapted Church Projects.

B. Related Requirements:

- 1. Section 09 6813: 'Tile Carpeting'.
- Section 09 6816: 'Sheet Carpeting'.

1.2 REFERENCES

A. Association Publications:

- The Carpet and Rug Institute Inc. (CRI), Dalton, GA www.carpet-rug.org:
 - a. CRI Indoor Air Quality (IAQ):
 - 1) CRI Green Label Plus Certification.

B. Definitions:

- Adhesive: Substance that dries to film capable of holding materials together by surface attachment.
- 2. Antimicrobial: Chemical treatment added to carpet or reduce growth of common bacteria, fungi, yeast, mold and mildew.
- 3. Appearance Retention: Ability of a fabric to retain its original aesthetics, color, and construction integrity.
- 4. Backing: Materials comprising back of carpet as opposed to carpet pile or face.
 - a. Tufted carpets: (1) Primary backing, woven or nonwoven fabric in which pile yarn is inserted by tufting needles. (2) Secondary backing, Fabric laminated to back of carpet to reinforce and increase dimensional stability.
 - b. Woven carpets: Backings are 'construction yarns' comprising chain warp, stuffer warp, and shot or fill, which are interwoven with face yarn during carpet fabric formation.
- 5. Backing Fabric: Fabric into which pile yarn is inserted or reinforcing layer that is adhered to reverse side of fabric.
- Bonding Agent (Backcoating): Application of latex or adhesive to back of carpet to anchor tufts
 usually followed immediately by addition of secondary backing material such as nonwoven
 polypropylene or poly-urethane attached cushion.
- 7. Carpet: Heavy fabric used to cover floor and made from variety of fibers.
- 8. Change In Surface Appearance: Cumulative change in surface appearance between unexposed and exposed specimens due to crushing, loss of tuft definition, and matting.
- 9. Colorfastness: Ability of fiber or carpet to retain color when exposed to (1) ultraviolet light, (2) crocking (wet or dry) and (3) atmospheric conditions.
- 10. Commercial Match: Matching of colors with acceptable tolerance, or with color variation that is barely detectable to naked eye.
- 11. Crockfastness: Resistance of transfer of colorant from surface of colored yarn or fabric to another surface, or to an adjacent area of same fabric, principally by rubbing.
- 12. Crushing: Collapsing of pile yarns, resulting in carpet matting and loss of resilience due to traffic.
- 13. Delamination: Form of deterioration of tufted carpet in which primary back and face yarns separate from secondary back.

- 14. Density: Amount of pile yarn per area of carpet or closeness of tufts. Higher density carpet improves resistance to crushing and matting.
- 15. Dimensional Stability: Ability of carpet to retain its size and shape once installed.
- 16. Face Weight: Total weight of face (above backing) yarns in carpet.
- 17. Fiber: Fundamental unit of carpet made from nylon, polyester, cotton, acrylics, wool, and recycled material.
- 18. Flammability: Procedures that have been developed for assessing flame resistance of carpets.
- 19. Foot Traffic Classification: Process that classifies areas of intended use and minimum carpeting texture appearance for particular areas of use established for each application based on level of expected foot traffic in specific areas. Classifications are Moderate, Heavy and Severe.
- 20. Fuzzing: Fluffy particles appear on carpet surfaces caused by fibers that loosen because of weak twist or snags.
- 21. Lightfastness: Degree of resistance of dyed textile materials to color destroying influence of sunlight.
- 22. Loss of Tuft Definition: Bursting, opening, and untwisting of pile yarn and/or decrimping of fibers in surface pile of pile yarn floor covering.
- 23. Matting: Loss of pile definition of a textile floor covering due to entanglement and compression of pile fibers.
- 24. Modification Ratio: Ratio between circumference of inner core of multi lobal fiber's cross section, and circumference of circle drawn around outer edges of fibers cross sections' outer lobes or tips.
- 25. Pile: Visible surface of carpet, consisting of yarn tufts in loop and/or cut configuration. Sometimes called face or nap.
- 26. Relative Humidity (RH) Testing: Testing of concrete slabs is defined as ratio of actual amount of water vapor present in volume of air at given temperature to maximum amount that air could hold at that temperature, expressed as percentage.
 - a. Relative Humidity test method covers quantitative determination of percent relative humidity in concrete slabs for field or laboratory tests.
 - Moisture test results indicate moisture condition of slab only at time of test.
- 27. Resilience: Ability of carpet to spring back to its original texture and thickness after being walked on or compressed weight of furniture.
- 28. Soil Resistance: Ability of carpet fiber to resist dry soil and maintain its original appearance after intermittent or restorative cleanings.
- 29. Soiling: Occurs when dirt particles build up in carpet fibers.
- 30. Stain Resistance: Ability of carpet fiber to resist absorption of stain and maintain its original appearance.
- 31. Texture: Visual and tactile surface characteristics of carpet pile, including such aesthetic and structural elements.
- 32. Tile: Carpet module usually 18 inch x 18 inch or 24 inch x 24 inch (450 mm x 450 mm or 600 mm x 600 mm) in size. Extremely dense construction with heavy reinforced backing.
- 33. Tuft: Cluster of yarns drawn through fabric and projecting from surface in form of cut yarns or loops.
- 34. Tuft Bind: Force (usually measured in pounds) required to pull tuft from carpet backing.
- 35. Tufted Carpet: Carpet produced by tufting machine instead of loam.
- 36. Twist: Winding of yarn around itself. More twist improves carpet performance (especially in cut pile).
- 37. Woven Carpet: Carpet produced on a loom through weaving process by which lengthwise (warp) yarns and widthwise (weft or filling) yarns are interlaced to form fabric.
- 38. Woven: Interlacing strands of fiber into yarn forms woven carpet.
- 39. Yarn: Fibers that are twisted together to form a continuous strand.

C. Reference Standards:

- 1. American Association of Textile Chemists and Colorists (AATCC):
 - a. Test Method:
 - 1) AATCC 16.3-2014, 'Colorfastness to Light: Xenon-Arc'.
 - 2) AATCC 107-2013, 'Colorfastness to Water'.
 - 3) AATCC 134-2011, 'Electrostatic Propensity of Carpets'.
 - AATCC 165- 2013, 'Colorfastness to Crocking: Textile Floor Coverings--Crockmeter Method'.
 - AATCC 174-2011, 'Antimicrobial Activity Assessment of Carpets'.
 - 6) AATCC 175-2013, 'Stain Resistance: Pile Floor Coverings'.

2. ASTM International:

- a. ASTM D1335-17, 'Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings'.
- b. ASTM D2646-18, 'Standard Test Methods for Backing Fabric Characteristics of Pile Yarn Floor Coverings'.
- c. ASTM D3676-13, 'Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay'.
- d. ASTM D3936-17, 'Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering'.
- e. ASTM D5116-17, 'Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products'.
- f. ASTM D5252-15, 'Standard Practice for the Operation of the Hexapod Drum Tester'.
- g. ASTM D5848-10, 'Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Coverings'.
- h. ASTM D6962-17, 'Standard Practice for Operation of a Roller Chair Tester for Pile Yarn Floor Coverings'.
- i. ASTM D7330-15, 'Standard Test Method for Assessment of Surface Appearance Change in Pile Floor Coverings Using Standard Reference Scales'.
- j. ASTM E648-17a, 'Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source'.
- k. ASTM E662-17a, 'Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials'.

3. British Spill Test:

- Test with protocol but not standardized test (Developed several years ago by West End Medical Association in Great Britain and since has been adopted by several U.S. Manufactures).
- 4. International Organization for Standardization (ISO).
 - a. ISO 2551:1981, 'Machine-made textile floor coverings Determination of dimensional changes due to the effects of varied water and heat conditions'.
- 5. National Fire Protection Association (NFPA):
 - NFPA (Fire) 253, 'Standard Method of Test for Critical Radiant Flux of Floor Covering Systems using a Radiant Heat Energy Source' (2015 Edition).
- 6. The Carpet and Rug Institute (CRI):
 - a. CRI 104, 'Standard For Installation of Commercial Carpet' (Sept 2015).
 - b. CRI TM-101, 'Assessment of Carpet Surface Appearance Change using the CRI Reference Scales'.
 - c. CRI TM-102, 'School Carpet Minimum Average Specifications'.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - Provide Source Quality Control testing as specified in this specification if requested by Owner.
 - 2. Sustainable Design Submittals:
 - a. Provide documentation for compliance of Product Data for Credit EQ 4.3 if requested by Owner:
 - 1) For carpet and cushion, documentation indicating compliance with testing and product requirements of CRI's "Green Label Plus" program.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. All products provided will meet requirements of all federal, state, and local codes having jurisdiction.
 - Label meeting Federal Labeling Requirements, as stated in Textile Products Identification Act under Federal Trade Commission, shall be attached to certification samples and products delivered.

2.1 OWNER-FURNISHED PRODUCTS

- A. Category One VMR Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1. Lees, Division of Mohawk Carpets, Glasgow, VA:
 - a. Contact Information: Help Line (800) 523-5555 or (801) 397-5626.
 - 2. Mannington Commercial Carpets, Calhoun, GA:
 - a. Contact Information: Help Line Voice Mail (800) 241-2262, ext 8045 or Mannington Installation Services, email Ids@mannington.com or (855) 466-2664.
 - 3. Tandus Centiva, Dalton, GA www.tandus-centiva.com.
 - a. Contact Information: Tracy Riddle cell (801) 580-5147 fax (866) 861-7522 Tracy.Riddle@Tarkett.com.

B. Design Criteria:

- 1. General:
 - a. Commercial Match:
 - 1) Colors, texture and pile of any product selected as carpet standard or custom designed specifically for Owner needs to be consistent in appearance.
 - 2) When new carpet is installed next to existing carpet, two pieces need to be within tolerance acceptable as commercial match.
 - 3) Regardless of reason, if commercial match is not achievable, existing carpet needs to be replaced to acceptable breaking point approved by Owner's Representative.
 - 4) If changes in supply chains or unforeseen circumstances require standard pattern to be re-engineered, new carpet must be made close to original as possible.
 - 5) New product must be approved by Owner.
 - b. Compatibility:
 - 1) Materials supplied for carpet installation shall be complete package from specified Carpet Manufacturer. Do not mix items from material packages of different carpet Manufacturers.
 - Provide carpet, seam sealers, adhesives, and other related materials that are compatible with one another and with substrates under conditions of service and application.
 - c. Tested Products:
 - 1) New technology and products not allowed unless pre-approved by Owner.
- 2. Carpet Material Requirements:
 - a. Carpet Backing:
 - 1) Modular PVC Hardback or Cushion:
 - a) Manufacturer's preference that meets or exceeds specification and life cycle warranty expectation.
 - b. Cushion Thickness:
 - 1) Attached cushion thickness shall be 0.10-inch minimum when tested in accordance with ASTM D3676.
 - c. Fiber:
 - 1) Meetinghouse, Mission Office, and O&M / R&I:
 - a) Antron Lumina and/or Legacy only.
 - 2) S&I Module and O&M / R&I:
 - a) Institute:
 - (1) Antron Lumina and/or Legacy only.
 - b) Seminary:
 - (1) Antron Lumina and/or Legacy only.
 - c) Antron Lumina and/or Legacy only.
 - d. Life Expectancy (Modular Carpeting):
 - 1) Meetinghouse, Mission Office, and O&M / R&I: twenty (20) years minimum.
 - 2) S&I and O&M / R&I:
 - a) Institute: fifteen (15) years minimum.
 - b) Seminary: twenty (20) years minimum.
 - e. Modification Ratio:
 - 1) Meetinghouse, Mission Office, and O&M / R&I: 1.5 or less.

- 2) S&I Module and O&M / R&I:
 - a) Institute: 1.5 or less.
 - b) Seminary: 1.5 or less.
- f. Pile Yarn Floor Construction:
 - 1) Meet standard for average pile yarn weight tested under ASTM D5848.
 - a) Carpet will retain eighty-five (85) percent of these amounts at end of the warranty period.
- 3. Carpet Physical Performance:
 - a. Appearance Retention Requirements:
 - 1) Foot Traffic Classification and Testing Requirements:
 - a) Heavy Traffic Criteria:
 - (1) Carpet is to be tested in accordance to ASTM D5252 with an Actionbac secondary backing meeting short term cycles (4000) grading scale of 3.0 and long-term cycles (12000) grading scale of 3.0 with appearance retention measured according.
 - (2) Carpet needs to be able to maintain 3.0 rating for eighty-five (85) percent of its warranty expected life cycle in accordance to ASTM D7330.
 - b) Severe Traffic Criteria:
 - (1) Carpet is to be tested in accordance to ASTM D5252 with an Actionbac secondary backing meeting short term cycles (4000) grading scale of 3.5 and long-term cycles (12000) grading scale of 3.5 with appearance retention measured according.
 - (2) Carpet needs to be able to maintain 3.5 rating for eighty-five (85) percent of its warranty expected life cycle in accordance to ASTM D7330.
 - 2) Severe Traffic:
 - a) Meetinghouse, Mission Office, and O&M / R&I.
 - b) S&I Module and O&M / R&I.
 - b. British Spill Test:
 - 1) Carpet must past British Spill Test (formally known as the National Health Service Patient Area Requirement for the United Kingdom, Method E: Part 2):
 - Test involves controlled spilling of blue dyed liquid from 1-meter (39 inches) height onto carpet product.
 - b) Spill is allowed to stand for period of twenty-four (24) hours, after which cuts are made through carpet in area of spill to establish whether there was penetration into or through carpet composite.
 - c. Colorfastness:
 - 1) Colorfastness to Crocking: AATCC 165:
 - a) Color transfer Class 4 minimum, wet and dry, when tested as specified.
 - Colorfastness to Light: AATCC 16.3:
 - a) Not less than 4 after 40 AFU (AATCC fading units). Colorfastness to Light, Xenon-Arc (60 AFU) (AATCC Fading Unit).
 - 3) Colorfastness to Water: AATCC 107:
 - a) Color transfer Class 4 minimum, AATCC Transference Scale (only yarn dyed carpets) (grade change in color and staining).
 - d. Compression Resistance and Compression Set Attached Cushion:
 - Minimum CLD of 7 lb per cu in (0.194 kg per cu cm) at 25 percent deflection, and maximum compression set of 10 percent after 50 percent constant compression when tested in accordance with ASTM D3676 with modification to allow recovery at 158 deg F (70 deg C) instead of room temperature for thirty (30) minutes.
 - e. Critical Radiant Flux (CRF):
 - Meet requirements of ASTM E648 Standard Test Method Minimum Class 1 Critical Radiant Flux (CRF) of 0.45 watts/cm2 or greater when tested in accordance with flooring radiant panel test using ASTM E648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source as the test method.
 - f. Delamination:
 - 1) Resistance to Delamination (Actionbac secondary backing): Not less than 3.5 lbf/in (15 N/mm) when tested in accordance with ASTM D3936.
 - 2) Resistance to Delamination (Attached Cushion): Not less than 15,000 cycles when tested in accordance with ASTM D6963.

- g. Dimensional Stability:
 - 1) 0.2 percent or less when tested in accordance with ISO 2551, 'Dimensional Stability (Aachen Test)'.
- h. Dry Breaking Strength:
 - 1) Not less than 100 lbs (445 N) when tested in accordance with ASTM D2646.
- i. Electrostatic Propensity of Carpets:
 - 1) Electrostatic shock propensity with maximum 3.5 kV when tested in accordance with AATCC 134, 'Step Method'.
- j. Flammability and Smoke Resistant:
 - 1) Smoke Density:
 - a) Smoke density generated from carpet and backing must not exceed 450 when tested in the flaming mode using ASTM E662, 'Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials'.
 - b) ASTM E662, 'Standard Research Test Method for Determining Smoke Generation of Solid Materials as test methods'.
- k. Indoor Air Quality (IAQ):
 - 1) CRI Test Program ASTM D5116.
 - 2) Method for determination of VOC emitted from carpet using specific sorbent tube and thermal desorption/gas chromatography as per ASTM 7339.
 - 3) Carpet, adhesives, and seam sealers shall be VOC compliant as certified with CRI Indoor Air Quality Carpet Testing Program Green Label Plus or tested for compliance to meet the CRI IAQ Carpet Testing Program requirements and criteria as per ASTM D5116 CRI Test Program.
- I. Soil Resist Treatment:
 - 1) Minimum average of 350 ppm fluorine on the pile fiber when 3 separate tests are conducted in accordance with CRI TM-102 test method.
 - 2) Installed carpet shall exhibit stain resisting ability equal to or exceeding that of any other premium carpet available at time of manufacture allowing removal of most foreign substances using generally accepted cleaning procedures and more aggressive cleaning procedures for stubborn stains without leaving any more visible stain and/or change in color than the most stain resistant premium carpet available at time of manufacture.
- m. Stain Resistance:
 - Minimum stain resistance rating of 8 when tested in accordance with AATCC 175, 'Stain Resistance: Pile Floor Coverings.
- n. Tuff Bind (drv):
 - 1) Not less than 10 lbs (45 N) when tested in accordance with ASTM D1335.

2.2 SOURCE QUALITY CONTROL

- A. Tests:
 - 1. Carpet:
 - a. Appearance Retention Rating:
 - 1) Hexapod Test Method: ASTM D5252.
 - 2) Grading: ASTM D7330.
 - b. Antimicrobial Activity: AATCC 174.
 - c. British Spill Test: Test Protocol.
 - d. Colorfastness:
 - 1) Crocking: AATCC 165.
 - 2) Light: AATCC 16.3.
 - 3) Water: AATCC 107.
 - e. Delamination: ASTM D3936 and ASTM D6962.
 - f. Dimensional Stability: ISO 2551.
 - g. Dry Breaking Strength: ASTM 2646.
 - h. Electrostatic Propensity of Carpets: AATCC 134.
 - i. Flame and Smoke Resistant. Provide carpet complying with ratings as indicated for following:
 - 1) Flooring Radiant Panel Test (Critical Radiant Flux), ASTM E648, NFPA 253.

- 2) Smoke Density Test: ASTM E662.
- j. Indoor Air Quality:
 - 1) ASTM 7339.
 - 2) Indoor Air Quality: CRI Test Program ASTM D5116.
- k. Pile Yarn Weight: ASTM D5848.
- I. Soil Resist Treatment: CRI TM-102.
- m. Stain Resistance: AATCC 175.
- n. Turf Bind: ASTM D1335.
- 2. Attached Backing:
 - a. Carpet Backing: ASTM D3676.
 - b. Compression Resistance (constant deflection): ASTM D3676.
 - c. Compression Set (constant force): ASTM D3676.
 - d. Cushion Density: ASTM D3676.
 - e. Cushion Thickness: ASTM D3676.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests:

 Carpet Manufacturer is responsible that concrete slab Alkalinity and Concrete Moisture Vapor Emission Rate (MVER) Testing for each Project is within Carpet Manufacturer's acceptable levels.

B. Field Inspections:

- 1. Unacceptable carpet after installation shall include but not be limited to:
 - a. Delaminating carpet from backings.
 - b. Fiber loss less than specified.
 - c. Edge raveling.
 - d. Fuzzing of carpet fibers.
 - e. Pilling of carpet fibers.
 - f. Appearance retention less than control samples attached to Agreement.
 - g. Dye bleeding.
 - h. Zippering fibers in carpet.
 - i. Color streaking.
 - j. Irregular tufts of fiber.
- 2. Unacceptable workmanship shall include but not be limited to:
 - a. Improper floor preparation before installation.
 - b. Failure of adhesive to completely adhere carpet to floor resulting in bubbles, ridges, or ripples where carpet has separated from floor.
 - c. Failure to properly install carpet next to walls and door frames to eliminate gaps or puckering of carpet.
 - d. Use of unspecified carpet.
 - e. Carpet base ends not finished to terminate at door frames or vertical trim shall have 45 degree angle 'birdsmouth' finish.
 - f. Adhesive exposed on carpet, on carpet base, beyond edges of carpet base, and on other surfaces of building.
 - g. Carpet base that is not scribed to fit against floor with no gaps.
 - n. Carpet base attached by means other than acceptable carpet base adhesive.

C. Non-Conforming Work:

- 1. Basis of Acceptable Carpeting: Source Quality Control Testing:
 - a. Carpet products not meeting Design Criteria and Source Quality Control Testing of this specification will be considered unacceptable carpeting.
- 2. Unacceptable Carpeting:

a. Unacceptable carpeting will be rejected and shall be repaired or replaced at no additional cost to Owner. Owner's Representative will determine reasonable location of acceptable transition points for removal of unacceptable carpet.

END OF SECTION

SECTION 09 9123

INTERIOR PAINTED GYPSUM BOARD, PLASTER

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Preparing and painting following existing interior gypsum board and plaster surfaces as described in Contract Documents:
 - a. Vestibule ceiling.
- B. Related Requirements:
 - 1. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - b. 'Attachment: Paint Color Schedule' for O&M / R&I Projects.
 - 2. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 2900.
 - a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
 - 1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
 - 2. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories.
 - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
 - All Other:
 - a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.
 - b. Previously Finished Work: Use MPI(r) RIN 9.2B Latex Finish system.
- C. Performance:
 - 1. Design Criteria:
 - a. New Surfaces: MPI Premium Grade finish requirements.
 - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
 - c. Sound Existing Surfaces: MPI Custom Grade requirements.
 - d. Gloss / Sheen Required:
 - 1) Remaining Painted Surfaces: Gloss Level 5.
- D. Materials:

- 1. Primers:
 - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
- 2. Finish Coats:
 - a. Remaining Painted Surfaces:
 - 1) MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

- A. General: See appropriate paragraphs of Section 09 9001.
- B. New Surfaces:
 - 1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.

END OF SECTION

SECTION 26 5100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install light as described in Contract Documents, complete with lamp.
- B. Related Requirements:
 - 1. Section 26 0501: 'Common Electrical Requirements'.
 - 2. Section 26 5121: 'Interior Lighting: LED Dimming Drivers'.
 - 3. Section 09 5116: 'Acoustical Tile Ceilings'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute (ANSI):
 - a. ANSI C78.377-2015, 'American National Standard for Electric Lamps: Specification for the Chromaticity of Solid State Lighting Products'.
 - 2. Federal Communications Commission (FCC):
 - a. Code of Federal Regulations (CFR):
 - 1) FCC 47 CFR Part 18, 'Industrial, Scientific, and Medical Equipment'.
 - 3. Institute of Electrical and. Electronics Engineers (IEEE):
 - a. IEEE C62.41.1-2002, 'Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits'.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Advance Transformer Co, Rosemont, IL www.advancetransformer.com.
 - b. Cooper Wiring Devices by Eaton, Peachtree City, GA www.cooperindustries.com.
 - c. General Electric Lighting, Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON www.gelighting.com/na.
 - d. Howard Lighting Products, Laurel, MS www.howard-ind.com.
 - e. Novitas Inc, Peachtree City, GA www.novitas.com.
 - f. Osram Sylvania, Danvers, MA www.sylvania.com or Osram Sylvania Ltd, Mississauga, ON (905) 673-6171.
 - g. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
 - h. Universal Lighting Technologies, Nashville, TN www.universalballast.com.
 - i. Venture Lighting International, Solon, OH www.venturelighting.com.
 - j. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
 - k. Westinghouse Lighting Corp, Philadelphia, PA www.westinghouselightbulbs.com.
 - 2. Product Options: When several lighting fixtures are specified by name for one use on Drawings, select any one of those specified. Do not mix fixtures from different manufacturers specified for one use.

B. Materials

Interior Lighting - 1 - 26 5100

- 1. Lighting Fixtures:
 - a. Type One Acceptable Products:
 - 1) See note on Drawings for acceptable manufacturers and models.
 - 2) Equals as approved by Architect before bidding. See Section 01 6200.
 - b. See 'Light Fixture Schedule' provided by Owner's Representative.
 - c. LED Lamps and Fixtures:
 - 1) Replacement Lamps shall have minimum efficiency of 70 lm / W per LM 79.
 - 2) Integral LED Lamps shall have minimum efficiency of 90 lm / W per LM 79.
 - 3) Provide minimum rated life of 50,000 per LM 80 and LM 70 standards.
 - 4) Color Temperature: 3000k.
 - 5) Provide full spectrum color index of 65.

C. Factory Assembly:

1. Fixtures shall be fully assembled complete with necessary wiring, sockets, lamps, reflectors, ballasts, auxiliaries, plaster frames, recessing boxes, hangers, supports, lenses, diffusers, and other accessories essential for complete working installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Interface With Other Work:
 - 1. Coordinate with Sections under 09 9000 heading to ensure that light coves are properly painted before installation of light fixtures.
- B. Securely mount fixtures. Support fixtures weighing 50 lbs (23 kg) or more from building framing or structural members.

3.2 ADJUSTMENT

A. Repair scratches or nicks on exposed surfaces of fixtures to match original undamaged conditions.

END OF SECTION

Interior Lighting - 2 - 26 5100

Sandy FM Group Crescent 1, 16 & 24

COMMON EARTHWORK REQUIREMENTS

SECTION 31 0501

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited to:
 - 1. General procedures and requirements for earthwork.
- B. Related Requirements:
 - 1. Pre-Installation conferences held jointly with Section 31 0501 as described in Administrative Requirements on Part 1 of this specification section:

1.2 REFERENCES

A. Definitions:

- 1. Aggregate Base: Layer of granular material immediately below concrete and asphalt paving or miscellaneous site concrete (sidewalks, curbs, etc) and below interior concrete slabs on grade.
- Base: See aggregate base.
- 3. Building Grading: sloping of grounds immediately adjacent to building. Proper grading causes water to flow away from a structure. Grading can be accomplished either with machinery or by hand
- 4. Compacted Fill: Placement of soils on building site placed and compacted per Contract Documents. Used to replace soils removed during excavation or to fill in low spot on building site.
- Excavation: Removal of soil from project site or cavity formed by cutting, digging or scooping on project site.
- 6. Fine Grading (FG): Preparation of subgrade preceding placement of surfacing materials (aggregate base, asphalt or concrete paving, and topsoil) for contour of building site required. Fine Grading is conducted to ensure that earth forms and surfaces have been properly shaped and subgrade has been brought to correct elevations. It is performed after rough grading and placement of compacted fill but before placement of aggregate base or topsoil.
- 7. Finish Grading: Completed surface elevation of landscaping areas for seeding, sodding, and planting on building site.
- 8. Natural Grade: Undisturbed natural surface of ground.
- 9. Rough Grading (RG): Grading, leveling, moving, removal and placement of existing or imported soil to its generally required location and elevation. Cut and fill is part of rough grading.
- 10. Subgrade (definition varies depending upon stage of construction and context of work being performed):
 - a. Prepared natural soils on which fill, aggregate base, or topsoil is placed. or
 - b. Prepared soils immediately beneath paving or topsoil.
- 11. Topsoil Placement and Grading: Topsoil placement and finish grading work required to prepare site for installation of landscaping.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference for common earthwork sections:
 - Participate in pre-installation conference held jointly with following sections:
 - 1) Section 03 3112: 'Cast-In-Place Sidewalks, Curbs and Gutters'.
 - 2) Section 31 1123: 'Aggregate Base'.
 - 3) Section 31 2216: 'Fine Grading'.
 - 4) Section 31 2323: 'Fill'.

- b. In addition to agenda items specified in Section 01 3100, review following:
 - 1) Review protection requirements.
 - 2) Review cleaning requirements.
 - 3) Review safety issues.
 - 4) Review field tests and inspections requirements.

B. Sequencing:

- 1. General Earthwork:
 - a. Excavation.
 - b. Rough Grading.
 - c. Fill.
 - d. Fine Grading.
 - e. Aggregate Base or Topsoil Grading.

1.4 QUALITY ASSURANCE

A. Testing And Inspection:

- 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - a. Owner will employ testing agencies to perform testing and inspection as specified in Field Quality Control in Part 3 of this specification:
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Forty-eight (48) hours minimum before performing any work on site, contact Blue Stakes of Utah 811 to arrange for utility location services.
 - 2. Perform minor, investigative excavations to verify location of various existing underground facilities at sufficient locations to assure that no conflict with the proposed work exists and sufficient clearance is available to avoid damage to existing facilities.
 - 3. Perform investigative excavating ten (10) days minimum in advance of performing any excavation or underground work.
 - 4. Upon discovery of conflicts or problems with existing facilities, notify Architect by phone or fax within twenty-four (24) hours. Follow telephone or fax notification with letter and diagrams indicating conflict or problem and sufficient measurements and details to evaluate problem.

3.2 PREPARATION

A. Protection:

- Spillage:
 - a. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
 - b. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
- 2. Dust Control:
 - a. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.

- b. Correct or repair damage caused by dust.
- 3. Existing Plants And Features:
 - Do not damage tops, trunks, and roots of existing trees and shrubs on site that are intended to remain.
 - b. Do not use heavy equipment within branch spread.
 - c. Interfering branches may be removed only with permission of Architect.
 - d. Do not damage other plants and features that are to remain.

3.3 REPAIR / RESTORATION

- A. Adjust existing covers, boxes, and vaults to grade.
- B. Replace broken or damaged covers, boxes, and vaults.
- C. Independently confirm size, location, and number of covers, boxes, and vaults that require adjustment.

3.4 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - 1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform The Work or Contractors own Testing and Inspection services.
 - 2. Testing and inspection of earthwork operations is required.
 - 3. Field Tests and Laboratory Tests:
 - a. Owner reserves right to require additional testing to re-affirm suitability of completed work including compacted soils that have been exposed to adverse weather conditions.
 - Field Inspections:
 - a. Notify Architect forty-eight (48) hours before performing excavation or fill work.
 - b. If weather, scheduling, or any other circumstance has interrupted work, notify Architect twenty-four (24) hours minimum before intended resumption of grading or compacting.

B. Non-Conforming Work:

If specified protection precautions are not taken or corrections and repairs not made promptly,
 Owner may take such steps as may be deemed necessary and deduct costs of such from monies
 due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from
 responsibility for proper protection of The Work.

END OF SECTION

SECTION 31 1123

AGGREGATE BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

- 1. Furnish and install the following as described in Contract Documents:
 - a. Aggregate Base:
 - 1) Miscellaneous exterior concrete (sidewalks, curb, gutter and equipment pads).
 - 2) Asphalt paving.

B. Related Requirements:

- 1. Section 31 2216: 'Fine Grading' for subgrade procedures.
- 2. Section 31 2323: 'Fill' for compaction procedures and tolerances.

C. Related Requirements:

- 1. Section 01 0000: 'General Requirements':
 - a. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
 - b. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
- 2. Section 03 3112: 'Cast-In-Place Sidewalks, Curbs and Gutters'.
- 3. Section 31 0501: 'Common Earthwork Requirements' for:
 - a. General procedures and requirements for earthwork.
 - b. Pre-installation conference held jointly with other common earthwork related sections.
- 4. Section 31 2216: 'Fine Grading' for subgrade procedures.
- 5. Section 31 2323: 'Fill' for compaction procedures and tolerances.

1.2 REFERENCES

A. Definitions:

- 1. Aggregate (Asphalt Paving):
 - a. Aggregate: A hard inert mineral material, such as gravel, crushed rock, slag, or sand.
 - b. Coarse Aggregate: Aggregate retained on No. 8 (2.36 mm) sieve.
 - c. Dense-Graded Aggregate: Aggregate that is graded from maximum size down through filler with object of obtaining an asphalt mix with controlled void content and high stability.
 - d. Fine Aggregate: Aggregate passing No. 8 (2.36 mm) sieve.
 - e. Reclaimed Asphalt Pavement (RAP): Existing asphalt mixture that has been pulverized, usually by milling, and is used like an aggregate in recycling of asphalt pavements.

B. Reference Standards:

- ASTM International:
 - a. ASTM C131/C131M-14, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine'.
 - b. ASTM D1556/D1556M-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
 - c. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.
 - ASTM D1883-16, 'Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
 - e. ASTM D2167-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.
 - f. ASTM D2419-14, 'Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.

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- g. ASTM D4318-10, 'Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils'.
- h. ASTM D6938-17, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:

- 1. Participate in MANADORY pre-installation conference as specified in Section 31 0501.
- 2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
 - a. Review requirements and frequency of testing and inspections.
 - b. Review aggregate base installation requirements.
 - c. Review proposed miscellaneous exterior concrete schedule.
 - d. Review proposed asphalt paving schedule.
 - e. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review frequency of testing and inspections.

B. Sequencing:

- 1. Compaction as described in Section 31 2216 'Fine Grading'.
- 2. Aggregate Base:
 - a. Install aggregate base at location shown in Contract Drawings.
- Concrete Slab is installed.

C. Scheduling:

- 1. Miscellaneous exterior concrete:
 - a. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete for exterior site work concrete (sidewalks, curbs, gutters, etc.), footings, foundation walls, and building slabs to allow inspection of aggregate base.
- 2. Asphalt Paving:
 - Notify Testing Agency and Architect twenty-four (24) hours minimum before placing aggregate base to allow inspection of aggregate base.

1.4 SUBMITTALS

- A. Closeout Submittals:
 - Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency Testing and Inspecting Reports of aggregate base.

1.5 QUALITY ASSURANCE

- A. Testing And Inspection:
 - 1. Owner will provide Testing and Inspection for aggregate base:
 - a. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - b. Owner will employ testing agencies to perform testing and inspection for aggregate base as specified in Field Quality Control in Part 3 of this specification.
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - See Section 01 1200: 'Multiple Contract Summary'.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 - 1. Do not perform work during unfavorable conditions as specified below:
 - a. Aggregate Base:
 - 1) Presence of free surface water.
 - 2) Over-saturated sub base materials.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate Base:
 - 1. Under Asphalt Paving (Section 32 1216 'Asphalt Paving'):
 - a. New Aggregate Base:
 - 1) Road Base to conform to 1-1/2 inches (38 mm) minus State DOT Specifications and Gradations.
 - 2) Aggregate base shall be non plastic.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Stockpiles:
 - 1. Provide area for each stockpile of adequate size, reasonably uniform in cross-section, well drained, and cleared of foreign materials.
 - 2. Locate piles so that there is no contamination by foreign material and no intermingling of aggregates from adjacent piles. Do not use steel-tracked equipment on stockpiles.
 - 3. Do not store aggregates from different sources, geological classifications, or of different gradings in stockpiles near each other unless bulkhead is placed between different materials.
 - 4. Do not use washed aggregates sooner than twenty-four (24) hours after washing or until surplus water has drained out and material has uniform moisture content.
 - 5. Do not stockpile higher than 15 feet (4.57 m). Cover or otherwise protect stockpiles for use in HMA to prevent buildup of moisture.
- B. Surface Preparation (Asphalt Paving):
 - 1. Subgrade:
 - a. Finish grade parking surface area to grades required by Contract Documents.
 - Aggregate base and paving must be placed before any moisture or seasonal changes occur
 to subgrade that would cause compaction tests previously performed to be erroneous.
 Recompact and retest subgrade soils that have been left exposed to weather.

3.2 INSTALLATION

- A. Aggregate Base:
 - 1. General:
 - a. Do not place aggregate base material when subgrade is frozen or unstable.

Aggregate Base - 3 - 31 1123

- b. Spread aggregate base material with equipment except in limited or restricted areas where use of hand spreading is allowed.
- c. Spread aggregate base material in manner that does not break down material and eliminates segregation, ruts, and ridges.
- d. Correct damage to aggregate base caused by construction activities, and maintain corrected aggregate base until subsequent course is placed.
- e. Do not allow traffic on aggregate base.
- f. Remove all standing storm water.

B. Tolerances:

- Asphalt Paving Areas:
 - a. Aggregate base:
 - 1) 0.00 inches (0.00 mm) high.
 - Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
 - 3) Finished base course shall be true to line and grade within plus or minus 1/4 inch in 10 feet (6 mm in 3 meters).
 - 4) Maximum variation from required grades shall be 1/10 of one foot (28 mm).

3.3 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 - b. Miscellaneous exterior concrete areas:
 - Testing Agency shall provide testing and inspection for exterior aggregate base.
 - 2) Number of tests may vary at discretion of Architect.
 - Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
 - a) Sitework Areas: One test for every 10,000 sq. ft. (930 sq. m) or less of exterior pads area but no fewer than three tests.

END OF SECTION

Aggregate Base - 4 - 31 1123

SECTION 31 2216

FINE GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

- 1. Perform fine grading of subgrade work required to prepare site for paving finish grading and for placement of topsoil as described in Contract Documents.
- Asphalt Paving
 - a. Prepare natural soil subgrade as described in Section 31 2213 'Rough Grading' or prepare fill subgrade as described in this specification section for asphalt paving.
- 3. Miscellaneous Concrete Paving:
 - a. Prepare natural soil subgrade as described in Section 31 2213 'Rough Grading' or prepare fill subgrade as described in this specification section for concrete paving.

B. Related Requirements:

- 1. Section 01 0000: 'General Requirements':
 - a. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
 - b. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
- 2. Section 31 0501: 'Common Earthwork Requirements' for:
 - a. General procedures and requirements for earthwork.
 - b. Pre-installation conference held jointly with other common earthwork related sections.
 - c. Pre-installation conference held jointly with other common planting related sections.
- 3. Section 31 1123: 'Aggregate Base' for aggregate base requirements.
- 4. Section 31 2323: 'Fill' for compaction procedures and tolerances for base.
- 5. Section 32 1216: 'Asphalt Paving' for finish grading for asphalt paving.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:

- Participate in MANDATORY pre-installation conference as specified in Section 31 0501 and Section 32 9001.
- 2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
 - a. Review backfill requirements.
 - b. Review geotechnical report.
 - c. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.

B. Schedulina:

- 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before installation of fill / engineered fill to allow inspection.
- Allow special inspector to review all subgrades and excavations to determine if site has been prepared in accordance with geotechnical report prior to placing any fill, aggregate base or concrete.
- Allow inspection and testing agency to inspect and test subgrades and each fill or backfill layer.
 Proceed with subsequent earthwork only after inspections and test results for previously compacted work comply with requirements.

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1.3 SUBMITTALS

- A. Closeout Submittals:
 - Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency Testing and Inspecting Reports of fill / engineered fill.

1.4 QUALITY ASSURANCE

- A. Testing And Inspection:
 - 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2. Owner will provide Testing and Inspection for fill / engineering fill:
 - a. Owner will employ testing agencies to perform testing and inspection for fill / engineering fill as specified in Field Quality Control in Part 3 of this specification.
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection Of In-Place Conditions: Protect utilities and site elements from damage.
- B. General:
 - Limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures.
- C. Surface Preparation:
 - 1. Asphalt Paving:
 - a. Survey and stake parking surfaces to show grading required by Contract Documents.
 - b. Subgrade (material immediately below aggregate base):
 - 1) Compact subgrade as specified in Section 31 2213 (natural soils) and Section 31 2323 (fill).
 - 2) Fine grade parking surface area to grades required by Contract Documents.
 - 3) Subgrade to be constructed smooth and even.
 - 2. Concrete Paving:
 - Survey and stake parking surfaces to show grading required by Contract Documents.
 - b. Subgrade (material immediately below aggregate base):
 - 1) Compact subgrade as specified in Section 31 2213 (natural soils) and Section 31 2323 (fill).
 - 2) Fine grade parking surface area to grades required by Contract Documents.
 - 3) Subgrade to be constructed smooth and even.

3.2 PERFORMANCE

- A. General:
 - 1. Do not expose or damage existing shrub or tree roots.

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B. Tolerances:

- 1. Site Tolerances:
 - a. Subgrade (material immediately below aggregate base):
 - 1) 0.00 inches (0.00 mm) high.
 - 2) Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
 - Maximum variation from required grades shall be 1/10 of one foot (28 mm).
- 2. Aggregate Base (Asphalt Paving) Tolerances:
 - a. Aggregate base shall be 6 inches (150 mm) thick minimum after compaction, except where shown thicker on Drawings.
 - b. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
- 3. Aggregate Base (Concrete Paving) Tolerances:
 - a. Finished base course shall be 4 inches (100 mm) thick minimum after compaction and true to line and grade within plus or minus 1/4 inch in 10 feet (6 mm in 3 m).
- 4. Slope grade away from building as specified in Section 32 9120.

3.3 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
 - Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor:
 - Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 - 2. Site Preparation:
 - a. Prior to placement of fill / engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical report.
 - b. Footing subgrade: At footing subgrades, Certified Inspector is to verify that soils conform to geotechnical report.
 - 3. Fill / Engineered Fill:
 - a. Testing Agency shall provide testing and inspection for fine grading.
 - b. Number of tests may vary at discretion of Architect.
 - c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.

END OF SECTION

Fine Grading - 3 - 31 2216