



MHA-PALMS AT UNIVERSITY APARTMENTS

COMMISSION #: 15083.00

PROJECT MANUAL

VOLUME I

OCTOBER 12, 2017

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AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Stonewate at Lake Nona Senior Living

10298 Savannah Park Drive

Orlando, FL 32832

THE OWNER:

(Name, legal status and address)

Lake Nona Senior Housing, LLC

2200 Winter Springs Blvd., Suite 106-317

Oveido, Florida, 32765

THE ARCHITECT:

(Name, legal status and address)

Bessolo Design Group

7901 4th Street North, Suite 201

St. Petersburg, FL 33702

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the

Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or

encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

Additions and Deletions Report for **AIA[®] Document A201[™] – 2007**

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Kevin J. Bessolo, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:07:49 on 07/12/2012 under Order No. 3994788800_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007, General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

Supplementary Conditions of the Contract for Construction

U.S. Department of Housing
and Urban Development
Office of Housing
Federal Housing Commissioner

Article 1 – Labor Standards

Instructions

Whenever only FHA mortgage insurance is involved, use paragraph (A) and (C) of Article 1 – Labor Standards. Whenever any direct form of assistance (Section 8, Section 202/811 Capital Advance, grants etc.) is involved, use paragraphs (A) and (B) and (C) of Article 1 – Labor Standards.

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted or insured by the United States of America and the following Federal Labor Standards Provisions are included in this Contract or related instrument pursuant to the provisions applicable to such Federal assistance or insurance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR Part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2)** The classification is utilized in the area by the construction industry; and
- (3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs A.1.(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD

or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1)** That the payroll for the payroll period contains the information required to be maintained under 29 CFR Part 5.5(a)(3)(i) and that such information is correct and complete;
- (2)** That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
- (3)** That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph A.3.(ii)(b) of this section.

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph A.3.(i) of this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

4. (i) Apprentices and Trainees. Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act Requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as HUD or its designee may be appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration . . . makes, utters or publishes any statement, knowing the same to be false . . . shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

B. Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages, liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

3. Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. The Contractor will be required to execute FHA Form No. 2403-A, Contractor's Prevailing Wage Certificate, as a condition precedent to insurance by the Federal Housing Administration of that certain mortgage loan, or an advance thereof, made or to be made by the mortgagee in connection with the construction of the project.

Article 2 – Equal Employment Opportunity

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds

obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided setting forth the provisions of this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

C. The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided advising the said labor union or workers representatives of the Contractor's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

E. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

F. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulations or order of the Secretary of Labor, or as otherwise provided by law.

G. The Contractor will include the portion of the sentence immediately preceding paragraph A and the provisions of paragraphs A through G in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance. *Provided, however,* that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Secretary of Housing and Urban Development or the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

H. The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided, That* if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to

any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

I. The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

J. The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

Article 3 – Equal Opportunity for Businesses and Lower Income Persons Located Within the Project Area

(Applicable to Section 236 projects, where the estimated replacement cost of the project as determined by the Secretary of Housing and Urban Development exceeds \$500,000, and to all projects, including Section 236 regardless of estimated replacement cost, receiving rent supplement assistance under Title I, Section 101 of the Housing and Urban Development Act of 1965.)

A. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the unit of local government or the metropolitan area (or nonmetropolitan county) as determined by the Secretary of Housing and Urban Development in which the projects located and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the same metropolitan area (or nonmetropolitan county) as the project.

Article 4 – Health and Safety

A. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

B. The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).

C. The Contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development of the Secretary of Labor shall direct as a means of enforcing such provisions.

**SECTION 00100
INSTRUCTIONS TO BIDDERS**

PART 1- GENERAL

DESCRIPTION OF WORK

HUD Form 5369 "Instruction to Bidders for Contracts – Public and Indians Housing Programs," pages 1 through 4, dated Nov. 1992 follow this Section and are incorporated into the Contract Documents.

See Section 00110 "Supplementary Instructions to Bidders" for modifications to HUD Form 5369.

END OF SECTION

**U.S. Department of Housing and
Urban Development**
Office of Public and Indian Housing

**Instructions to Bidders for Contracts
Public and Indian Housing Programs**

Instructions to Bidders for Contracts

Public and Indian Housing Programs

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1. Bid Preparation and Submission

(a) Bidders are expected to examine the specifications, drawings, all instructions, and, if applicable, the construction site (see also the contract clause entitled **Site Investigation and Conditions Affecting the Work** of the *General Conditions of the Contract for Construction*). Failure to do so will be at the bidders' risk.

(b) All bids must be submitted on the forms provided by the Public Housing Agency/Indian Housing Authority (PHA/IHA). Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder's name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent's authority. (Bidders should retain a copy of their bid for their records.)

(c) Bidders must submit as part of their bid a completed form HUD-5369-A, "Representations, Certifications, and Other Statements of Bidders."

(d) All bid documents shall be sealed in an envelope which shall be clearly marked with the words "Bid Documents," the Invitation for Bids (IFB) number, any project or other identifying number, the bidder's name, and the date and time for receipt of bids.

(e) If this solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "No Bid" in the space provided for any item on which no price is submitted.

(f) Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.

(g) Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph or facsimile (fax) machines will not be considered.

(h) If the proposed contract is for a Mutual Help project (as described in 24 CFR Part 905, Subpart E) that involves Mutual Help contributions of work, material, or equipment, supplemental information regarding the bid advertisement is provided as an attachment to this solicitation.

2. Explanations and Interpretations to Prospective Bidders

(a) Any prospective bidder desiring an explanation or interpretation of the solicitation, specifications, drawings, etc., must request it at least 7 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written amendment to the solicitation, if that information is necessary in submitting bids, or if the lack of it would be prejudicial to other prospective bidders.

(b) Any information obtained by, or provided to, a bidder other than by formal amendment to the solicitation shall not constitute a change to the solicitation.

3. Amendments to Invitations for Bids

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date on the bid form, or (3) by letter, telegram, or facsimile, if those methods are authorized in the solicitation. The PHA/IHA must receive acknowledgement by the time and at the place specified for receipt of bids. Bids which fail to acknowledge the bidder's receipt of any amendment will result in the rejection of the bid if the amendment(s) contained information which substantively changed the PHA's/IHA's requirements.

(c) Amendments will be on file in the offices of the PHA/IHA and the Architect at least 7 days before bid opening.

4. Responsibility of Prospective Contractor

(a) The PHA/IHA will award contracts only to responsible prospective contractors who have the ability to perform successfully under the terms and conditions of the proposed contract. In determining the responsibility of a bidder, the PHA/IHA will consider such matters as the bidder's:

- (1) Integrity;
- (2) Compliance with public policy;
- (3) Record of past performance; and
- (4) Financial and technical resources (including construction and technical equipment).

(b) Before a bid is considered for award, the bidder may be requested by the PHA/IHA to submit a statement or other documentation regarding any of the items in paragraph (a) above. Failure by the bidder to provide such additional information shall render the bidder nonresponsible and ineligible for award.

5. Late Submissions, Modifications, and Withdrawal of Bids

(a) Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the PHA/IHA that the late receipt was due solely to mishandling by the PHA/IHA after receipt at the PHA/IHA; or

(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and observed holidays.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the PHA/IHA is the time/date stamp of PHA/IHA on the proposal wrapper or other documentary evidence of receipt maintained by the PHA/IHA.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and Failure by a bidder to acknowledge receipt of the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the PHA/IHA will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids; provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

6. Bid Opening

All bids received by the date and time of receipt specified in the solicitation will be publicly opened and read. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present.

7. Service of Protest

(a) Definitions. As used in this provision:

"Interested party" means an actual or prospective bidder whose direct economic interest would be affected by the award of the contract.

"Protest" means a written objection by an interested party to this solicitation or to a proposed or actual award of a contract pursuant to this solicitation.

(b) Protests shall be served on the Contracting Officer by obtaining written and dated acknowledgement from —

[Contracting Officer designate the official or location where a protest may be served on the Contracting Officer]

(c) All protests shall be resolved in accordance with the PHA's/IHA's protest policy and procedures, copies of which are maintained at the PHA/IHA.

8. Contract Award

(a) The PHA/IHA will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the PHA/IHA considering only price and any price-related factors specified in the solicitation.

(b) If the apparent low bid received in response to this solicitation exceeds the PHA's/IHA's available funding for the proposed contract work, the PHA/IHA may either accept separately priced items (see 8(e) below) or use the following procedure to determine contract award. The PHA/IHA shall apply in turn to each bid (proceeding in order from the apparent low bid to the high bid) each of the separately priced bid deductible items, if any, in their priority order set forth in this solicitation. If upon the application of the first deductible item to all initial bids, a new low bid is within the PHA's/IHA's available funding, then award shall be made to that bidder. If no bid is within the available funding amount, then the PHA/IHA shall apply the second deductible item. The PHA/IHA shall continue this process until an evaluated low bid, if any, is within the PHA's/IHA's available funding. If upon the application of all deductibles, no bid is within the PHA's/IHA's available funding, or if the solicitation does not request separately priced deductibles, the PHA/IHA shall follow its written policy and procedures in making any award under this solicitation.

(c) In the case of tie low bids, award shall be made in accordance with the PHA's/IHA's written policy and procedures.

(d) The PHA/IHA may reject any and all bids, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA's/IHA's written policy and procedures.

(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

(f) The PHA/IHA may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

(g) A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

9. Bid Guarantee (applicable to construction and equipment contracts exceeding \$25,000)

All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. In the case where the work under the contract will be performed on an Indian reservation area, the bid guarantee may also be an irrevocable Letter of Credit (see provision 10, Assurance of Completion, below). Certified checks and bank drafts must be made payable to the order of the PHA/IHA. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in the rejection of the bid. Bid guarantees submitted by unsuccessful bidders will be returned as soon as practicable after bid opening.

10. Assurance of Completion

(a) Unless otherwise provided in State law, the successful bidder shall furnish an assurance of completion prior to the execution of any contract under this solicitation. This assurance may be [Contracting Officer check applicable items] —

[] (1) a performance and payment bond in a penal sum of 100 percent of the contract price; or, as may be required or permitted by State law;

[] (2) separate performance and payment bonds, each for 50 percent or more of the contract price;

[] (3) a 20 percent cash escrow;

[] (4) a 25 percent irrevocable letter of credit; or,

[] (5) an irrevocable letter of credit for 10 percent of the total contract price with a monitoring and disbursements agreement with the IHA (applicable only to contracts awarded by an IHA under the Indian Housing Program).

(b) Bonds must be obtained from guarantee or surety companies acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. Individual sureties will not be considered. U.S. Treasury Circular Number 570, published annually in the Federal Register, lists companies approved to act as sureties on bonds securing Government contracts, the maximum underwriting limits on each contract bonded, and the States in which the company is licensed to do business. Use of companies listed in this circular is mandatory. Copies of the circular may be downloaded on the U.S. Department of Treasury website <http://www.fms.treas.gov/c570/index.html>, or ordered for a minimum fee by contacting the Government Printing Office at (202) 512-2168.

(c) Each bond shall clearly state the rate of premium and the total amount of premium charged. The current power of attorney for the person who signs for the surety company must be attached to the bond. The effective date of the power of attorney shall not precede the date of the bond. The effective date of the bond shall be on or after the execution date of the contract.

(d) Failure by the successful bidder to obtain the required assurance of completion within the time specified, or within such extended period as the PHA/IHA may grant based upon reasons determined adequate by the PHA/IHA, shall render the bidder ineligible for award. The PHA/IHA may then either award the contract to the next lowest responsible bidder or solicit new bids. The PHA/IHA may retain the ineligible bidder's bid guarantee.

11. Preconstruction Conference (applicable to construction contracts)

After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the PHA/IHA and its architect/engineer, and other interested parties convened by the PHA/IHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract (e.g., Equal Employment Opportunity, Labor Standards). The PHA/IHA will provide the successful bidder with the date, time, and place of the conference.

12. Indian Preference Requirements (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

(a) HUD has determined that the contract awarded under this solicitation is subject to the requirements of section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b)). Section 7(b) requires that any contract or subcontract entered into for the benefit of Indians shall require that, to the greatest extent feasible

(1) Preferences and opportunities for training and employment (other than core crew positions; see paragraph (h) below) in connection with the administration of such contracts or subcontracts be given to qualified "Indians." The Act defines "Indians" to mean persons who are members of an Indian tribe and defines "Indian tribe" to mean any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians; and,

(2) Preference in the award of contracts or subcontracts in connection with the administration of contracts be given to Indian organizations and to Indian-owned economic enterprises, as defined in section 3 of the Indian Financing Act of 1974 (25 U.S.C. 1452). That Act defines "economic enterprise" to mean any Indian-owned commercial, industrial, or business activity established or organized for the purpose of profit, except that the Indian ownership must constitute not less than 51 percent of the enterprise; "Indian organization" to mean the governing body of any Indian tribe or entity established or recognized by such governing body; "Indian" to mean any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act; and Indian "tribe" to mean any Indian tribe, band, group, pueblo, or community including Native villages and Native groups (including

corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

(b) (1) The successful Contractor under this solicitation shall comply with the requirements of this provision in awarding all subcontracts under the contract and in providing training and employment opportunities.

(2) A finding by the IHA that the contractor, either (i) awarded a subcontract without using the procedure required by the IHA, (ii) falsely represented that subcontracts would be awarded to Indian enterprises or organizations; or, (iii) failed to comply with the contractor's employment and training preference bid statement shall be grounds for termination of the contract or for the assessment of penalties or other remedies.

(c) If specified elsewhere in this solicitation, the IHA may restrict the solicitation to qualified Indian-owned enterprises and Indian organizations. If two or more (or a greater number as specified elsewhere in the solicitation) qualified Indian-owned enterprises or organizations submit responsive bids, award shall be made to the qualified enterprise or organization with the lowest responsive bid. If fewer than the minimum required number of qualified Indian-owned enterprises or organizations submit responsive bids, the IHA shall reject all bids and readvertise the solicitation in accordance with paragraph (d) below.

(d) If the IHA prefers not to restrict the solicitation as described in paragraph (c) above, or if after having restricted a solicitation an insufficient number of qualified Indian enterprises or organizations submit bids, the IHA may advertise for bids from non-Indian as well as Indian-owned enterprises and Indian organizations. Award shall be made to the qualified Indian enterprise or organization with the lowest responsive bid if that bid is -

(1) Within the maximum HUD-approved budget amount established for the specific project or activity for which bids are being solicited; and

(2) No more than the percentage specified in 24 CFR 905.175(c) higher than the total bid price of the lowest responsive bid from any qualified bidder. If no responsive bid by a qualified Indian-owned economic enterprise or organization is within the stated range of the total bid price of the lowest responsive bid from any qualified enterprise, award shall be made to the bidder with the lowest bid.

(e) Bidders seeking to qualify for preference in contracting or subcontracting shall submit proof of Indian ownership with their bids. Proof of Indian ownership shall include but not be limited to:

(1) Certification by a tribe or other evidence that the bidder is an Indian. The IHA shall accept the certification of a tribe that an individual is a member.

(2) Evidence such as stock ownership, structure, management, control, financing and salary or profit sharing arrangements of the enterprise.

(f) (1) All bidders must submit with their bids a statement describing how they will provide Indian preference in the award of subcontracts. The specific requirements of that statement and the factors to be used by the IHA in determining the statement's adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement shall be rejected as nonresponsive. The IHA may require that comparable statements be provided by subcontractors to the successful Contractor, and may require the Contractor to reject any bid or proposal by a subcontractor that fails to include the statement.

(2) Bidders and prospective subcontractors shall submit a certification (supported by credible evidence) to the IHA in any instance where the bidder or subcontractor believes it is infeasible to provide Indian preference in subcontracting. The acceptance or rejection by the IHA of the certification shall be final. Rejection shall disqualify the bid from further consideration.

(g) All bidders must submit with their bids a statement detailing their employment and training opportunities and their plans to provide preference to Indians in implementing the contract; and the number or percentage of Indians anticipated to be employed and trained. Comparable statements from all proposed subcontractors must be submitted. The criteria to be used by the IHA in determining the statement(s)'s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement(s), or that includes a statement that does not meet minimum standards required by the IHA shall be rejected as nonresponsive.

(h) Core crew employees. A core crew employee is an individual who is a bona fide employee of the contractor at the time the bid is submitted; or an individual who was not employed by the bidder at the time the bid was submitted, but who is regularly employed by the bidder in a supervisory or other key skilled position when work is available. Bidders shall submit with their bids a list of all core crew employees.

(i) Preference in contracting, subcontracting, employment, and training shall apply not only on-site, on the reservation, or within the IHA's jurisdiction, but also to contracts with firms that operate outside these areas (e.g., employment in modular or manufactured housing construction facilities).

(j) Bidders should contact the IHA to determine if any additional local preference requirements are applicable to this solicitation.

(k) The IHA [] does [] does not [Contracting Officer check applicable box] maintain lists of Indian-owned economic enterprises and Indian organizations by specialty (e.g., plumbing, electrical, foundations), which are available to bidders to assist them in meeting their responsibility to provide preference in connection with the administration of contracts and subcontracts.

**SECTION 00110
SUPPLEMENTARY INSTRUCTION TO BIDDERS**

PART I – GENERAL

1.01 SCOPE

- A. This Section sets forth the modifications and additions to Section 00100 "Instructions to Bidders" HUD Form 5369.
- B. In those instances that a clause is amended, modified, voided, or superseded, the provisions of such Clause not specifically amended, modified, voided or superseded shall remain in effect. Should a conflict exist between the provisions of the Agreement, and those of the Specifications, the requirements of the Agreement shall apply.

1.02 MODIFICATIONS AND ADDITIONS

- A. Clause 2, add the following subclause (C): "(C) Contractor must submit questions concerning interpretations and bidding in writing to: Bessolo Design Group, Contact: Project Architect, 7901 4th Street North, Suite 200, St. Petersburg, FL 33702 (727.894.4453)/ph or (727) 896-8662 fax).
- B. Clause 12, Indian Preference Requirements: Delete Clause 12 in its entirety.

END OF SECTION

SECTION 00200 **GENERAL ABBREVIATIONS**

AB	ANCHOR BOLT	EA	EACH
AC	ACOUSTICAL	EF	EXHAUST FAN
A/C	AIR CONDITIONING	EJ	EXPANSION JOINT
ADJ	ADJUSTABLE	EJF	EXPANSION JOINT FILLER
AFF	ABOVE FINISH FLOOR	EL	ELEVATION
AHU	AIR HANDLING UNIT	ELEV	ELEVATOR
AL	ALUMINUM	EMER	EMERGENCY
ALT	ALTERNATE	EQ	EQUAL
ANCH	ANCHOR, ANCHORAGE, ANCHORED	EW	ELECTRIC WATER COOLER
APPROX	APPROXIMATE	EXH	EXHAUST
ARCH	ARCHITECTURAL	EXIST	EXISTING
AT	ACCOUSTICAL TILE	EXP	EXPOSED
@	AT	EXPAN	EXPANSION/EXPAND(ED)
		EXT	EXTERIOR
		EXTR	EXTRUDED
BA	BRONZE ANODIZED		
BD	BOARD	FD	FLOOR DRAIN
BLDG	BUILDING	FE	FIRE EXTINGUISHER
BLK	BLOCK	FEC	FIRE EXTINGUISHER CABINET
BLKG	BLOCKING	FFE	FINISH FLOOR ELEVATION
BM	BENCH MARK	FHC	FIRE HOSE CABINET
B.M.	BEAM	FIN	FINISH(ED)
BOT	BOTTOM	FL	FLOOR(ING)
BRK	BRICK	FLG	FLASHING
		FOC	FACE OF CONCRETE
CF	CUBIC FEET	FOF	FACE OF FINISH
CJ	CONTROL JOINT	FOM	FACE OF MASONRY
CL	CENTER LINE	FOS	FACE OF STUDS, FACE OF STEEL
CLG	CEILING	FT	FOOT
CMU	CONCRETE MASONRY UNIT	FTG	FOOTING
COL	COLUMN	FURR	FURRED (ING)
CONC	CONCRETE		
CONN	CONNECTION	GA	GAGE/GAUGE
CONST	CONSTRUCTION	GB	GRAB BAR
CPT	CARPET (ED)	GL	GLASS/GLAZING
CT	CERAMIC TILE	GND	GROUND
CW	COLD WATER	GT	GROUT
CY	CUBIC YARDS	GV	GALVANIZED
		GWB	GYPSON WALL BOARD
DET	DETAIL	HB	HOSE BIB
DIAM OR Ø	DIAMETER	HC	HOLLOW CORE
DIM	DIMENSION	HCU	HANDICAPPED UNIT
DN	DOWN	HD	HEAVY DUTY
DR	DOOR	HDW	HARDWARE
DS	DOWN SPOUT	HM	HOLLOW METAL

MHA-PALMS AT UNIVERSITY APARTMENTS**15083.00**

DWG	DRAWING(S)	HOR	HORIZONTAL
		HR	HANDRAIL
		HT	HEIGHT
		HVAC	HEATING/VENTILATING/AIR CONDITIONING
		HW	HOT WATER
INCL	INCLUDE (D) (ING)	PWD	PLYWOOD
INT	INTERIOR		
		QT	QUARRY TILE
JB	JUNCTION BOX		
		R	RISER
LAM	LAMINATE(D)	RAD	RADIUS
LAV	LAVATORY	RCP	REINFORCED CONCRETE PIPE
LF	LINEAR FOOT	RD	ROOF DRAIN
LL	LIVE LOAD	REF	REFRIGERATOR
LTL	LINTEL	REQD	REQUIRED
LW	LIGHTWEIGHT	RES	RESILIENT
		REV	REVISION (S), REVISED
MAS	MASONRY	RFG	ROOFING
MAT	MATERIAL	RM	ROOM
MAX	MAXIMUM	R.O.W.	RIGHT OF WAY
MET	METAL		
MIN	MINIMUM	SC	SOLID CORE
MISC	MISCELLANEOUS	SCN	SCREEN
MO	MASONRY OPENING	SEAL	SEALANT
MTG	MOUNTING, MOUNTED	SH	SHELF
MULL	MULLION	SHT	SHEET
		SHTG	SHEATHING
N	NORTH	SIM	SIMILAR
NIC	NOT IN CONTRACT	SL	SLOPE
NO (#)	NUMBER	SPEC	SPECIFICATION(S), SPECIFIED
NTS	NOT TO SCALE	SQ	SQUARE
		SS	STAINLESS STEEL
OA	OERALL	STC	SOUND TRANSMISSION COEFFICIENT
OBS	OBSECURE		
OC	ON CENTER (S)	STD	STANDARD
OH	OVERHEAD	STL	STEEL
OP	OPAQUE	STN	STAIN
OPG	OPENING	STO	STORAGE
OPH	OPPOSITE HAND	STR	STRUCTURAL
OPP	OPPOSITE	SUS	SUSPENDED
		SV	SHEET VINYL
PB	PANIC BAR	SY	SQUARE YARD
PERI	PERIMETER	SYM	SYMMETRICAL
PERP	PERPENDICULAR		
PL (PL)	PLATE	T	TREAD
P.L.	PROPERTY LINE	TB	TOWEL BAR
PLAM	PLASTIC LAMINATE	TEL	TELEPHONE JACK
PLAS	PLASTER	T&G	TONGUE AND GROOVE
PNL	PANEL	THK	THICK (NESS)

MHA-PALMS AT UNIVERSITY APARTMENTS**15083.00**

PNT	PAINT		
PR	PAIR	THR	THRESHOLD
PSF	POUNDS PER SQUARE FOOT	TPD	TOILET PAPER DISPENSER
PSI	POUNDS PER SQUARE INCH	TV	TELEVISION JACK
PT	PRESSURE TREATED	TXP	TEXTURED PAINT
PTD	PAPER TOWEL DISPENSER		(i.e. POPCORN)
PTN	PARTITION	TYP	TYPICAL
PVC	POLYVINYL CHLORIDE		
UC	UNDERCUT		
UNO	UNLESS NOTED OTHERWISE		
VB	VAPOR BARRIER		
VCT	VINYL COMPOSITION TILE		
VERT	VERTICAL		
VF	VINYL FABRIC		
VIN	VINYL		
W/	WITH		
WC	WATERCLOSET		
WD	WOOD		
WG	WIRED GLASS		
W/O	WITHOUT		
WP	WATERPROOF (ING)		
WPP	WATERPROOF PAINT		
W.PT.	WORKING POINT		
WR	WATER REPELLENT		
WS	WATER STOP		
WWF	WELDED WIRE FABRIC		

SECTION 00300
BID PROPOSAL FORM

PROPOSAL FORM

(Submit in quadruplet on Contractor's Letterhead)

DATE:

TIME:

For: MHA-Palms at University Apartments

Gentlemen:

The undersigned, hereinafter called "Bidder," having visited the site of the proposed project and familiarized himself with the local conditions, nature and extent of the Work, and having examined carefully the Drawings, Specifications, the Form of Agreement, and other Contract Documents with the Bond requirements therein, proposes to furnish all labor, materials, equipment and other items, facilities, and services for the proper execution and completion of

_____, in full accordance with the Advertisement for Bid, Invitation to Bid, Instructions to Bidders, and all other documents relating thereto, on file in the office of _____ and, if awarded the Contract, to complete the said Work within the time limits specified or stipulated herein for the following Bid price.

Base Bid: _____

Dollars \$ _____

With foregoing as a Base Bid, the following cost of alternate proposals are submitted in accordance with the drawings and specifications.

The Bidder hereby agrees that:

- a. The above proposal shall remain in full force and effect for a period of ninety (90) calendar days after the time and date of receipt of Bids and that this Bidder will not revoke or cancel this proposal or withdraw from the competition within the said ninety (90) calendar days.
- b. In case he be notified in writing by mail, telegraph, or delivery of the acceptance of this proposal within ninety (90) days after the time set for the opening of bids, the undersigned agrees to execute within ten (10) days a formal written contract for the work for the above stated compensation and at the time to furnish and deliver to the Owner a Performance Bond and a Payment Bond in accordance with the requirements of the Supplementary General Conditions of the Contract, both in an amount equal to 100% of the contract sum or shall assure completion per Clause 10 of HUD- Form 5369. The premium for such bond will be paid by the Prime Contractor.
- c. The undersigned agrees to commence actual physical work on the site with an adequate force and equipment within ten (10) calendar days of the date of receipt of written notice to commence and to complete fully all work within ____ consecutive calendar days from and including said date.
- d. Enclosed herewith is a bid bond in the amount of _____ Dollars (\$) (being not less than 5% of the Base Bid). The undersigned agrees that the above stated amount is the proper measure of liquidated damages, which the Owner will sustain by the failure of the undersigned to execute the contract and to furnish the Performance Bond and Payment Bond in case this proposal is accepted, and further agrees to the following:

*If this proposal is accepted within ninety (90) after the date set for the opening of bids and the undersigned fails to execute the contract within ten (10) days after notice of such acceptance or if he fails to furnish both Performance Bond and Payment Bond, and proper insurance, the obligation of the bid bond will remain in full force and effect and money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failures; otherwise, obligation of the Bond will be null and void.

*If the Contractor should fail, for reasons other than enumerated in General Condition HUD Form 5370, Clause 32, "Default" and other applicable clauses subsequently determined as nonjustifiable by the Owner to complete the project by the stipulated time, then the Contractor shall hereby agree as condition on this contract to pay to the Owner, amounts in accordance with the following, not as a penalty but as liquidated damages for such breach of contract, for each calendar day that the Contractor shall be in default after stipulated date.

LIQUIDATED DAMAGES _____

The above amount is agreed upon as a proper measure of liquidated damages which Owner will sustain per day, by failure of Contractor to complete work at stipulated time and is not construed in any penalty.

Attached is a fully and truthfully executed form HUD-5369, "Representation, Certifications, and other Statements of Bidders – Public and Indian Housing Programs."

Attached is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposals for the contract for which this proposal is submitted. Attached is a Sworn Statement Pursuant to Section 287.133 (3)(a), Florida Statutes, on Public Entity Crimes.

Note: The penalty for making false statements in offer is prescribed in 18 U.S.C. 1001.

This total base price includes all sitework and general construction, electrical and mechanical work shown and called for by the drawings and specifications.

GUARANTEED MAXIMUM PRICE BREAKDOWN:

The undersigned further states that the Guaranteed Maximum Price noted above, when broken down, is comprised of the following costs for the _____ (does not include any of the Alternate Prices), which are not for the addition to or deletion from the Base Bid. The breakdown is required for the bid to be considered complete.

DIVISION 1 – GENERAL CONDITIONS \$ _____
(Provide separate detail page)

DIVISION 2 – SITEWORK

02110	Clearing and Grubbing	\$ _____
02200	Earthwork	\$ _____
02282	Termite Control	\$ _____
02441	Irrigation	\$ _____
02495	Site Accessories	\$ _____
02511	Bituminous Paving Areas (subbase, paving, etc)	\$ _____
02520	Site Concrete Work	\$ _____
02630	Storm Drainage	\$ _____
02665	Water Distribution System	\$ _____
02700	Sewage Collection System	\$ _____
02750	Integrally Colored Concrete	\$ _____
02900	Plantings, Seeding, Landscape, Sod	\$ _____
	Site Electrical/Secondary feeders/conduits	\$ _____
	Other Division 2 Work (provide detail page)	\$ _____

DIVISION 2 – TOTAL \$ _____

DIVISION 3 – Concrete \$ _____

03300	Cast in place Concrete	\$ _____
03410	Structure precast	\$ _____
	Other Division 3 Work (provide detail page)	\$ _____

DIVISION 3 – TOTAL \$ _____

DIVISION 4 – Masonry \$ _____

04200	Unit Masonry	\$ _____
04700	Manufactured Masonry	\$ _____
	Other Division 4 Work (provide detail page)	\$ _____

DIVISION 4 – TOTAL \$ _____

DIVISION 5 – Metals \$ _____

05500	Metal Fabrications	\$ _____
05520	Metal Handrails & Railings	\$ _____
	Other Division 5 Work (provide detail page)	\$ _____

DIVISION 5 – TOTAL \$ _____

DIVISION 6 – Wood & Plastics

06100	Rough Carpentry	\$	_____
06176	Metal Plate Connected Wood Trusses	\$	_____
06402	Interior Architectural Woodwork	\$	_____
06610	Glass Fiber and Resin Fabrications	\$	_____
	Other Division 6 Work (provide detail page)	\$	_____

DIVISION 6 – TOTAL \$ _____

DIVISION 7 – Thermal & Moisture Protection

07100	Fluid Applied Waterproofing	\$	_____
07210	Insulation	\$	_____
07311	Fiberglass Shingles	\$	_____
07540	Asphalt & Membrane Roofing	\$	_____
07710	Gutters, Downspouts Siding, & Soffits	\$	_____
07720	Roofing Accessories	\$	_____
07900	Joint Sealers	\$	_____
	Other Division 7 Work (provide detail page)	\$	_____

DIVISION 7 – TOTAL \$ _____

DIVISION 8 – Doors & Glass

08160	Composite Doors	\$	_____
08220	FRP Doors	\$	_____
08305	Access Doors	\$	_____
08461	Automatic Doors	\$	_____
08520	Vinyl Windows	\$	_____
08710	Door Hardware	\$	_____
08800	Glass and Glazing	\$	_____
	Other Division 8 Work (provide detail page)	\$	_____

DIVISION 8 – TOTAL \$ _____

DIVISION 9 – Finishes

09220	Portland Cement Plaster	\$	_____
09255	Gypsum Board System	\$	_____
09311	Ceramic Tile, Marble & Quarry Tile	\$	_____
09511	Acoustical Ceilings	\$	_____
09650	Resilient Flooring & Vinyl Base	\$	_____
09688	Carpet	\$	_____
09900	Painting	\$	_____
	Other Division 9 Work (provide detail page)	\$	_____

DIVISION 9 – TOTAL \$ _____

DIVISION 10 – Specialties	\$ _____
10000 Miscellaneous Specialties	\$ _____
10260 Wall and Corner Guards	\$ _____
Other Division 10 Work (provide detail page)	\$ _____
DIVISION 10 – TOTAL	\$ _____
DIVISION 11 – Equipment	\$ _____
11175 Trash Chutes	\$ _____
11400 Residential Appliances	\$ _____
Other Division 11 Work (provide detail page)	\$ _____
DIVISION 11 – TOTAL	\$ _____
DIVISION 12 – Furnishings (Banquettes by Owner)	
Other Division 12 Work (provide detail page)	\$ _____
DIVISION 12 – TOTAL	\$ _____
DIVISION 13 – Not Used	
DIVISION 14 – Conveying Systems	
14210 Elevators	\$ _____
Other Division 14 Work (provide detail page)	\$ _____
DIVISION 14 – TOTAL	\$ _____
DIVISION 15 – Mechanical (Sections 15010-15860)	
Water Softener	\$ _____
Plumbing excluding fixtures	\$ _____
Plumbing Fixtures	\$ _____
HVAC excluding AC units	\$ _____
HVAC Units	\$ _____
Fire Sprinkler System	\$ _____
Other Division 15 Work (provide detail page)	\$ _____
DIVISION 15 – TOTAL	\$ _____

DIVISION 16 – Electrical

16010	Supplementary General Conditions	\$ _____
16040	Power, Wiring, and Devices	\$ _____
16511	Lighting Controls - Interior	\$ _____
16521	Lighting Controls - Exterior	\$ _____
16670	Lightning Protection System	\$ _____
16721	Fire Alarm System	\$ _____
	Other Division 16 Work (provide detail page)	\$ _____

DIVISION 16 – TOTAL \$ _____

FEE \$ _____

INSURANCE \$ _____

PAYMENT AND PERFORMANCE BOND \$ _____

TOTAL GUARANTEED MAXIMUM BASE BID \$ _____

ALTERNATES

The Undersigned proposes the following alternate prices for work more fully described in the Contract Documents. It is understood that the Owner shall accept or reject the alternates as his own best interests shall determine. All alternates noted with "(Price Required)": are to be completed for the Bid Proposal to be considered complete. None of the alternate Prices are to be included in the Guaranteed Maximum Base Bid Price. All alternate prices are to include full compensation for the work including overhead and profit.

ALTERNATE NO. 1: (Price Required)

ADD/DEDUCT \$ _____

ALTERNATE NO. 2: (Price Required)

ADD/DEDUCT \$ _____

ALTERNATE NO. 3: (Price Required)

ADD/DEDUCT \$ _____

ALTERNATE NO. 4: (Price Required)

ADD/DEDUCT \$ _____

ALTERNATE NO. 5: (Price Required)

ADD/DEDUCT \$ _____**BID ACCEPTANCE:**

In submitting this proposal, the undersigned understands that the right is reserved by the Architect to reject any and all bids or parts thereof and to waive any informalities, defects or irregularities in the bids, as may be deemed in its best interest. If written notice of acceptance of this proposal is mailed, telegraphed, faxed, or delivered to the undersigned within forty-five (45) days after the opening thereof, or at any time thereafter before this Proposal is withdrawn, the undersigned agrees to execute and deliver the Contract in the prescribed form and furnish a Performance and Payment Bond, each in a sum equal to 100% of the total contract price, and the policies of insurance or certificates of insurance within seven (7) days after the Contract is executed by the Owner.

TIME OF COMPLETION:

We, the undersigned agree to commence with construction within _____ calendar days after signing a Contract, and to complete the project within _____ calendar days after Notice To Proceed from the Owner. Contract includes _____ days of inclement weather. Time is of the essence in this project, and the contract will provide that if the contractor fails to commence work and complete the project in the time frame stated above, or an approved extension thereof, the contractor shall pay to the Owner as fixed, agreed and liquidated damages, but not as a penalty, the sum of \$300.00 for each calendar day of delay.

We, the undersigned, acting through its authorized officers and intending to be legally bound, agree that this Bid Proposal shall constitute an offer by the undersigned to enter into a contract with the acts and things therein provided, which offer shall be irrevocable for a period of 60 calendar days from the date of the opening hereof and that the Owner may accept this offer at any time during said period by notifying the undersigned of the acceptance of said offer. To the extent the period specified herein is in excess of any period specified by law for award of contract, submissions of this Proposal constitutes the written consent of the undersigned to an extension of time for award of the contract to the end of such period.

ADDENDA:

The undersigned agrees that the following addenda, which have been issued during the bidding period, have been received and have been considered both before and in the preparation of this proposal.

Addendum No. _____ dated _____

Addendum No. _____ dated _____

Addendum No. _____ dated _____

CONTRACTOR'S STATEMENTS OF BID QUALIFICATION:**ADDRESS, LEGAL STATUS AND SIGNATURE OF BIDDER:**

The undersigned Bidder does hereby designate the address given below as the legal address to which all notices, directions, or other communications shall be served or mailed.

The undersigned in submitting this proposal to Bessolo Design Group, Inc., and in consideration of receipt and consideration of this proposal by Bessolo Design Group, Inc., intends to be legally bound by this proposal.

The undersigned Bidder does hereby declare that the Bidder has the legal status checked below:

_____ Individual _____ Partnership
_____ Corporation incorporated under the laws of _____

Attached is the M.B.E. Utilization Summary 00710, page 4.

Florida Construction Industries Licensing Board Certification.

_____ (Name of Holder) _____ (Certificate no.)

In witness whereof, the bidder has hereunto set this signature and affixed his seal this
_____ day of _____, 200__ AD.

(CORPORATE SEALED IF BIDDER IS A CORPORATION)

BIDDER: _____
NAME

BY: _____
NAME

TITLE

Witness (Secretary's Attest)
if Bidder is Corporation

**SWORN STATEMENT UNDER SECTION 287.133(3)(A),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES**

(To be signed in the presence of notary public or other officer authorized to administer oaths)

DESCRIPTION:

STATE OF _____

COUNTY OF _____

Before me, the undersigned authority, personally appeared _____ who, being by me first duly sworn, made the following statement:

1. The business address of _____ (name of offeror or business) is
_____.
2. My relationship to: _____ (name of offeror or business) is
_____ (relationship such as sole proprietor, partner, president, vice president).
3. I understand that a public entity crime as defined in Section 287.133 of the Florida Statutes includes a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity in Florida or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any proposal or contract for goods or services to be provided to any public entity or such an agency or political subdivision and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy or material misrepresentation.
4. I understand that "convicted" or "conviction" is defined by the Florida Statutes to mean a finding of guilty or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilt or nolo contendere.
5. I understand that "affiliate" is defined by the Florida Statutes to mean (1) a predecessor or successor of a person or a corporation convicted of a public entity crime, or (2) an entry under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime, or (3) those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate, or (4) a person or corporation who knowingly entered into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months.

6. Neither the offeror or contractor, nor any officer, director, executive, partner, shareholder, employee, member or agent who is active in the management of the offeror or contractor has been convicted of a public entity crime subsequent to July 1, 1989.

(Draw a line through paragraph 6 if paragraph 7 below applies.)

7. There has been a conviction of a public entity crime by the offeror or contractor, or an officer, director, executive, partner, shareholder, employee, member or agent of the offeror or contractor who is active in the management of the offeror or contractor or an affiliate of the offeror or contractor. A determination has been made pursuant to Section 287.133(3) by order of the Division of Administrative Hearings that it is not in the public interest for the name of the convicted person or affiliate to appear on the convicted vendor list. The name of the convicted person or affiliate is _____. A copy of the order of the Division of Administrative Hearings is attached to this statement.

(Draw a line through paragraph 7 if paragraph 6 above applies.)

(Signature)

(Print name)

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____,
_____ by _____, who is personally known to me or who has produced
_____ as identification and who did take an oath.

Notary Public

My Commission expires:

**SECTION 00320
REPRESENTATIONS, CERTIFICATIONS AND OTHER
STATEMENTS OF BIDDERS**

PART I – GENERAL

DESCRIPTION OF WORK:

HUD Form 5369-A "Representations, Certifications, and other Statements of Bidders – Public and Indian Housing, " pages one through three inclusive, dated November 1992 follow this Section and are hereby included in the Project Manual and are incorporated into the Contract Documents.

Bidders shall include a fully and truthfully executed original of this form, along with the specified number of conformed copies, with the bid package. Failure to do so may be grounds for rejection of the bid as being non-responsive. Bidders must fill in the appropriate information in the blank spaces of the form and check the appropriate boxes where applicable. Bidders are hereby informed that certain clauses may or may not be applicable to this solicitation, based upon the dollar value of the bid proposal being submitted. Bidders shall be solely responsible for determining the applicable clauses where the contract dollar amount (amount of the bid proposal) is the deciding factor. Where the contract amount may be affected by bid alternates, Bidders shall complete the form based upon the highest possible dollar value.

For purposes of this solicitation, bidders are hereby informed that Clause 8 of the following Form HUD-5369-A is not applicable.

END OF SECTION

**U.S. Department of Housing
and Urban Development**
Office of Public and Indian Housing

**Representations, Certifications,
and Other Statements of Bidders**
Public and Indian Housing Programs

Representations, Certifications, and Other Statements of Bidders

Public and Indian Housing Programs

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1. Certificate of Independent Price Determination

(a) The bidder certifies that--

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to (i) those prices, (ii) the intention to submit a bid, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a competitive proposal solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory--

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

[insert full name of person(s) in the bidder's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder's organization];

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the bidder deletes or modifies subparagraph (a)2 above, the bidder must furnish with its bid a signed statement setting forth in detail the circumstances of the disclosure.

[] [Contracting Officer check if following paragraph is applicable]

(d) Non-collusive affidavit. (applicable to contracts for construction and equipment exceeding \$50,000)

(1) Each bidder shall execute, in the form provided by the PHA/IHA, an affidavit to the effect that he/she has not colluded with any other person, firm or corporation in regard to any bid submitted in response to this solicitation. If the successful bidder did not submit the affidavit with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the affidavit by that date may render the bid nonresponsive. No contract award will be made without a properly executed affidavit.

(2) A fully executed "Non-collusive Affidavit" [] is, [] is not included with the bid.

2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

"Bona fide employee" means a person, employed by a bidder and subject to the bidder's supervision and control as to time, place, and manner of performance, who neither exerts, nor proposes to exert improper influence to solicit or obtain contracts nor holds out as being able to obtain any contract(s) through improper influence.

"Improper influence" means any influence that induces or tends to induce a PHA/IHA employee or officer to give consideration or to act regarding a PHA/IHA contract on any basis other than the merits of the matter.

(b) The bidder represents and certifies as part of its bid that, except for full-time bona fide employees working solely for the bidder, the bidder:

(1) [] has, [] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [] has, [] has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(c) If the answer to either (a)(1) or (a)(2) above is affirmative, the bidder shall make an immediate and full written disclosure to the PHA/IHA Contracting Officer.

(d) Any misrepresentation by the bidder shall give the PHA/IHA the right to (1) terminate the contract; (2) at its discretion, deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions (applicable to contracts exceeding \$100,000)

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of a contract resulting from this solicitation;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the bidder shall complete and submit, with its bid, OMB standard form LLL, "Disclosure of Lobbying Activities;" and

(3) He or she will include the language of this certification in all subcontracts at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

(d) Indian tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) are exempt from the requirements of this provision.

4. Organizational Conflicts of Interest Certification

The bidder certifies that to the best of its knowledge and belief and except as otherwise disclosed, he or she does not have any organizational conflict of interest which is defined as a situation in which the nature of work to be performed under this proposed contract and the bidder's organizational, financial, contractual, or other interests may, without some restriction on future activities:

- (a) Result in an unfair competitive advantage to the bidder; or,
(b) Impair the bidder's objectivity in performing the contract work.
[] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

5. Bidder's Certification of Eligibility

(a) By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government, HUD, or the State in which this contract is to be performed; or,

(2) Participate in HUD programs pursuant to 24 CFR Part 24.

(b) The certification in paragraph (a) above is a material representation of fact upon which reliance was placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal contract programs.

6. Minimum Bid Acceptance Period

(a) "Acceptance period," as used in this provision, means the number of calendar days available to the PHA/IHA for awarding a contract from the date specified in this solicitation for receipt of bids.

(b) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(c) The PHA/IHA requires a minimum acceptance period of [Contracting Officer insert time period] calendar days.

(d) In the space provided immediately below, bidders may specify a longer acceptance period than the PHA's/IHA's minimum requirement. The bidder allows the following acceptance period: calendar days.

(e) A bid allowing less than the PHA's/IHA's minimum acceptance period will be rejected.

(f) The bidder agrees to execute all that it has undertaken to do, in compliance with its bid, if that bid is accepted in writing within (1) the acceptance period stated in paragraph (c) above or (2) any longer acceptance period stated in paragraph (d) above.

7. Small, Minority, Women-Owned Business Concern Representation

The bidder represents and certifies as part of its bid/ offer that it --

(a) [] is, [] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [] is, [] is not a women-owned business enterprise. "Women-owned business enterprise," as used in this provision, means a business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [] is, [] is not a minority business enterprise. "Minority business enterprise," as used in this provision, means a business which is at least 51 percent owned or controlled by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals. For the purpose of this definition, minority group members are:

(Check the block applicable to you)

- | | |
|------------------------|------------------------------|
| [] Black Americans | [] Asian Pacific Americans |
| [] Hispanic Americans | [] Asian Indian Americans |
| [] Native Americans | [] Hasidic Jewish Americans |

8. Indian-Owned Economic Enterprise and Indian Organization Representation (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

The bidder represents and certifies that it:

(a) [] is, [] is not an Indian-owned economic enterprise. "Economic enterprise," as used in this provision, means any commercial, industrial, or business activity established or organized for the purpose of profit, which is at least 51 percent Indian owned. "Indian," as used in this provision, means any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act.

(b) [] is, [] is not an Indian organization. "Indian organization," as used in this provision, means the governing body of any Indian tribe or entity established or recognized by such governing body. Indian "tribe" means any Indian tribe, band, group, pueblo, or

community including Native villages and Native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

9. Certification of Eligibility Under the Davis-Bacon Act (applicable to construction contracts exceeding \$2,000)

(a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

10. Certification of Nonsegregated Facilities (applicable to contracts exceeding \$10,000)

(a) The bidder's attention is called to the clause entitled **Equal Employment Opportunity** of the General Conditions of the Contract for Construction.

(b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.

(d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed \$10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:

(1) Obtain identical certifications from the proposed subcontractors;

(2) Retain the certifications in its files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause of the prime contract. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

Note: The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

11. Clean Air and Water Certification (applicable to contracts exceeding \$100,000)

The bidder certifies that:

(a) Any facility to be used in the performance of this contract [] is, [] is not listed on the Environmental Protection Agency List of Violating Facilities:

(b) The bidder will immediately notify the PHA/IHA Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the bidder proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and,

(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

12. Previous Participation Certificate (applicable to construction and equipment contracts exceeding \$50,000)

(a) The bidder shall complete and submit with his/her bid the Form HUD-2530, "Previous Participation Certificate." If the successful bidder does not submit the certificate with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the certificate by that date may render the bid nonresponsive. No contract award will be made without a properly executed certificate.

(b) A fully executed "Previous Participation Certificate" [] is, [] is not included with the bid.

13. Bidder's Signature

The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

(Signature and Date)

(Typed or Printed Name)

(Title)

(Company Name)

(Company Address)

**SECTION 00330
FORM OF NON-COLLUSIVE AFFIDAVIT**

STATE OF FLORIDA
_____ COUNTY

_____, being first duly sworn, deposes and says that he is _____, (A partner or officer of the firm of, etc.) the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference with any person, to fix the bid price or affiant or of any other bidder, or to fix any overhead, profit, or cost element of said bid price, or of that of any other bidder, or to secure any advantage against _____ HOUSING AUTHORITY or any person interested in the proposed Contract; and that all statements in said Proposal or Bid are true.

Signature of Bidder,
if Bidder is an individual

Signature of Partner,
if Bidder is a Partner

Signature of Officer,
if Bidder is a corporation
(Corporate seal required if
Corporation)

Subscribed and sworn to before me this _____ Day of _____ 20____.

Notary Public

My Commission expires _____

END OF SECTION

**SECTION 00400
PREVIOUS PARTICIPATION CERTIFICATE**

PART I - GENERAL

HUD Form 2530, "Previous Participation Certificate", pages one and two inclusive; and "Instructions for Completing the Previous Participation Certificate, HUD Form 2530," pages one and two inclusive are included herein on the following pages. These forms may be submitted as part of the bid package. If not submitted as part of the bid package, the successful bidder shall submit a fully and truthfully executed certificate within three (3) working days of the bid opening. Failure to submit the certificate by that date may render the bid non-responsive. No contract award will be made without a properly executed certificate which has been reviewed by HUD and based upon that review, a HUD authorization to award has been received by the Owner.

The Bidder shall indicate whether or not this document is included with the bid package at Clause 12 of form HUD-5369-A, "Representation, Certifications, and other Statement of Bidders – Public and Indian Housing Programs" include in this Project Manual at Section 00320.

END OF SECTION

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Office of Housing/Federal Housing Commissioner

WUFGrcctwo gpvqhCi tlewnwt g
Farmers Home Administration

RctvKw dg eqo rnygf d{ Rtlpekr cmqhO wnlkro k{ Rtqlgevu (See instructions)		Hqt J WF J S Hb J C wug qpr{	
Reason for submission: 30Agency name and City where the application is filed		4. Project Name, Project Number, City and Zip Code	
5. Loan or Contract amount \$	6. Number of Units or Beds	7. Section of Act	8. Type of Project (check one) <input type="checkbox"/> Existing <input type="checkbox"/> Rehabilitation <input type="checkbox"/> Proposed (New)

90Nhwcmrtqrqgf Rtlpekr cmcpf cwcej qti cplk cvlqp ej ctvht cmqti cplk cvlqpu

Name and address of Principals and Affiliates (Name: Last, First, Middle Initial) proposing to participate	: Tqg qhGcej Rtlpekr cnlp Rt qlgev	; 0Gzrgevdf ' Qy pgt uj lr lp Rt qlgev	320UUP qt KtUGo rnyf gt Pwo dgt

Certifications: The principal(s) listed above hereby apply to HUD or USDA FmHA, as the case maybe, for approval to participate as principal(s) in the role(s) and project listed above. The principal(s) each certify that all the statements made on this form are true, complete and correct to the best of their knowledge and belief and are made in good faith, including any Exhibits attached to this form. Y ctpkpi <HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. The principal(s) further certify that to the best of their knowledge and belief:

- Schedule A contains a listing, for the last ten years, of every project assisted or insured by HUD, USDA FmHA and/or State and local government housing finance agencies in which the principal(s) have participated or are now participating.
- For the period beginning 10 years prior to the date of this certification, and except as shown on the certification:
 - No mortgage on a project listed has ever been in default, assigned to the Government or foreclosed, nor has it received mortgage relief from the mortgagee;
 - The principals have no defaults or noncompliance under any Conventional Contract or Turnkey Contract of Sale in connection with a public housing project;
 - There are no known unresolved findings as a result of HUD audits, management reviews or other Governmental investigations concerning the principals or their projects;
 - There has not been a suspension or termination of payments under any HUD assistance contract due to the principal's fault or negligence;
 - The principals have not been convicted of a felony and are not presently the subject of a complaint or indictment charging a felony. (A felony is defined as any offense punishable by imprisonment for a term exceeding one year, but does not include any offense classified as a misdemeanor under the laws of a State and punishable by imprisonment of two years or less);
 - The principals have not been suspended, debarred or otherwise restricted by any Department or Agency of the Federal Government or of a State Government from doing business with such Department or Agency;
 - The principals have not defaulted on an obligation covered by a surety or performance bond and have not been the subject of a claim under an employee fidelity bond;
- All the names of the principals who propose to participate in this project are listed above.
- None of the principals is a HUD/FmHA employee or a member of a HUD/FmHA employee's immediate household as defined in Standards of Ethical Conduct for Employees of the Executive Branch in 5 C.F.R. Part 2635 (57 FR 35006) and HUD's Standard of Conduct in 24 C.F.R. Part 0 and USDA's Standard of Conduct in 7 C.F.R. Part 0 Subpart B.
- None of the principals is a participant in an assisted or insured project as of this date on which construction has stopped for a period in excess of 20 days or which has been substantially completed for more than 90 days and documents for closing, including final cost certification, have not been filed with HUD or FmHA.
- None of the principals have been found by HUD or FmHA to be in noncompliance with any applicable fair housing and civil rights requirements in 24 CFR 5.105(a). (If any principals or affiliates have been found to be in noncompliance with any requirements, attach a signed statement explaining the relevant facts, circumstances, and resolution, if any).
- None of the principals is a Member of Congress or a Resident Commissioner nor otherwise prohibited or limited by law from contracting with the Government of the United States of America.
- Statements above (if any) to which the principal(s) cannot certify have been deleted by striking through the words with a pen, and the relevant principal(s) have initialed each deletion (if any) and have attached a true and accurate signed statement (if applicable) to explain the facts and circumstances.

Pco g qhRtlpekr cn	Uli pcwvt g qhRtlpekr cn	EgtvHecvqp Fcvg*o o Ff H{{{	Ctgc Eqf g cpf Vgr0Pq0
Vj kuhqto rtgrctgf d{ *rtlpvpcog+	Ctgc Eqf g cpf Vgr0Pq0		

Previous Participation Certification

OMB Approval No. 2502-0118

(Exp. 02/29/2016)

Uej gf wng C< Nkuvqh Rt gxlqwu Rt qlgevu cpf Ugevlqp : Eqpvtcevu Below is a complete list of the principals' previous participation projects and participation history in multifamily Housing programs of HUD/FmHA, State and local Housing Finance Agencies. **Pqvg<** Read and follow the instruction sheet carefully. Make full disclosure. Add extra sheets if you need more space. Double check for accuracy. If no previous projects, write by your name, **"Pq rt gxlqwu rct vlek cvlqp. Hlt uv Gzrgt lpegeö."**

1. Principals Name (Last, First)	2. List of previous projects (Project name, project ID and, Govt. agency involved)	3.List Principals' Role(s) (indicate dates participated, and if fee or identity of interest participant)	4. Status of loan (current, defaulted, assigned, foreclosed)	5. Was the Project ever in default during your participation [guPq H{gu gznrlp		6. Last MOR rating and Physical Insp. Score and date

Rct v Hk Hqt J WF Kpvt pcnRt qegulpi Qprf

Received and checked by me for accuracy and completeness; recommend approval or refer to Headquarters after checking appropriate box.

Date (mm/dd/yyyy)	Tel No. and area code	<input type="checkbox"/> A. No adverse information; form HUD-2530 approval recommended. <input type="checkbox"/> B. Name match in system	<input type="checkbox"/> C. Disclosure or Certification problem <input type="checkbox"/> D. Other (attach memorandum)
Staff	Processing and Control		
Supervisor	Director of Housing/Director, Multifamily Division	Approved <input type="checkbox"/> Yes <input type="checkbox"/> No	Date (mm/dd/yyyy)

Ինքնաշարժիչ Եզրագծի վրա Ռեգիստրացիայի Վճար/4752

Carefully read these instructions and the applicable regulations. A copy of those regulations published at 24 C.F.R. 200.210 to 200.245 can be obtained from the Multifamily Housing Representative at any HUD Office. Type or print neatly in ink when filling out this form. Mark answers in all blocks of the form. If the form is not filled completely, it will delay approval of your application.

Attach extra sheets as you need them. Be sure to indicate "Continued on Attachments" wherever appropriate. Sign each additional page that you attach if it refers to you or your record.

Եզրագծի տեղեկությունները զննելու (գրական կա)

Any questions regarding the form or how to complete it can be answered by your HUD Office Multifamily Housing Representative.

Րաճաճություն - This form provides HUD with a certified report of all previous participation in HUD multifamily housing projects by those parties making application. The information requested in this form is used by HUD to determine if you meet the standards established to ensure that all principal participants in HUD projects will honor their legal, financial and contractual obligations and are acceptable risks from the underwriting standpoint of an insurer, lender or governmental agency. HUD requires that you certify your record of previous participation in HUD/USDA-FmHA, State and Local Housing Finance Agency projects by completing and signing this form, before your project application or participation can be approved.

HUD approval of your certification is a necessary precondition for your participation in the project and in the capacity that you propose. If you do not file this certification, do not furnish the information requested accurately, or do not meet established standards, HUD will not approve your certification.

Note that approval of your certification does not obligate HUD to approve your project application, and it does not satisfy all other HUD program requirements relative to your qualifications.

Կապակցությունից բխող Հղում J Վճար/4752

Form HUD-2530 must be completed and signed by all principals applying to participate in HUD multifamily housing projects, including those who have no previous participation. The form must be signed and filed by all principals and their affiliates who propose participating in the HUD project. Use a separate form for each role in the project unless there is an identity of interest.

Principals include all individuals, joint ventures,

partnerships, corporations, trusts, non-profit organizations, any other public or private entity that will participate in the proposed project as a sponsor, owner, prime contractor, turnkey developer, managing agent, nursing home administrator or operator, packager, or consultant. Architects and attorneys who have any interest in the project other than an arm's length fee arrangement for professional services are also considered principals by HUD.

In the case of partnerships, all general partners regardless of their percentage interest and limited partners having a 25 percent or more interest in the partnership are considered principals. In the case of public or private corporations or governmental entities, principals include the president, vice president, secretary, treasurer and all other executive officers who are directly responsible to the board of directors, or any equivalent governing body, as well as all directors and each stockholder having a 10 percent or more interest in the corporation.

Affiliates are defined as any person or business concern that directly or indirectly controls the policy of a principal or has the power to do so. A holding or parent corporation would be an example of an affiliate if one of its subsidiaries is a principal.

Զեջրակցի Եզրագծի Կապակցություն - All principals and affiliates must personally sign the certificate except in the following situation. When a corporation is a principal, all of its officers, directors, trustees and stockholders with 10 percent or more of the common (voting) stock need not sign personally if they all have the same record to report. The officer who is authorized to sign for the corporation or agency will list the names and title of those who elect not to sign. However, any person who has a record of participation in HUD projects that is separate from that of his or her organization must report that activity on this form and sign his or her name. The objective is **full** disclosure.

Զեջրակցի օ The names of the following parties do not need to be listed on form HUD-2530: Public Housing Agencies, tenants, owners of less than five condominium or cooperative units and all others whose interests were acquired by inheritance or court order.

Կապակցությունից բխող Հղում J Վճար/4752 Ծանոթություն

Հղում - The original of this form must be submitted to the HUD Office where your project application will be processed at the same time you file your initial project application. This form must be filed with applications for projects, or when otherwise required in the situations listed below:

- Projects to be financed with mortgages insured under the National Housing Act (FHA).

- Projects to be financed according to Section 202 of the Housing Act of 1959 (Elderly and Handicapped).
- Projects in which 20 percent or more of the units are to receive a subsidy as described in 24 C.F.R. 200.213.
- Purchase of a project subject to a mortgage insured or held by the Secretary of HUD.
- Purchase of a Secretary-owned project.
- Proposed substitution or addition of a principal or principal participation in a different capacity from that previously approved for the same project.
- Proposed acquisition by an existing limited partner of an additional interest in a project resulting in a total interest of 25 percent or more or proposed acquisition by a corporate stockholder of an additional interest in a project resulting in a total interest of 10 percent or more.
- Projects with U.S.D.A., Farmers Home Administration, or with state or local government housing finance agencies that include rental assistance under Section 8 of the Housing Act of 1937. For projects of this type, form HUD-2530 should be filed with the appropriate applications directly to those agencies.

Դիմումի վրա Բացարձակ Բացարձակ - If approval of your participation in a HUD project is denied, withheld, or conditionally granted on the basis of your record of previous participation, you will be notified by the HUD Office. You may request reconsideration by the HUD Review Committee. Alternatively, you may request a hearing before a Hearing Officer. Either request must be made in writing within 30 days from your receipt of the notice of determination.

If you do request reconsideration by the Review Committee and the reconsideration results in an adverse determination, you may then request a hearing before a Hearing Officer. The Hearing Officer will issue a report to the Review Committee. You will be notified of the final ruling by certified mail.

Արդյունքի Նկարագրի Ինքնաշարժիչ

Դիմումի և անձնակազմի this Certification: e.g., refinance, change in ownership, change in management agent, transfer of physical assets, etc.

Դիմում3 - Fill in the name of the agency to which you are applying. For example: HUD Office, Farmers Home Administration District office, or the name of a State or local housing finance agency. Below that, fill in the name of the city where the office is located.

Դիմում 4 - Fill in the name of the project, such as "Greenwood Apts." If the name has not yet been selected, write "Name unknown." Below that, enter the HUD contract or project identification number, the Farmers Home Administration project number, or

the State or local housing finance agency project or contract number. Include **cm** project or contract identification numbers that are relevant to the project. Also enter the name of the city in which the project is located, and the ZIP Code.

Դիմում 5 - Fill in the dollar amount requested in the proposed mortgage, or the annual amount of rental assistance requested.

Դիմում 6 - Fill in the number of apartment units proposed, such as "40 units." For hospital projects or nursing homes, fill in the number of beds proposed, such as "100 beds."

Դիմում 7 - Fill in the section of the Housing Act under which the application is filed.

Դիմում 9 - Definitions of all those who are considered principals and affiliates are given above in the section titled "Who Must Sign and File...."

Դիմում: - Beside the name of each principal, fill in the appropriate role. The following are examples of possible roles that the principals may assume: Owner/Mortgagor, Managing Agent, Sponsor, Developer, General Contractor, Packager, Consultant, Nursing Home Administrator etc.

Դիմում; - Fill in the percentage of ownership in the proposed project that each principal is expected to have.

Դիմում 32 - Fill in the Social Security Number or IRS employer number of every principal listed, including affiliates.

Ինքնաշարժիչ Եզրագծի Կապակցություն

Be sure that Schedule A is filled-in completely, accurately and the certification is properly dated and signed, because it will serve as a legal record of your previous experience. All Multifamily Housing projects involving HUD/ FmHA, and State and local Housing Finance Agencies in which you have previously participated **օրվա ճի** listed. Applicants are reminded that previous participation pertains to the individual principal within an entity as well as the entity itself. A newly formed company may not have previous participation, but the principals within the company may have had extensive participation and disclosure of that activity is required.

Եզրագրի 40 All previous projects must be listed or your certification cannot be processed. Include the name of all projects, project number, city where it is located and the governmental agency (HUD, USDA-FmHA or state or local housing finance agency) that was involved.

Եզրագրի 50 List the role(s) as a principal, dates participated and if fee or identity of interest (IOI) with owners.

<p>Equino p 60 Indicate the current status of the loan. Except for current loan, the date associated with the status is required. Loans under a workout arrangement are considered assigned. For all noncurrent loans, an explanation of the status is required.</p> <p>Equino p 70 Explain any project defaults during your participation.</p> <p>Equino p 80 Provide the latest Management Review (MOR) rating and Physical Inspection score.</p> <p>Egtvllcevp After you have completed all other parts of</p>	<p>form HUD-2530, including schedule A, read the Certification carefully. In the box below the statement of the certification, fill in the names of all principals and affiliates as listed in block 7. Each principal should sign the certification with the exception in some cases of individuals associated with a corporation (see "Exception for Corporations" in the section of the instructions titled "Who Must Sign and File Form HUD-2530). Principal who is signing on behalf of the entity should attach signature authority document. Each principal who signs the form</p>	<p>should fill in the date of the signature and a telephone number. By providing a telephone number, HUD can reach you in the event of any questions.</p> <p>If you cannot certify and sign the certification as it is printed because some statements do not correctly describe your record, use a pen to strike through those parts that differ with your record, and then sign and certify.</p> <p>Attach a signed statement of explanation of the items you have struck out on the certification. Item 2e. relates to felony</p>	<p>convictions within the past 10 years. If you are convicted of a felony within the past 10 years, strike out 2e. and attach statement of explanation. A felony conviction will not necessarily cause your participation to be disapproved unless there is a criminal record or other evidence that your previous conduct or method of doing business has been such that your participation in the project would make it an unacceptable risk from the underwriting stand point of an insurer, lender or governmental agency.</p>
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The Department of Housing and Urban Development (HUD) is authorized to collect this information by law (42 U.S.C. 3535(d) and 24 C.F.R. 200.217) and by regulation at 24 CFR 200.210. This information is needed so that principals applying to participate in multifamily programs can become HUD-approved participants. The information you provide will enable HUD to evaluate your record with respect to established standards of performance, responsibility and eligibility. Without prior approval, a principal may not participate in a proposed or existing multifamily project. HUD uses this information to evaluate whether or not principals pose an unsatisfactory underwriting risk. The information is used to evaluate the potential principals and approve only individuals and organizations that will honor their legal, financial and contractual obligations.

Rtlxce{ CevUcvgp gpv The Housing and Community Development Act of 1987, 42 U.S.C. 3543 requires persons applying for a Federally-insured or guaranteed loan to furnish his/her Social Security Number (SSN). HUD must have your SSN for identification of your records. HUD may use your SSN for automated processing of your records and to make requests for information about you and your previous records with other public agencies and private sector sources. HUD may disclose certain information to Federal, State and local agencies when relevant to civil, criminal, or regulatory investigations and prosecutions. It will not be otherwise disclosed or released outside of HUD, except as required and permitted by law. You must provide all of the information requested in this application, including your SSN.

Rwdnle tgrqtvp dwtfgp for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

A response is mandatory. Failure to provide any of the information will result in your disapproval of participation in this HUD program.

SECTION 00401
AGREEMENT BETWEEN OWNER AND CONTRACTOR

(Name of Contract)

THIS AGREEMENT

made this _____ day of _____ in the year Two thousand _____

BY AND BETWEEN

_____ Housing Authority

hereinafter called the OWNER, and

(Contractor's Name, Address & Federal Tax ID No.)
hereinafter called the CONTRACTOR

The Owner and the Contractor agree as set forth below.

ARTICLE 1. THE CONTRACT DOCUMENTS – The Contract Documents consist of this Agreement, the Contractor's proposal, conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of this Agreement and all Modifications issued subsequent thereto. These form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the drawings, specifications and addenda is as follows:

DRAWINGS: (PROJECT NUMBER, PROJECT TITLE, NUMBER OF PAGES OF DRAWINGS & WHO PREPARED BY)

SPECIFICATIONS: (PROJECT NUMBER, PROJECT TITLE & WHO PREPARED BY)

ADDENDA: (EACH ADDENDUM NUMBER, DATE & NUMBER OF PAGES)

In event of conflict in the provision of said Contract Documents, or any of them, the provisions of the basic Agreement which immediately precedes the Signatures of the parties shall control over the Specifications, the General Conditions and Supplementary General Conditions, and the Supplementary General Conditions shall control over the General Conditions of said Standard Form A201 of the American Institute of Architects. The General Conditions of Contract will control over all the other parts of the contract documents. In the event of a conflict between the Specifications and the Drawings the Specifications will control.

ARTICLE 2. The Contractor shall perform all the work required by the Contract Documents for items as specified in the (BASE BID & ALTERNATE NOS.).

ARTICLE 3 CONTRACT SUM – The owner shall pay the Contractor for the performance of the work, subject to additions and deductions by Change Order as provided in the Conditions of the contract, in current funds, the Contract Sum of (Amount of Contract in Alphabetical Terms Followed By Amount in Numerical Terms.)

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

CONTRACTOR

OWNER

APPROVED:

APPROVED:

By _____
Corporate President's Signature

By _____
Owner's Signature

ATTEST:

AS WITNESSED:

By _____
Corporate Secretary's Signature

By _____
Witness's Signature

AS WITNESSED:

By _____
Witness's Signature

APPROVED AS TO FORM AND
LEGALITY:

CORPORATE SEAL

By _____
Office of the General Counsel

END OF SECTION

SECTION 00600
PERFORMANCE AND PAYMENT BOND

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 BONDS

- A. PERFORMANCE AND PAYMENT BONDS shall be furnished to the Owner, by the Contractor, in an amount equal to 100 percent of the Contract sum as security for the faithful performance of the Contract and the payment of all persons performing labor and furnishing materials in connection with the Contract. Said payment bond shall also be executed in statutory bond and filed in the office of the Clerk of the District Court of the county in which the Project is located. Contractor shall provide the Owner with a certified copy of said statutory bond as so filed.
- B. BONDS FURNISHED shall be written by a SURETY approved by the US. Treasury Department and licensed to do business in the State in which the Project is located. No work shall be commenced until bonds are in force.
- C. FORM OF BOND shall be AIA Document A312, December, 1984 edition, issued and approved by the American Institute of Architects.
- D. POWER OF ATTORNEY for the surety company agent must accompany each bond issued, and must be certified to include the date of the bonds.
- E. PROVIDE TRIPLICATE COPIES of the bond forms and power of attorney.

PART 2 - MATERIALS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 00710
SUPPLEMENTARY GENERAL CONDITIONS**

PART I – GENERAL**1.01 SCOPE**

- A. This Section sets forth the modifications and additions to the General Conditions of the contract for Construction HUD-5370 (11/92)
- B. In those instances that a Clause of the General Conditions is amended, modified, voided, or superseded by the Agreement, the provisions of such Clause not specifically amended, modified, voided or superseded shall remain in effect. Should a conflict exist between the provisions of the Agreement and those of the specifications, the requirements of the Agreement shall apply.

1.02 MODIFICATIONS AND ADDITIONS

- A. Article 1 – Definitions
 - 1. Clause 1 (c) shall have the following added: The term Contracting Office refers to OWNER NAME & ADDRESS.
 - 2. Clause 1 (h) shall have the following added: The term _____ or Owner refers to _____ Housing Authority.
- B. Clause II – Contractor's Responsibility for Work Add the following subclauses;
 - 1. The Contractor shall be responsible for cutting, fitting or patching, required to complete the Work or to make its parts fit together properly.
 - 2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Housing Authority or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Housing Authority or a separate contractor except with written consent of the Housing Authority and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Housing Authority or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.
- C. Clause 9 Specifications and Drawings for Construction: Paragraph (a) delete the sentence, "In case of discrepancies between drawing and specifications, the specifications shall govern."
- D. Clause 13 Health, Safety & Accident Precaution - Add the following subclauses:
 - 1. To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this subclause. The Contractor for and in consideration of ten (\$10) Dollars and other good valuable considerations shall provide aforementioned indemnification.

2. In claims against any person or entity indemnified under this subclause (f) by an employee of the Contractor, or Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this subclause shall not be limited by limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workmen's compensation acts, disability benefits acts or other employee benefit acts.
3. The obligations of the Contractor under this Clause shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architects, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

E. Clause 27 Payments - Add the following subclause:

1. The Architect may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if the Architect's opinion the representation to the Owner required by Clause 27 (i) cannot be made. The amount of the Application, the Architect will notify the Contractor and Owner. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also decide not to certify payment because of subsequently discovered evidence or subsequent observations may nullify the whole or part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss because of:
 - a. defective Work not remedied;
 - b. third party claims filed or reasonable evidence indicating probable filing of such claims;
 - c. failure of the Contractor to make payments properly to Subcontractors for labor, materials or equipment;
 - d. reasonable evidence that the Work cannot be completed for the unpaid balance of the contract Sum;
 - e. damage to the Owner or another contractor;
 - f. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
 - g. persistent failure to carry out the Work in accordance with the Contractor Documents.

F. Clause 36 Insurance, subclause (b); delete last sentence. The Contractor is required to carry Builders Risk Insurance.

- G. Clause 38 Contractor/Subcontracting with Small and minority Firms, Women's Business Enterprise and Labor Surplus Area Firms add the following subclauses;
1. CMBE Participation Goal 15% of Base of bid;
 2. Each bidder shall meet, exceed or demonstrate that it could not meet, despite its good faith efforts, the project goal of the Housing Authority.
 3. Attached to and hereby incorporated in the Contract Documents is a MBE Utilization Summary, which must be submitted with Contractor's bid. Award of the Contract shall be conditioned upon submission of the MBE participation information and upon satisfaction of the project goal or, if the goal is not met, upon demonstration that good faith efforts were made to meet the goals. Failure to satisfy these requirements shall result in the bid being deemed non-responsive and rejected. If the Utilization Summary does not indicate the goal has been met, then the Contractor must dispatch for overnight delivery to the Housing Authority all documentation of good faith effort not later than two (2) working days after notification has not been met.
 4. If the apparent low bidder is determined not to have made a good faith effort, the Housing Authority will review the next lowest apparent responsive bid. This process will be repeated until a responsible bid is found.
- H. Clause 41, delete in its entirety.

MINORITY BUSINESS ENTERPRISE (MBE)
UTILIZATION SUMMARY

Prime Contractor _____

_____ Housing Authority

PROJECT NAME

Base Bid \$ _____

Total MBE Goal \$ _____

Certified MBE Contractor's /Subcontractor's Name & Address	Trade		Dollar Amount

Total Dollar Amount Achieved for MBE Goal \$ _____

MBE Percentage of Base Bid Achieved 15% (Percentage may be rounded to the nearest tenth %)

Note: If the Utilization Summary Form does not indicate that the goal has been met, then the prime contractor must dispatch for overnight delivery to the Housing Authority all documents of good faith effort not later than two (2) working days after notification that the goal has not been met.

Certified true and correct by:

Contractor's Representative_____
Title_____
Date

SPECIFICATIONS

Part I General Conditions:

- A. General conditions of HUD Form 51915-A, shall form a part of these specifications.
- B. Contractor shall comply with all local licensing and registration regulations.
- C. Contractor shall maintain adequate casualty and workmen's compensation insurance.
- D. Job site shall be maintained in a neat and organized manner throughout the duration of this job.
- E. Contractor shall comply with all local and OSHA regulations.
- F. General contractor shall submit a "Partial Release of Lien" to Housing Authority at the time of each draw and a full "Release of Lien" prior to or at the time of final payment to render the project free of any liens.
- G. Contractor to give 48 hour notice to Housing Authority before entering any unit.
- H. General contractor agrees not to subcontract or assign any portion of this work without Owner's written approval.

Part () Inspections:

- A. Periodic, unannounced inspections may be made at any time by the appropriate Housing Authority representative. These inspections do not relieve the contractor from his responsibility of proper workmanship and specification compliance. Manufacturer does not warrant the contractor's workmanship, and our inspections do not guarantee that the job has been done correctly. If we discover deficiencies, the contractor will be informed and expected to take corrective action. The inspections are merely an attempt to reduce mistakes and provide a better chance for success of the system. Failures resulting from inadequate preparation, improper installation, or any other reason other than defect in the manufacturer used are not covered.

Part () Clean Up:

- A. All building and grounds shall be left in the same state of cleanliness as was found before job commencement.

END OF SECTION

General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban Development

Office of Public and Indian Housing
OMB Approval No. 2577-0157 (exp. 01/31/2014)

Applicability. This form is applicable to any construction/development contract greater than \$100,000.

This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 24 CFR 85.36, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 135. The form is required for construction contracts awarded by Public Housing Agencies (PHAs).

The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, HAs would be unable to enforce their contracts.

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Responses to the collection of information are required to obtain a benefit or to retain a benefit.

The information requested does not lend itself to confidentiality.

HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Contract (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.
- (g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.
- (h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.
- (j) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.
- (l) "Work" means materials, workmanship, and manufacture and fabrication of components.
- (a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.
- (b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.
- (c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.
- (d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- (e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.
- (f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.
- (g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.
- (h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

3. Architect's Duties, Responsibilities, and Authority

- (a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

- (b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.
- (c) The Architect's duties and responsibilities may include but shall not be limited to:
- (1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;
 - (2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;
 - (3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,
 - (4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

- (a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.
- (b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

6. Construction Progress Schedule

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

7. Site Investigation and Conditions Affecting the Work

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

- (b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

8. Differing Site Conditions

- (a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
- (b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.
- (c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.
- (d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

9. Specifications and Drawings for Construction

- (a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be required in the planning and production of the work. Such

promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

- (b) Wherever in the specifications or upon the drawings the words 'directed', 'required', 'ordered', 'designated', 'prescribed', or words of like import are used, it shall be understood that the 'direction', 'requirement', 'order', 'designation', or 'prescription', of the Contracting Officer is intended and similarly the words 'approved', 'acceptable', 'satisfactory', or words of like import shall mean 'approved by', or 'acceptable to', or 'satisfactory to' the Contracting Officer, unless otherwise expressly stated.
- (c) Where 'as shown', 'as indicated', 'as detailed', or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word 'provided' as used herein shall be understood to mean 'provide complete in place' that is 'furnished and installed'.
- (d) 'Shop drawings' means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.
- (f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.
- (g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be requests may be submitted as the need arises, but each

such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

- (h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.
- (i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

10. As-Built Drawings

- (a) 'As-built drawings,' as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. 'As-built drawings' shall be synonymous with 'Record drawings.'
- (b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- (c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

11. Material and Workmanship

- (a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) Approval of equipment and materials.
- (1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment.
- waivers. Before installing the work, the Contractor shall

When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

- (2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.
- (3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.
- (4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.
- (5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.
- (6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.
- (c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

12. Permits and Codes

- (a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

examine the drawings and the specifications for

compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer. Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

- (b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

13. Health, Safety, and Accident Prevention

- (a) In performing this contract, the Contractor shall:
- (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
 - (2) Protect the lives, health, and safety of other persons;
 - (3) Prevent damage to property, materials, supplies, and equipment; and,
 - (4) Avoid work interruptions.
- (b) For these purposes, the Contractor shall:
- (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
 - (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.
- (c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.
- (d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.
- (e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

- (f) New work which connects to existing work

14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

15. Availability and Use of Utility Services

- (a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.
- (b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

- (a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.
- (b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- (c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.
- (d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.
- (e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

shall correspond in all respects with that to which it

connects and/or be similar to existing work unless otherwise required by the specifications.

- (g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.
- (h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.
- (i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.
- (j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- (k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

17. Temporary Buildings and Transportation of Materials

- (a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

18. Clean Air and Water

The contractor shall comply with the Clean Air Act, as

- (f) The PHA may conduct routine inspections of the construction site on a daily basis.

amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

20. Inspection and Acceptance of Construction

- (a) Definitions. As used in this clause -
 - (1) "Acceptance" means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
 - (2) "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
 - (3) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.
- (d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.
- (e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.
- (g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to

contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

- (h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.
- (i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the PHA considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

21. Use and Possession Prior to Completion

- (a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the
- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the

work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

23. Warranty of Construction

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of _____ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.
 - (b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—
 - (1) The Contractor's failure to conform to contract requirements; or
 - (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.
 - (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.
 - (d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.
 - (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.
 - (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:
 - (1) Obtain all warranties that would be given in normal commercial practice;
 - (2) Require all warranties to be executed in writing, for the benefit of the PHA; and,
 - (3) Enforce all warranties for the benefit of the PHA.
 - (g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.
- Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the

repair of any damage that results from any defect in PHA furnished material or design.

- (i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.
- (j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

24. Prohibition Against Liens

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

Administrative Requirements

25. Contract Period

The Contractor shall complete all work required under this contract within _____ calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

26. Order of Provisions

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

27. Payments

- (a) The PHA shall pay the Contractor the price as provided in this contract.
- (b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.
- (c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has

acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

- (d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved breakdown of the contract price. Such estimates shall be submitted not later than _____ days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.
- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that:
 - (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
 - (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
 - (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

Name: _____

Title: _____

Date: _____

- (f) Except as otherwise provided in State law, the PHA shall retain ten (10) percent of the amount of progress payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.
- (g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting

Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bonds furnished under this contract.

28. Contract Modifications

- (a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.
- (b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the
 - (1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit

Contractor and the Contracting Officer.

- (c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
 - (1) In the specifications (including drawings and designs);
 - (2) In the method or manner of performance of the work;
 - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
 - (4) Directing the acceleration in the performance of the work.
- (b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:
 - costs (identified with specific work to be performed);
 - Construction equipment exclusively necessary for the change;
 - Costs of preparation and/ or revision to shop drawings resulting from the change;
 - Worker's

Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.

- (2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.
- (3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change.

The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.

- (g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.
- (h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.
- (i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.
- (j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

30. Suspension of Work

- (a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have

been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

- (c) A claim under this clause shall not be allowed (1) for any proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and

costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

31. Disputes

- (a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.
- (c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.
- (d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.
- (e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.
- (f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

32. Default

- (a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall

be liable for any damage to the PHA resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

- (b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
 - (2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

33. Liquidated Damages

- (a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of \$ _____ [Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

completion of the work together with any increased costs occasioned the PHA in completing the work.

- (c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

34. Termination for Convenience

- (a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.
- (b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.
- (c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.
- (d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

36. Insurance

- (a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:
- (1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.
 - (2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$ _____ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims-made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

- (3) Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than \$_____ [Contracting Officer insert amount] per occurrence.
- (b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.
- (c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

37. Subcontracts

- (a) Definitions. As used in this contract -
- (1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

- (2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.
- (b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.
- (c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.
- (d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.
- (e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

- (a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;
- (c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;
- (d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- (e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

39. Equal Employment Opportunity

During the performance of this contract, the Contractor agrees as follows:

- (a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.
- (b) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

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- (c) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.
- (d) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
- (e) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
- (f) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
- (g) The Contractor shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (h) In the event of a determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.
- (i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.
- (j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.
- 40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.**
- (a) The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- (b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 135 regulations.
- (c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- (d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.
- (e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.
- (f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- (g) With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

41. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

43. Limitations on Payments made to Influence Certain Federal Financial Transactions

- (a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

45. Examination and Retention of Contractor's Records

be posted at all times by the Contractor and its

- (a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- (c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

46. Labor Standards - Davis-Bacon and Related Acts

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

- (a) Minimum Wages.
 - (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall subcontractors at the site of the work in a prominent and

accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized

representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the

amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or

program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

(c) Payrolls and basic records.

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)
- (ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
- (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
- (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.
- (3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to

make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

- the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
- (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause.
- (3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.
- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

47. Non-Federal Prevailing Wage Rates

- (a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds: (1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;
- (b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or
- (c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

- (a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.
- (b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

**SECTION 00800
WAGE DETERMINATION**

PART I - GENERAL

DESCRIPTION OF WORK

General Decision #FL20160098, dated 9/8/2017, of five (5) pages, follows this Section and is hereby included in the Project Manual and are incorporated into the Contract Documents.

Only Davis-Bacon Wage Rate issued by the U.S. Department of Housing & Urban Development are applicable. No State rates are applicable.

END OF SECTION

General Decision Number: FL170098 09/08/2017 FL98

Superseded General Decision Number: FL20160098

State: Florida

Construction Type: Residential

County: Brevard County in Florida.

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017
1	09/08/2017

ENGI0673-015 05/01/2013

Rates	Fringes
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POWER EQUIPMENT OPERATOR:

Crawler Crane, Hydro		
Crane, Locomotive Crane,		
Tower Crane, Truck Crane....	\$ 26.30	10.85
Gantry Crane, Bridge Crane..	\$ 24.14	10.85
Oiler.....	\$ 20.36	10.85

* IRON0808-003 02/01/2017

Rates	Fringes
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IRONWORKER, STRUCTURAL.....	\$ 26.03	12.95
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SUFL2009-094 06/08/2009

Rates	Fringes
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BRICKLAYER.....	\$ 20.00	0.00
CARPENTER, Includes Form Work....	\$ 13.46	0.54
CEMENT MASON/CONCRETE FINISHER...	\$ 12.56	0.00
ELECTRICIAN.....	\$ 12.66	0.00
IRONWORKER, ORNAMENTAL.....	\$ 12.60	0.00
IRONWORKER, REINFORCING.....	\$ 16.88	0.00

LABORER: Common or General.....\$ 10.00	0.00
LABORER: Mason Tender - Brick...\$ 11.51	0.00
LABORER: Mason Tender - Cement/Concrete.....\$ 10.46	0.00
LABORER: Pipelayer.....\$ 11.79	0.00
LABORER: Roof Tearoff.....\$ 9.00	0.00
LABORER: Landscape and Irrigation.....\$ 9.15	0.00
OPERATOR: Asphalt Paver.....\$ 12.07	0.00
OPERATOR: Backhoe Loader Combo.....\$ 17.04	0.00
OPERATOR: Backhoe/Excavator.....\$ 12.56	0.00
OPERATOR: Bulldozer.....\$ 12.14	0.00
OPERATOR: Distributor.....\$ 11.57	0.00
OPERATOR: Forklift.....\$ 17.38	0.00
OPERATOR: Grader/Blade.....\$ 15.50	0.00
OPERATOR: Loader.....\$ 11.70	0.00
OPERATOR: Roller.....\$ 11.02	0.00
OPERATOR: Screed.....\$ 11.08	0.00
OPERATOR: Trackhoe.....\$ 15.68	0.00
OPERATOR: Tractor.....\$ 10.20	0.00
PAINTER: Brush, Roller and Spray.....\$ 13.61	0.00
PLUMBER.....\$ 13.54	0.00
ROOFER, Includes Built Up, Modified Bitumen, and Shake & Shingle Roofs (Excludes Metal Roofs).....\$ 13.33	0.00
ROOFER: Metal Roof.....\$ 16.99	0.00
SHEET METAL WORKER, Excludes Metal Roof Installation.....\$ 9.81	0.00
TRUCK DRIVER, Includes Dump Truck.....\$ 10.22	0.00
TRUCK DRIVER: Lowboy Truck.....\$ 12.10	0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

**SECTION 00900
SUPPLEMENTARY INFORMATION**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SUBSURFACE INVESTIGATION REPORT

- A. A copy of the geotechnical report by Ardaman & Associates, Inc., dated July 26, 2017 is provided under this section.
- B. This report identified properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of the Architect/Engineer and is hereby incorporated into the project specifications.
- C. The recommendations described shall be construed as a requirement of the Contract, unless specifically referenced otherwise in the Contract documents.
- D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price/Sum accruing to the Owner.

1.03 TOPOGRAPHY SURVEY

- A. A copy of the survey is on file at the Architect's office titled, "Boundary, Topography, Utility and Tree Survey" and prepared by Packard and Associates, dated August 14, 2015.
- B. This survey identified grade elevations prepared primarily for the use of the Architect/Engineer in establishing new grades and identifying natural water shed.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Palms at University
East University Boulevard
Melbourne, Florida**



Ardaman & Associates, Inc.

OFFICES

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Cocoa – 1300 N. Cocoa Blvd., Cocoa, Florida 32922 – Phone (321) 632-2503
Fort Myers – 9970 Bavaria Road, Fort Myers, Florida 33913 – Phone (239) 768-6600
Miami – 2608 W. 84th Street, Hialeah, Florida 33016 – Phone (305) 825-2683
Monroe – 1122 Hayes Street, West Monroe, Louisiana 71292 – Phone (318) 387-4103
New Orleans – 1305 Distributors Row, Suite I, Jefferson, Louisiana 70123 – Phone (504) 835-2593
Port St. Lucie – 460 Concourse Place NW, Unit 1, Port St. Lucie, Florida 34986 – Phone (772) 878-0072
Sarasota – 78 Sarasota Center Blvd., Sarasota, Florida 34240 – Phone (941) 922-3526
Shreveport – 7222 Greenwood Road, Shreveport, Louisiana 71119 – Phone (318) 636-3673
Tallahassee – 3175 West Tharpe Street, Tallahassee, Florida 32303 – Phone (850) 576-6131
Tampa – 3925 Coconut Palm Drive, Suite 115, Tampa, Florida 33619 – Phone (813) 620-3389
West Palm Beach – 2200 North Florida Mango Road, Suite 101, West Palm Beach, Florida 33409 – Phone (561) 687-8200

MEMBERS:

A.S.F.E.
American Concrete Institute
ASTM International
Florida Institute of Consulting Engineers



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

July 26, 2017
File No. 17-23-5236

Melbourne Housing Authority
1404 Guava Avenue
Melbourne, Florida 32935

Attention: Mr. Michael Bean

Subject: Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Palms at University
East University Boulevard
Melbourne, Florida

Dear Mr. Bean:

As requested and authorized by you, we have completed a shallow subsurface soil exploration and geotechnical engineering evaluation for the subject project. The purposes of performing this exploration were to evaluate the general subsurface conditions within the building and parking/drive areas and to provide recommendations for site preparation, foundation support, and pavement design. In addition, we have explored the soil and groundwater conditions within the proposed stormwater ponds and we have estimated the normal seasonal high groundwater level at the boring locations. This report documents our findings and presents our engineering recommendations.

SITE LOCATION AND SITE DESCRIPTION

The project site is located on the south side of East University Boulevard in Melbourne, Brevard County, Florida (Section 10, Township 28 South, Range 37 East). The general site location is shown superimposed on the Melbourne East, Florida USGS quadrangle map presented on Figure 1.

The site is currently wooded and vegetated with thick brush. No structures currently exist on the project site.

BACKGROUND INFORMATION

Ardaman and Associates, Inc. performed a subsurface soil exploration at the project site in 2005. During the previous exploration at the site, a series of Standard Penetration Test (SPT) borings and auger borings were performed on the site. In addition, permeability testing of a soil sample collected from the project site was performed during the previous exploration. The geotechnical data collected during the 2005 exploration was utilized to supplement the data collected during this exploration.

PROPOSED CONSTRUCTION AND GRADING

It is our understanding that the proposed development includes a 3-story, approximate 65,162-square foot (total) multi-family residential building; a 1-story, approximate 5,000-square foot commercial building; asphalt paved parking and drive areas; and several dry stormwater retention ponds. It is anticipated that the proposed buildings will consist of load bearing masonry walls and interior columns with slab-on-grade floors.

For the purposes of our analysis, we have assumed the maximum loading conditions for the 3-story structure to be on the order of 5 to 7 kips per linear foot for wall foundations and 200 and 250 kips for individual column foundations. The assumed maximum loading conditions for the 1-story commercial building are 1 to 2 kips per linear foot for wall foundations and 30 to 40 kips for individual column foundations. Slab-on-grade loads for both buildings are not anticipated to exceed 100 pounds per square foot (psf).

Grading plans are not complete at this time, therefore we have assumed that 1 to 2 feet of fill is required to raise the building and parking/drive areas to final elevations. If actual building loads or fill height exceed our assumptions, then the recommendations in this report may not be valid.

REVIEW OF SOIL SURVEY MAPS

Based on the 1974 Soil Survey for Brevard County, Florida, as prepared by the U.S. Department of Agriculture Soil Conservation Service, the predominate soil types at the site are "Myakka sand, ponded" and "Immokalee sand". A brief description of these soil types, as taken from the Soil Survey, is provided below.

Myakka sand, ponded (Mp):

"Myakka sand, ponded" is a nearly level, poorly drained, sandy soil in shallow depressions in the flatwoods. Most areas are small; only a few are larger than 50 acres. It is similar to Myakka sand, but it is in low places where water accumulates. In most years it is flooded for 6 to 12 months.

Immokalee sand (Im):

"Immokalee sand" is a nearly level, poorly drained sandy soil in broad areas in the flatwoods, in low areas between sand ridges, or in slightly elevated areas between ponds and sloughs. Included with this soil in mapping are small areas of Basinger, Myakka, Placid, Daytona, St. Johns, Satellite and Smyrna soils. The included soils generally make up less than 25 percent of any one mapped area.

The water table is within 10 inches of the surface for 1 to 2 months in most years and between 10 and 40 inches more than half the time. Occasionally in very wet seasons it rises above the surface for a few days. Permeability is moderate or moderately rapid in the subsoil and rapid in the other horizons.

We note that the groundwater conditions mentioned above are not consistent with the levels encountered during this exploration. Based on our site observations, it appears as though the site may be artificially drained by a canal located just west of the site. If this canal is removed or altered significantly, the groundwater level conditions on the site may change.

FIELD EXPLORATION PROGRAM

SPT and Auger Borings

The field exploration program performed during this and the previous exploration included performing 16 Standard Penetration Test (SPT) borings and nine auger borings. The SPT borings were performed within or in close proximity to the proposed "footprints" of the buildings. The borings were advanced to depths ranging from 15 to 35 feet below the ground surface using the methodology outlined in ASTM D-1586. A summary of this field procedure is included in Appendix I. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory in sealed sample jars.

The auger borings were performed in the proposed parking/drive and stormwater retention pond areas. They were drilled using a truck-mounted, 4-inch diameter, continuous flight auger or a 3-inch diameter, hand-held bucket auger to depths ranging from 5 to 15 feet below the ground surface. A summary of this field procedure is included in Appendix I. Representative soil samples were recovered from the auger borings and transported to our laboratory for further analysis.

The groundwater level at each of the boring locations was measured during drilling. Upon completion, the borings were backfilled with soil cuttings.

Permeability Test Sampling

A test pit (TP-2) was excavated by hand to a depth of 2 feet below the existing ground surface adjacent to Boring AB-3. One 3-inch diameter Shelby-tube sample was obtained in a vertical orientation in the bottom of the excavation. The Shelby-tube sample was capped and transported to our laboratory for soil permeability testing.

Test Locations

The approximate locations of the borings and test pit are schematically illustrated on a site plan shown on Figure 2. These locations were determined in the field by estimating distances from existing site features and should be considered accurate only to the degree implied by the method of measurement used.

LABORATORY PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D-2488). The resulting soil descriptions are shown on the soil boring profiles presented in Appendix II.

A constant-head permeability test was performed on the Shelby-tube sample of soil obtained from the test pit near the location of Boring AB-3. The result of the laboratory permeability test is tabulated in the "Retention Ponds" section of this report.

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory programs are graphically summarized on the soil boring profiles presented in Appendix II. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The soils encountered in the SPT borings consisted of very loose to very dense fine sand (Unified Soil Classification SP) and fine sand with silt (SP-SM) to the termination depth of the deepest borings, 35 feet below ground surface. The auger borings generally encountered fine sand (SP) and fine sand with silt (SP-SM) to the termination depth of the deepest borings, 15 feet below ground surface. We note that hardpan-type soil was encountered in most of the borings. These soil profiles are outlined in general terms only. Please refer to Appendix II for soil profile details.

Groundwater Level

The groundwater level was measured in the boreholes on the day drilled. As shown in Appendix II, groundwater was encountered at depths that ranged from approximately 8.5 to 12.6 feet below the existing ground surface on the dates indicated. Fluctuations in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

The absence of groundwater data at some of the boring locations indicates that groundwater was not encountered within the vertical reach of the borings on the date drilled. For borings referenced "GNM" at the bottom of the boring profiles in Appendix II, groundwater was not encountered within the top 10 feet (and could not be measured below a depth of 10 feet due to the mudded condition of the borehole). However, this does not necessarily mean that groundwater would not be encountered within the vertical reach of the borings or within the top 10 feet of the borings referenced "GNM" at some other time.

NORMAL SEASONAL HIGH GROUNDWATER LEVEL

The normal seasonal high groundwater level each year is the level in the August-September period at the end of the rainy season during a year of normal (average) rainfall. The water table elevations associated with a higher than normal rainfall and in the extreme case, flood, would be higher to much higher than the normal seasonal high groundwater level. The normal high water levels would more approximate the normal seasonal high groundwater levels.

The seasonal high groundwater level is affected by a number of factors. The drainage characteristics of the soils, the land surface elevation, relief points such as drainage ditches, lakes, rivers, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high groundwater level.

In addition to evaluating the conditions above, we have reviewed annual precipitation data available from the Melbourne Office of the National Weather Service. Based on this data, the annual rainfall as of the date the borings for this recent exploration were conducted in Brevard County is approximately 18.9 inches, which is approximately 4.9 inches lower than normal for this time of year.

Based on our interpretation of the site conditions using our boring logs, we estimate the following normal seasonal high groundwater levels at the boring locations:

- At previous Borings TH-1 through TH-6, TH-10 through TH-16, AB-3, AB-4, AB-5, AB-7, AB-8, and AB-9 drilled in February, 2005; we estimate the normal seasonal high groundwater level to be approximately 3½ feet above the encountered levels.
- At Borings TH-1A through TH-3A and AB-1A through AB-3A drilled during this exploration, we estimate the normal seasonal high groundwater level to be approximately 2½ feet above the encountered levels.

We note that the groundwater level may temporarily perch at higher levels during or after heavy or prolonged rainfall due to the shallow hardpan-type soil present at the site.

ENGINEERING EVALUATION AND RECOMMENDATIONS

General

The results of our exploration indicate that, with proper site preparation as recommended in this report, the existing soils are suitable for supporting the proposed buildings on a conventional shallow foundation system. Spread footings should provide an adequate support system for the structures. The encountered soils are also suitable for support of the proposed parking/drive areas.

The following are our recommendations for overall site preparation, foundation support, and pavement construction which we feel are best suited for the proposed facility and existing soil conditions. The recommendations are made as a guide for the design engineer and/or architect, parts of which should be incorporated into the project's specifications.

Stripping and Grubbing

The "footprints" of the proposed buildings and the parking/drive areas, plus a minimum margin of 5 feet, should be stripped of all surface vegetation, stumps, debris, organic muck, organic topsoil or other deleterious materials, as encountered. Buried utilities should be removed or plugged to eliminate conduits into which surrounding soils could erode.

After stripping, the site should be grubbed or root-raked such that roots with a diameter greater than ½ inch, stumps, or small roots in a dense state, are completely removed. The actual depth(s) of stripping and grubbing must be determined by visual observation and judgment during the earthwork operation.

Proof-rolling

We recommend proof-rolling the cleared surface to locate any unforeseen soft areas or unsuitable surface or near-surface soils, to increase the density of the upper soils, and to prepare the existing surface for the addition of the fill soils (as required). Proof-rolling of the building areas should consist of at least 10 passes of a compactor capable of achieving the density requirements described in the next paragraph. Each pass should overlap the preceding pass by 30 percent to achieve complete coverage. If deemed necessary, in areas that continue to "yield", remove all deleterious material and replace with clean, compacted sand backfill. The proof-rolling should occur after cutting and before filling. The number of passes can be reduced to three within the proposed parking/drive areas.

A density equivalent to or greater than 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value for a depth of 2 feet in the building areas and 1 foot in the parking/drive areas must be achieved beneath the stripped and grubbed ground surface. Additional passes and/or overexcavation and recompaction may be required if these minimum density requirements are not achieved. The soil moisture should be adjusted as necessary during compaction.

Care should be exercised to avoid damaging any neighboring structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified and the existing condition (i.e. cracks) of the structures documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and Ardaman & Associates should be notified immediately.

Suitable Fill Material and the Compaction of Fill Soils

All fill soil should be free of organic materials, such as muck, wood, roots and vegetation. We recommend using fill with less than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. The fine sand and fine sand with silt (Strata Nos. 1 and 2 without roots, as shown in Appendix II) are suitable for use as fill soil and, with proper moisture control, should densify using conventional compaction methods. Soils with more than 12 percent passing the No. 200 sieve can be used in some applications, but will be more difficult to compact due to their inherent nature to retain soil moisture.

All structural fill should be placed in level lifts not to exceed 12 inches in uncompacted thickness. Each lift should be compacted to at least 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value. The filling and compaction operations should continue in lifts until the desired elevation(s) is achieved. If hand-held compaction equipment is used, the lift thickness should be reduced to no more than 6 inches.

We note that the partially-cemented hardpan-type soil was encountered in most of the borings conducted on the site at depths ranging from 1.5 to 12.5 feet below existing ground surface. Hardpan-type soils can be problematic for several reasons. First, hardpan can be difficult to excavate, often requiring special equipment; especially in confined excavations such as utility trenches, footings, etc. Excavated hardpan-type soils are often boulder-size chunks of cemented soils which are not easily broken down for re-use as structural fill. In addition, when pulverized into fragments that can be compacted to an adequately dense matrix, the in-place soil often fails the relative compaction test because the laboratory test continues to pulverize the soil into smaller

particles resulting in a denser laboratory matrix than that which occurs in the field. Alternative acceptance criteria may need to be used for hardpan-type soils used as fill. This criteria would need to be developed on a site specific basis after observing the contractor's earthwork methodology and the nature and condition of the compacted hardpan-type soils.

Foundation Support by Spread Footings and Foundation Compaction Criteria

Excavate the foundations to the proposed bottom of footing elevations and, thereafter, verify the in-place compaction for a depth of 2 feet below the footing bottoms. If necessary, compact the soils at the bottom of the excavations to at least 95 percent of the modified Proctor maximum dry density (ASTM D-1557) for a depth of 2 feet below the footing bottoms. Based on the existing soil conditions and, assuming the above outlined proof-rolling and compaction criteria are implemented, an allowable soil bearing pressure of 3,000 pounds per square foot (psf) may be used in the foundation design for the 3-story building. An allowable soil bearing pressure of 2,500 psf may be used in the foundation design for the 1-story building. These bearing pressures should result in foundation settlement within tolerable limits (i.e., 1 inch or less).

For the 3-story buildings, all bearing wall foundations should be a minimum of 30 inches wide and column foundations 36 inches wide. A minimum soil cover of 18 inches should be maintained from the bottom of the foundations to the adjacent finished grades.

For the 1-story building, all bearing wall foundations should be a minimum of 18 inches wide and column foundations 24 inches wide. A minimum soil cover of 18 inches should be maintained from the bottom of the foundations to the adjacent finished grades.

Floor Slab Moisture Reducer and Slab Compaction Requirements

Compaction beneath all floor slabs should be verified for a depth of 12 inches and meet the 95 percent criteria (modified Proctor, ASTM D-1557).

Precautions should be taken during the slab construction to reduce moisture entry from the underlying subgrade soils. Moisture entry can be reduced by installing a membrane between the subgrade soils and floor slab. Care should be exercised when placing the reinforcing steel (or mesh) and slab concrete such that the membrane is not punctured. We note that the membrane alone does not prevent moisture from occurring beneath or on top of the slab.

If interior columns are isolated from the floor slab, an expansion joint should be provided around the columns and sealed with a water-proof sealant.

Dewatering

If the control of groundwater is required to achieve the necessary stripping, excavation, proof-rolling, filling, compaction, and any other earthwork, sitework, and/or foundation subgrade preparation operations required for the project, the actual method(s) of dewatering should be determined by the contractor. Dewatering should be performed to lower the groundwater level to depths that are adequately below excavations and compaction surfaces. Adequate groundwater level depths below excavations and compaction surfaces vary depending on soil

type and construction method, and are usually 2 feet or more. Dewatering solely with sump pumps may not achieve the desired results.

Typical Asphaltic Concrete Surface Pavement Section

Site Preparation

All areas to be paved should be prepared as previously outlined. Prior to pavement base installation, the subgrade soil compaction should be verified for a depth of 12 inches (i.e.; compacted to at least 95 percent of the modified Proctor (ASTM D-1557, AASHTO T-180) maximum dry density value).

Limerock or Cemented Coquina Base

A limerock or cemented coquina base course 6 inches thick overlying an 8-inch thick stabilized subbase can be used provided that grading and drainage plans preclude periodic saturation of the base material. The periodic saturation of a limerock/coquina base material could lead to premature pavement distress. A minimum clearance of 18 inches must be maintained between the bottom of the limerock/coquina base and the seasonal high groundwater table.

The limerock or cemented coquina should have a minimum Limerock Bearing Ratio (LBR) value of 100 and should be compacted to at least 98 percent of the modified Proctor (ASTM D-1557, AASHTO T-180) maximum density value. For truck parking and drive areas, the base thickness should be a minimum of 8 inches.

An 8-inch thick subbase having a minimum Limerock Bearing Ratio (LBR) value of 40 must be achieved beneath the limerock or cemented coquina base. The natural soils may have to be stabilized with suitable clayey soil in order to achieve the required LBR value. The stabilized subbase must be compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D-1557, AASHTO T-180).

Crushed Concrete Base (Optional)

Crushed concrete base may be used. We recommend that the crushed concrete base course be supported by a free-draining subgrade. Six inches of base should be used in automobile parking areas while 8 inches of crushed concrete base should be used in truck parking and drive areas. A minimum clearance of 12 inches should be maintained between the bottom of the crushed concrete base and the seasonal high groundwater table.

The crushed concrete base should have a minimum Limerock Bearing Ratio (LBR) value of 100 and should be compacted to at least 98 percent of the modified Proctor maximum dry density (ASTM D-1557, AASHTO T-180). The crushed concrete should meet Graded Aggregate Base gradation requirements according to Section 204, of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. The subgrade beneath the crushed concrete base should consist of free draining sand compacted to at least 98 percent of the modified Proctor maximum dry density (ASTM D-1557, AASHTO T-180).

We note that if the contractor's means and methods include stabilizing soils beneath the crushed concrete base, then the stabilizing material should be coarse material (e.g.; gravel). Low permeability soils (e.g.; silt and/or clay) should not be used as stabilizing material beneath crushed concrete base.

Wearing Surface

A minimum 1½-inch layer of Type SP-9.5 or SP-12.5 asphaltic concrete should be used for a wearing surface in automobile parking areas. For truck parking and drive areas, 2 inches of Type SP-9.5 or SP-12.5 asphaltic concrete should be used.

Specific requirements for the Type-SP asphaltic concrete wearing surface are outlined in Section 334 in the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition. Equivalent Type S asphaltic concrete may be substituted for Type SP-9.5 or SP-12.5; however, we recommend a minimum Marshall stability of 2,200 pounds if Type S is used.

The latest specifications of Florida Department of Transportation shall govern the placement of the base and asphaltic concrete wearing surface. The above minimum requirements will satisfactorily support Traffic Level A*. If a heavier traffic pattern is anticipated, the design section should be increased accordingly.

Retention Ponds

We understand that several dry bottom retention ponds are planned. For this study, soil conditions were explored in the proposed pond areas with several soil borings drilled to depths ranging from 5 to 35 feet below existing ground surface.

The fine sand and fine sand with silt (Soil Strata Nos. 1 and 2 in Appendix II) encountered in the borings are generally considered to be relatively permeable, with the exception of the hardpan-type soil. Due to its cemented nature, the hardpan-type soil is likely less permeable than the fine sand and fine sand with silt, and should be considered to be an aquitard for retention pond drawdown evaluation.

The result of the constant-head laboratory permeability test is presented in the following table:

Sample Location	Sample Depth (feet)	Measured Permeability (inches/hour)
TP-2/AB-3	2 to 2.5	23

It is noted that a suitable factor of safety should be used with this permeability value for retention pond design purposes. In addition, for the type of soils tested, a transformation ratio of 1 horizontal to 1 vertical is appropriate (i.e.; the estimated ratio of horizontal to vertical permeability).

* Reference: "Flexible Pavement Design Manual", Florida Department of Transportation. (2016)

Ardaman & Associates, Inc. would be pleased to assist in evaluating the design exfiltration rates, underdrains and/or groundwater baseflow as pond geometry and stormwater volume requirements become available.

QUALITY ASSURANCE

We recommend establishing a comprehensive quality assurance program to verify that all site preparation and foundation and pavement construction is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates.

As a minimum, an on-site engineering technician should monitor all stripping and grubbing to verify that all deleterious materials have been removed and should observe the proof-rolling operation to verify that the appropriate number of passes are applied to the subgrade. In-situ density tests should be conducted during filling activities and below all footings, floor slabs and pavement areas to verify that the required densities have been achieved. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

Additionally for the pavements, Limerock Bearing Ratio tests should be performed. The base course(s) should be tested for density and thickness. We recommend that Ardaman & Associates be retained to review the asphalt pavement mix design proposed for use on the project prior to pavement placement. During asphalt pavement construction, samples of the asphaltic concrete should be obtained and tested in the laboratory to verify compliance with the mix design, including testing Marshall Stability (Type S asphalt), flow, asphalt content, and aggregate gradation. We also recommend full-time monitoring/testing in the batch plant and on the site during pavement placement. The asphaltic concrete thickness should be verified in the field.

Finally, we recommend inspecting and testing the construction materials for the foundations and other structural components.

IN-PLACE DENSITY TESTING FREQUENCY

In Central Florida, earthwork testing is typically performed on an on-call basis when the contractor has completed a portion of the work. The test result from a specific location is only representative of a larger area if the contractor has used consistent means and methods and the soils are practically uniform throughout. The frequency of testing can be increased and full-time construction inspection can be provided to account for variations. We recommend that the following minimum testing frequencies be utilized.

In proposed parking areas, a minimum frequency of one in-place density test for each 5,000 square feet of area (minimum of 4 test locations per area) should be used. The existing, natural ground should be tested to a depth of 12 inches at the prescribed frequency. Each 12-inch lift of fill, as well as the stabilized subgrade (where applicable) and base should be tested at this frequency. Utility backfill should be tested at a minimum frequency of one in-place density test for

each 12-inch lift for each 200 linear feet of pipe. Additional tests should be performed in backfill for manholes, inlets, etc.

In proposed structural areas, the minimum frequency of in-place density testing should be reduced to one test for each 2,500 square feet of structural area (minimum of 4 test locations per structure). In-place density testing should be performed at this minimum frequency for a depth of 2 feet below natural ground and for every 1-foot lift of fill placed in the structural area. In addition, density tests should be performed in each column footing for a depth of 2 feet below the bearing surface. For continuous or wall footings, density tests should be performed at a minimum frequency of one test for every 50 linear feet of footing, and for a depth of 2 feet below the bearing surface.

Representative samples of the various natural ground and fill soils, as well as stabilized subgrade (where applicable) and base materials should be obtained and transported to our laboratory for Proctor compaction tests. These tests will determine the maximum dry density and optimum moisture content for the materials tested and will be used in conjunction with the results of the in-place density tests to determine the degree of compaction achieved.

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figure 2 and in Appendix II, and on the assumed loading conditions. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of the Melbourne Housing Authority in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed facility, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman & Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

We are pleased to be of assistance to you on this phase of the project. When we may be of further service to you or should you have any questions, please contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950

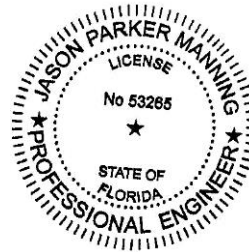


Dustin M. Cone
Assistant Project Engineer

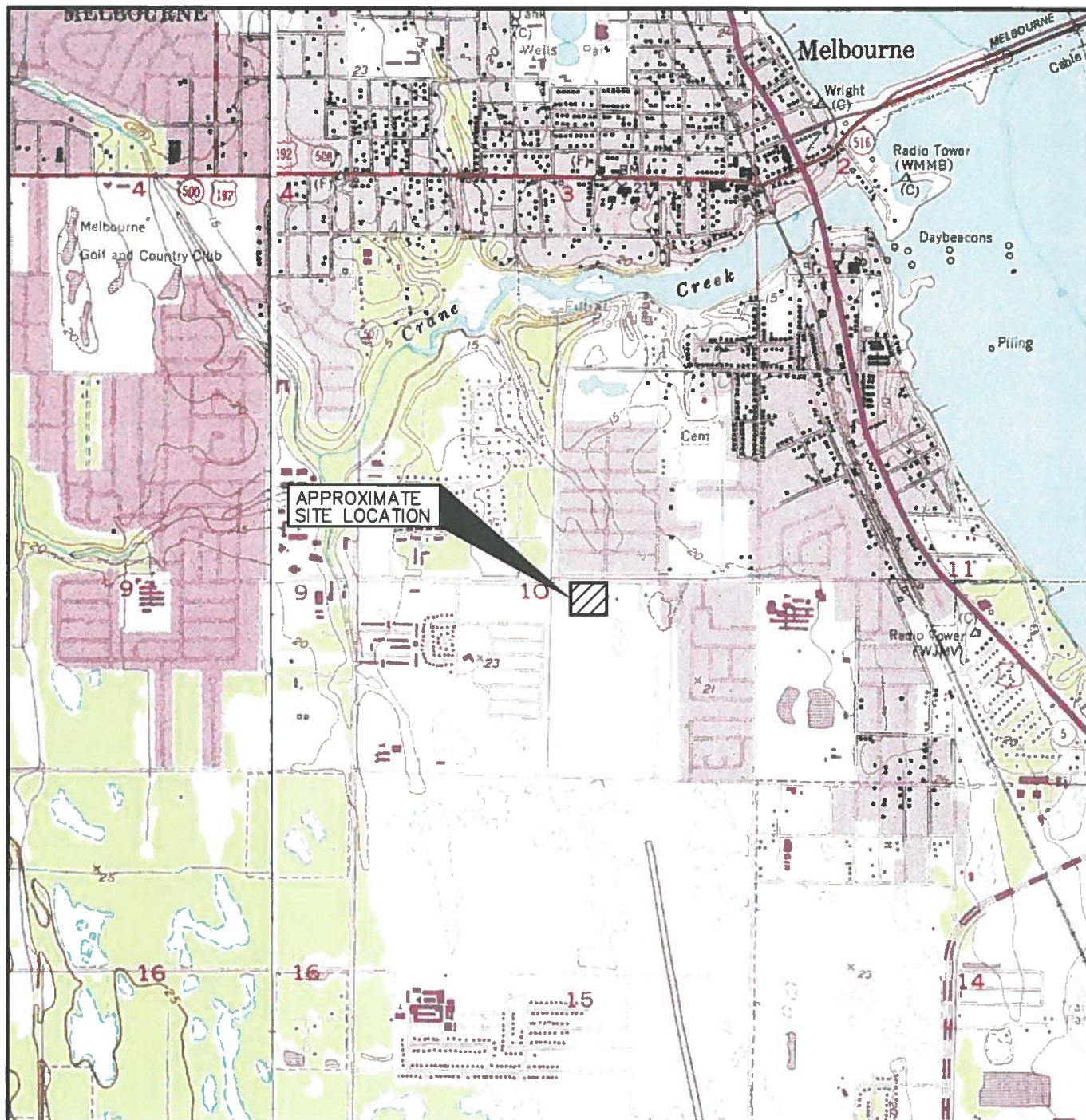


Jason P. Manning, P.E.
Branch Manager
Florida License No. 53265

DMC/JPM

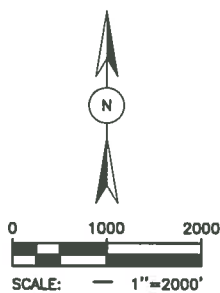


Cc: Mr. Steve Monroe, P.E. - Mid-Florida Engineering Consultants, Inc.



SECTION 10
TOWNSHIP 28 SOUTH
RANGE 37 EAST

OBTAINED FROM U.S.G.S. QUAD MAPS: MELBOURNE EAST, FLORIDA



QUADRANGLE LOCATION

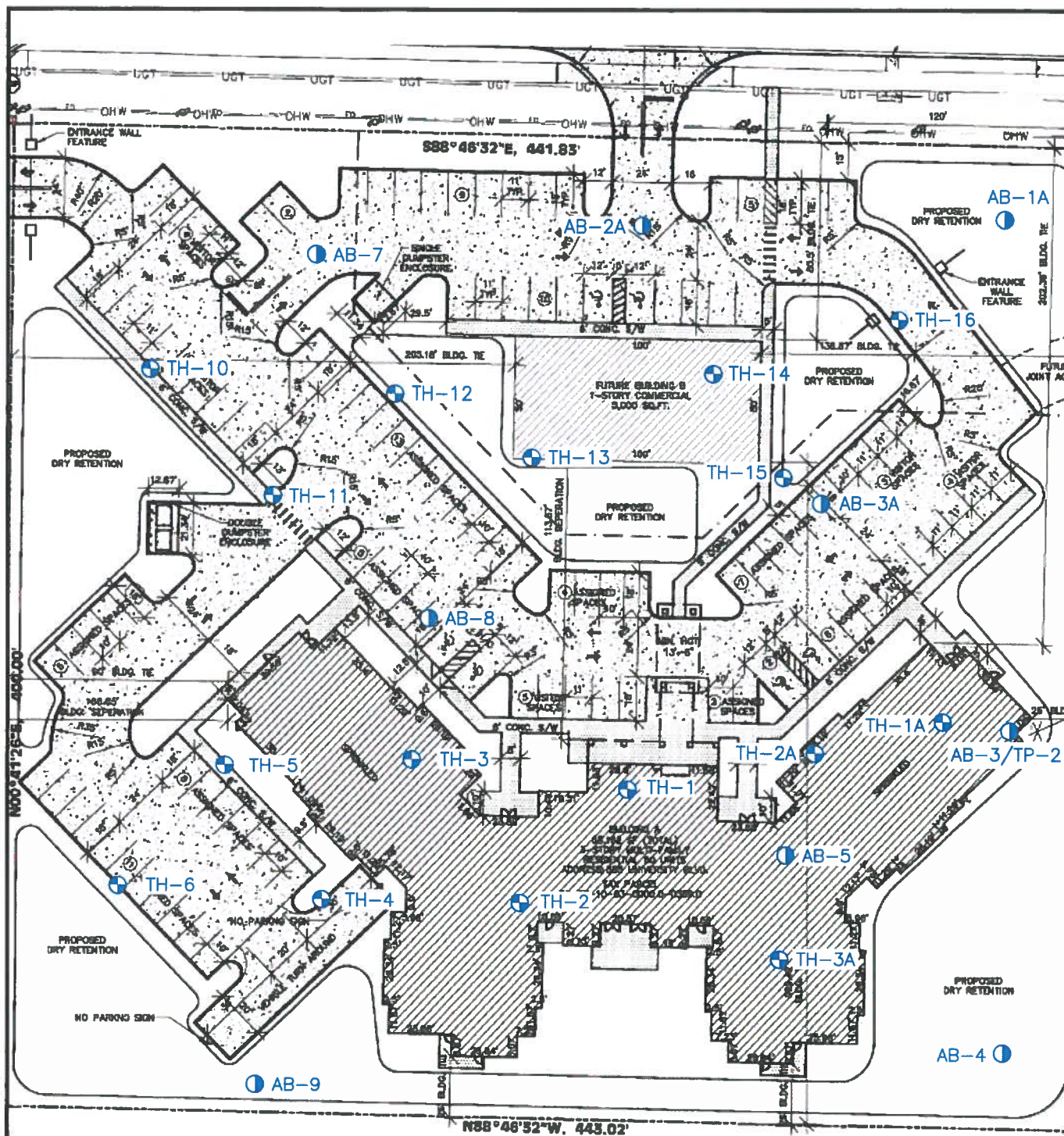
SITE LOCATION MAP



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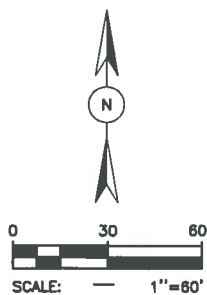
SUBSURFACE SOIL EXPLORATION
PALMS AT UNIVERSITY
MELBOURNE, FLORIDA

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LEGEND

- TH-1A STANDARD PENETRATION TEST (SPT) BORING LOCATION PERFORMED DURING THIS EXPLORATION
- AB-1A AUGER BORING LOCATION PERFORMED DURING THIS EXPLORATION
- AB-1, TH-1 AUGER OR SPT BORING PERFORMED DURING 2005 EXPLORATION
- TP TEST PIT PERFORMED DURING 2005 EXPLORATION



BORING LOCATION PLAN

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APPENDIX I

Standard Penetration Test and Auger Boring Procedures

STANDARD PENETRATION TEST

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D 1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load.

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from the soils at every 5 feet of drilled depth and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for 30 days prior to being discarded. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

AUGER BORINGS



Auger borings are used when a relatively large, continuous sampling of soil strata close to ground surface is desired. A 4-inch diameter, continuous flite, helical auger with a cutting head at its end is screwed into the ground in 5-foot sections. It is powered by the rotating action of the Kelly bar of a rotary drill rig. The sample is recovered by withdrawing the auger out of the ground without rotating it. The soil sample so obtained, is classified and representative samples put in bags or jars and brought back to the laboratory for classification testing.

APPENDIX II

Soil Boring Profiles

LEGEND

SOIL DESCRIPTIONS

-  ① FINE SAND (SP)
 ② FINE SAND WITH SILT (SP-SM)

COLORS

- (A) LIGHT GRAY TO GRAY
 (B) LIGHT BROWN TO BROWN
 (C) DARK BROWN

TH STANDARD PENETRATION TEST (SPT) BORING

AB AUGER BORING

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

GNE GROUNDWATER NOT ENCOUNTERED ON DATE DRILLED

GNM GROUNDWATER NOT MEASURED ON DATE DRILLED

 GROUNDWATER LEVEL MEASURED ON DATE DRILLED

SP,SP-SM
 SM,SC,CH

UNIFIED SOIL CLASSIFICATION SYSTEM

ENGINEERING CLASSIFICATION

I COHESIONLESS SOILS

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	0 TO 4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR. ABSENCE OF WATER SURFACE DATA ON CERTAIN BORINGS IMPLIES THAT NO GROUNDWATER DATA IS AVAILABLE, BUT DOES NOT NECESSARILY MEAN THAT GROUNDWATER WILL NOT BE ENCOUNTERED AT THESE LOCATIONS OR WITHIN THE VERTICAL REACHES OF THESE BORINGS IN THE FUTURE.

SOIL PROFILES LEGEND



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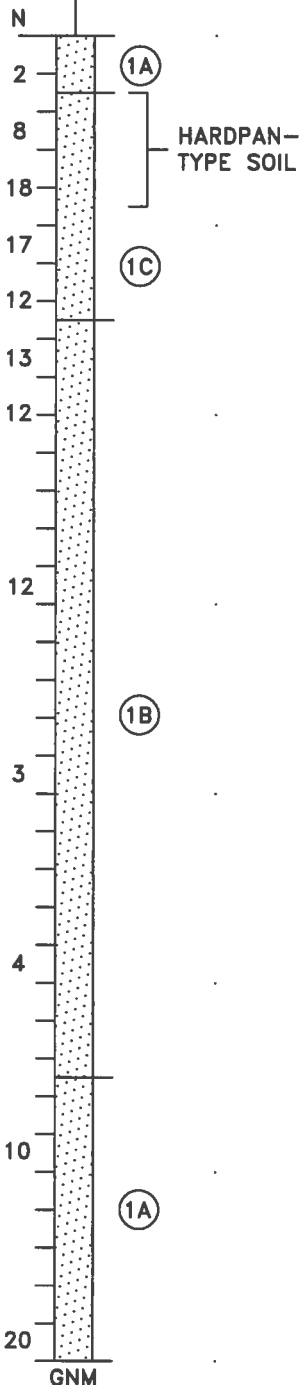
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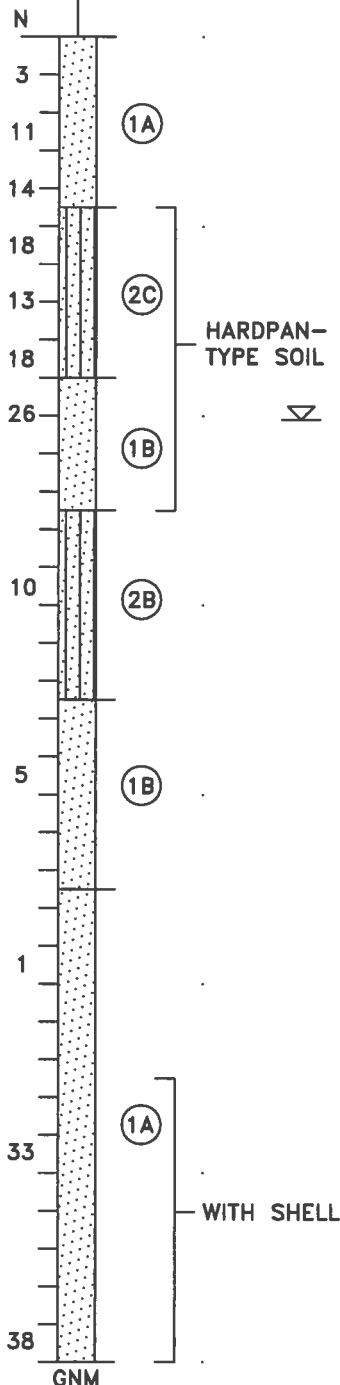
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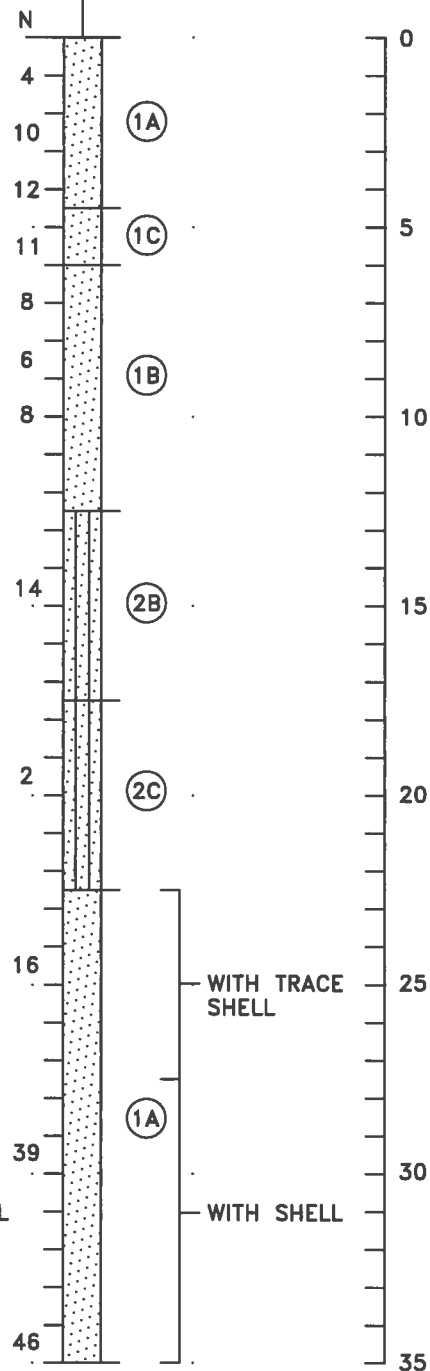
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TH-2A
7/19/17



TH-3A
7/19/17



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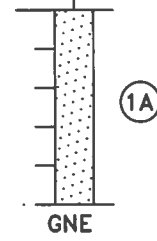
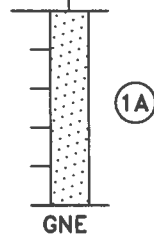
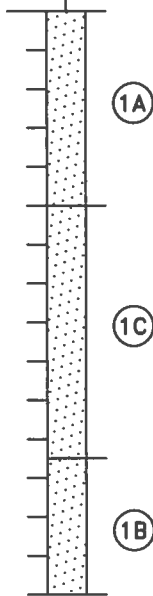
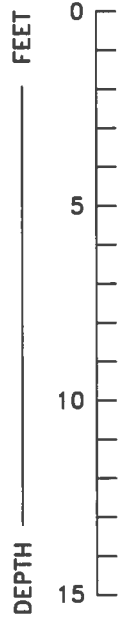
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AB-3A
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SOIL BORING PROFILES



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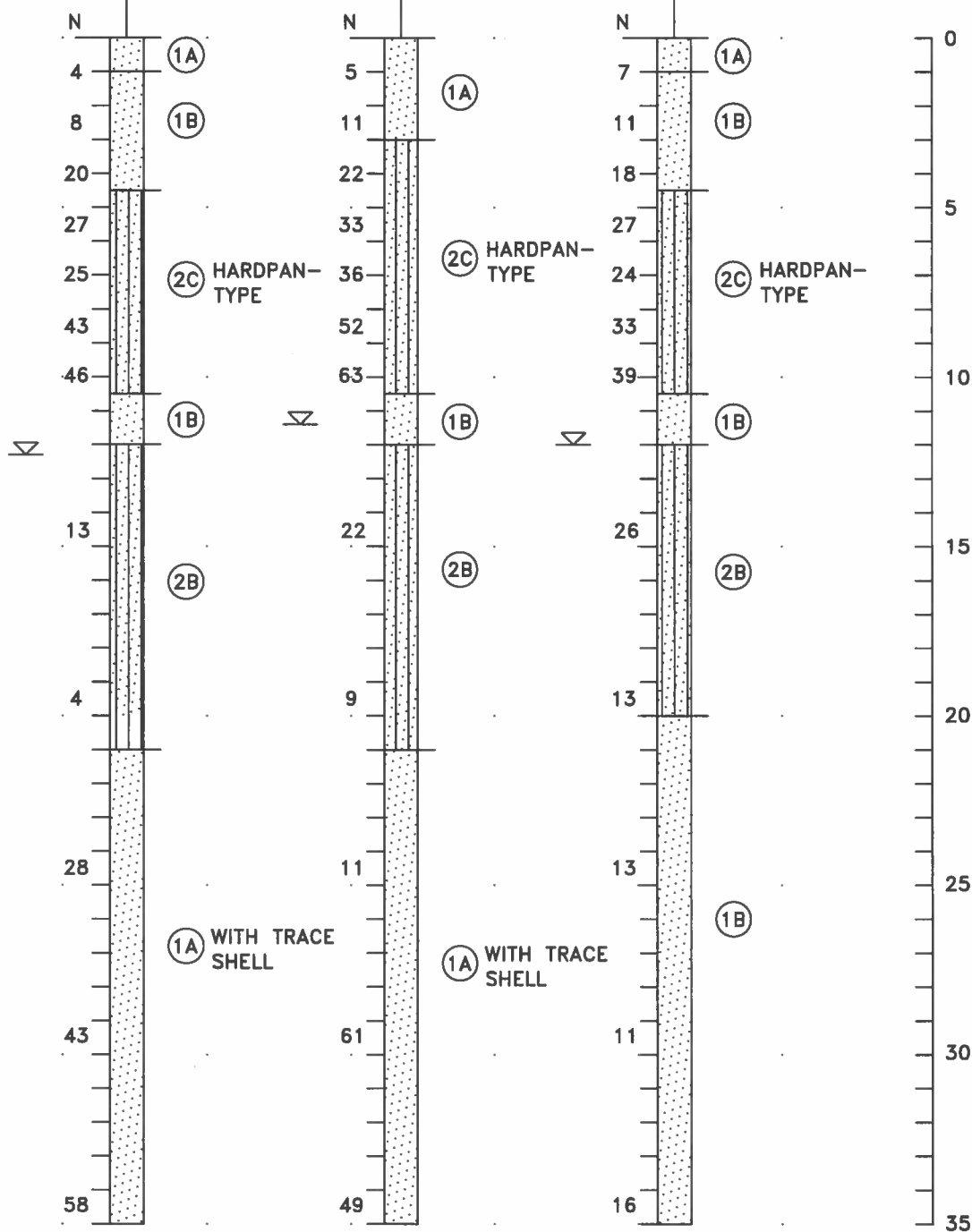
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DEPTH

TH-1
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TH-2
2/24/05

TH-3
2/24/05



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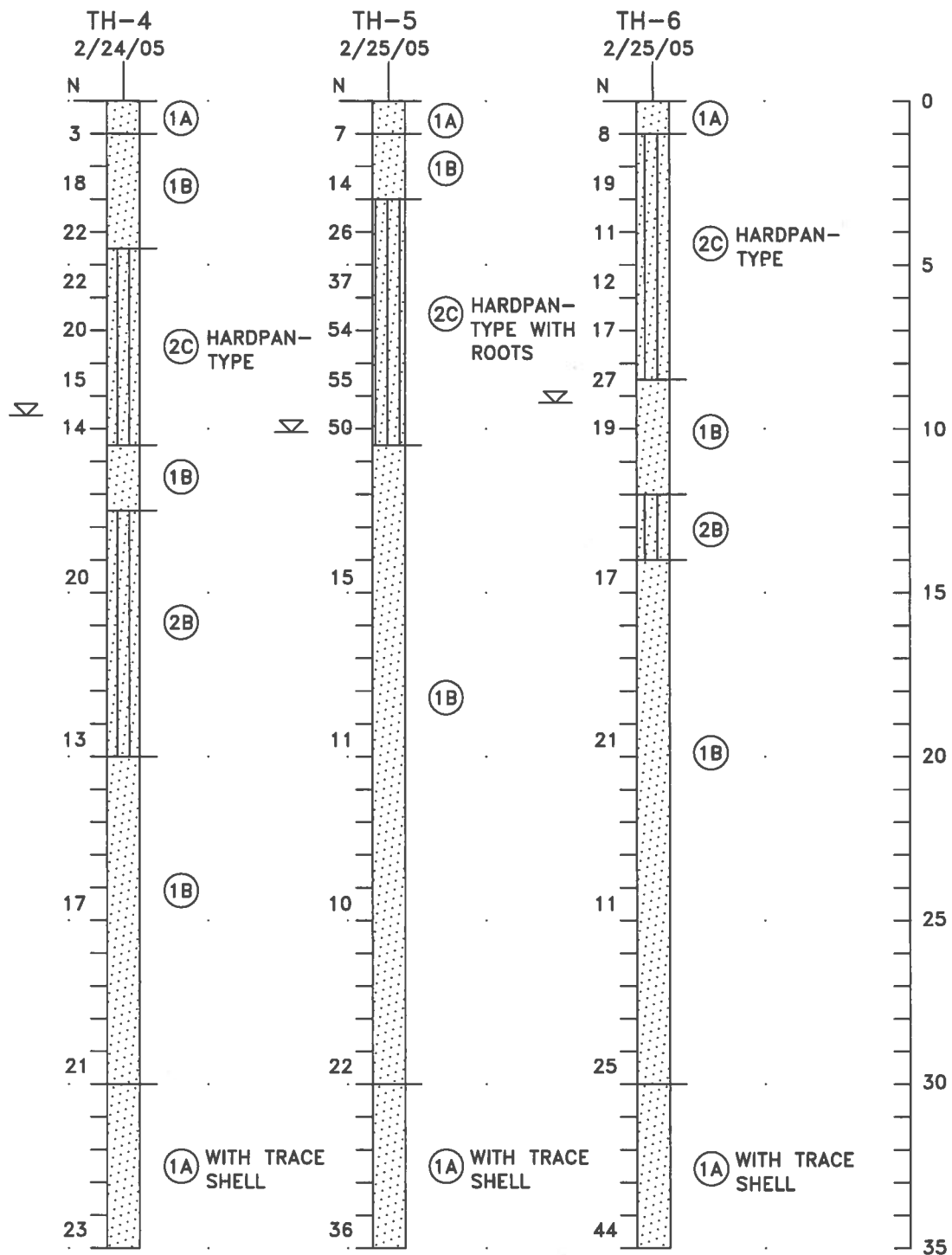
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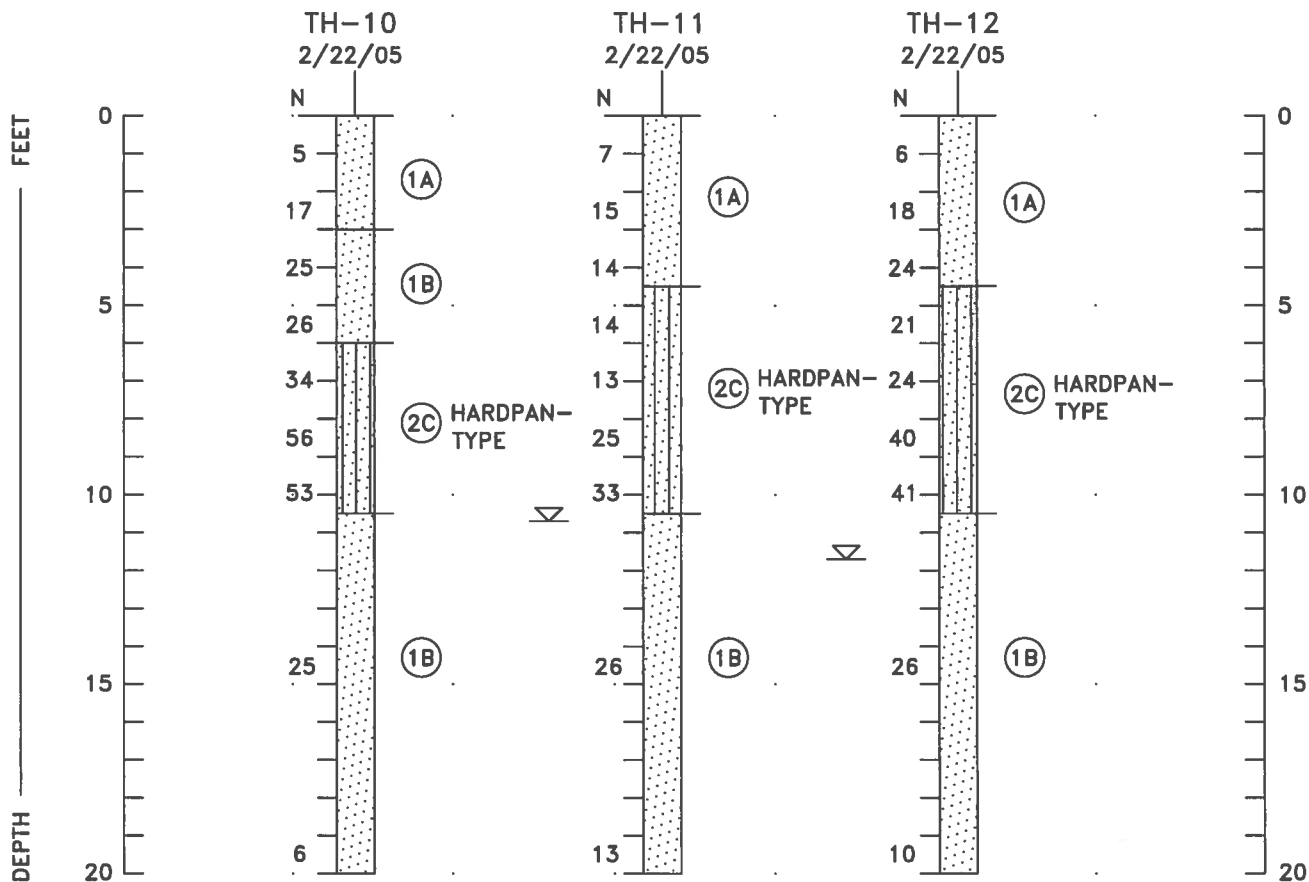
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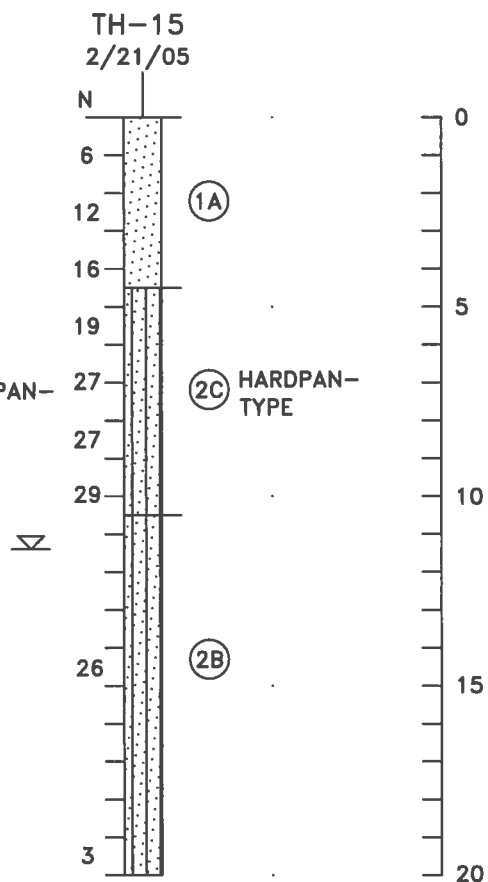
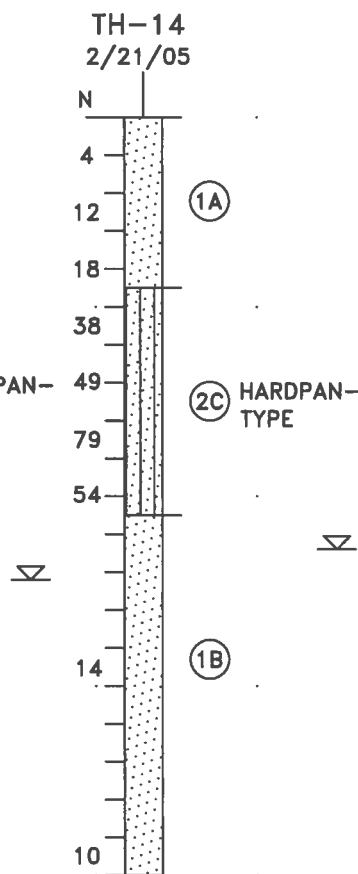
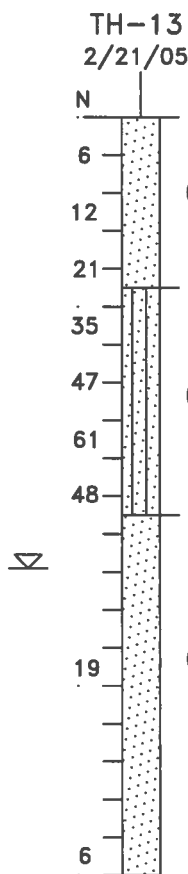
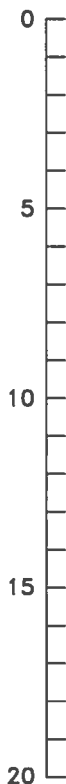
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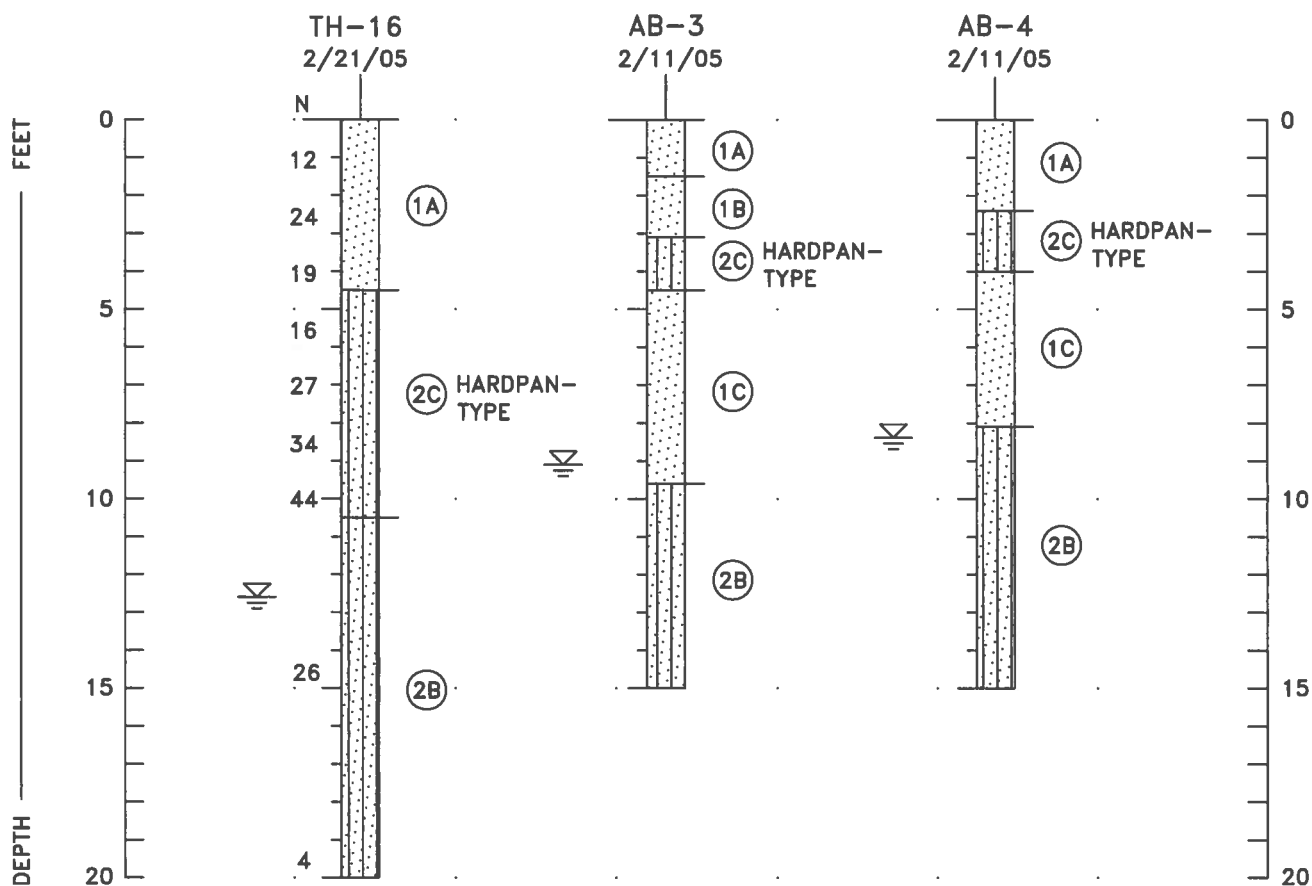
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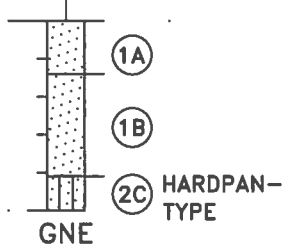
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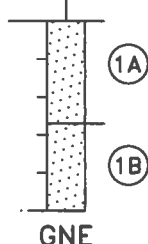
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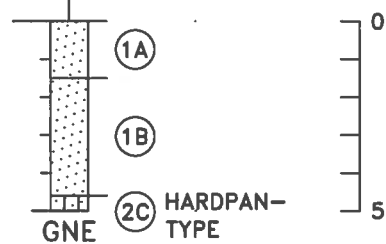
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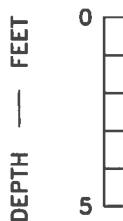
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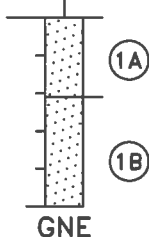
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SOIL BORING PROFILES



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**SECTION 01010
SUMMARY OF WORK**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. The project consists of constructing 60 MFR units, in one (1) 3-story buildings with elevator, approximately 50,000 sf. and an additional one (1) story commercial building with approximately 5,000 sf.
 - 1. Project Location: 585 E. University Avenue, Melbourne, FL 32901
- B. The work consists of wood framing, stairs, railings, windows, doors, gypsum board, tile, finishes, roofing, stucco, horizontal siding, as well as complete mechanical, plumbing, fire protection and electrical systems.

1.03 COORDINATION OF WORK

- A. Work of the contractor and subcontractors: provide in the following manner for interrelated portions of the project, unless specifically indicated otherwise on the drawings or elsewhere in these specifications.
- B. Work by contractor
 - 1. Provide structural openings, and chases for piping and ductwork, as established, and set by the mechanical and electrical subcontractors. Provide lintels, when required.
 - 2. Build in bolts, brackets and hangers, and similar items for work established by the mechanical and electrical subcontractors.
 - 3. Frame around and provide openings, including required lintels, for ductwork. Provide concrete equipment bases, where these are indicated on the drawings, including those shown on mechanical and electrical drawings.
 - 4. Provide curb and flashing for mechanical units not furnished with factory built curbs. Provide and build in flashings for mechanical units with factory built curbs installed by mechanical subcontractors.
 - 5. Provide required painting of mechanical and electrical equipment except shop coat and factory finishes.
- C. Work by mechanical subcontractor (HVAC, plumbing and fire protection):
 - 1. Arrange and pay for all inspections and tests of piping systems, required by governing authorities and these specifications.
 - 2. Furnish detailed drawings and location lines for concrete bases for mechanical equipment.
 - 3. Provide anchor bolts and other inserts required.
 - 4. Furnish location lines and dimensional data for field built roof curbs.
 - 5. Furnish and install pre-engineered, prefabricated curbs for mechanical equipment.

**SUMMARY OF WORK
SECTION 01010-1**

6. Furnish concrete bases required for proper installation of the mechanical equipment when not shown on the drawings.
 7. Cooperate with the contractor in laying out portions of the work requiring correlation of systems for esthetic effect, such as ceilings, wall paneling, and similar items.
 8. Mechanical equipment and controls electrical coordination: see sections 15010 and 16010.
 9. Furnish and install all fire dampers.
 10. Complete all fire caulking of system components through fire rated assemblies.
- D. Work by electrical subcontractor:
1. Provide motor starters complete with auxiliary contacts where required for the function of the mechanical system unless specifically noted otherwise on the drawings or in the mechanical specifications.
 2. Verify wiring requirements with mechanical specifications for motor driven equipment. Provide complete wiring for the equipment except controls and required interlocking.
 3. Provide concrete bases required for proper installation of electrical equipment when not shown on the drawings.
 4. Cooperate with the contractor in laying out portions of the work requiring correlation of systems for aesthetic effect, such as ceilings, wall paneling, and similar items.
 5. All control wiring set forth in the control diagrams on the drawings shall be furnished and installed by electrical subcontractor under the supervision of the control manufacturer's representative.
 6. Mechanical equipment and controls electrical coordination: see Sections 16010 and 15010.
 7. Complete fire caulking of all system components through fire rated assemblies.
- E. Openings, sleeves and chases:
1. Contractor shall provide miscellaneous openings, and built in sleeves, as required throughout the building for the various trades.
 2. Contractors or subcontractors requiring the building in of such items shall locate for, and provide such items to the contractor. If walls, floors or ceilings are already built, the subcontractor or contractor requiring such items shall provide such items in a manner approved by the architect.

1.04 COMMENCEMENT OF WORK

- A. Preparation: Properly prepare work to receive subsequent work or finish. Notify Architect if any work is unsatisfactory to receive subsequent work or finish and receive instruction before proceeding.

1.05 LAYOUT OF WORK

- A. Execution: The Contractor shall employ, or have in his employ, a competent Engineer who shall establish a permanent bench mark and general reference points, to which easy access may be had by all the Contractors and Subcontractors, for use in determining all levels, lines and grades and for verification from time to time during the progress of the work. It is the duty of each Contractor or Subcontractors to lay out his own work, take his own measurements, grades and levels, and be responsible for their

proper correlation to the entire project, except that the Contractor shall lay out the partitions on the forms or rough floors as a guide to the Trades.

- B. Coordination: Report inconsistencies between the Drawings and the actual size to the Architect and receive instructions before commencing work.

1.06 USE OF SITE

- A. Contractor may utilize the portion of the site designated by the Owner at the time of the pre-construction meeting.

1.07 WORK SEQUENCE

- A. The various phases of the work shall be executed in the following sequence, unless the Architect receives express permission of the Owner to permit specific variations requested by the Contractor.

1.08 OWNER FURNISHED ITEMS

- A. The following is a list of the items which shall be furnished by the Owner and installed by the Contractor:
- B. The following is a list of the items, which shall be furnished and installed by the Owner. Rough-ins and all final connections are by the General Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used

END OF SECTION

**SECTION 01020
ALLOWANCES****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Selected materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Contingency allowances.
 - 4. Inspection and testing allowances.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Modification Procedures" specifies procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Quality Control Services" specifies procedures governing the use of allowances for inspection and testing.

1.03 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise the Architect of the date when the final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At the Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by the Architect from the designated supplier.

1.04 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

- B. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.05 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. The Contractor's related costs for products and equipment ordered by the Owner under the contingency allowance are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

1.06 INSPECTION AND TESTING ALLOWANCES

- A. Inspection and testing allowances include the cost of engaging the inspection or testing agencies, the actual inspections and tests, and reporting the results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting upon failure of previous tests and inspections.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the inspection and testing allowance to Owner by Change Order.

1.07 UNUSED MATERIALS

- A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
 - 1. When requested by the Architect, prepare unused material for storage by Owner where it is not economically practical to return the material for credit. When directed by the Architect, deliver unused material to the Owner's storage space. Otherwise, disposal of unused material is the Contractor's responsibility.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine products covered by an allowance promptly upon delivery for damage or defects.

3.02 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1:

END OF SECTION

**SECTION 01026
UNIT PRICES****PART 1 – GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Quality Control Services" for general inspection requirements.
 - 3. Division 2 Section "Earthwork" for procedures for measurement and payment for rock excavation.
 - 4. Division 2 Section "Driven Piles" for procedures for measurement for payment for driven piles.

1.03 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

1.04 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit, and applicable taxes.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.
- D. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE

- A. Unit Price No. 1 -
 - 1. Description:
 - 2. Unit of Measurement:
- B. Unit Price No. 2 -
 - 1. Description:
 - 2. Unit of Measurement:
- C. Unit Price No. 3 -
 - 1. Description:
 - 2. Unit of Measurement:
- D. Unit Price No. 4 -
 - 1. Description:
 - 2. Unit of Measurement:
- E. Unit Price No. 5 -
 - 1. Description:
 - 2. Unit of Measurement:

END OF SECTION

**SECTION 01030
ALTERNATES**

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and all other parts of this Specification Project Manual apply to the Work of this section.

1.02 DESCRIPTION OF REQUIREMENTS

- A. Definition: An alternate is an amount proposed by the Bidders and stated on the Bid Form that will add to or deduct from the Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installations methods described in Contract Documents.
- B. Included as part of each alternate, all costs relative to the alternate including but not limited to overhead, insurances, permits, fees, labor, material, equipment, miscellaneous devices, appurtenances and all items incidental to or required for a complete alternate whether or not mentioned as part of the alternate.
- C. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.
- D. Schedule: A "Schedule of Alternates" is included at the end of this section. Specification sections referenced in the schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.
- E. The Description herein for each alternate is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable specification sections (Division 1 through 16), and to applicable drawings for specific requirements of work, regardless of whether references are so noted in description of each alternate. Coordinate relative work and modify surrounding work as required to properly integrate the work of each alternate. It is recognized that descriptions of alternates are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 SCHEDULE OF ALTERNATES:

- A. ALTERNATE NO. 1: (Price Required)

The additional cost to provide a 100% Performance Bond, and a 100% Labor and Material Payment Bond as per Article 7 of the General Conditions. The cost for the bonds is not to be included in the Base Bid Price.

B. ALTERNATE NO. 2: (Price Required)

Cost to provide Builder's Risk Insurance per Article 11 of the General Conditions. The cost for the Builder's Risk Insurance is not to be included in the Base Bid.

END OF SECTION

**SECTION 01035
MODIFICATION PROCEDURES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
 - 1. Multiple Prime Contracts: Provisions of this Section apply to the work of each prime contractor.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 3. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
 - 4. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.
 - 5. Division 1 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 MINOR CHANGES IN THE WORK

- A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - 2. Within 20 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.
 - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

- b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
 - 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 - 2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

1.05 ALLOWANCES

- A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in the purchase amount only where indicated as part of the allowance.
 - 2. When requested, prepare explanations and documentation to substantiate the margins claimed.
 - 3. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
 - 4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 21 days.
 - 1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.

2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

1.06 CONSTRUCTION CHANGE DIRECTIVE

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

1.07 CHANGE ORDER PROCEDURES

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

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01039
COORDINATION AND MEETINGS**

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Coordination
- B. Field Engineering
- C. Pre-Construction Conference
- D. Progress Meetings

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs. A meeting amongst all trades, specifically fire, plumbing and mechanical contractors for the purpose of determining sequencing of tasks so as to not conflict with other installations is suggested and the sole responsibility of the General Contractor. See Mechanical specifications for further direction.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

1.04 FIELD ENGINEERING

- A. Contractor to employ a Land Surveyor registered in the State of Florida.
- B. Contractor to locate and protect survey control and reference points.
- C. Control datum for survey that is established by Owner provided survey.

**COORDINATION AND MEETINGS
SECTION 01039-1**

- D. Contractor to provide field engineering services. Establish elevations, lines and levels, utilizing recognized engineering survey practices.
- E. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the work are in conformance with the Contract Documents.

1.05 CUTTING AND PATCHING (WHERE REQUIRED)

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written report in advance of cutting or altering elements which affects:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance or safety of element.
 - 4. Visual qualities of sight exposed elements.
- C. Execute cutting, fitting and patching, including excavation and fill, to complete Work and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods which will avoid damage to other Work, and provide surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision of remedy.

1.06 PRECONSTRUCTION CONFERENCE

- A. Architect/Engineer will schedule a conference after Contract Negotiation is complete.
- B. Attendance Required: Owner, Architect/Engineer and General Contractor.
- C. Agenda:
 - 1. Submission of executed bonds and insurance certificates.

COORDINATION AND MEETINGS SECTION 01039-2

2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, schedule of shop drawings, list of Products, schedule of values and progress schedule.
4. Designation of personnel representing the parties in Contract, Threshold Inspector and the Architect/Engineer.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
6. RFI procedure/process
7. Scheduling
8. Project Clean-up.
9. Project Coordination.

1.07 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at monthly intervals or as determine during the pre-construction meeting.
- B. Make arrangements for meetings, prepare agenda with copies of participants, preside at meetings, record minutes, and distribute copies to Architect/ Engineer, Owner, participants, and those affected by decisions made.
- C. Attendance Required: General contractor's job superintendent and project manager, Owner or owner's representative, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations.
 4. Identification of problems which impedes planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01040
COORDINATION****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.

1.03 RELATED SECTIONS

- A. Division 1 Section "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.
- B. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
- C. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
- D. Division 1 Section "Materials and Equipment" for coordinating general installation.
- E. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.04 COORDINATION

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

- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of schedules.
 - 2. Installation and removal of temporary facilities.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - 5. Project closeout activities.
- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.05 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. Show the relationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.
 - 3. Comply with requirements contained in Section "Submittals."
- B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
 - 1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.02 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining, and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High-speed operation.
 - 21. Improper lubrication.
 - 22. Unusual wear or other misuse.
 - 23. Contact between incompatible materials.
 - 24. Destructive testing.
 - 25. Misalignment.
 - 26. Excessive weathering.
 - 27. Unprotected storage.
 - 28. Improper shipping or handling.
 - 29. Theft.
 - 30. Vandalism.

END OF SECTION

**SECTION 01045
CUTTING AND PATCHING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This Section includes administrative and procedural requirements for cutting and patching.

1.03 RELATED SECTIONS

- A. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.04 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - 6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 - 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.05 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction in Division 13 Sections.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Processed concrete finishes.
 - b. Stonework and stone masonry.
 - c. Ornamental metal.
 - d. Matched-veneer woodwork.
 - e. Preformed metal panels.
 - f. Firestopping.

- g. Window wall system.
- h. Stucco and ornamental plaster.
- i. Acoustical ceilings.
- j. Terrazzo.
- k. Finished wood flooring.
- l. Fluid-applied flooring.
- m. Carpeting.
- n. Aggregate wall coating.
- o. Wall covering.
- p. Swimming pool finishes.
- q. HVAC enclosures, cabinets, or covers.

1.06 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.
- B. Plaster: Comply with ASTM C 842.
 - 1. Base Coat: Ready-mixed, sand aggregate gypsum plaster base.
 - 2. Finish Coat: Ready-mixed gypsum finish plaster.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
 - 1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 - 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
 - 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 - 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

- D. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.
1. Unless otherwise indicated, provide 3-coat work.
 2. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arrises.
 3. Cut, patch, point-up, and repair plaster to accommodate other construction.

3.04 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION

**SECTION 01050
FIELD ENGINEERING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, the following:
 - 1. Land survey work.
 - 2. Civil-engineering services.
 - 3. Damage surveys.
 - 4. Geotechnical monitoring.

1.03 RELATED SECTIONS

- A. Division 1 Section "Coordination" for procedures for coordinating field engineering with other construction activities.
- B. Division 1 Section "Submittals" for submitting Project record surveys.
- C. Division 1 Section "Project Closeout" for submitting final property survey with Project Record Documents and recording of Owner-accepted deviations from indicated lines and levels.

1.04 SUBMITTALS

- A. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements.
- B. Final Property Survey: Submit 10 copies of the final property survey.
- C. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

1.05 QUALITY ASSURANCE

- A. Surveyor Qualifications: Engage a land surveyor registered in the state where the Project is located, to perform required land-surveying services.
- B. Engineer Qualifications: Engage an engineer of the discipline required, licensed in the state where the Project is located, to perform required engineering services.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Identification: The Owner will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of 2 permanent benchmarks on the site, referenced to data established by survey control points.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- D. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
 - 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.

3.02 PERFORMANCE

- A. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 - 1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
 - 2. As construction proceeds, check every major element for line, level, and plumb.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
 - 1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 - 2. On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

- C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- E. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- F. Final Property Survey: Prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.
 - 1. Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey."

END OF SECTION

**SECTION 01105
RODENT CONTROL**

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies rodent control and general pest control requirements within project areas, and bordering areas as designated by the Owner and Architect. This work is to be performed prior to demolition, excavation, and site preparation and throughout the Contract, so that rodents and other pests do not disperse from or infest the project area.
- B. The Contractor shall develop and implement an Integrated Pest Management (IPM) approach. As part of that approach, the Contractor shall maintain a cooperative dialogue with appropriate agencies and management/representatives of neighboring properties.
- C. The Contractor shall perform the rodent control tasks described in this Scope of Work and also respond to other pest control needs when directed by the Owner.

1.02 SUBMITTALS

- A. Submit to the Engineer copies of pesticide applicator certifications and licenses within ten (10) days of the start of Rodent Control activities and ten (10) days prior to their issuance or renewal for the duration of this Contract.
- B. After performing the survey described in Paragraph 3.2 below and before initiating baiting, submit to the Architect a written description of proposed pest control procedures, indicating materials, quantities, methods and time schedule. For all pesticides to be used, submit a copy of the pesticide manufacturer's EPA-approved pesticide label with application directions.
- C. Submit to the Architect documentation of pest control activities and results as followed:
 - 1. Weekly – Submit data sheets with locations of sites treated, amounts and types of pesticide used, number and types of traps set, survey and inspection results, sanitation conditions, complaint calls investigated, and any problem that occurred.
 - 2. Monthly – Submit a written summary that includes determinable results of the IPM program and recommendations.
 - 3. Quarterly – Submit a map that shows bait stations, manholes, and catch basins where rodent baits are being maintained.

1.2 QUALIFICATIONS

- A. The Contractor shall perform this work at all times in accordance with the following minimum standards and as acceptable to the Owner and Architect.
 - 1. The Contractor and key personnel shall have experience with commercial and residential accounts and construction projects; have experience and technical training in vertebrate pest management and integrated pest management; have experience with various rodent control techniques, equipment and strategies;

have training and experience with insect control; and have knowledge of an experience with techniques to reduce non-target hazards.

2. The supervisor shall be licensed and certified in General Pest Control and Vertebrate Pest Control. The supervisor shall have specific training and experience in vertebrate pest management, commercial rodent control, general pest control, and integrated pest management.
3. Applicators shall be licensed by the Florida Pesticide Bureau and certified in General Pest Control. Applicators shall have specific training and experience in commercial rodent control and integrated pest management.

1.3 COORDINATION

- A. Perform this Work in cooperation with the other Work performed under the Contract.
- B. Initiate the work on or before field mobilization begins for the Contract and with adequate timing to achieve control before environmental disruptions. Provide a maintenance program until Contract is completed and all equipment and materials are removed.
- C. Perform the Work according to the preliminary schedule described in this section and as accepted or revised by the Owner and Architect. Estimated durations and start dates may be changed by the Owner or Architect to suit changes in construction schedules and field conditions. The Work could potentially require performance any day of the week and any hour of the day or night, regardless of weather.
- D. Perform this work in such a manner that toxicant or other control tools do not pose a hazard to persons, domestic animals, or non-target wildlife.

1.4 PERMITS

- A. Obtain and maintain in coordination with the Contractor appropriate permit(s) from city or state agencies for pest control activities associated with this Work.
- B. Obtain and maintain in coordination with the Contractor all right of entry permits required for the performance of this Work. This includes all utilities and private properties to which entrance is required.

PART 2 – PRODUCTS

2.1 PRODUCTS

- A. Furnish and use only pesticide formulations registered by the U.S. Environmental Protection Agency (EPA) and the Florida Department of Food and Agriculture, where appropriate according to label directions and as acceptable to the Architect.
- B. Furnish and use devices and supplies (e.g., traps and bait stations) to facilitate the management and effectiveness of the pest control program, where appropriate and as acceptable to the Architect.

PART 3 - EXECUTION**3.1 MEETINGS**

- A. Before proceeding with the Work, all pest control personnel shall attend a Work Shop held by the Contractor and Architect to discuss planned pest control methods and coordination.
- B. The supervisor shall meet with the Contractor weekly to discuss pest control activities.

3.2 SURVEY

- A. Prior to baiting, survey the proposed construction area and accessible or observable bordering areas and record signs of rodent activity and sanitation conditions. Closely inspect all embankments, edge areas, and properties within and abutting the construction area. Maintain survey records in the manner described in Paragraph 3.7 below.
- B. Thoroughly inspect construction area and accessible or observable bordering areas and any nearby areas designated by the Architect, for rodent activity and sanitation deficiencies weekly throughout the duration of this Contract and in accordance with the work schedule. Maintain inspection records in the manner described in Paragraph 3.7 below.
- C. Plan the control program and allocate resources based on survey and inspection data and as acceptable to the Owner.

3.3 APPLICATION FOR RODENT CONTROL

- A. Apply rodenticide in strict accordance with EPA-approved label directions. Maintain records of all bait placements in the manner described in Paragraph 3.7 below.
- B. Where appropriate, especially for surface placements of rodent baits, use properly secured and tamper-resistant bait stations consistent with EPA regulation. Individually number and properly identify all bait stations.
- C. Surface Applications
 - 1. Initial Surface Baiting

Rid the construction area of all detectable rodents before construction begins, or as acceptable to the Owner. Bait all observable rodent burrows. Install and secure bait stations at regular and appropriate intervals and locations, and document rodent activity (burrows, droppings, bait consumed, dead rodents). Replenish bait and shift bait stations as necessary to ensure complete control of rodent populations. Bait edge and accessible bordering areas as necessary to ensure that rodents will not be dispersed by construction activities and that rodents will not infest work areas.
 - 2. Maintain Surface Baiting

Establish a maintenance baiting program prior to mobilization by the Contractor, including construction areas and accessible bordering areas, as acceptable to the Owner. Check bait placements weekly. Use survey and baiting data to determine the most effective distribution of baiting locations and bait quantities. Shift and distribute bait and bait stations as appropriate to ensure continued control.

D. Subsurface Applications

1. General

For situations involving underground construction/demolition, utility relocation, or utility construction, and for other situations when determined necessary by the Owner or Architect, initiate subsurface baiting and rid underground environments of all detectable rodents before construction begins. Assign an identifying number to each manhole and catch basin where bait is placed so that locations of bait placements can be identified and rodent activity (dropping, bait consumed, dead rats) can be documented. Conduct bait applications during off-peak traffic hours unless otherwise directed by the Architect. Access manholes according to the requirements of appropriate agencies and utility companies. Coordinate the Work with appropriate municipal agencies and utility companies.

2. Initial Subsurface Baiting

Apply appropriate baits to control rodent populations in manholes and catch basins. This will involve suspending and securing bait using noncorrosive wire (e.g., 24 gauge plastic coated). Place bait in all accessible manholes and catch basins within the construction work area. In addition, bait an appropriate set of manholes and catch basins in the blocks bordering the work area and as acceptable to the Owner. Identify all baited manholes and catch basins with a standardized paint mark on the street and a numbered tag to be attached to the suspending wire. Approximately seven days after completion of the first baiting, check all manhole and catch basin baits and record estimates on the amount of bait consumed. Replenish or increase the amount of bait applied according to the amount consumed or as acceptable to the Owner and Architect. Repeat this process again approximately fourteen days later and until there is little or no bait consumed. Check manholes and catch basins weekly when they repeatedly have 100 percent of the bait consumed.

3. Maintenance of Subsurface Baiting

Prior to mobilization by the Contractor, establish a maintenance baiting program appropriate for the rodent infestation patterns identified during initial subsurface baiting. This program shall ensure continued control and shall be performed in a manner acceptable to the Owner and Architect. Maintain bait in manholes and catch basins that have rodent activity and those that had activity during initial baitings. Check each bait according to rodent activity levels. This could range from weekly to approximately every three months, depending upon the recent history of bait consumption. Use utility maps and baiting data to determine the most effective distribution of baiting locations and bait quantities. Shift and distribute baiting locations as necessary to ensure adequate interception points for controlling immigrating rodents.

E. Cleanup

1. Remove visible rodent carcasses and dispose of them daily consistent with the pesticide label directions and applicable codes, laws and regulations.
2. Upon completion of any pest control operations at the site, remove remaining bait and dispose of it according to the pesticide label and applicable codes, laws and regulations. Also remove all wires used for subsurface baiting and any bait stations or traps.

3.4 SANITATION

- A. Prior to construction and throughout the duration of this Contract, identify and document harborage and food sources available to rodents on the construction site and

in observable bordering areas. This includes any littering or improper or insufficient use of trash receptacles in construction areas. It also includes any bordering areas with sanitation conditions or structural deficiencies that violate City or State sanitation codes.

- B. Maintain records of sanitation conditions in the manner described in Paragraph 3.7 below.

3.5 COMPLAINT CALLS

- A. During construction, respond to pest-related complaints from the “adjacent” neighborhood (i.e. within 200 feet of the project limits) within 12 hours when directed by the Owner or Architect. Inspect the particular premises and adjacent areas for sanitation and structural deficiencies and also signs of historic and recent pest activity. Provide sanitation and structural maintenance information to the property owner. Use pesticides or traps as necessary and appropriate to resolve the complaint when there is a relationship between the pest infestation and construction activities, or when directed by the Owner or Architect.
- B. Maintain records of all complaints investigated, including location, contact person, inspection results, and actions taken. Document the relatedness of the pest infestation to construction activities.

3.6 GENERAL PEST CONTROL

- A. When directed by the Owner or Architect, the Contractor shall determine appropriate methods for any pest control task not specifically identified above and shall submit them in writing to the Owner and Architect for approval in advance. Such pest control tasks would relate to unanticipated pest control needs within construction areas or adjacent areas. This could include control of insects or vertebrates other than rats and mice.
- B. Maintain records of general pest control activities and results in the manner described in Paragraph 3.7 below.

3.7 RECORD KEEPING

- A. Use standardized data sheets acceptable to the Owner and Architect to maintain accurate records of date, placement, type and amount of pesticides or other control tools (e.g., traps) applied. Similarly, maintain records of surveys, inspections, changes in pest activity, sanitation conditions, and complaint calls. Submit data in a format acceptable to the Owner and Architect and as required under Paragraph 1.3 (C) above.

END OF SECTION

**SECTION 01200
GENERAL PROVISIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Examination of Site.
- B. Drawings and Specifications.
- C. Data and Measure.
- D. Cooperation of Trades.

1.03 EXAMINATION OF SITE:

- A. Contractor is requested to visit the site, compare the drawings and specifications with any work in place, and inform himself as to all conditions, including other work, if any, being performed. Failure to visit the site will in no way relieve the Contractor from necessity of furnishing any materials or performing any work that may be required to complete work in accordance with drawings and specifications without any additional costs to the Owner.

1.04 DRAWINGS AND SPECIFICATIONS

- A. These specifications are intended to supplement the drawings and it will not be the province of the specifications to mention any part of the work which the drawings are competent to fully explain in every particular and such omission is not to relieve the Contractor from carrying out portions indicated on the drawings only. Should items be required by these specifications or applicable code requirements and not indicated on the drawings, they are to be supplied even if of such nature that they could have been indicated thereon.
- B. In cases of disagreement between drawings and specifications, or within either drawings or specifications, the better quality or greater quantity of work shall be estimated and the matter referred to the Architect for a decision. Larger scale plans take precedence over smaller. Specifications take precedence over drawings.

1.05 DATA AND MEASURE

- A. The data given herein and on the drawings is as exact as could be secured. Their absolute accuracy is not guaranteed, and the Contractor shall obtain exact locations, measurements, levels, etc., at the site and shall satisfactorily adapt to his work to the actual conditions of the building. Do not scale prints. Verify all dimensions with the Architect prior to commencing work. Only Architectural drawings may be utilized in calculation. Other drawings (Mechanical, etc.) are diagrammatic or schematic.

1.06 EQUIPMENT AND CONSTRUCTION METHODS

- A. The Contractor shall be responsible for the equipment and methods used in the erection of his work covered by the contract, but the Architect reserves the right to approve such equipment and methods.
- B. If, at any time, the Contractor's working force, in the opinion of the Architect, shall be inadequate for securing the necessary progress, as herein stipulated, the Contractor shall, if so directed, increase the work force or equipment to such extent as to give reasonable assurance of compliance with the schedule of progress, but the failure to make such demand shall not relieve the Contractor of his obligation to secure the quality, the safe conduct of the work, and the rate of progress required by the contract. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliance and methods.
- C. Quality workmanship will be expected. The good appearance of finished work shall be of equal importance with its mechanical efficiency. No makeshifts will be permitted anywhere in the work, and all portions of the work shall be so laid out and installed that the work as a whole is of uniform quality and appearance.

1.07 COOPERATION OF TRADES

- A. It is the intention of the Contract Documents that the various trades engaged in the work shall cooperate in the execution of the work. The contractors will be expected and required at all times to require cooperation from all sub-contractors engaged in the work. The contractors shall plan the work in such a manner that all parts of the construction will fit in with other parts or sections in a proper manner and at the proper time.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01300
SUBMITTALS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Submittal Procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Shop drawings.
- E. Product Data.
- F. Samples.
- G. Manufacturers' instructions.
- H. Manufacturers' certificates.
- I. Construction photographs.

1.03 RELATED SECTIONS

- A. Section 01400 - Quality Control: Manufacturers' field services and reports.
- B. Section 01700 – Contract Closeout: Contract warranty and manufacturers' certificates Closeout certificates.

1.04 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with Alphabetic sequence.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and Detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimension, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents. All submittals without this stamp of approval or which have not been checked, or only superficially checked, will not be considered and will be returned to the Contractor for resubmission.

- E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.
- G. Provide space for Contractor and Architect/Engineer review stamps.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- J. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow 2 weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- K. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - 1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 - 2. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Architect.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.

- f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
- L. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.
 - 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 - 2. Transmittal Form: Use AIA Document G810

1.05 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement for Architect/Engineer review. Include the anticipated amount of each monthly payment that will become due to the Contractor in accordance with the Progress Schedule/
- B. Revise and resubmit as requested by the Architect.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version. No application for payment will be approved until the initial or revised schedule has been received and approved by the architect.
- D. Submit a horizontal bar chart with separate line for each major section of Work, identifying first work day of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Indicate Submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner.

1.06 PROPOSED PRODUCTS LIST

- A. Within 30 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.07 SUBMITTAL SCHEDULES

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.

1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of the subcontractor.
 - e. Description of the part of the Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for the Architect's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.08 SHOP DRAWINGS

- A. Contractor shall prepare and submit to the Architect 30 days after award of the Contract a schedule of Shop Drawings and Submittals as required in the Contract Documents. Schedule shall fix dates for submission, and the lead time for each submittal as related to the requirements for return receipt. No work shall be fabricated by the Contractor, save at his own risk, until approval of the shop drawings has been obtained.
- B. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 – Contract Closeout.
- C. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
1. Dimensions.
 2. Identification of products and materials included by sheet and detail number.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurement.
 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).
 7. Final Submittal: Submit 4 blue- or black-line prints and 2 additional prints where required for maintenance manuals, plus the number of prints needed by the Architect for distribution. The Architect will retain 1 print and return the remainder.

- a. Alternately, submissions may be sent electronically except for samples for various materials and color selection.
8. At contractor's option, electronic files may be submitted in lieu of hard copy prints. Electronic submittal shall be submitted with the same information as listed above and in Section 1.04 above.
9. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.09 PRODUCT DATA

- A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect/Engineer.
- B. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 – Contract Closeout.

1.10 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors in custom colors, textures, and patterns for Architect/Engineer.
- C. Include identification on each sample, with full Project information.
- D. Submit the number or samples specified in individual specification sections; one of which will be retained by Architect/Engineer.
- E. Reviewed samples, which may be used in the Work, are indicated in individual specification Sections.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, (start-up,) adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.12 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.13 ARCHITECT'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When the Architect marks a submittal "No Exception Taken," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect marks a submittal "Furnish as Corrected," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Resubmittal: When the Architect marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - a. Do not use, or allow others to use, submittals marked "Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - 4. Returned for Resubmittal: When the Architect marks a submittal "Rejected," do not proceed with any work covered by this submittal, including purchasing, fabrication, delivery or any other activity. This submittal does not comply with the Contract Documents or Specifications.
 - 5. Restricted Release: When the Architect marks a submittal "Submit Specified items," work covered by the submittal may proceed provided it complies with the Contract Documents and the Specifications are submitted for Architect review.
 - 6. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
- C. Unscheduled Submittals: The Architect will return unscheduled submittals to the sender without action.

1.14 CONSTRUCTION PHOTOGRAPHS

- A. Each month submit photographs to Architect/Engineer with Application for Payment.
- B. Photograph: Prints; color; 8 x 10 inch; mounted on 8-1/2 x 11 inch soft card stock, with left edge binding margin for three hole punch.

- C. Take two (2) aerial site photographs from differing directions indicating the relative progress of the Work, ten (10) days maximum prior to submitting Application for Payment.
- D. Identify photographs with date, time orientation and project identification.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01301
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General coordination procedures.
 2. Coordination drawings.
 3. Requests for Information (RFIs).
 4. Project Web site.
 5. Project meetings.
 6. Project photographs.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.03 DEFINITIONS

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

1.04 INFORMATIONAL SUBMITTALS

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

1.05 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-installation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

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1.06 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

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6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 - d. Plan piping sizes and floor penetration arrays within wall assemblies.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Division 01 Section "Submittal Procedures."
 11. Information Technology Rooms: The selected GC is to coordinate with the owner's IT personnel in creating coordination documents and installation of all IT related equipment and infrastructure.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Preparation Format: DWG, Version, operating in AutoCAD Architecture 2016 operating system.
 3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in AutoCAD Architecture 2016.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.07 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 3. Construction Progress Meetings: If during the course of a scheduled construction progress meeting, a question is raised and resolved at the meeting, the resolution of the issue will be recorded in the meeting minutes and shall be considered formal direction to proceed under that course of action. The Architect will not issue a separate document echoing that direction, nor shall the Contractor issue a confirming RFI. If the Contractor believes that the direction results in a change in the contract sum or schedule, he shall submit a proposal for consideration by the Owner as stipulated elsewhere in this Section.
 4. Reference Division 1 section "Progress Management and Coordination.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect and Construction Manager.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. EST will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:

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- a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 7 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. The project website shall generate and update of the RFI log and immediately notify via e-mail the Architect and Owner when an RFI has been posted and the Contractor and/or subcontractors when the RFI has been responded to. The Contractor will be required to distribute the RFI response to affected parties. Review the Owner's or Architect's response and post on the project's website for the Architect's notification within seven days if Contractor disagrees with Architect's response.
- Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect and Construction Manager.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- F. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
- G. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- H. Identification of related Field Order, Work Change Directive, Proposal Request, as appropriate.
- I. Forms to be used for all RFI are attached to the end of this section.

1.08 PROJECT WEB SITE

- A. The Contractor shall provide in its bid the cost to provide an interactive project website for the purpose of providing electronic access for all parties involved in the project to

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project documents generated during the course of construction. The purpose of establishing this website is to cut down on the amount of paper used on the project, to substantially reduce the costs associated with sending documents between parties via postal or delivery services, and to provide time efficiencies in the project for all parties involved. It is up to the Contractor to select the provider of this service. The provider of the interactive website shall be capable of providing training free of charge to the Owner, Architect, the Architect's sub-consultants, Contractor, all subcontractors, sub-subcontractors, and suppliers on a scheduled basis once the Owner has issued the Notice to Proceed.

1. All fees for this service are to be paid by the Contractor.
- B. The types of documents to be hosted on the website include, but may not be limited to, the following:
- Architects Supplemental Instructions (ASIs)
 - Contractor's Schedule of Values
 - Contractor's List of Key Personnel and Contact Information
 - Contractor's Construction Schedule
 - Meeting Minutes
 - Requests for Information (RFIs)
 - Responses Product Submittals (except for product samples)
 - Proposal Requests (PRs)
 - Change Order Proposals (COPs) Change Orders
 - Construction Change Directives (CCDs) Certificate(s) of Substantial Completion
 - Progress Photographs
 - Any close-out documents not listed above
- C. All documents to be posted to the project website will be required to be in PDF file format. Photos to be in JPEG file format.
- D. The provider of the interactive website, as part of their services, shall provide a free downloadable document editing software program to be used for providing review comments directly on the posted documents as applicable.

1.09 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees two days prior to meeting date.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.
 4. Changes to prior minutes shall be noted at the beginning of each meeting and recorded as the first item of business.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

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1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. LEED requirements.
 - m. Preparation of record documents.
 - n. Use of the premises and existing building.
 - o. Work restrictions.
 - p. Working hours.
 - q. Owner's occupancy requirements.
 - r. Responsibility for temporary facilities and controls.
 - s. Procedures for moisture and mold control.
 - t. Procedures for disruptions and shutdowns.
 - u. Construction waste management and recycling.
 - v. Parking availability.
 - w. Office, work, and storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Security.
 - aa. Progress cleaning.
 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager, and Owner's Commissioning Authority of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.

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- f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for completing LEED documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.

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- j. Submittal procedures.
 - k. Coordination of separate contracts.
 - l. Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of proposal requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
 - 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes within three days to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been

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made or recognized. Issue revised schedule concurrently with the report of each meeting.

- F. Coordination Meetings: Construction Manager will conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- G. Project Photography
1. General Contractor to provide 5 monthly aerial photos to Owner in hard copy and electronic media.

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2. General Contractor to provide weekly photo update to Owner with at least 8 captioned progress photos on PowerPoint format.
- H. Forms: Used as part of the requirements of this section are attached at the end of this section and are as follows:
1. AIA Document AIA G716 2004
 2. RFI Evaluation Form

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION



AIA[®] Document G716[™] – 2004

Request for Information (RFI)

TO:

FROM:

PROJECT:

ISSUE DATE:

RFI No.:

REQUESTED REPLY DATE:

PROJECT NUMBERS:

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*

SPECIFICATIONS

DRAWINGS

OTHER

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

By: _____ Date: _____ Copies to: _____

NOTE: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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020711ACD44



REQUEST FOR INFORMATION EVALUATION

Bessolo Design Group, 7901 4th St. N., Suite 200, St. Petersburg, Florida 33702



Project Name: _____ BDG Project No. _____ RFI No. _____

Date Received: _____ Date of Review: _____ Reviewed by: _____

In accordance with BDG's policy and procedures for evaluating potential Requests for Information (RFI's), a review of the document is conducted to determine if the document is a justifiable and complete request.

☐ **The attached document is considered a justifiable Request for information (RFI) within the definition of the Contract Documents and has been classified as one of the following categories:**

- | | |
|---|--|
| <input type="checkbox"/> Interpretation of Contract Documents | <input type="checkbox"/> Clarification of Contract Documents |
| <input type="checkbox"/> Drawing/Plan Clarifications | <input type="checkbox"/> Constructability Issue |
| <input type="checkbox"/> Site Condition Issue | <input type="checkbox"/> Additional Drawings/Specifications |

☐ **The attached RFI is determined to be a justifiable and complete Request for information (RFI), response is noted on the attached document:**

This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work, it must be approved and executed by the Owner in accordance with the Contract Documents.

☐ **The attached RFI is REJECTED due to insufficient required information. The following information is missing and must be included in the RFI:**

- | | |
|--|---|
| <input type="checkbox"/> Specification/Drawing/and detail reference no. | <input type="checkbox"/> Clearly state why a response is needed |
| <input type="checkbox"/> Clear and concise issue requiring clarification | <input type="checkbox"/> GC's own interpretation of the issue |
| <input type="checkbox"/> GC's proposed response/solution | <input type="checkbox"/> Priority of the Request |
| <input type="checkbox"/> Confirm no Change Order Required | <input type="checkbox"/> Confirm no time extension required |

☐ **The attached document is NOT a Request for information (RFI) within the definition of the Contract Documents and therefore has not been reviewed and is being returned to you without a response. The attached document has NOT been entered into the project's RFI Log.**

The attached document is considered one or more of the following:

- | | |
|--|---|
| <input type="checkbox"/> Project Communication | <input type="checkbox"/> Response to Non-Conformance Notice |
| <input type="checkbox"/> Request for Substitution/Or Equal Submittal | <input type="checkbox"/> Submittal and/or Shop Drawing |
| <input type="checkbox"/> Schedule Submittal/Change/Update | <input type="checkbox"/> Value Engineering Change Proposal |
| <input type="checkbox"/> Construction Deficiency | <input type="checkbox"/> Addresses Means and Methods |
| <input type="checkbox"/> Change in Design/Project Scope | <input type="checkbox"/> Other: _____ |

For evaluation and response in a timely manner, please resubmit the attached document in the proper format as stipulated in the Contract Documents.

SECTION 01302
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Special reports.
- B. Related Requirements:
 - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.03 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.04 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF electronic file.
- B. Startup construction schedule.
 - 1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit with Applications for Payment.
- H. Material Location Reports: Submit with Applications for Payment.

- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Special Reports: Submit at time of unusual event.

1.05 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review submittal requirements and procedures.
 - 7. Review time required for review of submittals and resubmittals.
 - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 9. Review time required for Project closeout and Owner startup procedures.
 - 10. Review and finalize list of construction activities to be included in schedule.
 - 11. Review procedures for updating schedule.

1.06 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 4. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.

- I. Building flush-out.
 - m. Startup and placement into final use and operation.
- 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
 - 1. See Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 7 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 20 days after date established for the notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery

activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.

- a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (see special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Architect within 1 day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION**3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01303
PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
- B. Related Requirements:
 - 1. Division 01 Section "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
 - 2. Division 01 Section "Submittal Procedures" for submitting photographic documentation as project record documents at project closeout.
 - 3. Division 01 section "Demonstration and Training" for submitting video recording of demonstration of equipment and training of Owners personnel.

1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit unaltered, original, full-size image files within 5 days of taking photographs.
 - 1. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Date photograph was taken.
 - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- C. Construction Photographs: Submit file of each photographic view within 5 days of taking photographs.
 - 1. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Name of Project.
 - b. Date photograph was taken if not date stamped by camera.
 - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - d. Unique sequential identifier keyed to accompanying key plan.
- D. Weekly submission of photographs can be in a report form and be a PDF file. Include the Owner and Architect in the distribution.

1.3 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

1.4 ADDITIONAL PHOTOGRAPHS

- A. If the Contractor for their own use, shoots additional photos or videos (i.e. aerial or satellite) those also are to be made available to the Owner and Architect.

PART 2 - PRODUCTS**2.1 PHOTOGRAPHIC MEDIA**

- A. Digital Images: Provide images in JPG or PDF format produced by a digital camera.

PART 3 - EXECUTION**3.1 CONSTRUCTION PHOTOGRAPHS**

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of excavation, or starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.
 - 1. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
- D. Periodic Construction Photographs: Take a minimum of 20 photographs, not including time lapse, weekly. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Time Lapse Sequence Construction Photographs: Take a minimum of 10 photographs as indicated, to show status of construction and progress since last photographs were taken.
 - 1. Frequency: Take photographs weekly.
- F. Final Completion Construction Photographs: Take a minimum of 100 color photographs after date of Substantial Completion for submission as Project Record Documents.

- G. Additional Photographs: Architect or Owner may request photographs in addition to periodic photographs specified.
1. In emergency situations, take additional photographs within 24 hours of request.
 2. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.

END OF SECTION

**SECTION 01304
PRODUCT REQUIREMENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

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

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
 - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 - 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified.

Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.
 - 6. Indicate any cost advantage to the Owner and / or no cost change for the using of the comparable product. Contractor is to absorb any associated cost (including but not limited to) Architects/ Engineers redesign, permit fees, work under separate contracts and current work under contract.
 - 7. Evidence that proposed product does not affect the current schedule.

PART 3 - EXECUTION (Not Used)

END OF SECTION

**SECTION 01400
QUALITY CONTROL**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-ups.
- E. Inspection and testing laboratory services.
- F. Manufacturers' field services and reports.

1.03 RELATED SECTIONS

- A. Section 01300 – Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 01401 – Structural Threshold Inspection, if applicable.

1.04 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality
- F. Secure Products in place with positive anchorage devices, designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.05 REFERENCES

- A. Conform to reference standard by date of issue current on date of Owner—Contractor Agreement.
- B. Obtain copies of standards when required by Contract Documents.

- C. Should specified reference standards conflict with Contract Documents, request clarification for Architect/Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract documents by mention or inference otherwise in any reference document.

1.06 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect/Engineer.

1.07 MOCK-UPS

- A. Tests will be performed under provisions identified in this section.
- B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes, where specified in other sections of this project manual.
- C. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect/Engineer/ Owner.
- D. In addition to mock-ups specified in other sections of this project manual, the general contractor shall mock up one apartment unit of each unit type shown on the drawings. These unit mock-ups shall be completed in a two (2) step process as follows:
 - 1. Step 1;
 - a. All partitions, soffits and ceilings completely framed.
 - b. All electrical devices roughed-in for Owner/ Architect review and approval prior to proceeding to step 2.
 - 2. Step 2;
 - a. All wall and ceiling finishes installed.
 - b. Windows and doors complete with all hardware and screens.
 - c. Framed openings, soffits and access doors.
 - d. Millwork trim, casing, moldings, wall base.
 - e. Tile work with all joints completely grouted and sealed.
 - f. All floor transitions/ thresholds between materials
 - g. Kitchen and bathroom cabinets, countertops, and appliances.
 - h. Bathroom accessories including grab bars, towel bars, soap dishes, shower curtain rod, mirrors, medicine cabinets, handicap shower seats.
 - i. All finishes including carpet, vinyl flooring, tile and painting.
 - j. All electrical receptacles and switches, electrical panels, fire alarm devices, smoke and heat detectors, CO2 detectors, speakers, disconnect switches, light fixtures, low voltage outlets.
 - k. Mechanical and plumbing systems including ductwork, grilles, access doors, heating/air conditioning unit, condensate lines, plumbing fixtures and trim.

Each unit shall be reviewed by the owner, architect, engineer and interior decorator for compliance with the contract documents. The mock up unit shall serve as the standard by which all other apartment units are to be built. Mock ups may serve as a sales unit for marketing purposes if desired and directed by the owner. The above list may not include all items that are required for each project, refer to the construction drawings for all work required in each resident unit.

1.08 INSPECTION AND TESTING LABORATORY SERVICES

- A. Owner will appoint, employ, and pay for service of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests and other services specified in individual specification Sections and as required by the Architect/Engineer.
- C. Reports will be submitted by the independent firm to the Architect/Engineer, in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

1.09 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, or required by material or Product suppliers or manufacturers, that qualified staff personnel observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, or to initiate instructions when necessary, this service shall be provided at no cost to the Owner.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

SECTION 01421
REFERENCE STANDARDS AND DEFINITIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized

individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-division format and CSI/CSC's "Master Format" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

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

- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.

Refer uncertainties and requirements that are different, but apparently equal, to the Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
 - E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.
 - F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following abbreviations and acronyms, as referenced in the Contract Documents, mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association 900 19th St., NW, Suite 300 Washington, DC 20006 www.aluminum.org	(202) 862-5100
AABC	Associated Air Balance Council 1518 K St., NW, Suite 503 Washington, DC 20005 www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org	(847) 303-5664
AAN	American Association of Nurserymen (See ANLA)	

AASHTO	American Association of State Highway & Transportation Officials 444 North Capitol St., NW, Suite 249 Washington, DC 20001 www.aashto.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215 www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association 1200 19th St., NW, Suite 300 Washington, DC 20036-2401 www.abma-dc.org	(202) 429-5155
ABMA	American Boiler Manufacturers Association 950 North Glebe Rd., Suite 160 Arlington, VA 22203-1824 www.abma.com	(703) 522-7350
ACI	American Concrete Institute P.O. Box 9094 Farmington Hills, MI 48333-9094 www.aci-int.org	(248) 848-3700
ACIL	ACIL: The Association of Independent Scientific, Engineering, and Testing Firms 1629 K St., NW, Suite 400 Washington, DC 20006 www.acil.org	(202) 887-5872
ACPA	American Concrete Pipe Association 222 West Las Colinas Blvd., Suite 641 Irving, TX 75039-5423 www.concrete-pipe.org	(972) 506-7216
ADC	Air Diffusion Council 11 South LaSalle St., Suite 1400 Chicago, IL 60603 www.airdiffusercouncil.org	(312) 201-0101
AEIC	Association of Edison Illuminating Companies 600 N. 18th St./P.O. Box 2641 Birmingham, AL 35291-0992 www.aeic.org	(205) 250-2530
AFBMA	Anti-Friction Bearing Manufacturers Association (See ABMA)	
AFPA	American Forest and Paper Association 1111 19th St., NW, Suite 800 Washington, DC 20036 www.afandpa.org	(800) 878-8878
AGA	American Gas Association 1515 Wilson Blvd. Arlington, VA 22209 www.agas.com	(703) 841-8400
AHA	American Hardboard Association 1210 W. Northwest Hwy Palatine, IL 60067-1897 www.ahec.org	(847) 934-8800

AHAM	Association of Home Appliance Manufacturers 20 N. Wacker Dr., Suite 1500 Chicago, IL 60606 www.aham.org	(312) 984-5800
AI	Asphalt Institute Research Park Dr./P.O. Box 14052 Lexington, KY 40512-4052 www.asphaltinstitute.org	(606) 288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006-5292 www.aia.org	(202) 626-7300
AIA	American Insurance Association 1130 Connecticut Ave., NW, Suite 1000 Washington, DC 20036 www.aiadc.org	(202) 828-7100
AIHA	American Industrial Hygiene Association 2700 Prosperity Ave., Suite 250 Fairfax, VA 22031 www.aiha.org	(703) 849-888
AISC	American Institute of Steel Construction One East Wacker Dr., Suite 3100 Chicago, IL 60601-2001	(800) 644-2400 (312) 670-2400
ISI	American Iron and Steel Institute 1101 17th St., NW Washington, DC 20036-4700 www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction 7012 S. Revere Pkwy, Suite 140 Englewood, CO 80112 www.aitc-glulam.org	(303) 792-9559
ALA	American Laminators Association (See LMA)	
ALCA	Associated Landscape Contractors of America 12200 Sunrise Valley Dr., Suite 150 Reston, VA 20191 www.alca.org	(703) 620-6363
ALI	Associated Laboratories, Inc. P.O. Box 152837/1323 Wall St. Dallas, TX 75315 www.associatedlab.com	(214) 565-0593
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875 www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. 30 W. University Dr. Arlington Heights, IL 60004-1893 www.amca.org	(847) 394-0150
ANLA	American Nursery and Landscape Association 1250 Eye St., NW, Suite 500 Washington, DC 20005	(202) 789-2900

ANSI	www.anla.org American National Standards Institute 11 West 42nd St., 13th Floor New York, NY 10036-8002 www.ansi.org	(212) 642-4900
AOAC	AOAC International 481 N. Frederick Ave., Suite 500 Gaithersburg, MD 20877 www.aiac.org	(301) 924-7077
AOSA	Association of Official Seed Analysts 201 N. 8th St., Suite 400 P.O. Box 81152 Lincoln, NE 68501-1152 www.aosaseed.org	(402) 476-3852
APA	APA-The Engineered Wood Association P.O. Box 11700 Tacoma, WA 98411-0700 www.apawood.org	(206) 565-6600
APA	Architectural Precast Association P.O. Box 08669 Fort Myers, FL 33908-0669 www.archprecast.org	(941) 454-6989
API	American Petroleum Institute 1220 L St., NW, Suite 900 Washington, DC 20005-8029 www.api.org	(202) 682-8000
ARI	Air-Conditioning and Refrigeration Institute 4301 Fairfax Dr., Suite 425 Arlington, VA 22203 www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association Center Park, 4041 Powder Mill Rd., Suite 404 Calverton, MD 20705 www.asphaltroofing.org	(301) 231-9050
ASA	Acoustical Society of America 500 Sunnyside Blvd. Woodbury, NY 11797 www.acousticsociety.org	(516) 576-2360
ASC	Adhesive and Sealant Council 1627 K St., NW, Suite 1000 Washington, DC 20006-1707 www.ascouncil.org	(202) 452-1500
ASCA	Architectural Spray Coaters Association 230 W. Wells St., Suite 311 Milwaukee, WI 53203 www.asca.org	(414) 273-3430
ASCE	American Society of Civil Engineers-World Headquarters 1801 Alexander Bell Dr. Reston, VA 20191-4400 www.asce.org	(800) 548-2723 (703) 295-6000

ASHES	American Society for Healthcare Environmental Services - Division of the American Hospital Assoc. One North Franklin, Suite 2700 Chicago, IL 60606 www.ahe.org	(800) 424-2626 (312) 422-3860
ASHRAE	American Society of Heating, Refrigerating and Air- Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329-2305 www.ashrae.org	(800) 527-4723 (404) 636-8400
ASLA	American Society of Landscape Architects 4401 Connecticut Ave., NW, 5th Floor Washington, DC 20008-2369 www.asla.org	(202) 686-2752
ASME	American Society of Mechanical Engineers 345 East 47th St. New York, NY 10017-2392 www.asme.org	(800) 434-2763 (212) 705-7722
ASPA	American Sod Producers Association (See TPI)	
ASPE	American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake Village, CA 91362-3649 www.aspe.org	(805) 495-7120
ASQC	American Society for Quality Control 611 East Wisconsin, Ave. Milwaukee, WI 53201-3005 www.asqc.org	(800) 248-1946 (414) 272-8575
ASSE	American Society of Sanitary Engineering 28901 Clemens Rd. Westlake, OH 44145 www.asse-plumbing.org	(216) 835-3040
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr. West Conshohocken, PA 19428-2959 www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions 1200 G St., NW, Suite 500 Washington, DC 20005	(202) 628-6380
AWCI	Association of the Wall and Ceiling Industries—International 307 E. Annandale Rd., Suite 200 Falls Church, VA 22042-2433 www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (See WCMA)	
AWI	Architectural Woodwork Institute 1952 Isaac Newton Sq. Reston, VA 20190 www.awinet.org	(703) 733-0600

AWPA	American Wood Preservers' Association 3246 Fall Creek Hwy, Suite 1900 Granbury, TX 76049-7979 www.awpa.com	(817) 326-6300
AWS	American Welding Society 550 NW LeJeune Rd. Miami, FL 33126 www.amweld.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association 6666 W. Quincy Ave. Denver, CO 80235 www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association 355 Lexington Ave., 17th Floor New York, NY 10017-6603 www.buildershardware.com	(212) 661-4261
BIA	Brick Institute of America 11490 Commerce Park Dr. Reston, VA 22091-1525 www.bia.org	(703) 620-0010
BIFMA	The Business & Institutional Furniture Manufacturer's Association 2680 Horizon Dr., SE, Suite A1 Grand Rapids, MI 49546-7500 www.bifma.com	(616) 285-3963
CAGI	Compressed Air and Gas Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/cagi	(216) 241-7333
CAUS	Color Association of the United States 409 W. 44th St. New York, NY 10036-4402 www.colorassociation.com	(212) 582-6884
CBM	Certified Ballast Manufacturers Association 1422 Euclid Ave., Suite 402 Cleveland, OH 44115-2094	(216) 241-0711
CCC	Carpet Cushion Council P.O. Box 546 Riverside, CT 06878-0546 www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association Inc. 260 Madison Ave., 16th Floor New York, NY 10016-2401 www.copper.org	(800) 232-3282 (212) 251-7200
CFFA	Chemical Fabrics & Film Association, Inc. c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/cffa	(216) 241-7333
CGA	Compressed Gas Association 1725 Jefferson Davis Hwy, Suite 1004 Arlington, VA 22202-4102 www.cganet.com	(703) 412-0900

CISCA	Ceilings and Interior Systems Construction Association 1500 Lincoln Hwy, Suite 202 St. Charles, IL 60174 www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Rd., Suite 419 Chattanooga, TN 37421 www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute 9891 Broken Land Pkwy, Suite 300 Columbia, MD 21046 www.chainlinkinfo.org	(301) 596-2584
CPPA	Corrugated Polyethylene Pipe Association 432 N. Superior St. Toledo, OH 43604 www.plasticpipe.org	(800) 510-2772 (419) 241-2221
CRI	Carpet and Rug Institute 310 S. Holiday, Ave. Dalton, GA 30722-2048 www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173-4758 www.crsi.org	(847) 517-1200
CSSB	Cedar Shake and Shingle Bureau 515 116th Ave., NE, Suite 275 Bellevue, WA 98004-5294 www.cedarbureau.org	(206) 453-1323
CTI	Ceramic Tile Institute of America 12061 West Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org	(310) 574-7800
CTI	Cooling Tower Institute P.O. Box 73383 Houston, TX 77273 www.cti.org	(281) 583-4087
DASMA	Door & Access Systems Manufacturers Association, Intl c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/dasma	(216) 241-7333
DHI	Door and Hardware Institute 14170 Newbrook Dr. Chantilly, VA 20151-2223 www.dhi.org	(703) 222-2010
DIPRA	Ductile Iron Pipe Research Association 245 Riverchase Pkwy East, Suite O Birmingham, AL 35244	(205) 988-9870
ECSA	Exchange Carriers Standards Association (See ATIS)	

EIA	Electronic Industries Association 2500 Wilson Blvd. Arlington, VA 22201 www.eciaonline.org	(703) 907-7500
EIMA	EIFS Industry Members Association 402 N. Fourth St., Suite 102 Yakima, WA 98901-2470 www.eifsfacts.com	(800) 294-3462 (509) 457-3500
EJMA	Expansion Joint Manufacturers Association 25 N. Broadway Tarrytown, NY 10591-3201 www.ejma.org	(914) 332-0040
FCI	Fluid Controls Institute c/o Thomas Associates, Inc 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/fci	(216) 241-7333
FCICA	Floor Covering Installation Contractors Association P.O. Box 948 Dalton, GA 30722-0948 www.fcica.com	(706) 226-5488
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System P.O. Box 9102 Norwood, MA 02062-9102 www.factorymutual.com	(781) 762-4300
FTI	Facing Tile Institute c/o Stark Ceramics P.O. Box 8880 Canton, OH 44711 www.ctioa.org	(330) 488-1211
GA	Gypsum Association 810 First St., NE, Suite 510 Washington, DC 20002 www.usg.com	(202) 289-5440
GANA	Glass Association of North America 3310 SW Harrison St. Topeka, KS 66611-2279 www.glasswebsite.com/gana	(913) 266-7013
GRI	Geosynthetic Research Institute 33rd and Lancaster Walk, Rush Building, West Wing Philadelphia, PA 19104 www.gri-server.coe.drexel.edu	(215) 895-2343
HEI	Heat Exchange Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/hei	(216) 241-7333
HI	Hydraulic Institute 9 Sylvan Way Parsippany, NJ 07054-3802 www.pumps.org	(201) 267-9700

HI	Hydronics Institute P.O. Box 218/35 Russo Pl. Berkeley Heights, NJ 07922 www.gamanet.org	(908) 464-8200
HMA	Hardwood Manufacturers Association 400 Penn Center Blvd., Suite 530 Pittsburgh, PA 15235-5605 www.hardwood.org	(412) 829-0770
HPVA	Hardwood Plywood and Veneer Association 1825 Michael Farraday Dr./P.O. Box 2789 Reston, VA 22195-0789 www.hpva.org	(703) 435-2900
IAS	International Approval Services 8504 East Pleasant Valley Rd. Cleveland, OH 44131 www.iasapprovals.org	(216) 524-4990
ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, MA 02664	(508) 394-4424
IEC	International Electrotechnical Commission (Available from ANSI) 11 West 42nd St., 13th Floor New York, NY 10036-8002	(212) 642-4900
IEEE	Institute of Electrical and Electronics Engineers 345 E. 47th St. New York, NY 10017-2394 www.ieee.org	(800) 678-4333 (212) 705-7900
IESNA	Illuminating Engineering Society of North America 120 Wall St., 17th Floor New York, NY 10005-4001 www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council (Now part of ITS)	
IIDA	International Interior Design Association	(312) 467-1950
ILI	Indiana Limestone Institute of America Stone City Bank Building, Suite 400 Bedford, IN 47421 www.iliai.org	(812) 275-4426
IMSA	International Municipal Signal Association P.O. Box 539/165 E. Union St. Newark, NY 14513 www.imsasafety.org	(800) 723-4672 315) 331-2182
INCE	Institute of Noise Control Engineering P.O. Box 3206, Arlington Branch Poughkeepsie, NY 12603 www.inceusa.org	(914) 462-4006
IRI	Industrial Risk Insurers P.O. Box 5010/85 Woodland St. Hartford, CT 06102-5010 www.insuranceproviders.org	(860) 520-7300

ISA	ISA - International Society for Measurement and Control P.O. Box 12277/67 Alexander Dr. Research Triangle Park, NC 27709 www.isa.org	(919) 549-8411
ISS	Iron and Steel Society 410 Commonwealth Dr. Warrendale, PA 15086-7512 www.issource.org	(412) 776-1535
ISWA	Insect Screening Weavers Association P.O. Box 1018 Ossining, NY 10562	(914) 962-9052
ITS	Intertek Testing Services P.O. Box 2040 Cortland, NY 13045-7902 www.itsglobal.com	(800) 345-3851 (607) 753-6711
KCMA	Kitchen Cabinet Manufacturers Association 1899 Preston White Dr. Reston, VA 22091-4326 www.kema.org	(703) 264-1690
LGSI	Light Gage Structural Institute c/o Loseke Technologies, Inc. P.O. Box 560746 The Colony, TX 75056 www.cfsei.org	(972) 625-4560
LIA	Lead Industries Association, Inc. 295 Madison Ave. New York, NY 10017 www.leadinfo.com	(800) 422-5323 (212) 578-4750
LMA	Laminating Materials Association 116 Lawrence St. Hillsdale, NJ 07642-2730 www.lma.org	(201) 664-2700
LPI	Lightning Protection Institute 3335 N. Arlington Heights Rd., Suite E Arlington Heights, IL 60004-7700 www.lightning.org	(800) 488-6864 (847) 577-7200
MBMA	Metal Building Manufacturer's Association c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/mbma	(216) 241-7333
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr. Rockville, MD 20850-4329 www.mcaa.org	(301) 869-5800
MFMA	Maple Flooring Manufacturers Association 60 Revere Dr., Suite 500 Northbrook, IL 60062 www.maplefloor.com	(847) 480-9138
MFMA	Metal Framing Manufacturers Association 401 N. Michigan Ave. Chicago, IL 60611 www.metalframingmfg.org	(312) 644-6610

MHI	Material Handling Institute 8720 Red Oak Blvd., Suite 201 Charlotte, NC 28217-3992 www.mhi.org	(800) 345-1815 (704) 522-8644
MIA	Marble Institute of America 30 Eden Alley, Suite 301 Columbus, OH 43215 www.marble-institute.com	(614) 228-6194
MIA	Masonry Institute of America 2550 Beverly Blvd. Los Angeles, CA 90057 www.masonryinstitute.org	(213) 388-0472
ML/SFA	Metal Lath/Steel Framing Association 8 South Michigan Ave., Suite 1000 Chicago, IL 60603	(312) 456-5590
MRCA	Midwest Roofing Contractors Association 4840 W. 15th St., Suite 1000 Lawrence, KS 66049 www.mrca.org	(800) 879-4448 (913) 843-4888
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry 127 Park St., NE Vienna, VA 22180-4602	(703) 281-6613
NAA	National Arborist Association P.O. Box 1094 Amherst, NH 03031-1094 www.natlarb.com	(800) 733-2622 (603) 673-3311
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Ave., Suite 1000 Chicago, IL 60603 www.gss.net/naamm	(312) 456-5590
NAGDM	National Association of Garage Door Manufacturers (See DASMA)	
NAIMA	North American Insulation Manufacturers Association 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314 www.naima.org	(703) 684-0084
NAMI	National Accreditation & Management Institute, Inc. P.O. Box 366/207 S. Washington St. Berkeley Springs, WV 25411	(304) 258-5100
NAPA	National Asphalt Pavement Association NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413 www.asphaltpavement.org	(301) 731-4748
NAPM	National Association of Photographic Manufacturers 550 Mamaroneck Ave. Harrison, NY 10528	(914) 698-7603
NBHA	National Builders Hardware Association (See DHI)	

NCAC	National Council of Acoustical Consultants P.O. Box 359/66 Morris Ave., Suite 1A Springfield, NJ 07081 www.ncac.com	(201) 564-5859
NCCA	National Coil Coaters Association 401 N. Michigan Ave. Chicago, IL 60611 www.coilcoating.org	(312) 321-6894
NCMA	National Concrete Masonry Association 2302 Horse Pen Rd. Herndon, VA 20171-3499 www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute P.O. Box 759/253-80 Center St. Lake Geneva, WI 53147 www.ncpi.org	(414) 248-9094
NCRPM	National Council on Radiation Protection & Measurements 7910 Woodmont Ave., Suite 800 Bethesda, MD 20814-3095 www.ncrp.com	(800) 229-2652 (301) 657-2652
NCSPA	National Corrugated Steel Pipe Association 1255 23rd St., NW, Suite 850 Washington, DC 20037 www.ncspa.org	(202) 452-1700
NEBB	Natural Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877-4121 www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814-5372 www.necanet.org	(301) 657-3110
NEI	National Elevator Industry 185 Bridge Plaza North, Suite 310 Fort Lee, NJ 07024 www.neii.org	(201) 944-3211
NELMA	Northeastern Lumber Manufacturers Association 272 Tuttle Rd./P.O. Box 87A Cumberland Center, ME 04021 www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association 1300 N 17th St., Suite 1847 Rosslyn, VA 22209 www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association P.O. Box 687/106 Stone St. Morrison, CO 80465-1526 www.electricnet.com/neta	(303) 697-8441
NFPA	National Fire Protection Association One Batterymarch Park/ P.O. Box 9101 Quincy, MA 02269-9101 www.nfpa.org	(800) 344-3555 (617) 770-3000

NFPA	National Forest Products Association (See AFPA)	
NFRC	National Fenestration Rating Council Incorporated 1300 Spring St., Suite 120 Silver Spring, MD 20910 www.nfrc.org	(301) 589-NFRC
NHLA	National Hardwood Lumber Association P.O. Box 34518 Memphis, TN 38184-0518 www.natlhardwood.org	(901) 377-1818
NIA	National Insulation Association 99 Canal Center Plaza, Suite 222 Alexandria, VA 22314 www.insulation.org	(703) 683-6422
NIAC	National Insulation and Abatement Contractors Association (See NIA)	
NKCA	National Kitchen Cabinet Association (See KCMA)	
NLGA	National Lumber Grades Authority #406-First Capital Pl., 960 Quayside Dr. New Westminster, BC V3M 6G2	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association P.O. Box 3009 Memphis, TN 38173-0009 www.nwfa.org	(901) 526-5016
NPA	National Particleboard Association 18928 Premiere Ct. Gaithersburg, MD 20879-1569 www.pbmdf.com	(301) 670-0604
NPCA	National Paint and Coatings Association 1500 Rhode Island Ave., NW Washington, DC 20005-5597 www.paint.org	(202) 462-6272
NRCA	National Roofing Contractors Association O'Hare International Center 10255 W. Higgins Rd., Suite 600 Rosemont, IL 60018-5607 www.roofonline.org	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association 900 Spring St. Silver Spring, MD 20910 www.nrmca.org	(301) 587-1400
NSA	National Stone Association 1415 Elliot Pl., NW Washington, DC 20007 www.aggregates.org	(202) 342-1100
NSF	NSF International(Formerly: National Sanitation Foundation) P.O. Box 130140 Ann Arbor, MI 48113-0140 www.nsf.org	(313) 769-8010

NSSEA	National School Supply and Equipment Association 8300 Colesville Rd., Suite 250 Silver Spring, MD 20910 www.nssea.org	(800) 395-5550 (301) 495-0240
NTMA	National Terrazzo and Mosaic Association 3166 Des Plaines Ave., Suite 121 Des Plaines, IL 60018 www.ntma.com	(800) 323-9736 (847) 635-7744
NUSIG	National Uniform Seismic Installation Guidelines 12 Lahoma Ct. Alamo, CA 94526 www.nbug.org	(510) 946-0135
NWMA	National Woodwork Manufacturers Association (See NWWDA)	
NWWDA	National Wood Window and Door Association 1400 E. Touhy Ave., G-54 Des Plaines, IL 60018 www.nwwda.org	(800) 223-2301 (847) 299-5200
PATMI	Power Actuated Tool Manufacturers' Institute, Inc. 1603 Boonslick Rd. St. Charles, MO 63301-2244	(314) 947-6610
PCA	Portland Cement Association 5420 Old Orchard Rd. Skokie, IL 60077-1083 www.portcement.org	(847) 966-6200
PCI	Precast/Prestressed Concrete Institute 175 W. Jackson Blvd. Chicago, IL 60604 www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America 3913 Old Lee Hwy, Suite 33-B Fairfax, VA 22030 www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing and Drainage Institute 45 Bristol Dr., Suite 101 South Easton, MA 02375	(800) 589-8956 (508) 230-3516
PEI	Porcelain Enamel Institute 4004 Hillsboro Pike, Suite 224-B Nashville, TN 37215 www.porcelainenamel.com	(615) 385-5357
PGI	PVC Geomembrane Institute P.O. Box 4226 Traverse City, MI 49685 users.aol.com/forPVC1	(616) 933-6373
PPFA	Plastic Pipe and Fittings Association 800 Roosevelt Rd., Building C, Suite 20 Glen Ellyn, IL 60137-5833	(630) 858-6540
PPI	Plastic Pipe Institute 1801 K St., NW, Suite 600L Washington, DC 20006 www.plasticpipe.org	(202) 974-5306

RCMA	Roof Coatings Manufacturers Association Center Park 4041 Powder Mill Rd., Suite 404 Calverton, MD 20705	(301) 230-2501
RCSC	Research Council on Structural Connections Sargent & Lundy 55 E. Monroe St. Chicago, IL 60603	(312) 269-2424
RFCI	Resilient Floor Covering Institute 966 Hungerford Dr., Suite 12-B Rockville, MD 20850-1714 www.rfci.com	(301) 340-8580
RMA	Rubber Manufacturers Association 1400 K St., NW, Suite 900 Washington, DC 20005 www.rma.org	(800) 220-7620 (202) 682-4800
SAE	SAE International 400 Commonwealth Dr. Warrendale, PA 15096-0001 For publications: Call (412) 776-4970 www.sae.org	(412) 776-4841
SDI	Steel Deck Institute P.O. Box 25 Fox River Grove, IL 60021 www.sdi.org	(847) 462-1930
SDI	Steel Door Institute 30200 Detroit Rd. Cleveland, OH 44145-1967 www.steeldoor.org	(216) 889-0010
SEFA	Scientific Equipment and Furniture Association 1028 Duchess Dr. McLean, VA 22102-2010 www.sefalabfurn.com	(703) 790-8661
SEGD	Society for Environmental Graphic Design 401 F St., NW, Suite 333 Washington, DC 20001-2728	(202) 638-5555
SHLMA	Southern Hardwood Lumber Manufacturers Association (See HMA)	
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Ave. Chicago, IL 60611-4267 www.igmaonline.org	(312) 644-6610
SJI	Steel Joist Institute 3127 10th Ave., North Ext. Myrtle Beach, SC 29577-6760 www.steeljoist.org	(803) 626-1995
SMA	Screen Manufacturers Association 2850 S. Ocean Blvd., Suite 114 Palm Beach, FL 33480-5535	(561) 533-0991
SMACNA	Sheet Metal & Air Conditioning Contractors' National Assoc. 4201 Lafayette Center Dr./P.O. Box 221230	(703) 803-2980

	Chantilly, VA 20151-1209 www.smacna.org	
SPI	Society of the Plastics Industry, Inc. .Spray Polyurethane Division 1801 K St., NW, Suite 600K Washington, DC 20006 www.socplas.org	(800) 951-2001 (202) 974-5200
SPIB	Southern Pine Inspection Bureau 4709 Scenic Hwy Pensacola, FL 32504-9094 www.spib.org	(904) 434-2611
SPRI	SPRI(Formerly: Single Ply Roofing Institute) 175 Highland Ave. Needham Heights, MA 02194-3034 www.spri.org	(617) 444-0242
SSINA	Specialty Steel Industry of North America c/o Collier, Shannon Rill & Scott 3050 K St., NW, Suite 400 Washington, DC 20007 www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	Steel Structures Painting Council 40 24th St., 6th Floor Pittsburgh, PA 15222-4643 www.sspc.org	(412) 281-2331
SSPMA	Sump and Sewage Pump Manufacturers Association P.O. Box 647 Northbrook, IL 60065-0647	(847) 559-9233
STI	Steel Tank Institute 570 Oakwood Rd. Lake Zurich, IL 60047-1559 www.steel.org	(847) 438-8265
SWI	Steel Window Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/swi	(216) 241-7333
SWPA	Submersible Wastewater Pump Association 1806 Johns Dr. Glenview, IL 60025-1657	(847) 729-7972
SWRI	Sealant, Waterproofing and Restoration Institute 2841 Main Kansas City, MO 64108 www.swrionline.org	(816) 472-7974
TCA	Tile Council of America 100 Clemson Research Blvd. Anderson, SC 29625 www.tcnatile.com	(864) 646-8453
TIMA	Thermal Insulation Manufacturers Association (See NAIMA)	

TPI	Truss Plate Institute 583 D'Onofrio Dr., Suite 200 Madison, WI 53719 www.tpinsf.org	(608) 833-5900
TPI	Turfgrass Producers International 1855-A Hicks Rd. Rolling Meadows, IL 60008	(800) 405-8873 (847) 705-9898
UL	Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062 www.ul.com	(800) 704-4050 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association 2655 Villa Creek Dr., Suite 155 Dallas, TX 75234 www.members.aol.com/unibell1	(972) 243-3902
USITT	USITT: The American Association of Design and Production Professionals in the Performing Arts 6443 Ridings Rd. Syracuse, NY 13206-1111	(800) 938-7488 (315) 463-6463
USP	U.S. Pharmacopeia 12601 Twinbrook Pkwy Rockville, MD 20852-1790	(800) 227-8772 (301) 881-0666
WA	Wallcoverings Association 401 N. Michigan Ave. Chicago, IL 60611-4267 www.wallcoverings.org	(312) 644-6610
WCLIB	West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281-3145 www.wclib.org	(503) 639-0651
WCMA	Window Covering Manufacturers Association 355 Lexington Ave., 17th Floor New York, NY 10017-6603 www.wcmanet.org	(212) 661-4261
WEF	Water Environment Federation 601 Wythe St. Alexandria, VA 22314-1994	(703) 684-2400
WMMPA	Wood Moulding & Millwork Producers Association 507 First St. Woodland, CA 95695 www.wmmpa.com	(800) 550-7889 (916) 661-9591
WRI	Wire Reinforcement Institute 203 Loudoun St., SW Leesburg, VA 20175-2718 www.wirereinforcementinstitute.org	(703) 779-2339
WSC	Water Systems Council Building C, Suite 20, 800 Roosevelt Rd. Glen Ellyn, IL 60137 www.watersystemscouncil.org	(630) 545-1762

WWPA	Western Wood Products Association Yeon Building/522 SW 5th Ave. Portland, OR 97204-2122 www.wwpa.org	(503) 224-3930
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- G. Federal Government Agencies: Names and titles of Federal Government standards- or specification-producing agencies are often abbreviated. The following abbreviations and acronyms referenced in the Contract Documents indicate names of standards- or specification-producing agencies of the Federal Government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CE	Corps of Engineers (U.S. Department of the Army) 20 Massachusetts Ave., NW Washington, DC 20314 CRD standards are available from: U.S. Army Corps of Engineers Waterways Experiment Station Technical Report Distribution Section Services Branch, TIC 3909 Halls Ferry Rd. Vicksburg, MS 39180-6199	(202) 761-0660 (601) 634-2696
CFR	Code of Federal Regulations (Available from the Government Printing Office) Washington, DC 20401 www.access.gpo.gov	(202) 512-0000
CPSC	Consumer Product Safety Commission East West Towers/4330 East-West Hwy Bethesda, MD 20814 www.cpsc.gov	(800) 638-2772
CS	Commercial Standard (U.S. Department of Commerce)Government Printing Office Washington, DC 20402	(202) 512-1800
DOC	Department of Commerce 14th St. and Constitution Ave., NW Washington, DC 20230 www.commerce.gov	(202) 482-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590 www.dot.gov	(202) 366-4000
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460 www.epa.gov	(202) 260-2090
FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Ave., SW Washington, DC 20591 www.faa.gov	(202) 366-4000
FCC	Federal Communications Commission 1919 M St., NW Washington, DC 20554 www.fcc.gov	(202) 418-0126

FDA	Food and Drug Administration 5600 Fishers Lane Rockville, MD 20857 www.fda.gov	(301) 443-1544
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh St., SW Washington, DC 20410 www.hud.gov	(202) 401-0388
FS	Federal Specification Unit (Available from GSA) 470 East L'Enfant Plaza, SW, Suite 8100 Washington, DC 20407 www.gsa.gov	(202) 619-8925
GSA	General Services Administration F St. and 18th St., NW Washington, DC 20405 www.gsa.gov	(202) 708-5082
MIL	Military Standardization Documents (U.S. Department of Defense) Defense Printing Service 700 Robbins Ave., Building 4D Philadelphia, PA 19111	(215) 697-2179
NIST	National Institute of Standards and Technology Building 101, #A1134, Rte. I-270 and Quince Orchard Rd. Gaithersburg, MD 20899 www.nist.gov	(301) 975-2000
OSHA	Occupational Safety and Health Administration 200 Constitution Ave., NW Washington, DC 20210 www.osha.gov	(202) 219-8148
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 512-1800
RUS	Rural Utilities Service (U.S. Department of Agriculture) 14th St. and Independence Ave., SW Washington, DC 20250	(202) 720-9560
TRB	Transportation Research Board, National Research Council 2101 Constitution Ave., NW Washington, DC 20418 www.tra.org	(202) 334-2934
USDA	U.S. Department of Agriculture 14th St. and Independence Ave., SW Washington, DC 20250 www.usda.gov	(202) 720-8732
USPS	U.S. Postal Service 475 L'Enfant Plaza, SW Washington, DC 20260-0010 www.uspa.gov	(202) 268-2000

1.05 GOVERNING REGULATIONS AND AUTHORITIES

- A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need.
- B. Comply with all rules, regulations, directives, etc. pertaining to the latest edition of the Florida Building Code which includes but is not necessarily limited to the following:
 - 1. All supplements to the Building Code issued and effective.
 - 2. Guidelines for Design and Construction of Health Care Facilities.
 - 3. Florida Building Commission Building Codes and Standards
 - 4. Florida Fire Prevention Code
 - 5. International Code Council

1.06 SUBMITTALS

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Ventilation.
 - 4. Telephone service.
 - 5. Sanitary facilities, including drinking water.
 - 6. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage sheds.
 - 2. Temporary roads and paving.
 - 3. Dewatering facilities and drains.
 - 4. Temporary enclosures.
 - 5. Hoists and temporary elevator use.
 - 6. Temporary project identification signs and bulletin boards.
 - 7. Waste disposal services.
 - 8. Rodent and pest control.
 - 9. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.
 - 3. Sidewalk bridge or enclosure fence for the site.
 - 4. Environmental protection.

1.03 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.04 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire- prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
 - 1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
 - 2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
 - 3. For fences and vision barriers, provide minimum 3/8-inch- (9.5-mm-) thick exterior plywood.
 - 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- (16-mm-) thick exterior plywood.

- C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.
- D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.
- E. Paint: Comply with requirements of Division 9 Section "Painting."
 - 1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior- grade acrylic-latex emulsion over exterior primer.
 - 2. For sign panels and applying graphics, provide exterior- grade alkyd gloss enamel over exterior primer.
 - 3. For interior walls of temporary offices, provide 2 coats interior latex-flat wall paint.
- F. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- G. Water: Provide potable water approved by local health authorities.
- H. Open-Mesh Fencing: Provide 0.120-inch- (3-mm-) thick, galvanized 2-inch (50-mm) chainlink fabric fencing 6 feet (2 m) high with galvanized barbed-wire top strand and galvanized steel pipe posts, 1-1/2 inches (38 mm) I.D. for line posts and 2-1/2 inches (64 mm) I.D. for corner posts.

2.02 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4-inch (19-mm), heavy-duty, abrasion- resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured, NEMA- polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.

- G. Temporary Toilet Units: Provide self-contained, single- occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- H. Fire Extinguishers: Provide hand-carried, portable, UL- rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

2.03 PROJECT IDENTIFICATION

- A. Provide 8'-0" by 4'-0" project sign of MPO plywood and 4" x 4" pressure treated wood frame construction, painted, with Exhibit lettering by a professional sign painter and installed by GC.
- B. List name of project, name of Owner, Architect/Engineer and Contractor. Sign to include rendering and company logo/information as directed by Owner and Architect.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked- in services.
 - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders.
- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
 - 1. Sterilization: Sterilize temporary water piping prior to use.

- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
1. Install electric power service underground, except where overhead service must be used.
 2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
1. Separate Telephone Lines: Provide additional telephone lines for the following:
 - a. Where an office has more than 2 occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for a fax machine in the field office.
 - c. Provide a separate line for the Owner's use.
 2. At each telephone, post a list of important telephone numbers.
- F. Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
- G. Toilets: Use of the Owner's existing toilet facilities will be permitted, so long as facilities are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to the condition prevalent at the time of initial use.
- H. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
1. Provide separate facilities for male and female personnel.
- I. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
1. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

- J. Drinking-Water Facilities: Provide containerized, tap- dispenser, bottled-water drinking-water units, including paper supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7 to 13 deg C).
- K. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to the municipal system, as directed by sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- L. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.03 SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.
 - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet (9 m) of building lines. Comply with requirements of NFPA 241.
- C. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:
 - 1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase.
 - 2. Equip with a water cooler and private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.
- D. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on- site.
- E. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking

where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.

1. Paving: Comply with Division 2 Section "Hot-Mixed Asphalt Paving" for construction and maintenance of temporary paving.
 2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
 3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- F. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Where temporary wood or plywood enclosure exceeds 100 sq. ft. (9.2 sq. m) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- H. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Temporary Elevator Use: Refer to Division 14 Sections for elevators.
- J. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.

2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- K. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- L. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- M. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- N. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
- B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 4. Provide supervision of welding operations, combustion- type temporary heating units, and similar sources of fire ignition.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected

against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

- E. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
 - 1. Provide open-mesh, chainlink fencing with posts set in a compacted mixture of gravel and earth.
 - 2. Provide plywood fence, 8 feet (2.5 m) high, framed with four 2-by-4-inch (50-by-100-mm) rails, and preservative-treated wood posts spaced not more than 8 feet (2.5 m) apart.
- F. Covered Walkway: Erect a structurally adequate, protective covered walkway for passage of persons along the adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing. Provide wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage. Extend the back wall beyond the structure to complete the enclosure fence. Paint and maintain in a manner acceptable to the Owner and the Architect.
- G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- H. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.05 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
 3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION

**SECTION 01503
EXECUTION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Requirements:
 - 1. Division 01 Section "Summary" for limits on use of Project site.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Division 07 Section "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit 4 copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that

results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable design requirements Section.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

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

- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Contractor will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of 2 permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

Record benchmark locations, with horizontal and vertical data on Project Record Documents.

Where the actual location or elevation of layout points cannot be marked, provide temporary reference points to locate the Work. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

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

2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
- Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
- Preinstallation Conferences: Include Owner's construction personnel at preinstallation

conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls" and as dictated by local authorities having jurisdiction whichever is most stringent.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

**SECTION 01600
MATERIALS AND EQUIPMENT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Alternatives.

1.03 RELATED SECTIONS

- A. Section 01400 – Quality Control: Product quality monitoring.

1.04 PRODUCTS

- A. Products: Means new material, machinery components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for re-use.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.

1.05 TRANSPORTATION AND HANDLING

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

1.06 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Avoid mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.07 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming one or more Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

PART 2 - PRODUCTS**2.01 PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
 - 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 - 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
 - 1. Semiproprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.

2. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
3. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
 - a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
4. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
5. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
6. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

**SECTION 01650
STARTING OF SYSTEMS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.03 RELATED SECTIONS

- A. Section 01400 – Quality Control: Manufacturers field reports.
- B. Section 01700 – Contract Closeout: System operation and maintenance data and extra materials.

1.04 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are completed and tested.
- F. Execute start-up under supervision of responsible Contractor's personnel in accordance with manufacturers' instruction.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.05 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct by a qualified manufacturers' representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instruction.

1.06 TESTING, ADJUSTING, AND BALANCING

- A. Contractor will appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.
- B. The independent firm will perform services specified in Section 15990.
- C. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.
- D. The mechanical and electrical sub-contractors shall conduct 3-month, 6-month and 9-month inspections, following the Substantial Completion of Construction, for preventative maintenance purposes. These first year warranty inspection reports shall be submitted in written form to the Owner/Architect within ten (10) days of inspection.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01700
CONTRACT CLOSEOUT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.

1.03 RELATED SECTIONS

- A. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.
- B. Section 01730 - Operation and Maintenance Data.
- C. Section 01740 - Warranties and Bonds.

1.04 CLOSOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.
- B. Provide submittals to Architect/Engineer that shall include the following:
 - 1. Record Drawings
 - 2. Operation and Maintenance Data
 - 3. Guarantees, Warranties and Bonds
 - 4. Keys and Keying Schedule
 - 5. Spare Parts and Maintenance Materials
 - 6. Certificate of Insurance for Products and Completed Operations
 - 7. Certificate of Occupancy, if required
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.05 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.

- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.06 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.07 PROJECT RECORD DOCUMENTS

- A. Maintain on-site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other Modifications to the Contract
 - 5. Reviewed shop drawings, product data, and samples
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturers' name and product model and number
- E. Record Documents and Shop Drawings: legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish ground floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract Drawings.
- F. Submit documents to Architect/Engineer at Project Closeout.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION**3.01 CLOSEOUT PROCEDURES**

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 - 1. Maintenance manuals.
 - 2. Record documents.
 - 3. Spare parts and materials.
 - 4. Tools.
 - 5. Lubricants.
 - 6. Fuels.
 - 7. Identification systems.
 - 8. Control sequences.
 - 9. Hazards.
 - 10. Cleaning.
 - 11. Warranties and bonds.
 - 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
 - 1. Startup.
 - 2. Shutdown.
 - 3. Emergency operations.
 - 4. Noise and vibration adjustments.
 - 5. Safety procedures.
 - 6. Economy and efficiency adjustments.
 - 7. Effective energy utilization.

3.02 FINAL CLEANING

- A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are

- noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
- c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
- 1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION

**SECTION 01730
OPERATION AND MAINTENANCE DATA**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Format and content of manuals.
- B. Schedule of submittals.

1.03 RELATED SECTIONS

- A. Section 01300 – Submittals: Shop drawings, product data and samples.
- B. Section 01400 – Quality Control: Manufacturer's instructions.
- C. Section 01400 – Quality Control: Test and balance reports.
- D. Section 01600 – Material and Equipment: Systems demonstration.
- E. Section 01700 – Contract Closeout: Project Record Documents.
- F. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.04 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.05 FORMAT

- A. Prepare data in the form of an instructional manual.
- B. Binders: Commercial quality, 8-1/2 x 11 inch three-ring binders with hardback, cleanable, plastic covers. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project and identify subject matter of contents.
- D. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- E. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.06 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of volume.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. (Do not use Project Record Documents as maintenance drawings.)
- E. Type Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01400.
- F. Warranties and Bonds: As specified in Section 01740.

1.07 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance and repair.
- D. Additional Requirements: As specified in individual Product specification sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.08 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications.
- C. Include color coded wiring diagram as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulations, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagram.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports as specified in Section 01400.
- O. Additional Requirements: As specified in individual Product specification sections.
- P. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.09 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.10 SUBMITTALS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes in final form 15 days prior to final inspection. Copy will be returned after final inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.
- D. Submit two copies of revised volumes of data in final form within ten days after final inspection.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01731
PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Division 01 Section "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
 - 2. Division 01 Section "Execution" for final property survey.
 - 3. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit 1 set(s) of marked-up record drawings and specifications.
 - 2. Number of Electronic Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit 1 paper-copy set(s) of marked-up record drawings.
 - 2) Submit PDF electronic files of scanned record drawings.
- B. Record Product Data: Submit 1 paper copy and annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit 1 paper copy and annotated PDF electronic files and directories of each submittal.
- D. Reports: Submit written report [weekly] indicating items incorporated into project record

documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.3 MISCELLANEOUS RECORD SUBMITTALS

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

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION

**PROJECT RECORD DOCUMENTS
SECTION 01731 - 3**

10/12/2017

**SECTION 01732
DEMONSTRATION AND TRAINING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Requirements:
 - 1. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit 2 copies within 7 days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01, Section 01301 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

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

PART 2 - PRODUCTS**2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 - 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.

5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner with at least 7 days' advance notice.

- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, a written or a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
 - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
 - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION

**SECTION 01740
WARRANTIES AND BONDS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Preparation and submittal
- B. Time and schedule of submittals

1.03 RELATED SECTIONS

- A. Document 00701 – General Conditions: Performance Bond and Labor and Material Payment Bonds, Warranty, and Correction of Work.
- B. Section 01700 – Contract Closeout 01730 – Operation and Maintenance Data.
- C. Individual Specifications Sections: Warranties required for specific products or Work.

1.04 FORM OF SUBMITTALS

- A. Bind in commercial quality, 8-1/2 x 11 inch three ring side binders with hardback, cleanable plastic covers.
- B. Label cover of each binder with typed or printed title, "WARRANTIES AND BONDS", with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible principal.
- C. Table of contents: Neatly typed, in the sequence of the Table of Contents of the Project manual, with each item identified with the number and title of the specification Section in which specified, and the name of the product or Work item.
- D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address and telephone number of responsible principal.

1.05 PREPARATION OF SUBMITTALS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item or work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.

- D. Retain warranties and bonds until time specified for submittal.

1.06 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten (10) days after acceptance.
- B. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.
- C. For items of Work when acceptance is delayed beyond Date of Substantial Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

**SECTION 01805
CLEANING UP****PART I – GENERAL****1.01 RELATED DOCUMENTS**

- A. The general provisions of the Contract, including the General, Supplementary General Conditions and special conditions shall apply to the Work specified in this section.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Volatile waste shall be stored in covered metal containers, and removed from the premises daily.
- B. Clean-up and disposal operations shall be conducted to comply with local ordinances and Anti-Pollution Laws.
 - 1. Burning or burying of rubbish and waste on the site is not permitted.
 - 2. Disposal of volatile fluid waste in storm or sanitary sewer systems, or into streams or waterways is not permitted.
- C. Hazardous materials shall be stored and disposed of only as permitted by law and shall be properly and legally removed from the premises prior to the completion of the Contract.

1.03 MATERIALS

- A. Cleaning materials shall be used on materials only when recommended specifically by the materials manufacturer.

1.04 CLEANING DURING CONSTRUCTION

- A. The Contractor shall oversee cleaning by the various trades and ensure that the building and grounds are maintained free from accumulations of waste materials. The premises shall be kept free from the accumulation of waste materials or rubbish at all times, daily cleaning required.
- B. The Contractor shall provide suitable containers on the Site for collection of waste disposed of in a legal manner.
- C. The Contractor shall not, in any case, use the Owner's trash facilities.

1.05 FINAL CLEANING

- A. At completion of the Project, and just prior to Final Acceptance, the Contractor and Owner shall conduct an inspection of the entire Project. Prior to conducting this inspection the Contractor shall clean, or re-clean, entire areas exposed to view to normal level for "first class" maintenance/cleaning of building projects of a similar nature, as needed to produce a "clean" condition as judged by the Architect and Owner. The Contractor shall at minimum:

1. Remove grease, dust, dirt, stains, temporary labels, and fingerprints, non-permanent protection and other foreign materials from interior and exterior surface.
 2. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
 3. Broom clean paved surfaces, clean and rake site, and clean other exposed site finishes.
- B. The Contractor shall maintain cleaning while the Project is occupied by the Owner.
- C. The Contractor shall remove all his/her waste materials and rubbish from and about the project as well as all tools, construction equipment, and machinery and surplus materials.

END OF SECTION

**SECTION 02282
TERMITE CONTROL**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section includes soil treatment for termite control.

1.03 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data and application instructions.
- C. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides.

1.04 QUALITY ASSURANCE

- A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.
- B. Engage a professional pest control operator who is licensed according to regulations of governing authorities to apply soil treatment solution.
- C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.05 JOB CONDITIONS

- A. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.
- B. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.06 WARRANTY

- A. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.
- B. Warranty Period: 5 years from date of Substantial Completion.

- C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 SOIL TREATMENT SOLUTION

- A. General: Use an emulsible, concentrated termiticide that dilutes with water, specially formulated to prevent termites infestation. Fuel oil will not be permitted as a diluent. Provide a solution consisting of one of following chemical elements.
- B. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Equil Adonis 75 WSP Insecticide by Envincio LLC
 - 2. DemonMax by Syngent Crop Protection, Inc.
 - 3. Premise Pro insecticide by Bayer Environmental Science
- C. Dilute with water to concentration level recommended by manufacturer.
- D. Other solutions may be used as recommended by Applicator if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placing compacted fill under slabs if recommended by toxicant manufacturer.
- B. Application Rates: Apply soil treatment solution as follows:
 - 1. Under slab-on-grade structures, treat soil before concrete slabs are placed, using the following application rates:
 - a. Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) to soil in critical areas under slab, including entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.
 - b. Apply 1 gallon of chemical solution per 10 sq. ft. (4.1 L of chemical solution per sq. m) as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallon of chemical solution per 10 sq. ft. (6.1 L of chemical solution per sq. m) to areas where fill is washed gravel or other coarse absorbent material.
 - c. Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench for each 12 inches (300 mm) of depth from grade to footing, along outside edge of building. Dig a trench 6 to 8 inches (150 to 200 mm) wide along outside of foundation to a depth of not less than 12 inches (300 mm). Punch holes to top of footing at not more than 12 inches (300 mm) o.c. and apply chemical

solution. Mix chemical solution with the soil as it is being replaced in the trench.

2. Under crawlspace and basement structures, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures.
 3. Treat soil under or around crawlspace structures as follows:
 - a. Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench along inside of foundation walls, along both sides of interior partitions, and around piers and plumbing. Do not apply an overall treatment in crawlspaces.
 - b. Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench, for each 12 inches (300 mm) of depth from grade to footing, along outside of foundation walls, including part beneath entrance platform porches, etc.
 - c. Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) along the inside and outside of foundation walls of porches.
 - d. Apply 1 gallon of chemical solution per 10 sq. ft. (4.1 L of chemical solution per sq. m) of soil surface as an overall treatment only where attached concrete platform and porches are on fill or ground.
 4. At hollow masonry foundations or grade beams, treat voids at rate of 2 gallons per 10 linear feet 2.6 L per meter, poured directly into the hollow spaces.
 5. At expansion joints, control joints, and areas where slabs will be penetrated, apply at rate of 4 gallons per 10 linear feet (5.1 L per linear m) of penetration.
- C. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.
- D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION

**SECTION 03100
CONCRETE FORMWORK**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 RELATED SECTIONS

- A. Section 03200 – Concrete Reinforcement.
- B. Section 03300 – Cast-In-Place Concrete.

1.03 WORK INSTALLED BUT FURNISHED BY OTHERS

- A. Build in anchors, inserts, bolts, hangers, sleeves, ferrules, water stops and other accessories.

1.04 QUALITY ASSURANCE

- A. Design, construct and erect formwork per ACI 347 Recommended Practice for Concrete Formwork. Refer to Section 6.1 of ACI 318 Code and Commentary.

1.05 ALLOWABLE TOLERANCES

- A. In accordance with ACI 301 as listed in Table 4.3.1 – Tolerances for Formed Surfaces.

1.06 REFERENCES

- A. ACI 301-05 – Specifications for Structural Concrete for Building
- B. ACI 318-11 – Building Code Requirements for Structural Concrete
- C. ACI 347R-14 – Recommended Practice for Concrete Formwork
- D. ACI 347.2R-05 – Guide for Shoring/Re-shoring of Concrete Multistory Buildings

1.07 DESIGN OF FORMWORK AND SHORING

- A. Design of formwork, shoring, and re-shoring and its removal is the Contractor's responsibility. Design formwork in a manner such that existing or new construction is not overstressed. Do not remove shoring earlier than recommended by ACI 301 and ACI 347.
- B. Before starting construction, the Contractor shall develop a procedure and schedule for removal of shores and installation of re-shores for calculating the loads transferred to the structure. The structural analysis and concrete strength assumptions used shall be submitted to Architect.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Concealed Concrete: No. 2 Commons Southern Pine, S4S, or better.
- B. Exposed Concrete: B-B Plyform, Class I or II, EXT-APA, Metal or fiberglass forms may be used.
- C. Construction joint forms for slabs-on-grade: Key-type steel formers, Vulcan Screed Joints, Burke Keyed Kold Joint Form, Dayton Sure-Grip G-20, or equivalent.
- D. Expansion joint filler: Asphalt impregnated, pre-molded fiberboard by full thickness of slab or joint. ASTM D994.
- E. Form coating: Non-staining mineral oil.

2.02 EARTH FORMS

- A. Where soil is firm enough to permit cutting to true size, concrete may be placed without forms.

PART 3- EXECUTION**3.01 ERECTING**

- A. Erect forms to obtain shapes, designs and dimensions indicated. Make forms sufficiently tight to prevent leakage. Brace, shore and tie forms together to maintain position without sagging or bulging.
- B. Provide $\frac{3}{4}$ " chamfering at exposed corners.
- C. Prepare insides of forms so that concrete will have a smooth, uniform finish, free from fins, stone pockets, voids and other surface defects.
- D. Provide construction joint forms where concrete placement terminates at the end of a day or because of other reasons.
- E. Provide bulkheads, with reinforcing steel penetrating bulkheads, where concrete placement stops at end of day or for other reasons.
- F. Where soil conditions are such that concrete cannot be placed without forms, and where other conditions cause trenches to be opened wider than footing or slab widths, erect forms for footing or slabs.
- G. Install items furnished by others for installation in concrete. Use templates to locate anchor bolts and other critical items.
- H. In areas where concrete is sloped, have Surveyor verify drainage prior to placing concrete.

3.02 PREPARING

- A. Prepare insides of forms so that concrete will have a smooth, uniform finish free of surface defects.

- B. Coat forms before reinforcement steel is placed. Where mill-oiled forming material is used, follow manufacturer's instructions for recoating. Where forming material is not mill-oiled, coat forms before each use.
- C. Before reusing forms, thoroughly clean them and remove projecting nails or similar devices.
- D. Use of any forming lubricants shall not prevent application of spray on textured ceiling finishes.

3.03 CONSTRUCTION JOINTS

- A. Provide construction in accordance with ACI 302, Chapter 6 and ACI 318.
- B. Obtain the Architect's approval of construction joint locations.

3.04 FORM REMOVAL

- A. Remove forms in such manner and such time as to insure safety of structure and to avoid chipping and spalling of concrete. Refer to Section 6.2 of ACI 318, Code and Commentary, and Section 376.2.3 of ACI 347 for form removal requirements.

END OF SECTION

**SECTION 03200
CONCRETE REINFORCEMENT**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 RELATED SECTIONS

- A. Section 03100 – Concrete Formwork.
- B. Section 03300 – Cast-In-Place Concrete.
- C. Section 04200 – Unit Masonry

1.03 QUALITY ASSURANCE

- A. Comply with American Concrete Institute (ACI) "Specifications for Structural Concrete for Buildings (ACI 301)" except as modified herein.
 - 1. This standard is referred to as "ACI 301."
 - 2. Maintain field references in accordance with Section 1.6 of ACI 301.

1.04 SUBMITTALS

- A. Submit warranty from mill or supplier stating that materials meet requirements of referenced ASTM and ACI Standards.
- B. Detail reinforcing steel in accordance with ACI 315, "Details and Detailing of Concrete Reinforcement." Submit prints of shop drawings per Section 01300 indicating bending and placement of reinforcement as well as sleeve and built-in work locations. Fabricator is responsible for making and distributing prints showing required revisions. Do not fabricate reinforcement steel until approval of Engineer has been obtained (or submit under provisions of Section 01300).

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Reinforcement Steel: ASTM A615, Grade 60, deformed.
- B. Welded Wire Fabric: Welded steel wire fabric, ASTM A185; wire size and spacing as indicated.
- C. Bar Supports:
 - 1. All surfaces exposed to weather or liquid or which can be seen in service condition shall have bar supports conforming to Class C, D, or E as defined in Chapter 9 of CRSI, Placing Reinforcing Bars. Where no protection is required, Class A supports may be used.

- D. Other Supports:
 - 1. Solid Concrete brick may be used to support reinforcement to obtain proper clearance from earth and rigidity of reinforcement under concreting operations. Concrete masonry brick shall not be used in lieu of solid concrete brick.

2.02 FABRICATING

- A. Comply with ACI 301 chapters and the CRSI Manual of Standard Practice.

PART 3 - EXECUTION

3.01 CONDITION OF SURFACES

- A. Maintain reinforcement surfaces free of rust scale and other coatings which might impair concrete bond as described in Section 7.4 of ACI 318.

3.02 PLACING

- A. Handle, place and tie reinforcement steel in accord with "Building Code Requirements for Reinforced Concrete", ACI 318 and CRSI publication "Placing Reinforcing Bars," Latest Edition. Comply with ACI 301.
- B. Provide Class B tension splices for all splices unless indicated or noted otherwise. Do no splicing of reinforcing steel except as authorized by Architect.
- C. Bend bars cold. Do not field bend bars partially embedded in concrete except as specifically permitted by Architect. Do not heat or cut bars with a torch.
- D. After vapor barrier or under floor waterproofing, as applicable, for slab-on-grade has been placed, install welded wire fabric per Section 5.4 of ACI 301. Locate welded wire fabric in middle third of slabs. Lap side one full mesh plus 2". Lap ends two full meshes.

3.03 CONCRETE PROTECTION FOR REINFORCEMENT

- A. Protect reinforcing by thickness of concrete indicated, in accordance with ACI 318.
- B. Where not indicated, thickness of concrete over reinforcing shall be as follows:
 - 1. Where concrete is deposited against the ground without the use of forms – 3 inches.
 - 2. Where concrete is exposed to weather or to ground but placed in forms – 2 inches for bars larger than No. 5 and 1 ½ inches for No. 5 bars or smaller.
 - 3. In slabs and walls not exposed to the ground or to the weather – ¾ inches.
- C. Variation from clear cover and depth of members shall conform to section 7.5 of ACI 318.

END OF SECTION

**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This section specifies cast-in-place concrete, complete and in place as shown on the drawings, including formwork, reinforcing, mix design, placement procedures, curing, testing and finishing.
- B. Concrete paving and walks are specified in Division 2.
- C. Pre-cast concrete is specified in other Division 3 sections.
- D. Mechanical finishes and concrete floor topping are specified in other Division 3 sections.

1.03 RELATED SECTIONS

- A. Section 03305 - Controlled Low Strength Material (CLSM).

1.04 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Project data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, water stops, joint systems, curing compounds, dry-shake finish materials, and others as requested by the Architect.
- C. Concrete mix design for each unique class of concrete in the project.
- D. Shop drawings for reinforcement, for fabrication, bending, and placement of concrete reinforcement. Comply with ACI Detailing Manual, showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement for openings through concrete structures and corner bars.
- E. Submitted shop drawings must be checked and signed by the General Contractor.
- F. Shop drawings for formwork, shoring, and reshoring prepared by a registered Professional Engineer for fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
- G. Architect's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility.

- H. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
 - 1. Fibrous reinforcement
 - 2. Reglets
 - 3. Waterstops
 - 4. Vapor retarder
- I. Laboratory test reports for concrete materials and mix design test.
- J. Material certificates in lieu of materials laboratory test reports when permitted by Architect. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- K. Minutes of pre-construction conference.
- L. Proposed construction joint locations for all structural components.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - ACI 301-10 - Specifications for Structural Concrete
 - ACI 315-99 - Standard Practice for Detailing Reinforced Concrete Structures
 - ACI 318-11 - Building Code Requirement for Reinforced Concrete"
 - CRSI Manual of Standard Practice
- B. Concrete testing services: Owner shall engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes. Testing laboratory shall be currently accredited by C.M.E.C, N.V.L.A.P, or other recognized authority, or the basis of compliance with ASTM C1077. Sampling and testing of concrete to be done by ACI certified field technician Grade 1 personnel or equivalent.
- C. Materials and installed work may require testing and re-testing at any time during progress of work. Tests, including re-testing or rejected materials for installed work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Forms for exposed finished concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for unexposed finish concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
- C. Shores and struts: Provide positive means of adjustment capable of taking up formwork settlement during concreting

- D. Form coatings: Provide commercial formulation formcoating compounds with a maximum VOC of 350 mg/1 that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- E. Form ties: Factory fabricated, adjustable length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spilling concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface.
- F. Provide ties that, when removed, will leave holes no larger than one (1) inch diameter in concrete surface.

2.02 REINFORCING MATERIALS

- A. Reinforcing bars: ASTM A615, Grade 60, deformed. Deliver to job site bundled, tagged and marked. Store off ground.
- B. Steel wire: ASTM A82, plain cold-drawn steel.
- C. Welded wire fabric: ASTM A185, welded steel wire fabric. Use sheet stock only for slabs on grade.
- D. Welded deformed steel wire fabric: ASTM A497.
- E. Supports for reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar type supports complying with CRSI specifications.
- F. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
- G. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.03 FIBROUS REINFORCING FOR CONCRETE SLABS

- A. Macro Synthetic Fiber: Self-fibrillating polypropylene/polyethylene color blended synthetic macro fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M.
- B. Macro synthetic fibers with the following typical physical properties:
 - 1. Specific Gravity: 0.91 - 0.92, Density: 0.91 – 0.92 kg/liter.
 - 2. Material Properties Tensile Strength: 90 - 110 ksi (620 - 760 MPa).
 - 3. Tensile Strength: 70 ksi (CE 480 MPa).
 - 4. Materials: Virgin Copolymer and Polypropylene.
 - 5. Blended Forms: Monofilament and Fibrillated Fiber Systems.
 - 6. Packaged and Collated Forms: Dispersible bag and twisted bundles.
 - 7. Nominal Length: 1.5 inch or 2.25 inch (38 mm or 54 mm).
 - 8. Fibers are sized to be flexible and not stiff to ensure fibers 'lay down' and are easy to finish.

- C. Products; subject to compliance with requirements, provide one of the following (or equal):
 - 1. FRC Industries; FRC HPS-650 or FRC HPS-950 Blend.
 - 2. Forta Corporation; FORTA FERRO.
 - 3. Sika Corporation; SikaFiber® Force-950 Blend.
 - 4. ABC Polymer Industries, LLC – FiberForce 650
- D. Fiber Dosage; add macrosynthetic fiber reinforcement at these dosages:
 - 1. Typical Slab on Grade – 3 pounds yd³
 - 2. Mechanical Rooms – 4 pounds yd³
 - 3. Topping Slabs – 4 pounds yd³
 - 4. Composite Metal Decks – 4 pounds yd³
 - 5. Paving – Consult Product Representative.
- E. Batching and Mixing:
 - 1. Add macrosynthetic fiber reinforcement at the prescribed dosage with drum turning, after all or a portion of the concrete has been loaded into the truck or mixer.
 - 2. After fibers have been added, add water-reducing admixture (polycarboxylate superplasticizer).
 - 3. Follow ACI procedures to mix 5 minutes once all ingredients are in the drum.

2.04 CONCRETE MATERIALS

- A. Portland cement: ASTM C150, Type I or Type II. Use one brand of cement throughout project unless otherwise acceptable to Architect.
- B. Fly ash: ASTM C618, Class F or Class C. Do not use for exposed architectural concrete.
- C. Normal weight aggregates: ASTM C33 and herein specified. Provide aggregates from a single source for exposed concrete. Maximum aggregate size = 1-1/2" (1/2" for topping slabs). For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling causing deleterious substances.
- D. Water: Potable
- E. Admixtures, general: Provide admixtures for concrete that contain no more than 0.1 percent chloride ions. Calcium chloride shall not be permitted. Admixtures may be used at the option of the Contractor.
- F. Air-entraining admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.
- G. The following admixture may be used at the Contractor's option:
- H. Water reducing admixture: ASTM C494, Type A.
- I. High-range water reducing admixture (super plasticizer): ASTM C494, Type F or Type G.
- J. Water reducing, retarding admixture: ASTM C494, Type D.

2.05 RELATED MATERIALS

- A. Waterstops: provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- B. Polyvinyl chloride waterstops: Corps of engineers CRD-C 572
- C. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. The Burke Co.
 - 2. Greenstreak Plastic Products Co.
 - 3. W.R. Meadows, Inc.
 - 4. Progress Unlimited
 - 5. Schlegel Corporation
 - 6. Vinylex Corporation
- D. Vapor retarder: Provide vapor retarder cover over prepared base material below slabs on grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154, as follows:
 - 1. Polyethylene sheet not less than ten (10) mils thick.
- E. Absorptive cover: Burlap cloth made from jute or kenaf, weighing approximately nine (9) ounces per square yard, complying with AASHTO m 182, Class 2
- F. Moisture retaining cover: One of the following, complying with ASTM C171.
 - 1. Waterproof paper
 - 2. Polyethylene film
 - 3. Polyethylene-coated burlap
- G. Liquid membrane-forming curing compound: Liquid-type membrane-forming curing compound complying with ASTM C309, Type 1, Class A. Moisture loss not more than 0.055 gr./square centimeter when applied to 200 square feet/gallon. Do not use curing sealing or hardening solutions where fluid applied waterproof coating is to be used.
- H. Floor sealer: One of the following.
 - 1. Sikafloor WB-20 by Sika Corporation.
 - 2. GRACE Concrete Seal W by W.R. Grace.
 - 3. EVERCLEAR VOX by Euclid Chemical Co.
- I. Bonding compound: Polyvinyl acetate or acrylic base.
- J. Epoxy adhesive: ASTM C881, two component materials suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.
- K. Patching Mortar: Packaged, dry mix complying with ASTM C928 that contains a non-dispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. CGM, Incorporated; Pro Trowel Mortar, Pro Gel Mortar, Pro Flowable Mortar or Pro N.B.P.
 - b. Dayton Superior Corporation; HD-50 or Thin Resurfacer.
 - c. The Euclid Chemical Company; Concrete Coat, Thin Coat or Verticoat.
 - d. MBT protection and Repair, Div. Of ChemRex, Inc.; Emaco R320 C1 or Emaco R350 C1.
 - e. W.R. Meadows, Inc.; Sealtight Meadow-Patch T1 or Sealtight Meadow-Crete FNP.
 - f. Sika Corporation; SikaTop 121 Plus, Sika Top 122 Plus, Sika Top 123 Plus or Sika Top 126 Plus.
 - g. Sonneborn, Div. of ChemRex, Inc.; Screed, Sonopatch 100, Sonopatch 200, or Sonopatch 300.
 - h. Sto Corp., Concrete Restoration Division; Sto Flowable Mortar, Sto Overhead Mortar, Sto Thin Coat Mortar or Sto Trowel-Grade Mortar.
 - i. Tamms Industries, Inc.; Duraltop Fast Set or Speed Crete PM.
 - j. ThorRoc, Div. of ChemRex; Inc.; HB2 Repair Mortar or Polyset.
2. Use gels and flowable products for horizontal surfaces. Use mortars and trowelable products for vertical surfaces and bottoms of surfaces.
 3. Install products in strict conformance to the manufacturer's instructions. Special attention shall be given to surface preparation and cleaning of surface to be patched.

2.06 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301, Chapter 3, Method 1 of 2. If trial batch method is used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field control testing.
- B. Fly ash shall not exceed 25 percent of total cementitious content by weight.
- C. Submit written reports to Architect for each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- D. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules.
 1. 4,000 psi, 28 day compressive strength; W/C ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air entrained), minimum 587 lbs. of cement per cubic yard.
 2. 3,000 psi, 28 day compressive strength; W/C ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air entrained), minimum 517 lbs. of cement per cubic yard.
- E. Adjustment to concrete mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

2.07 ADMIXTURES

- A. Contractor may use any of the following admixtures in the concrete mix designs in order to meet the specified strength and performance requirements.
- B. Contractor may use water reducing admixture or high range water reducing admixture (superplasticizer) in concrete as required for placement and workability.
- C. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees Fahrenheit (10 degrees Celsius).
- D. Use air entraining admixture in exterior exposed concrete unless otherwise indicated. Add air entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within following limits:
 - 1. Concrete (not exposed to freezing, thawing, or hydraulic pressure) or to receive a surface hardener: 2 percent to 4 percent air.
- E. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.
- F. Water cement ratio: Provide concrete for following conditions with maximum water cement (W/C) ratios as follows:
 - 1. Subjected to brackish water, salt spray, or deicers; W/C 0.40
- G. Slump limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Ramps, slabs, and sloping surfaces: not more than three (3) inches.
 - 2. Concrete containing HRWR admixture (superplasticizer): Not more than eight (8) inches after addition of HRWR to site verified two(2) inch to three (3) inch slump concrete.
 - 3. Other concrete: Four (4) inches plus or minus one (1) inch.

2.08 CONCRETE MIXING

- A. Ready mix concrete: comply with requirements of ASTM C94, and as specified.
- B. When air temperature is between 85 degrees Fahrenheit (30 degrees Celsius) and 90 degrees Fahrenheit (32 degrees Celsius), reduce mixing and delivery time from 1 ½ hours to 75 minutes, and when air temperature is above 90 degrees, Fahrenheit (32 degrees Celsius), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION**3.01 GENERAL**

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.
- B. WORKMEN: Contractor to employ adequate number of skilled workmen, including superintendent and foreman to ensure installation in strict accordance with the design.

3.02 FORMS

- A. General: design, erect, support, brace and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347. Camber formwork to provide for anticipated deflections. Adjust shores and struts accordingly.
- B. Construct forms to size, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
- D. Provide temporary openings where interior area of formwork is inaccessible for clean-out, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated on the drawings, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for other trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Proposed opening size and location must be submitted to Structural Engineer for review prior to construction.
- H. Earth forms: Concrete may be placed directly against sides of footing excavations when acceptable to Architect. When earth forms are acceptable, and one (1) inch to plan dimensions of footings.
- I. Cleaning and tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete placement as required to prevent mortar leaks and maintain proper alignment.
- J. See ACI 117 for formwork tolerance.

3.03 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Following leveling and tamping of sub-base for slabs on grade, place vapor retarder/barrier sheeting with longest dimension parallel with direction of pour.
- B. Lap joints six (6) inches and seal vapor retarder/barrier joints with manufacturer's recommended mastic and pressure sensitive tape.

3.04 PLACEMENT REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice or "Placing Reinforcing Bars", for details and methods of reinforcement and supports and as herein specified.
- B. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations. Repair all tears or punctures with manufacturer's recommended mastic and pressure sensitive tape.
- C. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy bond with concrete.
- D. Reinforcing bars shall not be cut or bent in field unless specifically called for on the structural drawings.
- E. Accurately position, support and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as approved by the Architect.
- F. Place reinforcement to obtain at least minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- G. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps adjoining widths to prevent continuous laps in either direction. Snip every other wire at control joint locations as shown in the structural drawings. Pull wire up during placement.
- H. Minimum cover distances from edge of bar to face of concrete:

1. Concrete cast against and permanently exposed earth	3"
2. Concrete exposed to earth weather	
#6 through #18 bars	2"
#5 bar and smaller	1 ½"
3. Concrete not exposed to weather or in contact with ground, slabs, walls, joists	
#11 bar and smaller	¾"

3.05 JOINTS

- A. Construction joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between wall and footings. Accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except otherwise indicated. Do not continue reinforcement through sides of strip placement.

- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Field fabricate joints in waterstops in accordance with manufacturer's printed instructions.
- F. Isolation joints in slabs-on-ground: Construct isolation joints in slab-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
- G. Joint filler material: Bituminous fiber type conforming to ASTM D1751.
- H. Contraction (control) joints in slabs-on-ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8 inch wide by 1/4 slab depth or inserts 1/4 inch wide by 1/4 slab depth, unless otherwise indicated.
- I. Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
- J. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
- K. If joint pattern not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
- L. Joint sealant material is specified in Division 7 Sections of these specifications.

3.06 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
- B. Do not relocate or otherwise disturb reinforcing bars.
- C. Forms for slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike off templates or compacting type screeds.

3.07 PREPARATION OF FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, non-residual, low-VAC, form-coating compound before reinforcement is placed.
- B. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

- C. Coat steel forms with non-staining, rust preventative material. Rust stained steel formwork is not acceptable.

3.08 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or case in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Place concrete in presence of a qualified concrete inspector from the independent testing laboratory.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.
- C. Deposit concrete continually or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes or weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete to avoid segregation at its final location.
- D. Placing concrete in forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate place layer and at least six (6) inches into preceding layer. Do not insert vibrators into lower layers of concrete that have not begun to set. At each intersection limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and the embedded items without causing segregation of mix.
- G. Use chutes or tremies for placing concrete where a drop of more than six (6) feet is required. Use flow checking devices where drop through tremies exceeds 18 feet.
- H. Placing concrete slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- I. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items into corners.
- J. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- K. Maintain reinforcing in proper position during concrete placement.
- L. Hot weather placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and herein specified.

- M. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees Fahrenheit (32 degrees Celsius). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use liquid nitrogen to cool concrete at Contractor's option.
- N. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- O. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
- P. Place slabs between dawn and 11:30 a.m. on any day which the temperature is expected to reach 80 degrees Fahrenheit.
- Q. Use water reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to Architect.
- R. Freshly placed concrete shall be protected from damage or injury due to water, falling objects, persons, or anything that might mar, or discolor the concrete finish.

3.09 FINISH OR FORMED SURFACES

- A. Rough form finish: For formed concrete surfaces not exposed to view in the finish work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding ¼ inch in height rubbed down or chipped off. (Class B per ACI 347)
- B. Smooth form finish: For formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, painting, or similar system. This is an as cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed. (Class A per ACI 347)
- C. Grout cleaned finish: Provide grout cleaned finish to scheduled concrete surfaces that have received smooth form finish treatment.
- D. Combine one part Portland cement to 1-1/2 parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene based bonding admixture and water to consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.
- E. Thoroughly wet concrete surfaces, apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing.
- F. Related unformed surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. Scratch finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
- B. After placing slabs, plane surface to tolerances for floor flatness (Ff) of 15 and floor levelness (fl) of 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
- C. Float finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes and hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and as otherwise indicated.
- D. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats or by hand floating if area is small or inaccessible to power units. Check and level surface plane tolerances of Ff18 – fl 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to uniform, smooth, granular texture.
- E. Trowel finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
- F. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff 20 – fl 17. Grind smooth surface defects that would telegraph through applied floor covering system.
- G. Trowel and fine broom finish: Where ceramic or quarry tile is to be installed with thin set mortar, apply trowel as specified, then immediately follow with slightly scarifying surface by fine brooming.
- H. Non-slip broom finish: Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
- I. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- J. Non-slip aggregate finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and elsewhere as indicated.
- K. After completion of float finishing and before starting trowel finish, uniformly spread 25 pounds of dampened non-slip aggregate per 100 square feet of surface. Tamp aggregate flush with surface using a trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.

- L. After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose non-slip aggregate.

3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperature. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with and evaporation control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than seven (7) days at 50 degrees minimum.
- C. Curing methods: Perform curing of concrete by curing and sealing compound, by moisture retaining cover curing, and by combinations thereof, as herein specified.
- D. Provide moisture curing by following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with four (4) inch lap over adjacent absorptive covers.
- E. Provide moisture cover curing as follows:
 - 1. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least three (3) inches and sealed by waterproof tape or adhesive.
 - 2. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks and curbs as follows:
 - 1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Re-coat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing formed surfaces: Cure formed surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing methods specified above, as applicable.
- H. Curing unformed surfaces: Cure unformed surfaces such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.

- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover, unless otherwise directed.
- J. Floor sealer: Seal concrete slabs to be exposed to view in the completed structure with floor sealer product.

3.12 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring and reshoring.
- B. Extend shoring from ground to roof for structures four (4) stories or less, unless otherwise permitted.
- C. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.
- D. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28 day strength and heavy loads due to construction operations have been removed.

3.13 REMOVAL OF FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of work, may be removed after cumulatively curing not less than 50 degrees Fahrenheit (10 degrees Celsius) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained 100 percent of design minimum compressive strength of in -place concrete by testing field cured specimens representative of concrete location members.
- C. Form-facing material may be removed four (4) days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be accepted for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to Architect.

3.15 MISCELLANEOUS CONCRETE ITEMS

- A. Filling in: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

Mix, place, and cure concrete as herein specified, to blend with in -place construction. Provide other miscellaneous concrete filling shown or required to complete work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment bases and foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced masonry: Provide masonry grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.16 CONCRETE SURFACE REPAIRS

- A. Patching defective areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect, and at no additional cost to owner.
- B. Cut out honeycomb, rock pockets, voids over ¼ inch in any dimension and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.
- C. For expose-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
- D. Repair of formed surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects as such include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of unformed surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.
- G. Correct high areas in unformed surfaces by grinding after concrete after concrete has cured at least 14 days.

- H. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend in to adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
- I. Repair defective areas, except random cracks and single holes not exceeding one (1) inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least $\frac{3}{4}$ inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes not over one (1) inch in diameter by dry pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a #16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack before bonding compound has dried. Compound dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- K. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- L. Repair methods not specified above may be used, subject to acceptance of Architect.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner will employ a testing laboratory to perform tests and to submit test reports. Testing Agency shall be subject to approval by the Architect. The Contractor is to notify the Testing Agency of scheduled concrete placements in sufficient time to allow the inspector to verify reinforcing steel placement and to observe the concrete placement.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling fresh concrete: ASTM C172, except modified for slump to comply with ASTM C94.
- D. Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
- E. Air content: ASTM C173; volumetric method for light weight or normal weight concrete; ASTM C231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
- F. Concrete temperature: Test hourly when air temperature is 40 degrees Fahrenheit (4 degrees Celsius) and below, when 80 degrees Fahrenheit (27 degrees Celsius) and above, and each time a set of compression test specimens are required.

- G. Compression test specimen: ASTM C31; one set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cure test specimens are required.
- H. Compressive strength tests: ASTM C39; one set for each day's pour exceeding five (5) cubic yards plus additional sets for each 50 cubic yards more than the first 25 cubic yards for each concrete class placed in any one day; one specimen tested at seven (7) days, two specimens tested at twenty-eight (28) days, and one specimen retained in reserve for later testing if required.
- I. When frequency of testing will provide fewer than five (5) strength tests for a given class of concrete, conduct testing from at least five (5) randomly selected batches or from each batch if fewer than five (5) are used.
- J. When total quantity of a given class of concrete is less than 50 cubic yards, Architect may waive strength test if adequate evidence of satisfactory strength is provided,
- K. When strength of field cured cylinder is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- L. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength tests results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- M. Test results will be reported in writing to Architect, Structural Engineer, Ready-Mix Producer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive breaking strength, and type of break for both seven (7) day tests and 28 day tests.
- N. Non-destructive testing: Impact hammer, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- O. Additional tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION

**SECTION 03542
CEMENT-BASED UNDERLAYMENT**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This section includes the provision and installation of all materials, equipment and incidentals necessary and/or required for a complete installation of cement-based, polymer-modified, self-leveling underlayment for interior finish flooring as specified herein.

1.03 RELATED SECTIONS

- A. Related Sections include the following:
 - 1. Division 3 Section "Concrete Toppings" for cementitious wear toppings applied over base slabs.
 - 2. Division 9 Sections for patching and leveling compounds applied with finish flooring.
- B. Allowances: Furnish cement-based underlayment under the allowances specified in Division 1 Section "Allowances."
- C. Unit Prices: Administrative and procedural requirements for unit prices are specified in Division 1 Section "Unit Prices."

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Plans indicating substrates, locations, and average depths of cement-based underlayment based on survey of substrate conditions.

1.05 SYSTEM REQUIREMENTS

- A. Performance Requirements
 - 1. Manufacturer's product
 - a. Compressive strength 2500 to 3200 psi (14 to 22 MPa)
 - b. Density 115 pounds per cubic foot (1,840 kg/m³)
 - 2. Sound Control
 - a. Minimum Sound Transmission Class, 50 STC (45 if field tested) – Section 1207.2 ASTM E90 and E336
 - b. Minimum Impact Insulation Class, 50 IIC (45 if field tested) – Section 1207.3 ASTM E492 and E1007

1.06 QUALITY ASSURANCE

- A. Performance Standards:
 - 1. Underlayment mix shall be tested for a slump using a 2" (i.d.) x 4" (50 mm x 101 mm) cylinder resulting in a patty size of 8 ½" (216 mm) plus or minus 1 inch (25 mm) diameter.
 - 2. Compressive strength tested in accordance with ASTM C 472M.
- B. Installer Qualifications: An experienced installer (applicator) who is acceptable to manufacturer, who has completed cement-based underlayment applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.
- C. Mockups: Before installing underlayment, apply mockups to demonstrate qualities of materials and execution. Comply with the following requirements, using materials indicated for the completed Work:
 - 1. Architect will select one area or surface to represent surfaces and conditions for application on each substrate required.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be applied.
 - 3. Obtain Architect's approval of mockups before starting underlayment application.
 - 4. Maintain mockups, during underlayment application and until installation of finish flooring, in an undisturbed condition as a standard for judging the completed Work.
 - 5. Approved mockups may become part of the completed Work if undisturbed when finish flooring is installed.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture, exposure from the elements or other detrimental effects.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written recommendations for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
- B. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

1.09 COORDINATION

- A. Coordinate cement-based underlayment with requirements of finish flooring products, including adhesives, specified in Division 9 Sections.
 - 1. Before installing surface sealers recommended by underlayment manufacturer, if any, verify compatibility with finish flooring installation adhesives.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Gypcrete, Maxxon Corporation
 2. K-15 Self-Leveling Underlayment Concrete; Ardex, Inc.
 3. Self-Leveling Underlayment; W. R. Bonsal Company.
 4. 300 Premium Underlayment; Burke Group, LLC (The).
 5. Conflow; Conspec Marketing and Manufacturing Co., Inc.
 6. Levelayer I; Dayton Superior Corp.
 7. Levelex Underlayment; L&M Construction Chemicals, Inc.
 8. Ultra/Plan MB; Mapei Corporation.
 9. Level-Right; Maxxon Corporation.

2.02 PRODUCTS AND MATERIALS

- A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in uniform thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
 2. Compressive Strength: Not less than 3200 psi (22 MPa) at 28 days when tested according to ASTM C 109/C 109M.
 3. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm), or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg. F (21 deg. C).
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Site Verification of Conditions:
1. Installation shall not begin until the building is enclosed, including roof, windows and doors and any other apertures.

2. Wood substrate shall be structurally sound, properly fastened, and dry. Contractor shall clean subfloor to remove mud, oil, grease, and other contaminating factors before the arrival of the authorized applicator.
 3. The wood subfloor must be adequate to withstand live and dead loads with a deflection limitation of $L/360$.
- B. Examine Substrates: With Installer present, examine substrates for conditions affecting performance of underlayment including substrate moisture content. Begin underlayment application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions for substrate indicated. Provide clean, dry, neutral-pH substrate for underlayment application.
1. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment according to manufacturer's written recommendations.
 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.
- C. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
1. Install underlayment reinforcement recommended in writing by manufacturer.
- D. Metal Substrates: Mechanically remove rust, foreign matter, and other contaminants that might impair underlayment bond according to manufacturer's written instructions. Apply corrosion-resistant coating compatible with underlayment if recommended in writing by underlayment manufacturer.
- E. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.
- F. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.03 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
1. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
 2. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

- C. Apply underlayment to produce uniform, level surface.
 - 1. Apply a final layer without aggregate if required to produce smooth surface.
 - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install finish flooring over underlayment until after time period recommended by underlayment manufacturer.
- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.04 FIELD QUALITY CONTROL

- A. Slump Test: If slump testing is recommended in writing by manufacturer, test underlayment for slump as it is placed for compliance with manufacturer's written recommendations.
- B. Field Samples: Take at least three molded-cube samples from each underlayment batch. Test samples according to ASTM C 109/C 109M for compliance with compressive-strength requirements. When requested, provide test results to Architect.

3.05 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

**SECTION 04200
UNIT MASONRY**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply this section.

1.02 DESCRIPTION OF WORK

- A. This section includes the following:
 - 1. Concrete unit masonry

1.03 RELATED SECTIONS

- A. Division 3 Section: "Cast-in-Place Concrete"
- B. Products installed but not furnished under this Section include the following:
 - 1. Steel lintels in unit masonry are specified in Division 5 Section, "Metal Fabrication".
 - 2. Wood nailers and blocking built into unit masonry are specified in Division 6 Section, "Rough Carpentry".
 - 3. Reglets in masonry joints for metal flashing are specified in Division 7 Section, "Flashing and Sheet Metal".
 - 4. Hollow metal frames in unit masonry openings are specified in Division 8 Section, "Hollow Metal Doors and Frames".

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (f'm):
 - 1. f'm = 1,500 psi on net area., U.N.O.

1.05 SUBMITTALS

- A. General: Submit the following in accordance with conditions of Contract and Division 1 Specification Section.
 - 1. Product data for each different masonry unit, accessory, pre-mixed mortar, pre-mixed masonry grout and other manufactured product indicated.
 - 2. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.
 - 3. Submitted shop drawings must be checked and signed by the General Contractor.
 - 4. Material certificates signed by manufacturer and Contractor certifying that each type of masonry unit complies with requirements specified in referenced unit masonry standard, including fire performance characteristics.
 - 5. Hot weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

6. Results from tests and inspections performed by Owner's representatives will be reported promptly and in writing to Architect and Contractor.
7. Mix designs for ready mix masonry grout showing the proportions of all materials and compression test reports for the mix.

1.06 QUALITY ASSURANCE

- A. Unit masonry standard: ACI 530.1/ASCE 6 "Specifications for Masonry Structures.
- B. Fire performance characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistances has been determined per ASTM E 119 by a testing and inspecting organization, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- C. Single source responsibility for masonry units: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from the manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. The contractor shall retain a qualified testing laboratory to perform the following tests:
 1. Sample and test grout in accordance with ASTM C 1019 for each 5,000 square foot of masonry.
 2. Slump tests – ASTM C 143
- E. When requested by the Architect/Engineer, the Contractor shall retain a qualified testing laboratory to perform a masonry prism test in accordance with ASTM E 447, Method B, modified as follows:
 1. Prisms shall be stack bond, one unit long and thick with a full mortar bed.
 2. Limit height/thickness ratio from 1.33 – 5.00.
 3. Provide a minimum of one joint.One set of three (3) prisms prior to construction and during construction for each 5,000 square feet of wall.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry material to project in undamaged condition.
- B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion and other causes. If units become wet, do not place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in a dry location.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.08 PROJECT CONDITIONS

- A. Protection of masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Extend cover to minimum of 24 inches down both sides and hold cover securely in place.
- C. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- D. Do not apply uniform floor or roof loads for at least 12 hours and concentrate loads for at least three (3) days after building masonry walls or columns.
- E. Stain prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.
- F. Protect base of walls from rain splashed mud and mortar splatter by means of covering spread on ground and over wall surface.
- G. Protect sills, ledges, and projections from mortar droppings.
- H. Protect surfaces of window and door frames, as well as similar products with painted and integral finish from mortar droppings.
- I. Hot weather construction: Comply with referenced unit masonry standard.

PART 2 - GENERAL**2.01 MATERIALS - GENERAL**

- A. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.
- B. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.
- C. Concrete masonry units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.
- D. Provide Type II, non-moisture controlled units.
- E. Exposed faces: Manufacturer's standard color and texture, unless otherwise indicated.
- F. Hollow load-bearing concrete masonry units: ASTM C 90, Grade N and as follows:
 - 1. Unit compressive strength: Provide units with minimum average net area compressive strength 1500 psi, average of 3 units.
- G. Weight classification: Normal weight.

2.02 CONCRETE MASONRY UNITS (CMU)

- A. Hollow and solid concrete masonry units shall conform to ASTM C 90, Type I Lightweight. Cement shall have a low alkali content and be of one brand.
 - 1. Aggregates: Lightweight aggregates and blends of lightweight and heavier aggregates in proportions used in producing the units, shall comply with the following requirement when tested for stain-producing iron compounds in accordance with ASTM C641: by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification.
 - 2. Kinds and Shapes: Units shall be modular in size and shall include closer, jamb, header, lintel and bond beam units and special shapes and sizes to complete the work as indicated. In exposed interior masonry surfaces, units having a bullnose shall be used for vertical external corners except at door, window, and louver jambs. Radius of the bullnose shall be 1-inch. Units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

2.03 MORTAR AND GROUT MATERIALS

- A. Mortar – ASTM C270, Type S using either ASTM C1329, Type S mortar cement or ASTM C91, Type S masonry cement. Other mortar materials shall meet the requirements of the ASTM standards listed in ASTM C270.
- B. Grout – 3,000 psi at 28 days with high w/c ratio and minimum slump of 8-10". Do not use water reducers to obtain slump in grout.
- C. Portland cement: ASTM C 150, Type 1 or II. Provide natural color.
- D. Ready-mixed mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- E. Hydrated lime: ASTM C 207, Type S.
- F. Aggregate for mortar: ASTM C144, except for joints less than ¼ inch use aggregate graded with 100 percent passing the #16 sieve.
- G. Aggregate for grout: ASTM C 404.
- H. Water: Clean and potable.

2.04 REINFORCING STEEL

- A. General: Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article, formed from the following:
 - 1. Galvanized carbon steel wire, coating class as required by referenced unit masonry standard for application indicated.
 - 2. Reinforcing bars ASTM A 615 Grade 60 deformed.
- B. Description: Welded wire units pre-fabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with pre-fabricated corner on tee units, and complying with requirements indicated below:
 - 1. Wire diameter for side rods: 0.1483 inch (9 gage).

- C. For single wythe masonry, provide type as follows with single pair of side rods:
 - 1. Ladder design with perpendicular cross rods spaced not more than 16 inches O.C.
- D. For multi-wythe masonry, provide type as follows:
 - 1. Ladder design with perpendicular cross spaced not more than 16 inches O.C. and number of side rods as follows:
 - 2. Number of side rods for multi-wythe concrete masonry: One side rod for each face shell of hollow masonry units more than 4 inches or less in nominal width.
- E. Tab design with single pair of side rods and rectangular box-type cross ties spaced not more than 16 inches O.C., with side rods spaced for embedment within each face shell of back-up wythe and ties extended to engage the outer wythe by at least 1 ½ inches.
- F. Use units with adjustable two piece rectangular ties where horizontal joints of facing wythe do not align with those of back-up by more than and where indicated.
- G. Available manufacturers: Subject to compliance with requirements, manufacturers offering joint reinforcement that may be incorporated in the Work include, but are not limited to, the following:
 - 1. AA Wire Products
 - 2. Dur-O-Wal, Inc.
 - 3. Heckman Building Products, Inc.
 - 4. Hohmann & Barnard, Inc.
 - 5. Wire-Bond

2.05 TIES AND ANCHORS

- A. General: Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of reference unit masonry standard and this article.
- B. Galvanized carbon steel wire: ASTM A 82, coating class as required by reference unit masonry standard for application indicated.
- C. Wire diameter: 0.1875 inch.
- D. Galvanized heavy thickness steel sheet: ASTM A 635 (commercial quality) hot-rolled carbon steel sheet hot-dip galvanized after fabrication to comply with ASTM A 525, Class B3, for rigid anchors fabricated from steel sheet or strip with a thickness of 0.180 inch and greater.
- E. Steel plates and bars: ASTM A 36, hot dipped galvanized to comply with ASTM A 123 or ASTM A 153, Class B3, as applicable to size and form indicated.
- F. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
 - 1. Dur-O-Wal, Inc.
 - 2. Heckman Building Products, Inc.
 - 3. Hohmann & Barnard, Inc.

2.06 BENT WIRE TIES

- A. Individual units pre-fabricated from bent wire to comply with requirements indicated below:
 - 1. Tie shape for hollow masonry units laid with cells vertical: Rectangular with closed ends and not less than four (4) inches wide.
- B. Type for masonry where coursing between wythes align: Unit ties bent from one piece of wire.
- C. Type for masonry where coursing between wythes does not align: Adjustable ties composed of two parts, one with pintles, the other with eyes, maximum misalignment: 1-1/4 inches.

2.07 ADJUSTABLE ANCHORS FOR CONNECTING MASONRY TO STRUCTURAL WORK

- A. General: Two piece assemblies as described below allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression force perpendicular to it.
- B. For anchorage to concrete framework, provide manufacturer's standard with dovetail anchor section formed from sheet metal and triangular shaped wire ties section seized to extend within one (1) inch of masonry face and as follows:
 - 1. Wire diameter: 0.1875 inch.

2.08 MISCELLANEOUS ANCHORS

- A. Unit type masonry inserts in concrete: Cast iron or malleable iron inserts of type and sized indicated.
- B. Dovetail slots: Furnished dovetail slots, with filler strips, or slot size indicated, fabricated from 0.0336 inch (22 gauge) sheet metal.
- C. Rebar Positioners: Furnish 9 gauge, galvanized rebar positioners with one bent wire in each face shell and double closed loops to accurately position rebar.

2.09 POST-INSTALLED ANCHORS

- A. Anchors as described below, with capacity to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.
 - 1. Type: Chemical Anchors
 - 2. Type: Expansion Anchors
- B. Corrosion protection: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
- C. For cast-in-place and post-installed anchors in concrete: Capability to sustain, without failure, a load equal to four (4) times load imposed.
- D. For post-installed anchors in grouted concrete masonry units: Capability to sustain, without failure, a load equal to six (6) times loads imposed.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Non-metallic expansion joint strips: Pre-molded filler strips complying with ASTM D 1056, type 2 (closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (compression deflection range of 2 – 5 psi), compressible up to 35 percent, of width and thickness indicated, formulated from the following material:
 - 1. Neoprene
 - 2. Urethane
 - 3. Polyvinyl chloride
- B. Pre-formed control joint gaskets: Materials as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated:
 - 1. Styrene-Butadiene rubber compound: ASTM D 2000, Designation 2AA-805
 - 2. Polyvinyl Chloride: ASTM D 2287, General Purpose Grade, Type PVC-65406
- C. Bond breaker strips: Asphalt saturated organic roofing felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt).

2.11 MASONRY CLEANERS

- A. Job mixed detergent solution: Solution of trisodium phosphate (1/2 cup dry measure) dissolved in one gallon of water.
- B. Job mixed muriatic solution: Solution of 1 part muriatic acid and ten (10) parts clean water, mixed in a non-metallic container with acid added to water.
- C. Proprietary acidic cleaner: Manufacturer's standard strength, general purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.
- D. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface acting acids, chelating, and wetting agents.
- E. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitors.
- F. Available products: Subject to compliance with requirements, a product that may be used to clean until masonry surfaces includes, but is not limited to, the following:
 - 1. "Sure Klean No. 600 Detergent", ProSoCo, Inc.
 - 2. "Sure Klean No. 101 Lime Solvent", ProSoCo, Inc.
 - 3. "Sure Klean Vana Trol", ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures including coloring pigments, air-entraining agents, antifreeze compounds, or admixtures, unless otherwise indicated.
- B. Do not use calcium chloride in mortar or grout.
- C. Mortar for unit masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below:

1. Type M or S, Portland Cement/Lime or Mortar cement mortar only. Do not use Masonry cement mortar for concrete masonry.
- D. Grout for unit masonry: Comply with ASTM C 476 and referenced unit masonry standard. Use concrete grout with pea gravel for all grouting in 8" and larger concrete masonry units.

2.13 SOURCE QUALITY CONTROL

- A. Concrete masonry unit tests: For each type, class, and grade of concrete masonry unit indicated, units will be tested by qualified independent testing laboratory for strength, absorption, and moisture content per ASTM C 140, if required by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION - GENERAL

- A. Mix mortar and grout in power driven, drum type mixers. Operate mixer a minimum of five (5) minutes after addition of all materials.
- B. Comply with referenced unit masonry standard and other masonry construction to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
- C. Build chases and recesses as shown or required to accommodate items specified in this and other sections of the specifications. Provide not less than eight (8) inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- E. Cut masonry units with motor driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining constructions. Uses full size units without cutting where possible.
- F. Matching existing masonry: Where applicable, match coursing, bonding, color, and texture of new masonry with existing masonry.

3.03 CONSTRUCTION TOLERANCES

- A. Comply with construction tolerances of ACI 530 or N.C.M.A.

3.04 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. Bond pattern for exposed masonry: Lay exposed masonry in the following bond pattern; Do not use units with less than nominal four (4) inch horizontal face dimensions at corners or jambs.
 - 1. One half running bond with vertical joint in each course centered on units in courses above and below.
- D. Lay concealed masonry with all units in a wythe in running bond or bounded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal four (4) inch horizontal face dimensions at corners or jambs.
- E. Stopping and resuming work: In each course, rack back $\frac{1}{2}$ unit length for one-half running bond or $\frac{1}{3}$ unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, and remove loose masonry units and mortar prior to laying fresh masonry.
- F. Re-temper mortar as necessary to keep plastic. Use no mortar after setting has begun or after 2 $\frac{1}{2}$ hours of initial mixing.
- G. Built-in work: As construction progresses, built-in items specified under this and other sections of the specifications. Fill in solidly with masonry around built-in items.
- H. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
- I. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- J. Fill cores in hollow concrete masonry units with grout three (3) courses (24 inches) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- K. Reinforced vertical concrete blocks cells, grouting solid where indicated on plan.

3.05 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows: With full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.

3.06 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of $\frac{5}{8}$ inch of exterior side of walls, $\frac{1}{2}$ inch elsewhere. Lap reinforcing a minimum of six (6) inches.

- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of pre-fabricated "L" and "T" sections. Cut and bed reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- D. Provide horizontal joint reinforcement at doors and windows for first and second block course above and below apertures. Run reinforcing continuous or extend two (2) feet from aperture edge.

3.07 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
 - 1. Provide an open space not less than one (1) inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches O.C. vertically and 26 inches O.C. horizontally.

3.08 MOVEMENT (CONTROL AND EXPANSION) JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated, not to exceed twenty five feet on centers (25'-0"). Build in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Fit bond breaker strips on in ends of block units on one side of control joint. Fill the joint with mortar and rake joints in exposed faces.

3.09 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2' - 0" for block size units are shown without structural steel or other supporting lintels. Provide reinforced pre-cast concrete lintels. Cure pre-cast lintels before handling and installation.
- C. Provide minimum bearing of eight (8) inches at each jamb, unless otherwise indicated.

3.10 INSTALLATION OF REINFORCED UNIT MASONRY

- A. General: Install reinforced unit masonry to comply with requirements or referenced unit masonry standard. All reinforced unit masonry shall be inspected by a certified structural masonry inspector.
- B. Temporary formwork: Construct formwork and shores to support reinforced masonry elements during construction. Contractor is completely responsible for the proper design and construction of all temporary forms and bracing.

- C. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
- D. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
- E. All vertical reinforcing in concrete masonry cells shall be held in place with rebar positioners. At least one positioner shall be used at the top and bottom of each grout pour.
- F. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- G. Masonry wall lateral support interval, per Florida Building Code Table 2109.4.1, is 12 foot horizontal maximum.
- H. High-lift grouting in conformance with ACI 530.1 shall be used for all reinforced masonry. Maximum grout pour height shall be 12'-0", placed in 6'-0" maximum lifts.

3.11 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than 1 metal tie for 4 sq. ft. (0.37 sq. m) of wall area spaced not to exceed 24 inches (610 mm) o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
- B. Use continuous horizontal-joint reinforcement installed in horizontal mortar joints for bond tie between wythes.
- C. Use either of the structural bonding systems specified above.
- D. Use structural bonding system indicated on Drawings.
- E. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
 - 1. Provide continuity with horizontal-joint reinforcement at corners by using prefabricated "L" units in addition to masonry bonding.
- F. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:
 - 1. Provide individual metal ties not more than 16 inches (406 mm) o.c.
 - 1. Provide continuity with horizontal-joint reinforcement by using prefabricated "T" units.
 - 2. Provide rigid metal anchors not more than 24 inches (610 mm) o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.12 FLASHING, WEEP HOLES, AND VENTS

- G. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- H. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.
- I. Install flashing as follows:
 - 3. At composite masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches (100 mm), and through the inner wythe to within 1/2 inch (13 mm) of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches (50 mm), unless otherwise indicated.
 - 4. At lintels and shelf angles, extend flashing a minimum of 4 inches (100 mm) into masonry at each end. At heads and sills, extend flashing 4 inches (100 mm) at ends and turn up not less than 2 inches (50 mm) to form a pan.
 - 3. Interlock end joints of ribbed sheet-metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements of Division 7 Section "Joint Sealants" for application indicated.
 - 4. Extend sheet-metal flashing 1/2 inch (13 mm) beyond face of masonry at exterior and turn down to form a drip.
 - 5. Cut off flashing flush with face of wall after masonry wall construction is completed.
- J. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
 - 1. Form weep holes with product specified in Part 2 of this Section.
 - 2. Form weep holes by keeping head joints free and clear of mortar.
 - 3. Space weep holes 24 inches (600 mm) o.c.
 - 4. Space weep holes 16 inches (400 mm) o.c.
 - 5. In cavities, place pea gravel to a height equal to height of first course, but not less than 2 inches (50 mm), immediately above top of flashing embedded in the wall, as masonry construction progresses, to splatter mortar droppings and to maintain drainage.
 - 6. Place cavity drainage material immediately above flashing in cavities.
 - 7. In insulated cavities, cover cavity side of open weep holes with copper or plastic insect screening before placing loose-fill masonry insulation in cavity.
- K. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.
- L. Install vents in vertical head joints at the top of each continuous cavity. Space vents and close off cavities vertically and horizontally with blocking in manner indicated.
 - 1. Install through-wall flashing and weep holes above horizontal blocking.

- M. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.13 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
 - 1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
 - 2. Provide temporary opening by omitting 1 brick every 48 inches (1200 mm) at bottom of cavity and in first course above flashing. After wall has been built to top of cavity and mortar has set, flush out cavity with a hose, allow to dry, and then close temporary opening.
- B. Tie exterior wythe to back-up with continuous horizontal-joint reinforcing

3.14 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave ½ panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Wet all surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 5. Clean concrete masonry by means of cleaning method indicated in N.C.M.A. TEK 45 applicable to type of stain present on exposed surfaces.
- D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of substantial completion.

END OF SECTION

**SECTION 04225
MASONRY MORTAR, CMU**

PART 1 - GENERAL**1.01 DESCRIPTION**

- A. Provide mortar for load bearing concrete masonry unit (CMU) work indicated and specified.

1.02 QUALITY ASSURANCE

- A. Mortar for load bearing CMU walls shall conform to the following standards:
 - 1. American Concrete Institute (ACI) 531.
 - 2. ASTM Specifications referenced herein.
 - 3. National Concrete Masonry Association (NCMA): TEK notes information series.
- B. Testing and Inspection of Mortar for Load Bearing CMU Walls:
 - 1. Contractor shall employ and pay for the services of an independent testing laboratory for preparation and testing of mortar cubes for each type mortar specified for compliance with requirements of referenced mortar standards.
 - 2. For additional testing and inspection requirements, refer to Section CONCRETE MASONRY UNITS/LIGHTWEIGHT.
- C. Use only one source brand of mortar materials.

1.03 SUBMITTALS

- A. Product Data: Submit for each mortar material.

1.04 MATERIAL STORAGE

- A. Store mortar materials off ground in waterproof shelter.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Portland Cement: ASTM C150:
 - 1. Type I natural gray color.
 - 2. Type III high-early-strength; use for laying masonry in cold weather.
- B. Masonry Cement: ASTM C91, except with 12% maximum air content by volume non-staining type.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Aggregates: ASTM C144, sharp, natural sand.
- E. Water: Drinkable

2.02 MORTAR FOR UNIT MASONRY

- A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.
- B. Do not use calcium chloride in mortar.

2.03 MORTAR TYPE AND PROPORTION

- A. Mortar for all masonry not otherwise indicated shall conform to ASTM C270, Type S Mortar, 3,250 psi at 28 days. Proportions shall be by volume. Aggregate shall be damp, loose sand measure. Provide one of the following:
 - 1. Masonry Cement Mortar:
 - a. Portland Cement: ½ part.
 - b. Masonry Cement: One part.
 - c. Aggregate: Not less than 3-1/2 and not more than 4-1/2 parts.
 - 2. Cement-Lime Mortar:
 - a. Portland Cement: One part.
 - b. Lime: ¼ to ½ part/
 - c. Aggregate: Not less than 3 and not more than 4 parts.

2.04 GROUT

- A. Grout for filling masonry cells, cavities and lintels shall be 3,000 psi concrete in accordance with requirements specified in Section, CAST-IN-PLACE CONCRETE in Division 3. Conform to ASTM C 476.

PART 3 - EXECUTION**3.01 MEASURING**

- A. Do not use shovels for measuring mortar materials.
- B. Use a measuring container of a calculated volume in cubic feet of the cement and masonry cement to place all materials in mixer.

3.02 MIXING

- A. Thoroughly machine mix for a period of not less than 3 minutes and not more than 5 minutes after all materials are in the mixer.

3.03 APPLICATION

- A. Use and place mortar in final position within 2-1/2 hours after mixing. Discard all mortar not used within this limit.
- B. Mortars that have stiffened within 2-1/2 hours after mixing because of evaporation of moisture from mortar may be retempered to restore workability by adding water as frequently as needed to restore the required consistency.

3.04 QUALITY CONTROL

- A. Contractor shall employ and pay an independent testing laboratory to provide quality control procedures for all masonry mortar in accordance with ASTM C 780.

END OF SECTION

**MASONRY MORTAR CMU
SECTION 04225 -2**

10/12/2017

**SECTION 04700
MANUFACTURED MASONRY**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SUMMARY

- A. Section Includes: Manufactured stone veneer, Manufactured stone trim and application materials.
- B. Related Sections:
 - 1. Division 04 –Unit Masonry
 - 2. Division 07- Sheet-metal flashing

1.03 REFERENCES

- A. American Concrete Institute (ACI).
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 2. ASTM C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - 3. ASTM C 177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - 4. ASTM C 192, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
 - 5. ASTM C 270, Standard Specification for Mortar for Unit Masonry.
 - 6. ASTM C 482, Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
 - 7. ASTM D 226, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. International Code Council (ICC):
 - 1. ES Report.
 - 2. UBC Standard No. 14-1, Kraft Waterproof Building Paper.
- D. Underwriters Laboratories (UL):
 - 1. Listing in Material Approval Guide.
 - 2. UL 723, Standard for Safety for Surface Burning Characteristics of Building Materials.
- E. Masonry veneer manufacturers association installation guide for adhered manufactured stone veneer, 4th Edition 5th Printing.

1.04 SUBMITTALS

- A. Reference Section 01300 - Submittal Procedures; submit following items:
 - 1. Product Data: Manufactured masonry and application materials including mortar color charts, and weather resistant barrier.
 - 2. Samples: Panel containing full-size samples of specified manufactured masonry showing full range of colors and textures complete with specified mortar.
 - a. Actual size of masonry sample approximately 12 by 12 inches (300 by 300 mm).
 - 3. Quality Assurance/Control Submittals:
 - a. Qualifications:
 - 1) Proof of manufacturer qualifications.
 - 2) Proof of installer qualifications.
 - b. Certificates: ICC-ES Report.
 - c. Manufacturer's Installation Instructions.
- B. Closeout Submittals: Reference Section 01700—Closeout Submittals; submit following items:
 - 1. Maintenance Instructions.
 - 2. Special Warranties.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer Qualifications:
 - a. Minimum five years' experience in producing manufactured masonry.
 - b. Member of following organizations:
 - 1) MSJC.
 - 2) ACI.
 - 3) ASTM.
 - 2. Installer Qualifications: Company with documented experience in installation of manufactured masonry including minimum 5 projects.
- B. Certifications:
 - 1. Current ICC-ES Report.
 - 2. UL: Listing in Material Approval Guide.
 - 3. Florida Product Approval Number and/ or Notice of Acceptance from Miami-Dade approval process.
- C. Field Samples: Provide in a location selected by Architect showing representative sample of installed product including penetration and termination details, corner detail and mortar color and tooling.
 - 1. Reference Section 01400 – Quality Control.
 - 2. Minimum Size: 4 by 4 feet.
 - 3. Approved field samples may remain as part of completed Work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Reference Section 01 –Product Storage and Handling Requirements.
- B. Follow manufacturer's instructions.
- C. Store moisture-sensitive materials in weather protected enclosures.

1.07 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Maintain materials and ambient temperature in area of installation at minimum 40 degrees F (4 degrees C) prior to, during, and for 48 hours following installation.

1.08 WARRANTY

- A. Special Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing for a period of 50 years following date of Substantial Completion.

1.09 MAINTENANCE

- A. Extra Materials: Furnish extra manufactured stone material in a variety of shapes and sizes in quantity equal to three percent of the installed stone.

PART 2 - PRODUCTS**2.01 MANUFACTURER**

- A. Boral Stone Products LLC
One Owens Corning Parkway
Toledo, OH 43659
Tel: (800) 255-1727
Website: www.culturedstone.com
- B. El Dorado Stone, LLC
P. O. Box 489
Carnation, Washington 98014
Tel: (800) 925-1491
Website: www.eldoradostone.com
- C. Stonecraft Industries
8300 County Road 189
Holmesville, OH 44633
Tel: (888) 580-6448, (800) 228-3124
Website: www.stonecraft.com

2.02 MANUFACTURED MASONRY MATERIALS

- A. Select textures and colors from current cultured stone product resources.
- B. Manufactured Masonry Physical Properties:
 - 1. Compressive Strength: ASTM C 192 and ASTM C39, 1800 psi, 5 specimen average, 1500 psi minimum for individual unit.
 - 2. Bond Between Stone Unit, Type S Mortar, and Backing: ASTM C 482, 50 psi.
 - 3. Thermal Resistance: ASTM C 177, R-factor, 0.355 per inch (25.4 mm) of thickness.
 - 4. Freeze/Thaw: ASTM C 67, no disintegration and less than 3 percent weight loss.
 - 5. Fire Hazard Test, UL 723:
 - a. Flame spread: 0.
 - b. Smoke Development: 0.
 - 6. Maximum Veneer Unit Weight: 15 psf (73 kg/m²).

2.03 RELATED MATERIALS

- A. Weather Resistant Barrier: [Kraft waterproof building paper, UBC Standard No. 14-1] [No. 15, Type I, asphalt saturated felt, ASTM D 226].

- B. Mortar: Premixed Type N or mortar mixed using components and proportions following manufactured masonry manufacturer's installation instructions. Comply with ASTM C 270.
 - 1. Mortar Color: Iron oxide pigments.
- C. Sealer: Water based silane or siloxane masonry sealer, clear

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates upon which manufactured masonry will be installed.
- B. Coordinate with responsible entity to correct unsatisfactory conditions.
- C. Commencement of work by installer is acceptance of substrate conditions.

3.02 PREPARATION

- A. Protection: Prevent work from occurring on the opposite of walls to which manufactured masonry is applied during and for 48 hours following installation of the manufactured masonry.
- B. Surface Preparation: Follow manufacturer's instructions designated below for the appropriate type of manufactured masonry and substrate.

3.03 INSTALLATION

- A. Install Manufactured Masonry in accordance with manufacturer's installation instructions using grouted joints.
- B. Install architectural trim products in accordance with manufacturer's installation instructions.
- C. Install/Apply Related Materials specified above in accordance with type of substrate and manufactured masonry manufacturer's installation instructions.
- D. Install stone sealer per manufacturer's recommendations.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide two periodic site visits, each of approximately one hour duration.

3.05 CLEANING

- A. Reference Section 01–Cleaning and Waste Management.
- B. Clean manufactured masonry in accordance with manufacturer's installation instructions.

3.06 PROTECTION

- A. Protect finished work from rain during and for 48 hours following installation.
- B. Protect finished work from damage during remainder of construction period.

END OF SECTION

**SECTION 05500
METAL FABRICATIONS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This section includes the provision and installation of all materials, equipment and incidentals necessary and/or required for a complete installation of all Shop fabricated ferrous metal items, galvanized and prime painted as specified herein.
1. Rough hardware.
 2. Ladders (including elevator pit ladders).
 3. Ladder safety cages.
 4. Ship's ladders.
 5. Loose bearing and leveling plates.
 6. Loose steel lintels.
 7. Miscellaneous framing and supports for the following:
 - a. Overhead doors
 - b. Suspended toilet partitions
 - c. Suspended operable partitions.
 - d. Elevator hoisting machines and sheaves
 - e. Elevator door sills
 - f. Bay Window Framing Unit
 - g. Applications where framing and supports are not specified in other sections.
 8. Miscellaneous steel trim, including the following:
 - a. Steel angle corner guards.
 - b. Edgings.
 - c. Loading dock edge angles
 9. Pipe guards.
 10. Wheel guards.
 11. Pipe bollards.

1.03 RELATED SECTIONS

- A. Section 04200 – Unit Masonry
- B. Section 05120 – Structural Steel
- C. Section 08530 – Vinyl Windows

1.04 REFERENCES

- A. ASTM A 36 - Structural Steel
- B. ASTM A 53 - Hot-dipped, Zinc-coated Welded and Seamless Steel Pipe

- | | | | |
|----|------------|---|---|
| C. | ASTM A 123 | - | Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip. |
| D. | ASTM A 153 | - | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| E. | ASTM A 283 | - | Carbon Steel Plates, Shapes, and Bars |
| F. | ASTM A 307 | - | Carbon Steel Externally Threaded Standard Fasteners |
| G. | ASTM A 325 | - | High Strength Bolts for Structural Steel Joints |
| H. | ASTM A 386 | - | Zinc-Coating (Hot-Dip) on Assembled Steel Products |
| I. | ASTM A 500 | - | Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes |
| J. | ASTM A 501 | - | Hot-Formed Welded and Seamless Carbon Steel Structural Tubing |
| K. | ASTM B 177 | - | Chromium Electroplating on Steel for Engineering Use |
| L. | AWS A 2.0 | - | Standard Welding Symbols |
| M. | AWS D 1.1 | - | Structural Welding Code |
| N. | SSPC | - | Steel Structures Painting Councils |

1.05 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations and details where applicable, under provisions of section 01300.

1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated.

PART 2 - PRODUCTS**2.01 FERROUS METALS**

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Rolled Steel Floor Plates: ASTM A 786.
- D. Steel Tubing: Product type (manufacturing method) and as follows:
1. Cold-Formed Steel Tubing: ASTM A 500.

2. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
- E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 1. Black finish, unless otherwise indicated.
 2. Galvanized finish for exterior installations and where indicated.
- F. Gray-Iron Castings: ASTM A 48, Class 30.
- G. Malleable-Iron Castings: ASTM A 47, Grade 32510.
- H. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
 - a. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.02 ALUMINUM

- A. Aluminum Extrusions: ASTM B 221 , alloy 6063-T6.
- B. Aluminum-Alloy Rolled Tread Plate: ASTM B 632 Pattern 1, alloy 6061-T6.

2.03 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for reglvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.04 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A , with hex nuts, ASTM A 563, and, where indicated, flat washers.

- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1.
- E. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.
- F. Plain Washers: Round, carbon steel, ANSI B18.22.1.
- G. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594.
- I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.05 GROUT

- A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Nonshrink, Metallic Grouts:
 - a. Supreme Plus; Cormix Construction Chemicals.
 - b. Hi Mod Grout; Euclid Chemical Co.
 - c. Embeco 885 and 636; Master Builders Technologies, Inc.
 - d. Ferrolith G Redi-Mix and G-NC; Sonneborn Building Products—ChemRex, Inc.
 - e. Met-ox; The Spray-Cure Company.
 - 2. Nonshrink, Nonmetallic Grouts:
 - a. B-6 Construction Grout; W. R. Bonsal Co.
 - b. Diamond-Crete Grout; Concrete Service Materials Co.
 - c. Supreme; Cormix Construction Chemicals.
 - d. Sure-grip High Performance Grout; Dayton Superior Corp.
 - e. Euco N-S Grout; Euclid Chemical Co.
 - f. Five Star Grout; Five Star Products.
 - g. Vibropruf #11; Lambert Corp.
 - h. Crystex; L & M Construction Chemicals, Inc.
 - i. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - j. Sealtight 588 Grout; W. R. Meadows, Inc.

- k. SonogROUT 14; Sonneborn Building Products—ChemRex, Inc.
- l. Kemset; The Spray-Cure Company.

2.06 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless higher strengths are indicated.

2.07 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 100 deg F.
- D. Shear and punch metals cleanly and accurately. Remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.08 ROUGH HARDWARE

- A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.13 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.14 SHELF AND RELIEVING ANGLES

- A. Fabricate shelf and relieving angles from steel angles of sizes indicated and for attachment to concrete framing. Provide slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and not more than 24 inches o.c., unless otherwise indicated.
- B. For cavity walls, provide vertical channel brackets to support shelf/relieving angles from back-up masonry and concrete. Align expansion joints in angles with indicated control and expansion joints in cavity wall exterior wythe.
- C. Galvanize shelf angles to be installed on exterior concrete framing.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.16 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.

- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- C. Fabricate support for suspended toilet partitions as follows:
 - 1. Beams: Continuous steel shapes of size required to limit deflection to L/360 between hangers, but use not less than C8 by 11.5 channels or another shape with equivalent structural properties.
 - 2. Hangers: Steel rods, 1/2-inch minimum diameter, spaced not more than 36 inches o.c. Thread rods to receive anchor and stop nuts. Fit hangers with wedge-shaped washers for full bearing on sloping flanges of support beam.
 - 3. Braces and Angles: Steel angles of size required for rigid support of beam and for secure anchorage.
- D. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.18 PIPE BOLLARDS

- A. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4-inch minimum steel plate.
- B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch-thick steel plate welded to bottom of sleeve.

2.19 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
- B. Finish metal fabrications after assembly.

2.20 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick or thicker.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning."
 2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.21 ALUMINUM FINISHES

- A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I clear coating 0.7 mil or thicker complying with AAMA 607.1.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

END OF SECTION

**SECTION 05510
METAL STAIRS**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Straight run, steel-framed stairs.
 - 2. Steel pipe handrails and railing systems attached to metal stairs.
 - 3. Steel pipe handrails attached to walls adjacent to metal stairs.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 5 Section "Pipe and Tube Railings" for pipe and tube handrails and railing systems.
 - 2. Division 5 Section "Pipe and Tube Railings" for pipe handrails and railing systems, not attached to metal stairs or to walls adjacent to metal stairs.
 - 3. Division 5 Section "Ornamental Handrails and Railings" for ornamental metal handrails and railing systems fabricated from stock components.

1.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer, fabricate, and install steel stairs to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each component of steel stairs.
 - 1. Treads of Steel Stairs: Capable of withstanding a uniform load of 100 lbf per sq. ft. or a concentrated load of 300 lbf on a area of 4 sq. inches located in the center of the tread, whichever produces the greater stress.
 - 2. Platforms of Steel Stairs: Capable of withstanding a uniform load of 100 lbf per sq. ft..
 - 3. Stair Framing: Capable of withstanding stresses resulting from loads specified above as well as stresses resulting from railing system loads.
- B. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to comply with requirements of ASTM E 985 for structural performance based on the following:
 - 1. Testing performed according to ASTM E 894 and E 935.
 - 2. Structural computations.
- C. Structural Performance: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each of the respective components of each metal fabrication.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbf per linear foot applied horizontally and concurrently with uniform load of 100 lbf per linear foot applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbf per linear foot applied in any direction.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails, balusters, or other elements composing the infill area.
 - a. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

1.04 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for metal stairs, prefilled metal pan stair treads, nonslip aggregates and nonslip aggregate surface finishes, cast nosings, extruded nosings, steel floor plate, paint products, and grout.
- C. Shop drawings detailing fabrication and installation of steel stairs. Include plans, elevations, sections, and details of steel stairs and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
 1. For installed steel stairs indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for their preparation.
- D. Samples for initial selection of the following products, in the form of manufacturer's color charts or sections of units showing the full range of colors and patterns.
- E. Samples for verification of the following products, in the form of sections of units in manufacturer's standard sizes. Prepare samples from same material to be used for the Work.
 1. Precast stair treads.
 2. Epoxy-filled stair treads.
 3. Extruded abrasive nosings.
- F. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

- G. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of architects and owners, and other information specified.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing steel stairs similar to those indicated for this Project with a record of successful in-service performance and with sufficient production capacity to produce required units without delaying the Work.
- B. Installer Qualifications: Arrange for steel stair installation specified in this Section by the same firm that fabricated them.
- C. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of metal stairs (including handrails and railing systems) similar to this Project in material, design, and extent and that have a record of successful in-service performance.
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering preassembled stair units that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Alliance Steel and Fabrications, Inc.
 - 2. American Metal Works, Inc.
 - 3. American Stair Corp., Inc.
 - 4. The Sharon Companies, Ltd.

2.02 FERROUS METALS

- A. Metal Surfaces, General: For surfaces exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, roughness, or, for steel sheet, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold-Formed Steel Tubing: ASTM A 500.
 - 2. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.

- D. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 - 1. Black finish, unless otherwise indicated.
 - 2. Galvanized finish for exterior installations and where indicated.
- E. Rolled Steel Floor Plate: ASTM A 786.
- F. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.
- G. Wire Rod for Grating Cross Bars: ASTM A 510.
- H. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality, and grade as follows:
 - 1. Cold-Rolled Structural Steel Sheet: ASTM A 611, grade as follows:
 - a. Grade A, unless otherwise indicated or required by design loading.
 - 2. Hot-Rolled Structural Steel Sheet: ASTM A 570, grade as follows:
 - a. Grade 30, unless otherwise indicated or required by design loading.
- I. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:
 - 1. Cold-Rolled Steel Sheet: ASTM A 366.
 - 2. Hot-Rolled Steel Sheet: ASTM A 569.
- J. Galvanized Steel Sheet: Quality as follows:
 - 1. Structural Quality: ASTM A 446; Grade A, G 90 coating, unless otherwise indicated, or unless another grade is required for design loading.
 - 2. Commercial Quality: ASTM A 526 , G 90 coating designation, unless otherwise indicated.
- K. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.03 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head type, ASTM A 307, Grade A , with hex nuts, ASTM A 563, and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1.
- E. Plain Washers: Round, carbon steel, ANSI B18.22.1.
- F. Lock Washers: Helical, spring type, carbon steel, ANSI B 18.21.1.
- G. Expansion Anchors: Anchor bolt and sleeve assemblies of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in

concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594.

2.04 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.05 CAST ABRASIVE NOSINGS

- A. Fabricate units of material, sizes, and configurations indicated. If not indicated, provide cast-iron units with integral abrasive finish. Furnish in lengths required to accurately fit each opening or conditions.
 1. Cast units with an integral abrasive grit consisting of aluminum oxide, silicon carbide, or a combination of both.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. American Safety Tread Co., Inc.
 2. Amstep Products.
 3. Armstrong Products, Inc.
 4. Balco/Metalines, Inc.
 5. Safe-T-Metal Co.
 6. Wooster Products Inc.
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.
- D. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.
- E. Apply black asphaltic coating to concealed bottoms, sides, and edges of cast-iron units set into concrete.
- F. Provide a plain surface texture, except where fluted or cross-hatched surfaces are indicated.

2.06 EXTRUDED ABRASIVE NOSINGS

- A. Fabricate units of material, sizes, and configurations indicated. Provide extruded aluminum units with abrasive filler consisting of aluminum oxide or silicon carbide grits, or a combination of both, in an epoxy-resin binder. Furnish in lengths as required to accurately fit each opening or conditions.
 - 1. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above the aluminum extrusion.
 - 2. Provide solid abrasive type units without ribs.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Safety Tread Co., Inc.
 - 2. Amstep Products.
 - 3. Armstrong Products, Inc.
 - 4. Balco/Metalines, Inc.
 - 5. Safe-T-Metal Co.
 - 6. Wooster Products Inc.
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.
- D. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.

2.07 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Nonshrink, Nonmetallic Grouts:
 - a. B-6 Construction Grout; W. R. Bonsal Co.
 - b. Diamond-Crete Grout; Concrete Service Materials Co.
 - c. Supreme; Cormix Construction Chemicals.
 - d. Sure-grip High Performance Grout; Dayton Superior Corp.
 - e. Euco N-S Grout; Euclid Chemical Co.
 - f. Five Star Grout; Five Star Products.
 - g. Vibropruf #11; Lambert Corp.
 - h. Crystex; L&M Construction Chemicals, Inc.
 - i. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - j. Sealtight 588 Grout; W. R. Meadows, Inc.
 - k. SonogROUT 14; Sonneborn Building Products—ChemRex, Inc.
 - l. Kemset; The Spray-Cure Company.

2.08 CONCRETE FILL AND REINFORCING MATERIALS

- A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast-in-Place Concrete" for normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 2,500 psi, unless higher strengths indicated.
- B. Nonslip Aggregate Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rust-proof and nonglazing; unaffected by freezing, moisture, or cleaning materials.
- C. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

2.09 PRECAST CONCRETE TREADS

- A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast-in-Place Concrete" for normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 5,000 psi and a total air content of not less than 4 percent nor more than 6 percent.
- B. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 inches by 2 inches–W0.3 by W0.3 (16 ASW gage or 0.0625-inch diameter); comply with ASTM A 185 and ASTM A 82, except for minimum wire size.

2.10 FABRICATION, GENERAL

- A. Form steel stairs from materials of size, thickness, and shapes indicated, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Shear and punch metals cleanly and accurately.
- D. Remove sharp or rough areas on exposed surfaces.
- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

- H. Shop Assembly: Preassemble in shop to greatest extent possible to minimize field splicing and assembly. Use connections that maintain structural value of joined pieces. Clearly mark units for field assembly and coordinated installation.
- I. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.11 STEEL-FRAMED STAIRS

- A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, columns, handrails, railing systems, newels, balusters, struts, clips, brackets, bearing plates, or other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.
 - 1. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM "Metal Stair Manual" for class of stair designated, except where more stringent requirements are indicated.
 - a. Commercial class, unless otherwise indicated.
 - b. Architectural class where indicated.
 - 2. Fabricate treads and platforms of exterior stairs to accommodate slopes to drain in finished traffic surfaces.
- B. Stair Framing: Fabricate stringers of structural steel channels, plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to stringers; and bolt or weld newels and framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finish surfaces.
 - 1. Where masonry walls support steel stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- C. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated, but not less than that required, to support total design loading.
 - 1. Form metal pans of uncoated cold-rolled steel sheet, unless otherwise indicated.
 - 2. Form metal pans of uncoated hot-rolled steel sheet, unless otherwise indicated.
 - 3. Form metal pans of galvanized-steel sheet, where indicated.
 - 4. Directly weld risers and subtreads to stringers; locate welds on side of metal pans to be concealed by concrete fill.
 - 5. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 - 6. Shape metal pans to include nosing integral with riser.
 - 7. Attach cast abrasive nosings to pan risers. Make nosings full width of tread with noses flush with riser faces and tread surfaces.
 - 8. Attach extruded abrasive nosings to pan risers. Make nosings full width of tread with noses flush with riser faces and tread surfaces.
 - 9. At Contractor's option, provide prefabricated stair assemblies with prefilled treads consisting of pre-poured reinforced concrete fill, with nonslip aggregate

- finish, in welded sheet metal pan, attached to installed stringers using manufacturer's standard connection detail.
10. Provide epoxy-resin-filled treads, reinforced with glass fibers, with slip-resistant, abrasive surface.
 11. Provide subplatforms of configuration and construction indicated; if not indicated, of same metal as risers and subtreads, in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.
 - a. Smooth Soffit Construction: Construct subplatforms with smooth soffits.
- D. Steel Floor Plate Treads and Platforms: Provide raised pattern steel floor plate in pattern indicated or, if not indicated, as selected from manufacturer's standard patterns.
- E. Steel Floor Plate Treads and Platforms: Provide abrasive surface floor plate.
1. Abrasive Surface Floor Plate: Manufacturer's standard abrasive granules, rolled into surface of steel plate. Provide material with coefficient of friction (COF) of 0.6 or higher when tested according to ASTM C 1028.
 2. Abrasive Surface Floor Plate: Steel plate with abrasive material metallurgically bonded to steel by proprietary process. Provide material with coefficient of friction (COF) of 0.6 or higher when tested according to ASTM C 1028.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Mebac, IKG Borden.
 - 2) SLIP-NOT, Molnar: W. S. Molnar Company.
 3. Form treads of 1/4-inch-thick steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to stringers and weld treads to brackets.
 4. Fabricate platforms of floor plate of thickness indicated. Provide nosing matching that on treads at all landings. Secure to platform framing members with welds.
- F. Floor Grating Treads and Platforms: Provide patterns, spacing, and bar sizes indicated; fabricate to comply with ANSI/NAAMM MBG 531 "Metal Bar Grating Manual."
1. Fabricate treads from pressure-locked steel grating with 1-by- 3/16-inch bearing bars at 7/16 inch o.c. and cross bars at 4 inches o.c., NAAMM designation: P-7-4 STEEL.
 2. Fabricate treads from welded steel grating with 1-1/4-by-3/16-inch bearing bars at 15/16 inch o.c. and cross bars at 4 inches o.c., NAAMM designation: W-15-4 STEEL.
 3. Surface: Plain.
 4. Surface: Serrated.
 5. Finish: Shop prime paint.
 6. Finish: Painted.
 7. Finish: Galvanized.
- G. Fabricate grating treads with steel plate nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.

- H. Fabricate grating treads with cast abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
- I. Fabricate grating platforms with nosing matching that on grating treads at all landings. Provide toe plates at open-sided edges of grating platform. Secure grating to platform frame with welds.

2.12 STEEL PIPE HANDRAILS AND RAILING SYSTEMS

- A. General: Fabricate pipe handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - 1. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, and weld all around.
- C. Form changes in direction of handrails and rails as follows:
 - 1. As detailed.
 - 2. By welding in prefabricated flush elbow fittings.
 - 3. By radius bends of radius indicated.
 - 4. By flush radius bends.
 - 5. By bending.
 - 6. By any method indicated above, applicable to change of direction involved.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- F. Close exposed ends of pipe by welding 3/16-inch- thick steel plate in place or with prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 inch or less.
- G. Fabricate newels of steel tubing and provide newel caps of gray-iron castings, as shown.
- H. Fabricate newels of steel tubing and provide newel caps of pressed steel, as shown.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of handrails and railing systems to other work. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work.
 - 1. Connect railing posts to stair framing by direct welding, unless otherwise indicated.
- J. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through

wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

- K. For galvanized handrails and railing systems, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- L. For nongalvanized steel handrails and railing systems, provide nongalvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

2.13 STAIR HANDRAILS AND RAILING SYSTEMS

- A. General: Comply with applicable requirements of Division 5 Section "Pipe and Tube Railings" for steel pipe railings and handrails, and as follows:
- B. General: Comply with applicable requirements of Division 5 Section "Ornamental Handrails and Railings" for railings and handrails, and as follows:
 - 1. Fabricate newels of steel tubing and provide newel caps of gray-iron castings, as shown.
 - 2. Fabricate newels of steel tubing and provide newel caps of pressed steel, as shown.
 - 3. Railings may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
 - 4. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

2.14 FINISHES

- A. General: Finish metal stairs after assembly.
 - 1. Comply with NAAMM "Metal Finishes Manual" for recommendations on application and designations of finishes.
- B. Galvanizing: Hot-dip galvanize items indicated to be galvanized to comply with applicable standard listed below:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.
 - 3. Fill vent and drain holes that will be exposed in the finished work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- C. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed units:
 - 1. Exteriors (SSPC Zone 1B): SSPC SP 6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC SP 3 "Power Tool Cleaning."
- D. Apply shop primer to uncoated surfaces, except those with galvanized finish or those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise

indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, weld plates, and anchor bolts. Coordinate delivery of such items to Project site.

3.02 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing steel stairs to in-place construction; include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing steel stairs. Set units accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Install steel stairs by welding stair framing to steel structure or to weld plates cast into concrete, except where otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted field connections.
- F. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with concrete or dissimilar metals with a heavy coat of bituminous paint.
- H. Install precast treads with adhesive supplied by manufacturer.

3.03 INSTALLING STEEL STAIRS WITH GROUTED BASE PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base plates.

- B. Set steel stair base plates on wedges or other adjustable devices. After the stairs have been positioned and aligned, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.04 INSTALLING STEEL PIPE RAILINGS AND HANDRAILS

- A. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
 - 1. Anchor posts to steel by welding directly to steel supporting members.
 - 2. Anchor handrail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with drilled-in expansion anchors.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
 - 3. For concrete and solid masonry anchorage, use drilled-in expansion anchor.
 - 4. For hollow masonry anchorage, use toggle bolts having square heads.
 - 5. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.
 - 6. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.

3.05 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on steel stairs are specified in Division 9 Section "Painting."
- C. For galvanized surfaces, clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

**SECTION 05520
HANDRAILS AND RAILINGS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SECTION INCLUDES

- A. Aluminum tube handrails, balusters, fittings and integral screen enclosure.

1.03 RELATED SECTIONS

- A. Cast-in-Place Concrete – Section 03300
- B. Unit Masonry – Section 04200
- C. Precast Concrete – Plant Cast Stairs – Section 03411

1.04 APPLICABLE STANDARDS

- A. ASTM B 211 Aluminum-Alloy Bars, Rods, and Wire
- B. ASTM B 221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
- C. ASTM B 241 Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
- D. ASTM B 483 Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.
- E. SSPC Steel Structures Painting Council

1.05 DESIGN REQUIREMENTS

- A. Railing assembly, wall rails, and attachments to resist vertical and lateral uniform force of 75 lbs. per lineal foot at any point and 250 lbs. applied at any concentrated point without damage or permanent set.

1.06 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories, under provisions of Section 01300.

1.07 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Acceptable manufacturers offering equivalent products
 - 1. Poma Corporation
 - 2. American Stair, Inc.
 - 3. Aluminum Tube Railing, Inc.
 - 4. Econo-Rail
 - 5. K.N. Edwards
 - 6. RAILCO by Sharon Company
 - 7. Safe-D Aluminum

2.02 ALUMINUM RAILING SYSTEM

- A. Rails and Posts as indicated on drawings.
- B. Mounting: as required for secure anchorage to masonry, concrete or wood; non-corrosive to materials joined.
- C. Splice Connectors: Concealed spigot aluminum.
- D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- E. Finish: Shop painted to white color.

2.03 FABRICATION

- A. Fit and shop assemble components in largest practical sizes, for delivery to site.
- B. Fabricate component with joints tightly fitted and secured.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Accurately form components to suit stairs and landings and to each other and to building structure.

PART 3 - EXECUTION**3.01 PREPARATION**

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to Project site.

3.02 INSTALLATION, GENERAL

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railing systems. Set handrails and railing systems accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
 - 1. Do not weld, cut, or abrade surfaces of handrails and railing components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/4 inch in 12 feet (2 mm in 1 m).
 - 3. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (2 mm in 1 m).
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.
- D. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- E. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.
- F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railing systems and for properly transferring loads to in-place construction.

3.03 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical joints for permanently connecting railing components. Locate exposed fasteners in least conspicuous locations. Seal recessed holes of exposed locking screws with plastic filler, cement colored to match finish of handrails and railing systems.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact, or use fittings designed for this purpose.
- C. Expansion Joints: Install expansion joints at locations indicated but not further apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches (150 mm) of post.

3.04 ANCHORING POSTS

- A. Anchor posts in concrete with pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, solidly fill annular space between post and sleeve with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
- B. Anchor posts in concrete by forming or core-drilling holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) greater than outside diameter of post. Clean holes of all loose material, insert posts, and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 - 1. Nonshrink, nonmetallic grout.
 - 2. Nonshrink, nonmetallic grout or anchoring cement.
- C. Cover anchorage joint with a round steel flange attached to post as follows:
 - 1. Welded to post after placement of anchoring material.
 - 2. By set screws.
- D. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8-inch (3-mm) buildup, sloped away from post.
- E. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For aluminum pipe railings, attach posts as indicated using fittings designed and engineered for this purpose.
 - 2. For stainless steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
 - 3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- F. Install removable railing sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.

3.05 ANCHORING RAIL ENDS

- A. Anchor rail ends into concrete and masonry with round flanges connected to rail ends and anchored into wall construction with postinstalled anchors and bolts.
- B. Anchor rail ends to metal surfaces with oval or round flanges.
 - 1. Weld flanges to rail ends.
 - 2. Connect flanges to rail ends using nonwelded connections.
 - 3. Bolt flanges to metal surfaces.

3.06 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets and end fittings. Provide bracket with 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

- C. Secure wall brackets and wall return fittings to building construction as follows:
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
 - 3. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 - 4. For hollow masonry anchorage, use toggle bolts with square heads.
 - 5. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installation to accurately locate backing members.
 - 6. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.

3.07 ADJUSTING AND CLEANING

- A. Clean the following metals by washing thoroughly with clean water and soap, followed by rinsing with clean water.
 - 1. Aluminum.
 - 2. Stainless steel.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9.
- D. For Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

3.08 PROTECTION

- A. Protect finishes of handrails and railing systems from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

**SECTION 06001
CARPENTRY**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Roof curbs and cants.
- B. Blocking in wall and roof openings.
- C. Concealed wood blocking for support of washroom accessories, wall cabinets, towel bars, wardrobes, handrails (General Contractor's option to provide metal blocking).
- D. Finish carpentry and cabinet work.
- E. Roof plywood sheathing.
- F. Installation of door hardware. See Section 08710 for required hardware sets.

1.03 REFERENCES

- A. MIL-V-13518C(1) Wood Preservative: Tetrachlorophenol and Pentachlorophenol, Surface Sealing Compound.
- B. PS 1- Construction and Industrial Plywood.
- C. PS 20- American Softwood Lumber Standard.
- D. PS 51 – Hardwood and Decorative Plywood.
- E. PS 58- Basic Hardwood
- F. NFPA- National Design Specification for Wood Construction.

1.04 QUALITY ASSURANCE

- A. Rough Carpentry, Truss and Framing Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA)
- B. When applicable, fabricate cabinet work and site made finish carpentry items in accordance with recommendations of Quality Standards of Architectural Woodwork Institute (AWI).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver shop fabricated carpentry items until site conditions are adequate to receive the work. Protect items from weather while in transit.

PART 2 - PRODUCTS**2.01 ROUGH CARPENTRY**

- A. Interior – Fire Retardant treated Southern Pine bearing a U.L. fire hazard classification stamped on, in red ink, each piece of lumber.
- B. Interior and Exterior – Pressure treated Southern Pine.

2.02 FINISH CARPENTRY AND CABINETWORK MATERIALS

- A. Softwood Lumber: PS 20; graded in accordance with the requirements of AWI; maximum moisture content of six (6) percent for interior work and ten (10) percent for exterior work; of following species and grades:

<u>Item</u>	<u>Species</u>	<u>Quality</u>
Refer to drawings for trim	Oak	Stain
Refer to drawings for trim	Birch	Stain

<u>Item</u>	<u>Species</u>	<u>Quality</u>
Refer to drawings for trim	Birch	Paint

- B. Softwood Plywood: PS 1; graded in accordance with AWI; core material of the following species, grades, and eventual finishes:

<u>Item</u>	<u>Species</u>	<u>Grade</u>	<u>Finish</u>
Countertop	Fir	Custom	Plastic Laminate
Substrate Fir	Plywood		

- C. Sheathing: APA rated CDX plywood sheathing, exposure One (1) with "H" clips.
- D. Wood Particleboard: Composed of wood chips, shavings, flakes, with high waterproof resin binders; water resistant adhesive; of grade to suit application; sanded faces.
- E. Plastic Laminate: General purpose type; minimum 1/16 inches thick.
- F. Plastic Laminate Backing: High pressure paper base laminate without a decorative finish.
- G. Adhesive: Contact cement recommended by millwork manufacturer to suit application.
- H. Nails: Size and type to suit application.
- I. Bolts, Nuts, Washers, Lags, Pins and Screws: Size and type to suit application.

2.03 CABINET HARDWARE

- A. Shelf Standards and Rests: No. 255 surface mount and No. 256 by Knappe and Vogt or equal.
- B. Drawers and Door Pulls: Wire Pull
- C. Drawer Slides: As manufactured by Grass America, Inc., or equal.
- D. Hinges: Spring loaded type, self closing, Module 90 series as manufactured by Grass America, Inc., or equal concealed.

2.04 FABRICATION

- A. Fabricate cabinetwork and finish carpentry items in accordance with recommendations of AWI. Shop fabricate items where possible.
- B. Fit shelves, doors and exposed edges with 5/8 inch wide matching plastic edging. Use full length pieces only.
- C. Cabinetwork doors: Minimum 5/8 inch thick and of type construction indicated on Drawings.
- D. For laminate clad cabinets apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Corners and joints to be hairline. Slightly bevel arises. Locate counter butt joints at least 2 feet (600mm) from sink cut-outs.
- E. Cap exposed plastic laminate edges with material of same finish and pattern. Mechanically fasten splashbacks to counter-tops with steel brackets at 16 inches (400mm) on center.
- F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- G. Shop assemble cabinetwork and finish carpentry items for delivery to site in sizes easily handled and to ensure passage through building openings.

2.05 PREPARATION OF FINISH CARPENTRY ITEMS FOR FINISHING

- A. Sand work smooth and recess exposed nails and screws. Apply wood filler in exposed nail and screw indentations and leave ready to receive site applied finishes. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- B. Seal, stain and varnish concealed and semi-concealed surfaces. Brush apply only.
- C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fitments. Verify locations of cutouts from site dimensions. Prime paint; Seal contact surfaces of cutouts.

PART 3 - EXECUTION**3.01 SCHEDULE**

- A. Rough Carpentry Work
 - 1. Miscellaneous blocking and shimming at interior and exterior doors and windows.
 - 2. Blocking and canting for roof mounted mechanical items.
 - 3. Behind wall wood blocking for wall mount lavatories, washroom accessories, drapery rods, closet shelving, wall cabinets, wardrobes, door stops, and handrails (fire retardant).
Note: Blocking must be able to withstand a 250 lbs. load for five (5) minutes for handrails.

3.02 BUILDERS HARDWARE INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.03 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
- D. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:
 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
 4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

END OF SECTION

**CARPENTRY
SECTION 06001-4**

10/12/2017

**SECTION 06100
ROUGH CARPENTRY**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Framing with timbers.
 - 3. Framing with engineered wood products.
 - 4. Rooftop equipment bases and support curbs.
 - 5. Wood furring, grounds, nailers, and blocking.
 - 6. Sheathing.
 - 7. Subflooring.
 - 8. Underlayment.
 - 9. Utility shelving.

1.03 RELATED SECTIONS

- A. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 6 Section "Metal-Plate-Connected Wood Trusses."
 - 2. Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

1.04 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.
- B. Exposed Framing: Dimension lumber not concealed by other construction and indicated to receive a stained or natural finish.

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for the following products:
 - 1. Engineered wood products.
 - 2. Underlayment.
 - 3. Insulating sheathing.
 - 4. Air-infiltration barriers.
 - 5. Metal framing anchors.
 - 6. Construction adhesives.

- C. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- D. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:
 - 1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
 - 2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
 - 3. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.
- E. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
- F. Warranty of chemical treatment manufacturer for each type of treatment.
- G. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence the following products' compliance with building code in effect for Project.
 - 1. Engineered wood products.
 - 2. Foam-plastic sheathing.
 - 3. Air-infiltration barriers.
 - 4. Metal framing anchors.
 - 5. Power-driven fasteners.
 - 6. Fire-retardant-treated wood.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- B. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood product from one source and by a single manufacturer.
- C. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product from one source and by a single producer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
 - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Wood-Preservative-Treated Materials:
 - a. Baxter: J. H. Baxter Co.
 - b. Chemical Specialties, Inc.
 - c. Continental Wood Preservers, Inc.
 - d. Hickson Corp.
 - e. Hoover Treated Wood Products, Inc.
 - f. Osmose Wood Preserving, Inc.
 2. Fire-Retardant-Treated Materials, Interior Type A:
 - a. Baxter: J. H. Baxter Co.
 - b. Chemical Specialties, Inc.
 - c. Continental Wood Preservers, Inc.
 - d. Hickson Corp.
 - e. Hoover Treated Wood Products, Inc.
 3. Fire-Retardant-Treated Materials, Exterior Type:
 - a. American Wood Treaters, Inc.
 - b. Hoover Treated Wood Products, Inc.
 4. Laminated-Veneer Lumber:
 - a. Alpine Structures.
 - b. Boise Cascade Corp.
 - c. Georgia-Pacific Corp.
 - d. Louisiana-Pacific Corp.
 - e. Trus Joist MacMillan.
 - f. Willamette Industries, Inc.
 5. Parallel-Strand Lumber:
 - a. Alpine Structures.
 - b. Trus Joist MacMillan.
 6. Prefabricated Wood I-Joists:
 - a. Alpine Structures.
 - b. Boise Cascade Corp.
 - c. Georgia-Pacific Corp.
 - d. Louisiana-Pacific Corp.
 - e. Superior Wood Systems, Inc.
 - f. Trus Joist MacMillan.
 - g. Willamette Industries, Inc.
 7. Gypsum Sheathing Board:
 - a. Domtar Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co.; Gold Bond Building Products Division.
 - d. United States Gypsum Co.
 8. Glass-Fiber-Surfaced Gypsum Sheathing Board:
 - a. Georgia-Pacific Corp.
 - b. United States Gypsum Co.

9. Extruded Cellular Polystyrene Sheathing:
 - a. Amoco Foam Products Co.
 - b. Dow Chemical Company (The).
 - c. UC Industries, Inc.
10. Polyisocyanurate Foam Sheathing:
 - a. Celotex Corporation (The); Building Products Division.
 - b. NRG Barriers, Inc.
11. Air-Infiltration Barriers:
 - a. Amoco Foam Products Co.
 - b. Anthony Industries, Inc.; Simplex Products Division.
 - c. Celotex Corporation (The); Building Products Division.
 - d. DuPont Company; Fibers Department.
 - e. Parsec, Inc.
 - f. Raven Industries, Inc.
 - g. Reemay, Inc.
 - h. Sto-Cote Products, Inc.
12. Metal Framing Anchors:
 - a. Cleveland Steel Specialty Co.
 - b. Harlen Metal Products, Inc.
 - c. Silver Metal Products, Inc.
 - d. Simpson Strong-Tie Company, Inc.
 - e. Southeastern Metals Manufacturing Co., Inc.

2.02 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 1. NELMA - Northeastern Lumber Manufacturers Association.
 2. SPIB - Southern Pine Inspection Bureau.
 3. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 1. Provide dressed lumber, S4S, unless otherwise indicated.
 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
 - 1. Do not use chemicals containing chromium or arsenic.
 - 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing members less than 18 inches (460 mm) above grade.
 - 4. Wood floor plates installed over concrete slabs directly in contact with earth.
- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).
- D. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.04 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated wood is indicated, comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Research or Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which a current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated.
 - 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- B. Interior Type A: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:
 - 1. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.

2. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
 3. Contact with treated wood does not promote corrosion of metal fasteners.
- C. Exterior Type: Use for exterior locations and where indicated.
- D. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

2.05 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
- B. Non-Load-Bearing Interior Partitions: Provide framing of the following grade and species:
1. Grade: Construction, Stud, or No. 3.
 2. Grade: Standard, Stud, or No. 3.
 3. Species: Eastern softwoods; NELMA.
 4. Species: Spruce-pine-fir south; NELMA.
 5. Species: Hem-fir north; NLGA.
 6. Species: Spruce-pine-fir north; NLGA.
 7. Species: Northern species; NLGA.
 8. Species: Southern pine; SPIB.
 9. Species: Mixed southern pine; SPIB.
 10. Species: Hem-fir; WCLIB or WWPA.
 11. Species: Spruce-pine-fir south; WCLIB or WWPA.
 12. Species: Any species above.
- C. Exterior and Load-Bearing Walls: Provide framing of the following grade and species:
1. Grade: No. 2, or better.
 2. Species: Southern pine; SPIB.
 3. Species: Hem-fir; WCLIB or WWPA.
 4. Species: Douglas fir south; WWPA.
- D. Framing Other than Non-Load-Bearing Partitions: Provide framing of the following grade and species:
1. Grade: No. 2.
 2. Grade: Construction or No. 2.
 3. Grade: Construction, Stud, or No. 3.
 4. Species: Spruce-pine-fir south; NELMA.
 5. Species: Douglas fir-larch north; NLGA.
 6. Species: Hem-fir north; NLGA.
 7. Species: Spruce-pine-fir north; NLGA.
 8. Species: Southern pine; SPIB.
 9. Species: Mixed southern pine; SPIB.
 10. Species: Douglas fir-larch; WCLIB or WWPA.
 11. Species: Hem-fir; WCLIB or WWPA.

12. Species: Douglas fir south; WWPA.
 13. Species: Any species above.
 14. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1450f-1.3E.
 15. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1800f-1.6E.
- E. Ceilings (Non-Load-Bearing): For ceiling framing that does not support a floor, roof, or attic, provide the following grade and species:
1. Grade: No. 2.
 2. Grade: Construction or No. 2.
 3. Grade: Construction, Stud, or No. 3.
 4. Species: Spruce-pine-fir south; NELMA.
 5. Species: Douglas fir-larch north; NLGA.
 6. Species: Hem-fir north; NLGA.
 7. Species: Spruce-pine-fir north; NLGA.
 8. Species: Southern pine; SPIB.
 9. Species: Mixed southern pine; SPIB.
 10. Species: Douglas fir-larch; WCLIB or WWPA.
 11. Species: Hem-fir; WCLIB or WWPA.
 12. Species: Douglas fir south; WWPA.
 13. Species: Any species above.
- F. Other Framing Not Listed Above: Provide the following grades and species:
1. Grade: Select Structural.
 2. Grade: No. 1.
 3. Grade: No. 2.
 4. Grade: Construction or No. 2.
 5. Grade: Construction, Stud, or No. 3.
 6. Species: Douglas fir-larch north; NLGA.
 7. Species: Hem-fir north; NLGA.
 8. Species: Southern pine; SPIB.
 9. Species: Douglas fir-larch; WCLIB or WWPA.
 10. Species: Hem-fir; WCLIB or WWPA.
 11. Species: Douglas fir south; WWPA.
 12. Species: Any species above.
 13. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1450f-1.3E.
 14. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1800f-1.6E.
 15. Species and Grade: Any species and grade with a modulus of elasticity of at least 1,300,000 psi (8950 MPa) and an extreme fiber stress in bending of at least 850 psi (5.9 MPa) for 2-inch nominal (38 mm-actual) thickness and 12-inch nominal (286-mm actual) width for single member use.
- G. Exposed Framing: Provide material hand-selected from lumber of species and grade indicated below for uniformity of appearance and freedom from characteristics that would impair finish appearance.
1. Species and Grade: As indicated above for load-bearing construction of same type.

2. Species and Grade: Spruce-pine-fir south, Select Structural; NELMA, WCLIB, or WWP.
3. Species and Grade: Hem-fir north, Select Structural; NLGA.
4. Species and Grade: Spruce-pine-fir north, Select Structural; NLGA.
5. Species and Grade: Southern pine, Select Structural; SPIB.
6. Species and Grade: Hem-fir, Select Structural; WCLIB or WWP.

2.06 TIMBERS

- A. For timbers of 5-inch nominal (117-mm actual) size and thicker, provide material complying with the following requirements:
1. Species and Grade: Douglas fir-larch north, Select Structural per NLGA rules.
 2. Species and Grade: Southern pine, No. 1 Dense per SPIB rules.

2.07 BOARDS

- A. Exposed Boards: Where boards will be exposed in the finished work, provide the following:
1. Moisture Content: 19 percent maximum.
 2. Moisture Content: 15 percent maximum.
 3. Species and Grade: Eastern white pine, D Select per NELMA or NLGA rules.
 4. Species and Grade: Redwood, Clear per RIS rules.
 5. Species and Grade: Southern pine, C Finish per SPIB rules.
 6. Species and Grade: Hem-fir, C & Btr per WCLIB rules or C Select per NLGA or WWP rules.
 7. Species and Grade: Spruce-pine-fir, C & Btr per WCLIB rules or C Select per NLGA or WWP rules.
- B. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:
1. Species and Grade: Eastern softwoods, No. 3 Common per NELMA rules.
 2. Species and Grade: Northern species, No. 3 Common or Standard per NLGA rules.
 3. Species and Grade: Mixed southern pine, No. 2 per SPIB rules.
 4. Species and Grade: Hem-fir, Standard per WCLIB rules or No. 3 Common per WWP rules.
 5. Species and Grade: Spruce-pine-fir, Standard per WCLIB rules or No. 3 Common per WWP rules.
 6. Species and Grade: Western woods, Standard per WCLIB rules or No. 3 Common per WWP rules.
 7. Species and Grade: Any species above.

2.08 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

- C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

2.09 ENGINEERED WOOD PRODUCTS

- A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that evidence compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Parallel-Strand Lumber: Lumber manufactured by laying up wood strands using an exterior-type adhesive complying with ASTM D 2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:
 - 1. Extreme Fiber Stress in Bending: 2900 psi (20 MPa) for 12-inch nominal- (286-mm actual-) depth members.
 - 2. Modulus of Elasticity: 2,000,000 psi (13 800 MPa).
 - 3. Tension Parallel to Grain: 2400 psi (16.5 MPa).
 - 4. Compression Parallel to Grain: 2900 psi (20 MPa).
 - 5. Compression Perpendicular to Grain: 400 psi (3 MPa) perpendicular to and 600 psi (4.1 MPa) and parallel to wide face of strands.
 - 6. Horizontal Shear: 210 psi (1.4 MPa) perpendicular to and 290 psi (2 MPa) and parallel to wide face of strands.
- C. Prefabricated Wood I-Joists: Units manufactured by bonding stress-graded lumber flanges to wood-based structural-use panel webs with exterior-type adhesives complying with ASTM D 2559, to produce I-shaped joists complying with the following requirements:
 - 1. Flange Material: Laminated-veneer lumber.
 - 2. Flange Material: Southern pine dimension lumber.
 - 3. Flange Material: Spruce-pine-fir dimension lumber.
 - 4. Flange Material: Any material indicated above, as standard with joist manufacturer.
 - 5. Web Material: Oriented-strand board (OSB) complying with DOC PS 2.
 - 6. Web Material: Plywood complying with DOC PS 2.
 - 7. Web Material: Either material indicated above, as standard with joist manufacturer.
 - 8. Structural Capacities: Establish and monitor structural capacities according to ASTM D 5055.
 - 9. Sizes: Depths and widths as indicated, with flanges not less than 1-1/2 inches (38 mm) in actual width.

2.10 WOOD-BASED STRUCTURAL-USE PANELS, GENERAL

- A. Structural-Use Panel Standards: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.
- B. Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.

2.11 CONCEALED, PERFORMANCE-RATED STRUCTURAL-USE PANELS

- A. General: Where structural-use panels are indicated for the following concealed types of applications, provide APA-performance-rated panels complying with requirements designated under each application for grade, span rating, exposure durability classification, and edge detail (where applicable).
 - 1. Thickness: Provide panels meeting requirements specified but not less than thickness indicated.
 - 2. Span Ratings: Provide panels with span ratings required to meet "Code Plus" provisions of APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial."
- B. Combination Subfloor-Underlayment: APA-rated Sturd-I-Floor.
 - 1. Exposure Durability Classification: Exposure 1.
 - 2. Span Rating: As required to suit joist spacing indicated.
 - 3. Span Rating: Single Floor - 24.
 - 4. Edge Detail: Tongue and Groove.
 - 5. Surface Finish: Fully sanded face.
- C. Wall Sheathing: APA-rated Structural I sheathing.
 - 1. Exposure Durability Classification: Exposure 1.
 - 2. Span Rating: As required to suit stud spacing indicated.
 - 3. Span Rating: 12/0, 16/0, 20/0, or Wall - 16 for stud spacing of 16 inches (406 mm) or less.
 - 4. Span Rating: 24/0, 24/16, 32/16, or Wall - 24 for stud spacing of 24 inches (610 mm) or less.
- D. Roof Sheathing: APA-rated Structural I sheathing.
 - 1. Exposure Durability Classification: Exposure 1.
 - 2. Span Rating: As required to suit rafter spacing indicated.
 - 3. Span Rating: 12/0.
 - 4. Span Rating: 16/0 or Roof - 16.
 - 5. Span Rating: 20/0 or Roof - 20.
 - 6. Span Rating: 24/0 or Roof - 24.
 - 7. Span Rating: 24/16.
 - 8. Span Rating: 32/16 or Roof - 32.
 - 9. Span Rating: 40/20 or Roof - 40.
 - 10. Span Rating: 48/24 or Roof - 48.

2.12 STRUCTURAL-USE PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than 15/32 inch (11.9 mm) thick.

2.13 STRUCTURAL-USE PANELS FOR UNDERLAYMENT

- A. General: Over smooth subfloors, provide underlayment not less than 1/4 inch (6.4 mm) thick. Over board or uneven subfloors, provide underlayment not less than 11/32 inch (8.7 mm) thick.
- B. Structural-Use Panel Underlayment for Resilient Flooring: For underlayment 19/32 inch (15.1 mm) thick or more, provide fully sanded, veneer-faced, APA-rated, Sturd-I-Floor panels as follows:
 - 1. Exposure Classification: Exposure 1.
- C. Plywood Underlayment for Ceramic Tile: Provide APA-rated, Underlayment grade, exterior plywood, 5/8 inch (15.9 mm) thick, for ceramic tile set in epoxy mortar.
- D. Structural-Use Panel Underlayment for Carpet: For underlayment 19/32 inch (15.1 mm) thick or more, provide APA-rated Sturd-I-Floor panels with touch sanded face and as follows:
 - 1. Exposure Classification: Exposure 1.

2.14 GYPSUM SHEATHING

- A. Gypsum Sheathing Board: Water-resistant-core gypsum sheathing board complying with ASTM C 79 with long edges surfaced with water-repellent paper and as follows:
 - 1. Type: Regular.
 - 2. Type: X.
 - 3. Edge Configuration: V-shaped tongue-and-groove long edges, for horizontal application.
 - 4. Edge Configuration: Square, for vertical application.
 - 5. Thickness: 1/2 inch (12.7 mm).
 - 6. Thickness: 5/8 inch (15.9 mm).
- B. Glass-Fiber-Surfaced Gypsum Sheathing Board: Gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, surfaced on face and back with glass-fiber mats with alkali-resistant coating, and with unsurfaced square edges; complying with ASTM C 79, and requirements indicated below:
 - 1. Type: Regular.
 - 2. Type: X.
 - 3. Thickness: As indicated.

2.15 AIR-INFILTRATION BARRIER

- A. Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

- B. Air retarder complying with ASTM E 1677; made from polyolefins; either cross-laminated films, woven strands, or spunbonded fibers; coated or uncoated; with or without perforations to transmit water vapor but not liquid water; and as follows:
 - 1. Minimum Thickness: 3 mils (0.08 mm).
 - 2. Minimum Water-Vapor Transmission: 10 perms (575 ng/Pa x s x sq. m) when tested according to ASTM E 96, Procedure A.
 - 3. Maximum Flame Spread: 25 per ASTM E 84.
 - 4. Minimum Allowable Exposure Time: 3 months.

2.16 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.17 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
 - 1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.
 - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180) coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.
- C. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.052 inch (1.3 mm).
 - 2. Thickness: 0.064 inch (1.6 mm).

- D. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 1-1/2 inches (38 mm).
 - 2. Strap Width: 2 inches (50 mm).
 - 3. Thickness: 0.052 inch (1.3 mm).
 - 4. Thickness: 0.064 inch (1.6 mm).
- E. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch (50-mm) minimum side cover, socket 0.064 inch (1.6 mm) thick, standoff and adjustment plates 0.108 inch (2.8 mm) thick.
- F. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 3/4 inch (19 mm).
 - 2. Width: 1-1/4 inches (32 mm).
 - 3. Thickness: 0.052 inch (1.3 mm).
 - 4. Thickness: 0.064 inch (1.6 mm).
 - 5. Length: 16 inches (400 mm).
 - 6. Length: 24 inches (600 mm).
 - 7. Length: As indicated.
- G. Rafter Tie-Downs (Hurricane Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-5/8 inches (41 mm) wide by 0.052 inch (1.3 mm) thick.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
 - 4. "Table 23-I-Q-Nailing Schedule" of the Uniform Building Code.
 - 5. Florida Building Code

- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
- G. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.
- H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.

3.02 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.03 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - 1. Firestop furred spaces of walls at each floor level and at ceiling with wood blocking or noncombustible materials, accurately fitted to close furred spaces.
- B. Furring to Receive Plywood Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring at 24 inches (610 mm) o.c., horizontally and vertically. Select furring with no knots capable of producing bent-over nails and damage to paneling.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.
- D. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.

3.04 WOOD FRAMING, GENERAL

- A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Install framing members of size and at spacing indicated.
- D. Do not splice structural members between supports.

- E. Firestop concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where firestopping is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- (38-mm actual-) thickness lumber of same width as framing members.

3.05 WALL AND PARTITION FRAMING

- A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction, unless otherwise indicated.
 - 1. For exterior walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
 - 2. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual) size wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
- B. Construct corners and intersections with 3 or more studs. Provide miscellaneous blocking and framing as shown and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide continuous horizontal blocking at midheight of single-story partitions over 96 inches (2438 mm) high and multistory partitions, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal (89-mm actual) depth for openings 36 inches (900 mm) and less in width, and not less than 6-inch nominal (140-mm actual) depth for wider openings.
 - 2. For load-bearing walls, provide double-jamb studs for openings 72 inches (1800 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth shown or, if not shown, as recommended by AFPA's "Manual for Wood Frame Construction."
- D. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated. Provide one of the following:
- E. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:
 - 1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal- (19-by-89-mm actual-) size boards.
 - 2. Diagonal bracing at 45-degree angle using metal bracing.
 - 3. Plywood panels, not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.

3.06 FLOOR JOIST FRAMING

- A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on

masonry. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors.
 2. Where framed into wood supporting members, by using wood ledgers as shown or, if not shown, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches (76 mm) and do not embed more than 4 inches (102 mm).
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).
- D. Do not notch in middle third of joists; limit notches to 1/6 depth of joist, 1/3 at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.
- E. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c. extending over and fastening to 3 joists. Embed anchors at least 4 inches (100 mm) into masonry with ends bent at right angles 4 inches (100 mm) into grouted masonry.
- H. Under jamb studs at openings, provide solid blocking between joist.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.
1. Diagonal wood bridging formed from bevel cut 1-by-3-inch nominal- (19-by-64-mm actual-) size lumber, double-crossed and nailed both ends to joists.
 2. Steel bridging installed to comply with bridging manufacturer's written instructions.
 3. Bridging may be omitted where joist depth is 12-inch nominal (286-mm actual) size or less, and where indicated live load is 40 psf (1915 Pa) or less.

3.07 RAFTER AND CEILING JOIST FRAMING

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
1. Where ceiling joists are at right angles to rafters, provide additional short joists perpendicular to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps.

Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

- B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
 - 1. At valleys, provide double-valley rafters of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
 - 2. At hips, provide hip rafter of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as shown or, if not shown, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as shown for eaves, overhangs, dormers, and similar conditions, if any.

3.08 TIMBER FRAMING

- A. Install timber framing with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) air space at sides and ends of wood members.
- C. Where built-up beams or girders of 2-inch nominal- (38-mm actual-) dimension lumber on edge are shown, fasten together with 2 rows of 20d (100-mm) nails spaced not less than 32 inches (800 mm) o.c. Locate one row near top edge and other near bottom edge. Locate end joints in members over supports; for continuous members, stagger ends at quarter points between supports.
- D. Install wood posts using metal anchors indicated.
- E. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.09 STAIR FRAMING

- A. Provide stair framing members of size, space, and configuration indicated or, if not otherwise indicated, to comply with the following requirements:
 - 1. Stringer Size: 2-by-12-inch nominal- (38-by-286-mm actual-) size minimum.
 - 2. Notching: Notch stringers to receive treads, risers, and supports; leave at least 3-1/2 inches (89 mm) of effective depth.
 - 3. Stringer Spacing: At least 3 stringers for each 36-inch (914-mm) clear width of stair.

- B. Provide stair framing that does not exceed the following variations between treads and risers within each flight:
 - 1. Adjacent Treads and Risers: 3/16 inch (4.7 mm).
 - 2. Between Largest and Smallest Treads and Risers: 3/8 inch (9.5 mm).

3.10 INSTALLATION OF STRUCTURAL-USE PANELS

- A. General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions of above-referenced guide.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subflooring-Underlayment: Glue and nail to framing throughout.
 - 2. Subflooring: Glue and nail to framing throughout.
 - 3. Sheathing: Nail to framing.
 - 4. Underlayment: Nail to subflooring.
 - 5. Plywood Backing Panels: Nail or screw to supports.

3.11 GYPSUM SHEATHING

- A. General: Fasten gypsum sheathing to supports with galvanized roofing nails or divergent point galvanized staples. Nail or staple to comply with manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch (10 mm) from edges and ends of units. Fit units tightly against each other and around openings.
- B. Install 24-by-96-inch (609-by-2438-mm) sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints of adjacent boards not less than 1 stud spacing, 2 where possible.

3.12 AIR-INFILTRATION BARRIER

- A. Cover sheathing with air-infiltration barrier as follows:
 - 1. Apply asphalt-saturated organic felt horizontally with 2-inch (50-mm) overlap and 6 inch (150 mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
 - 2. Apply air retarder to comply with manufacturer's written instructions.
 - 3. Apply air-infiltration barrier to cover upstanding flashing with 4-inch (100-mm) overlap.

END OF SECTION

**SECTION 06101
SHEATHING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
1. Wall sheathing.
 2. Roof sheathing.
- B. Related Requirements:
1. Division 06 Section "Rough Carpentry" for plywood backing panels.
 2. Division 07 Section "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.04 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
1. Preservative-treated plywood.
 2. Fire-retardant-treated plywood.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fireretardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 – PRODUCTS**2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."
 - 2. Provide appropriate sheathing as indicated by UL assembly or current code.

2.02 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small- Scale Environmental Chambers."
- B. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
- C. Oriented Strand Board: DOC PS 2.
- D. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- E. Factory mark panels to indicate compliance with applicable standard.

2.03 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood unless otherwise indicated.

2.04 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with firetest-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
 - 1. Roof and wall sheathing within 48 inches of fire walls.
- F. Glass-mat Wall Sheathing: ASTM C 1177./ 1177M
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corporation; GlasRoc
 - b. G-P Gypsum Corporation; Dens-Glass Gold
 - c. Temple-Inland Inc.; GreenGlass
 - d. United States Gypsum Co.; Securock
 - 2. Type and Thickness: Type X, 5/8 inch thick
 - 3. Size 48 by 96 inches or 48 by 108 inches or 48 by 120 inches for vertical installation.

2.05 WALL SHEATHING

- A. Plywood Wall Sheathing: Exposure 1 sheathing.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: As indicated on structural drawings.

- B. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: As indicated on structural drawings.

2.06 ROOF SHEATHING

- A. Plywood Roof Sheathing: Sheathing or as indicated on structural drawings.
 - 1. Span Rating: Not less than 16/0.
 - 2. Nominal Thickness: As indicated on structural drawings.

2.07 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.

2.08 SHEATHING JOINT –AND–PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass Mat Gypsum Sheathing: Elastomeric; medium, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Division 078 Section “Joint Sealants”.
 - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide by 10 by 10 or 10 by 20 threads/ inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mast gypsum sheathing and with a history of successful in-service use.

2.09 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Provide "Fastening Schedule" as indicated in current local code, local ordinances having jurisdiction and structural drawings whichever is most stringent.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.02 WOOD STRUCTURAL PANEL INSTALLATION

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

3.03 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to wood framing with nails or screws.
 - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 3. Install boards with a 3/8 inch gap where on-load bearing construction abuts structural elements.
 - 4. Install boards with a 1/4 inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints

of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlaying self-furring metal lath is screw attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlaying self-furring metal lath is screw attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION

SECTION 06176
METAL-PLATE-CONNECTED WOOD TRUSSES

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes wood roof floor and girder trusses and truss accessories.

1.03 RELATED SECTIONS

- A. Related Sections include the following:
 - 1. Division 6 Section "Carpentry" for roof sheathing and subflooring and dimension lumber for supplementary framing and permanent bracing.
 - 2. Division 6 Section "Rough Carpentry" for supporting framing.

1.04 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NELMA - Northeastern Lumber Manufacturers Association.
 - 2. NLGA - National Lumber Grades Authority.
 - 3. SPIB - Southern Pine Inspection Bureau.

1.05 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated.
 - 2. Maximum Deflection Under Design Loads:
 - a. Roof Trusses: Vertical deflection of 1/360 of span.
 - b. Floor Trusses: Vertical deflection of 1/360 of span.

1.06 SUBMITTALS

- A. Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements, including bending strength, stiffness, and fastener-holding capacity. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5664.
 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Shop Drawings: Show location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber; splice details; type, size, material, finish, design values, orientation, and location of metal connector plates; and bearing details.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.
- D. Qualification Data: For fabricator and Installer.
- E. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- F. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Preservative-treated wood.
 2. Fire-retardant-treated wood.
 3. Metal-plate connectors.
 4. Metal framing anchors.

1.07 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

- C. Source Limitations for Connector Plates: Obtain metal connector plates through one source from a single manufacturer.
- D. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.
- E. Comply with applicable requirements and recommendations of the following publications:
 - 1. TP1 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
 - 2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
 - 3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
- F. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Comply with TPI recommendations to avoid damage and lateral bending. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.09 COORDINATION

- A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Metal Connector Plates:
 - a. Alpine Engineered Products, Inc.
 - b. CompuTrus, Inc.
 - c. Eagle Metal Products.
 - d. Jager Industries, Inc.
 - e. Mitek Industries, Inc.
 - f. Robbins Engineering, Inc.
 - g. TEE-LOK Corporation.
 - h. Truswal Systems Corporation.
 - 2. Metal Framing Anchors:
 - a. Alpine Engineered Products, Inc.
 - b. Cleveland Steel Specialty Co.
 - c. Harlen Metal Products, Inc.
 - d. KC Metals Products, Inc.
 - e. Silver Metal Products, Inc.
 - f. Simpson Strong-Tie Company, Inc.

- g. Southeastern Metals Manufacturing Co., Inc.
- h. United Steel Products Company, Inc.

2.02 DIMENSION LUMBER

- A. Grade and Species: Provide dimension lumber of any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."
 - 1. Grade for Chord Members: No. 2.
 - 2. Grade for Web Members: No. 2, same grade as indicated for chord members.
 - 3. Species: Southern pine; SPIB.

2.03 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and **one of** the following:
 - a. Chromated copper arsenate (CCA).
 - b. Ammoniacal copper zinc arsenate (ACZA).
 - c. Ammoniacal, or amine, copper quat (ACQ).
 - d. Copper bis (dimethyldithiocarbamate) (CDDC).
 - e. Ammoniacal copper citrate (CC).
 - f. Copper azole, Type A (CBA-A).
 - g. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry material after treatment to maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat trusses where indicated on Drawings.

2.04 FIRE-RETARDANT-TREATED WOOD

- A. General: Where fire-retardant-treated wood is indicated, provide wood that complies with performance requirements in AWPAC20. Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664.

2. Use treatment that does not promote corrosion of metal fasteners.
 3. Use Exterior type for exterior locations and where indicated.
 4. Use Interior Type A High Temperature (HT), unless otherwise indicated.
- B. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.05 METAL CONNECTOR PLATES

- A. General: Fabricate connector plates to comply with TPI 1 from metal complying with requirements indicated below:
- B. Hot-Dip Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180) coating designation; Designation SS, Grade 33, and not less than 0.036 inch (0.9 mm) thick.
- C. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, 80Z (24G) coating designation; ASTM A 570/A 570M, Structural Steel (SS), Grade 33, and not less than 0.047 inch (1.2 mm) thick.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZ150) coating designation; Structural Steel (SS), Grade 33, and not less than 0.036 inch (0.9 mm) thick.
- E. Stainless-Steel Sheet: ASTM A 666, Type 316, and not less than 0.035 inch (0.88 mm) thick.

2.06 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.07 METAL FRAMING ANCHORS

- A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:
 1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
- C. Stainless-Steel Sheet: ASTM A 666, Type 316.
 1. Use for exterior locations and where indicated.
- D. Truss Tie-Downs: Refer to Structural Drawings for Truss to Structure straps, hangers & anchors. Truss to Truss connections shall be by the Truss Design Engineer.
- E. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- F. Floor Truss Hangers: Refer to Structural Drawings for Truss to Structure straps, hangers & anchors. Truss to Truss connections shall be by the Truss Design Engineer.

2.08 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- B. Protective Coatings: SSPC-Paint 22, epoxy-polyamide primer or SSPC-Paint 16, coal-tar epoxy-polyamide paint.

2.09 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. Before installing, splice trusses delivered to Project site in more than one piece.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not cut or remove truss members.
- L. Replace wood trusses that are damaged or do not meet requirements.
 - 1. Do not alter trusses in field.

3.02 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply primer, when part of coating system, and one coat of protective coating.
 - 1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

END OF SECTION

METAL-PLATE-CONNECTED WOOD TRUSSES SECTION 06176 - 7

**SECTION 06200
INTERIOR FINISH CARPENTRY**

PART 1 - GENERAL**1.01 SECTION INCLUDES**

- A. Finish carpentry items
- B. Wood casing and moldings
- C. Hardware and attachment accessories
- D. Fiberglas reinforcement panels

1.02 RELATED REQUIREMENTS

- A. Section 06402 – Interior Architectural Woodwork: Shop fabricated custom cabinet work.
- B. Section 12353 – Residential Casework: Shop fabricated cabinet work.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 – American National Standard for Particleboard; 2009
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.
- C. NEMA LD 3 – High Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- D. NHLA G-101 – Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2007.
- E. PS 1 – Structural Plywood; 2007.

1.04 SUBMITTALS

- A. Submit the following under provisions of Section 013310 – Submittal Procedures
- B. Product Data:
 - 1. Provide data on fire retardant treatment materials and application instructions.
 - 2. Provide manufacturer's data on products included in this Section.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- D. Samples: Submit two samples of products included in this Section showing color, texture, and other features required for Architect's approval.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Section 300, Premium or Custom grade.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.
- B. Resin Panels to be individually wrapped in moisture-resistant plastic film, inspect for damage to protective wrap and color discoloration or damage to panel tiles.

1.07 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- C. Wood trim and finish carpentry to acclimate to prevailing humidity conditions for a minimum of 24 hours.

PART 2 - PRODUCTS**2.01 LUMBER MATERIALS**

- A. As specified under Sections 06402 – Interior Architectural Woodwork
- B. Softwood Lumber: Pine or Polar species, plain sawn, maximum moisture content of 6 percent; with vertical grain.
 - 1. Grading: In accordance with rules certified by ALSC; www.alsc.org.
- C. Hardwood Lumber: Poplar species, Grade: FAS plain sawn, maximum moisture content of 6 percent, of quality suitable for transparent finish.
 - 1. Grading: In accordance with NHLA Grading Rules; www.natlhardwood.org.
 - 2. Sizing: Random lengths and widths ranging from nominal 4 to 8 inches.

2.02 SHEET MATERIALS

- A. Softwood Plywood: PS 1 Grade A-B; Veneer core; fir face species, rotary cut.
 - 2.02.1.1.A.1 Fire-retardant treated at exposed locations.
- B. Particleboard: ANSI A208.1; composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

2.03 STANDING AND RUNNING TRIM

- A. Wood trim and molding profiles:
 - 1. Door and Window Casing – Type CAS-1: 13/16 by 3-1/2 inch Heavy-beaded Colonial; Wood Species: Type Primed softwood; Product: KB130 by Kuiken Bros. or equal.
 - 2. Base Type WDB-1; SSI Moldings #SSI – 322, 3/4"X4", Paint Grade.
 - 3. Applied Molding – Type AM-1: Bead Moldings or equal.-3/4 by 1-3/8 inch; Wood species: Primed softwood; KB808 by Kuiken Bros. or equal.
 - 4. Applied Molding – Type AM-2: Base Cap, 11/16 by 1-1/8 inch; Wood species: Primed softwood. Product: KB392 by Kuiken Bros. or equal.
 - 5. Applied Molding – Type AM-2: Base Cap, 3/4 by 1-3/8 inch; Wood species: Mahogany;. Product: KB393 by Kuiken Bros. or equal.
 - 6. Crown Molding – Type CM-1: 21/32 by 5-1/2 inch Beaded Crown; Wood species: Primed softwood or MDF; Product: KB350 by Kuiken Bros. or equal.

2.04 FIBERGLASS REINFORCED PANELS (FRP)

- A. Random chopped fiberglass with modified polyester copolymer resins and pigments with the following characteristics:
 - 1. Thickness: 0.09 inches
 - 2. Size: 48 by 120 inches
 - 3. Hardness: ASTM D-2553 Barcol Test: 35 to 50
 - 4. Water Absorption: ASTM D-570, 0.15 percent / 24 hours
 - 5. Flame and Smoke Ratings: ASTM E-84, Class A/I. flame spread less than 25, smoke development less than 450.
 - 6. Finish: Pebbled
 - 7. Color: White – P100
- B. Accessories: One-piece vinyl, edge moldings, inside and outside corner trim, division bar.
- C. Adhesive: Manufacturer's recommended type with primer, if required, for substrate.
- D. Manufacturers and Products:
 - 1. Crane Composites, Inc.; Product: Glasbord-FSI
 - 2. Marlite; Product: Standard FRP

2.05 FASTENINGS

- A. General Adhesives: Water-based type, unless otherwise required by manufacturer's instruction for product and substrate.
- B. Fasteners: Of size and type to suit application; Cadmium finish in concealed locations and Cadmium finish in exposed locations.

2.06 ACCESSORIES

- A. Lumber for Shimming, Blocking, and Joining: Softwood lumber of Cedar species.

- B. Primer: As specified under Section 09900 – Painting and Coatings.
- C. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 WOOD TREATMENT

- A. Fire Retardant Treatment: Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- B. Provide identification on fire retardant treated material.
- C. Redry wood after pressure treatment to maximum 9 percent moisture content.

2.08 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- C. When necessary to cut and fit onsite, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit counter butt joints minimum 2-feet from sink cut-outs.
- E. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.
- F. Seal cut edge of resin panels with manufacturer's recommended sealer.
- G. Treat all custom millwork to meet Class-A fire-rating
- H. Fabric Covered Seating: Shape medium density fiberboard with ½ inch radius on one face.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- C. See Section 06100 – Rough Carpentry for installation of recessed wood blocking.

3.02 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- C. Attach suspended false beam using following manufacturer's instructions, ASTM E 636/E636M and ASTM E580/E580M for seismic restraint.

3.03 FIBERGLASS REINFORCED PANEL INSTALLATION

- A. Follow manufacturer's written instructions for preparation, cutting and drilling, fitting, and securing fiberglass reinforced panels.
- B. Allow fiberglass reinforced panels to acclimate to room temperature for at least 24 hours with the shipping materials and banding removed. Lay panels flat on a solid level, dry surface. Do not store directly on concrete or any other surface that emits moisture.
- C. Walls should be flat and even. Remove high spots and fill in low spots prior to beginning installation.
- D. Follow adhesive manufacturer's recommendations for trowel style and application amount. Using cross-hatch pattern achieve 100 percent adhesive coverage. Extend adhesive to all edges of the panel and apply directly to the back of each panel.
- E. Provide manufacturer's recommended spacing between panels for thermal expansion and contraction.
- F. Seal joints with silicone sealant specified under Section 07900 – Joint Sealants.
- G. Install edge, corner and division bars in accordance with manufacturer's instructions at all edges.

3.05 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand smooth.
- B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.06 TOLERANCES

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

END OF SECTION

**SECTION 06400
CASEWORK**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. All labor, materials, equipment and services necessary to provide all Architectural Woodwork as indicated or specified.
- B. To permit fabrication of millwork to utilize his manufacturing process to the best advantage, all details of millwork construction are not shown on the drawings. It is the intent of these specifications to require items of millwork complete and finished; with the highest degree of workmanship. In general, millwork shall be completely fabricated at the shop as far as possible and delivered ready to set in place in largest units consistent with convenient erection.

1.03 SUBMITTALS

- A. Shop Drawings: Submit shop drawings on all items of Architectural Woodwork per General Conditions.
- B. Manufacturer's Descriptive Literature: Submit for specialty items not manufactured by the architectural woodwork contractor.
- C. Samples: Submit finished samples of each finish to be applied at factory.

1.04 QUALITY ASSURANCE

- A. AWI "Quality Standards Illustrated" shall apply and by reference are hereby made part of this Specification. Any reference to Custom in this Specification shall be as defined in the AWI "Quality Standards Illustrated" (latest edition).
- B. Any item not given specific quality grade shall be Custom Grade as defined in the AWI "Quality Standards Illustrated".
- C. The approved woodwork manufacturer must have a reputation for doing satisfactory work on time for comparable work. The Architect reserves the right to approve the woodwork manufacturer selected to furnish all of the woodwork.

1.05 FIELD DIMENSIONS

- A. The woodwork manufacturer is responsible for details and dimensions not controlled by job conditions and shall show on his Shop Drawings all required field measurements beyond his control. The General Contractor and the woodwork manufacturer shall cooperate to establish and maintain these field dimensions.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. The woodwork manufacturer and the Contractor shall be jointly responsible to make certain that woodwork is not delivered until the building and storage areas are sufficiently dry so that woodwork will not be damaged by excessive changes in moisture content.

PART 2 - PRODUCTS**2.01 MATERIALS**

- | | | |
|----|--|--|
| A. | Standing and Running Trim, Guard Rails and Other Material less than 8 inches in width: | |
| | AWI Quality Grade | Custom |
| | Solid Wood | Plain Sawn Red Oak |
| | Plywood | Red Oak |
| B. | Built-in Shelves and Cabinets: | |
| | AWI Quality Grade | Custom |
| | Cabinet Tops and Splashes | Industrial Grade Particle Board |
| | to Receive Plastic Laminate | 45 lb. Density |
| | Unexposed Framing | #1 Douglas Fir |
| | Exposed Framing | Plain Sawn Red Oak - F.A.S. Grade |
| C. | High Pressure Laminate Counter Tops: | |
| | AWI Quality Grade | Custom |
| | Laminate Selection | NEMA LD-3, 0.050 thick, colors as selected by Architect. |
| D. | Hardware, furnish and Install all items of casework hardware as follows: | |
| | Pulls | Stanley 4484 26D or EPCO MC-4024 |
| | Drawer Guides | KV #1330 or Grant 246 |
| | Pivot Hinges | Stanley 1588 |
| | Shelf Standards | KV #255 and #256 |
| | Magnetic Catches | Stanley SP41 and SP 45 or Ives 325A69 & 327A69 |
| | Locks | Sargent #4142 6-pin or Schlage 26-023 |

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. See Section 06200 - FINISH CARPENTRY

END OF SECTION

SECTION 06401
EXTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
1. Exterior standing and running trim.
 2. Exterior ornamental work including:
 - a. Pediment heads.
 - b. Pilasters.
 - c. Cupolas.
 - d. Balusters.
 - e. Columns.
 3. Exterior frames and jambs.
 4. Exterior shutters.
 5. Shop priming of exterior woodwork.
 6. Shop finishing of exterior woodwork.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 6 Section "Rough Carpentry" for exposed framing and for blocking, shims, and nailers for installing exterior woodwork.
 2. Division 6 Section "Rough Carpentry" for exposed framing and for blocking and other carpentry work concealed in the wall.
 3. Division 6 Section "Finish Carpentry" for exterior carpentry exposed to view that is not specified in this Section.
 4. Division 6 Section "Plastic Fabrications" for exterior moldings, cornices, and ornamentation made of plastic.
 5. Division 8 Section "Flush Wood Doors" for doors specified by reference to architectural woodwork standards.
 6. Division 8 Section "Stile and Rail Wood Doors" for doors specified by reference to architectural woodwork standards.
 7. Division 9 Section "Painting" for field finishing of installed exterior architectural woodwork.

1.03 DEFINITIONS

- A. Exterior architectural woodwork includes wood blocking, shims, and nailers for installing woodwork items unless concealed within other construction prior to woodwork installation.

1.04 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Wood-preservative-treatment data from chemical treatment manufacturer. Include certification of chemical solution and affirm that it complies with indicated treatment standard.
- D. Fire-retardant-treatment data for material treated to reduce combustibility. Include certification by treating plant that treated materials comply with requirements.
- E. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of blocking and nailers, including concealed blocking and reinforcing specified in other Sections.
- F. Samples for verification of the following:
 - 1. Lumber for transparent finish (exterior wood stain), 50 sq. in. (300 sq. cm), for each species, with one-half of exposed surface finished with coating specified in Division 9 Section "Exterior Wood Stains."
 - 2. Lumber and panel products for shop-applied opaque finish, 8 by 10 inches (200 by 250 mm) for panels and 50 sq. in. (300 sq. cm) for lumber, for each finish system and color, with one-half of exposed surface finished.
- G. Product certificates signed by woodwork manufacturers certifying that their products comply with specified requirements.
- H. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.
- B. Installer Qualifications: Arrange for exterior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.
- C. Single-Source Responsibility for Fabrication and Installation: Engage a qualified woodworking firm to assume undivided responsibility for fabricating and installing woodwork specified in this Section.

- D. Quality Standard: Except as otherwise indicated, comply with the following standard:
 - 1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of exterior architectural woodwork, construction, finishes, and other requirements.
 - a. Provide AWI Certification Labels or Certificates of Compliance indicating that woodwork meets requirements of grades specified.
- E. Fire-Test-Response Characteristics: Provide materials with the following fire-test-response characteristics as determined by testing identical products per ASTM test method indicated below by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fire-retardant-treated material with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
 - 1. Surface-Burning Characteristics: Not exceeding values indicated below, when subjected to accelerated weathering test ASTM D 2898, Method A, and then tested per ASTM E 84 for 30 minutes with no evidence of significant combustion. In addition, the flame front shall not progress more than 10-1/2 feet (3.2 m) beyond the center line of the burner at any time during the test.
 - a. Flame Spread: 25.
 - b. Smoke Developed: 450.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Obtain and comply with woodwork manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage.
- B. Weather Limitations: Proceed with installation of exterior woodwork only when existing and forecasted weather conditions will permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.
- C. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Verify locations of concealed framing, blocking, and reinforcements that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
 - 2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.08 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, reinforcements, and other related units of Work specified in other Sections to ensure that exterior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS**2.01 WOODWORK FABRICATORS**

- A. Available Fabricators: Subject to compliance with requirements, fabricators offering exterior architectural woodwork that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Fypon
 - 2. S & S Millwork
 - 3. B & B Wood Products
 - 4. HB & G Products
 - 5. White River Hardwoods and Woodworks

2.02 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of exterior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:
 - 1. Hardboard: AHA A135.4.
 - 2. Softwood Plywood: PS 1.

2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Nonpressure Process: Comply with NWWDA I.S.4 and the following for woodwork items indicated to receive water-repellent preservative treatment.
 - 1. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate (IPBC) as its active ingredient.
 - 2. Water-Repellent Preservative/Insecticide: NWWDA-tested and -accepted preservative and water-repellent formulation containing 3-iodo-2-propynyl butyl carbamate (IPBC) as its active ingredient, combined with an insecticide containing chlorpyrifos as its active ingredient.
- B. Preservative Treatment by Pressure Process: Comply with AWPAC C2 (lumber) and AWPAC C9 (plywood) and the following for woodwork items indicated to receive pressure preservative treatment. Mark each treated item with the AWPB or SPIB Quality Mark Requirements.
 - 1. Preservative Chemicals: Pressure-impregnate woodwork with preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
 - 2. Pressure-treat aboveground items with preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). Kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 and 15 percent.

- C. Extent of Treatment: Treat each item of exterior woodwork regardless of species from which it is fabricated.

2.04 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
- B. Fire-Retardant Chemicals: Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
- C. Fire-Retardant-Treated Lumber: Comply with the following:
 - 1. Organic-Resin-Based Formulation: Exterior type per AWPA C20, consisting of organic-resin solution, relatively insoluble in water, thermally set in wood by kiln drying.
 - 2. Mill lumber after treatment, within limits set for wood removal that does not affect listed fire-test-response characteristics, using a woodworking plant certified by testing and inspecting agency.
 - 3. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
 - 4. Kiln-dry material before and after treatment to levels required for untreated material.
 - 5. Discard treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective material.
 - 6. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 7. Products: Subject to compliance with requirements, provide one of the following:
 - a. Organic-Resin-Based Formulation (Exterior Type):
 - 1) Exterior Fire-X; American Wood Treaters, Inc.
 - 2) Exterior Fire-X; Hoover Treated Wood Products, Inc.

2.05 INSTALLATION MATERIALS

- A. Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Blocking, Shims, and Nailers: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
- C. Screws: Select material, type, size, and finish required for each use, nonferrous metal or hot-dip galvanized, unless otherwise indicated. Comply with ASME B18.6.1 for applicable requirements.
 - 1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

- D. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
 - 1. Stainless-steel nails.
 - 2. Aluminum nails.
 - 3. Hot-dip galvanized nails.
 - 4. Any material indicated above.
- E. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts, unless otherwise indicated. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.06 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Edges of solid-wood (lumber) members 3/4 inch (19 mm) thick or less: 1/16 inch (1.5 mm).
 - 2. Edges of rails and similar members more than 3/4 inch (19 mm) thick: 1/8 inch (3 mm).
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Shop-cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and seal edges with a water-resistant coating suitable for exterior applications.

2.07 EXTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 300.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Backout or groove backs of flat trim members, kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- E. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- F. Wood Species: As indicated.

2.08 EXTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 300.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Backout or groove backs of flat trim members, kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- F. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- G. Wood Species: Ponderosa pine.
- H. Wood Species: Eastern white pine, sugar pine, Idaho white pine.
- I. Wood Species: Any closed-grain hardwood listed in referenced woodworking standard.
 - 1. Sort lumber stock to eliminate flat-sawed pieces of redwood whose exposed, flat surfaces are more than 3 inches (75 mm) wide.

2.09 EXTERIOR ORNAMENTAL WORK FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 700.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Teak.
- F. Wood Species: Honduras mahogany.
- G. Wood Species: Clear heart redwood.
- H. Wood Species: As indicated.

2.10 EXTERIOR ORNAMENTAL WORK FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 700.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Clear heart redwood.
- F. Wood Species: Ponderosa pine.

- G. Wood Species: Eastern white pine, sugar pine, Idaho white pine.
- H. Wood Species: Any closed-grain hardwood listed in referenced woodworking standard.

2.11 EXTERIOR FRAMES AND JAMBS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 900.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Honduras mahogany.
- F. Wood Species: Clear heart redwood.
- G. Wood Species: White oak.
- H. Wood Species: As indicated.

2.12 EXTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 900.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Clear heart redwood.
- F. Wood Species: Ponderosa pine.
- G. Wood Species: Eastern white pine, sugar pine, Idaho white pine.
- H. Wood Species: Any closed-grain hardwood listed in referenced woodworking standard.

2.13 EXTERIOR SHUTTERS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 1200.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Teak.
- F. Wood Species: Honduras mahogany.

- G. Wood Species: Clear heart redwood.
- H. Wood Species: As indicated.

2.14 EXTERIOR SHUTTERS FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 1200.
- B. Grade: Premium.
- C. Grade: Custom.
- D. Grade: Economy.
- E. Wood Species: Clear heart redwood.
- F. Wood Species: Ponderosa pine.
- G. Wood Species: Eastern white pine, sugar pine, Idaho white pine.

2.15 SHOP PRIMING

- A. Woodwork for Opaque Finish: Shop prime woodwork for paint finish with one coat of wood primer specified in Division 9 Section "Painting."
- B. Woodwork for Transparent Finish: Shop seal woodwork for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified in the following:
 - 1. Division 9 Section "Painting."
 - 2. Division 9 Section "Exterior Wood Stains."
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including back. Apply 2 coats to items installed over concrete or masonry.

2.16 SHOP FINISHING

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
 - 1. Grade: Provide finishes of same grades as items to be finished.
 - 2. Grade: Premium.
 - 3. Grade: Custom.
 - 4. Grade: Economy.
- B. General: The entire finish of exterior architectural woodwork is specified in this Section. To the greatest extent possible, finish architectural woodwork at the fabrication shop. Defer only final touchup and cleaning until after installation.

- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including back. Apply 2 coats to items installed over concrete or masonry.
- D. Opaque Finish: Comply with requirements indicated below for finish system, color, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.
 - 1. AWI Finish System OP-4: Conversion varnish.
 - 2. AWI Finish System OP-6: Catalyzed polyurethane.
 - 3. Proprietary Finish System: High-performance, polymer-coating system applied by specialists trained by the coating manufacturer and consisting of a water-repellent preservative, a polyurea primer, and an elastomeric polyurethane topcoat.
 - a. Product: Subject to compliance with requirements, provide Flexachron system by PPG Industries.
 - 4. Color: Match Architect's sample.
 - 5. Color: Match color indicated by reference to a coating manufacturer's standard designations for this characteristic.
 - 6. Color: As selected by Architect from the full range of standard colors available in finish system specified.
 - 7. Sheen: Satin 30-50 gloss units.
 - 8. Sheen: Semigloss 55-75 gloss units.
 - 9. Sheen: Gloss 80-100 gloss units.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.02 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) for plumb and level.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.
- E. Preservative-Treated Lumber: Where cut or drilled in field, treat cut ends with preservative solution used in original treatment by brushing, spraying, dipping, or soaking.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where necessary. Stagger joints in adjacent and related members.
 - 1. Install standing and running trim with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) variation from a straight line.
- H. Complete the finishing work specified in this Section to the extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats to exposed surfaces where only sealer/prime coats were applied in the shop.
- I. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.04 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

3.05 SCHEDULE

- A. Couploa:
- B. Exterior Columns:
- C. Exterior Brackets:

END OF SECTION

SECTION 06402
INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim.
 - 2. Laminate-clad cabinets (plastic-covered casework).
 - 3. Plastic-laminate countertops.
 - 4. Interior ornamental work.
 - 5. Interior frames and jambs
 - 6. Shop finishing of woodwork.

1.03 RELATED SECTIONS

- A. Division 6 Section "Carpentry" for exposed framing and for furring, blocking, shims, and hanging strips for installing interior woodwork.
- B. Division 6 Section "Carpentry" for exposed framing and for furring, blocking, and other carpentry work concealed in the wall.
- C. Division 8 Section "Wood Doors" for doors specified by reference to architectural woodwork standards.
- D. Division 8 Section "Stile and Rail Wood Doors" for doors specified by reference to architectural woodwork standards.
- E. Division 9 Section "Wood Flooring" for wood flooring.
- F. Division 9 Section "Painting" for field finishing of installed interior architectural woodwork.

1.04 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.
- B. Rough carriages for stairs are a part of interior architectural woodwork. Platform framing, headers, partition framing, and other rough framing associated with stairwork are specified in Division 6 Section "Carpentry."

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

- B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Fire-retardant-treatment data for material treated to reduce combustibility. Include certification by treating plant that treated materials comply with requirements.
- D. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
 - 4. Show veneer leaves with dimensions, grain direction, exposed face, and an identification number indicated for each leaf. Identification number shall indicate the flitch and the sequence within the flitch for each leaf.
- E. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Shop-applied transparent finishes.
 - 2. Shop-applied opaque finishes.
 - 3. Plastic laminates.
 - 4. Thermoset decorative overlays.
- F. Samples for verification of the following:
 - 1. Lumber with or for transparent finish, 50 sq. in. (300 sq. cm), for each species and cut, finished on one side and one edge.
 - 2. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
 - 3. Wood-veneer-faced panel products, with or for transparent finish, 8 by 10 inches (200 by 250 mm), for each species and cut. Include at least one face-veneer seam and finish one-half of face as specified.
 - a. Step finish materials on sample to show and clearly define each coat.
 - b. Provide separate samples of unfaced panel product used for core.
 - 4. Lumber and panel products with shop-applied opaque finish, 8 by 10 inches (200 by 250 mm) for panels and 50 sq. in. (300 sq. cm) for lumber, for each finish system and color, with one-half of exposed surface finished.
 - 5. Laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
 - 6. Thermoset decorative-overlay surfaced panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
 - 7. Solid surfacing materials, 6 inches (150 mm) square.
 - 8. Corner pieces as follows:
 - a. Cabinet front frame joints between stiles and rail, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
 - b. Miter joints for standing trim.

- 9. Exposed cabinet hardware, one unit for each type and finish.
- G. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.
- H. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.
- B. Installer Qualifications: Arrange for interior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.
- C. Single-Source Responsibility: Arrange for production of interior architectural woodwork with sequence-matched wood veneers by a single firm.
 - 1. Include the veneering of wood doors in the single-firm production where veneer matching extends across wood doors.
- D. Single-Source Responsibility for Fabrication and Installation: Engage a qualified woodworking firm to assume undivided responsibility for fabricating, finishing, and installing woodwork specified in this Section.
- E. Quality Standard: Except as otherwise indicated, comply with the following standard:
 - 1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.
 - a. Provide AWI Certification Labels or Certificates of Compliance indicating that woodwork meets requirements of grades specified.
 - 2. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.
- F. Fire-Test-Response Characteristics: Provide materials with the following fire-test-response characteristics as determined by testing identical products per ASTM test method indicated below by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fire-retardant-treated material with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
 - 1. Surface-Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant combustion. In addition, the flame front shall not progress more than 10-1/2 feet (3.2 m) beyond the center line of the burner at any time during the test.
 - a. Flame Spread: 25.
 - b. Smoke Developed: 450.

- G. Mockup: Prior to fabricating or installing interior architectural woodwork, construct mockup to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockup of the size indicated, using materials indicated for final unit of work, and complying with the following requirements.
1. Locate mockup on site in the location indicated or, if not indicated, as directed by Architect.
 2. Notify Architect one week in advance of the date and time when fabrication of mockup will begin.
 3. Notify Architect one week in advance of the date and time when mockup will be installed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's acceptance of mockup before start of final unit of Work.
 6. Retain and maintain mockup during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockup from Project site.
 - b. Accepted mockup in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.
- B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Obtain and comply with woodwork fabricator's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork will be within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- C. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed.

2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.09 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved schedule for cabinet hardware specified in Division 8 Section "Door Hardware" to fabricator of architectural woodwork; coordinate cabinet shop drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
 1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
 - a. Wilsonart
 - b. Formica Corporation.
 - c. Laminart.
 - d. Nevamar Corp.
 - e. Pioneer Plastics Corp.
 - f. Westinghouse Electric Corp.; Specialty Products Div.
 - g. Ralph Wilson Plastics Co.
- B. Adhesive for Bonding Plastic Laminate: Contact cement.
- C. Thermoset Decorative Overlay: Decorative surface of thermally fused polyester or melamine-impregnated web, bonded to specified substrate and complying with ALA 1992.
 1. Substrate: Medium-density particleboard.

2.02 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
- B. Fire-Retardant Chemicals: Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
- C. Fire-Retardant-Treated Lumber: Comply with the following:
 1. Organic-Resin-Based Formulation: Exterior type per AWWA C20, consisting of organic-resin solution, relatively insoluble in water, thermally set in wood by kiln drying.

2. Low-Hygroscopic Formulation: Interior Type A per AWWA C20.
 3. Nonpressure-Treatment Formulation: Nontoxic, water-soluble product applied by dip, spray, roller, curtain coating, vacuum chamber, or soaking.
 4. Mill lumber after treatment, within limits set for wood removal that does not affect listed fire-test-response characteristics, using a woodworking plant certified by testing and inspecting agency.
 5. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
 6. Kiln-dry material before and after treatment to levels required for untreated material.
 7. Discard treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective material.
 8. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Organic-Resin-Based Formulation (Exterior Type):
 - 1) Exterior Fire-X; American Wood Treaters, Inc.
 - 2) Exterior Fire-X; Hoover Treated Wood Products, Inc.
 - b. Low-Hygroscopic Formulation (Type A):
 - 1) D-Blaze; J. H. Baxter Co.
 - 2) D-Blaze; Chemical Specialties, Inc.
 - 3) Pyro-guard; Continental Wood Preservers, Inc.
 - 4) Dricon; Hickson Corp.
 - 5) Pyro-guard; Hoover Treated Wood Products, Inc.
 - c. Nonpressure-Treatment Formulation:
 - 1) Gaia Process; Fibretech, Inc.
- D. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve products identical to those tested for flame spread of 25 or less and for smoke developed of 25 or less per ASTM E 84 by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
1. For panels 3/4 inch (19 mm) thick and less and 45-lb/cu. ft (720-kg/cu. m) density, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2000 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 lbf (1100 N) and 225 lbf (1000 N) respectively.
 2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick and 44-lb/cu. ft (705-kg/cu. m) density, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1700 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 lbf (1100 N) and 175 lbf (780 N) respectively.
 3. Product: Subject to compliance with requirements, provide Duraflake FR by Willamette Industries, Inc.

- E. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve products identical to those tested for flame spread of 25 or less and for smoke developed of 200 or less per ASTM E 84 by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
 - 1. Product: Subject to compliance with requirements, provide Medite FR by Medite Corp.

2.03 CABINET HARDWARE AND ACCESSORY MATERIALS

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware."
- B. Cabinet Hardware Schedule: Refer to schedule at end of this Section for cabinet hardware required for architectural cabinets.
- C. Hardware Standard: Comply with BHMA A156.9 for items indicated by reference to BHMA numbers or referenced to this standard.
- D. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of BHMA A156.9.

2.04 INSTALLATION MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
- C. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.
 - 1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.
- D. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- E. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.05 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:
 - 1. Grade: Custom
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

- C. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch (19 mm) thick or less: 1/16 inch (1.5 mm).
 - 2. Edges of rails and similar members more than 3/4 inch (19 mm) thick: 1/8 inch (3 mm).
 - 3. Corners of cabinets and edges of solid-wood (lumber) members and rails: 1/16 inch (1.5 mm).
- E. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Trial fit assemblies at the fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on approved shop drawings before disassembling for shipment.
- F. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.
- G. Install glass to comply with applicable requirements of Division 8 Section "Glazing" and of FGMA "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.06 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 300.
 - 1. Grade: Custom.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- D. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.
- E. Wood Species: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise indicated.
 - 1. Provide split species on trim that face areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.

2.07 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 300.
 - 1. Grade: Premium.
 - 2. Grade: Custom
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- D. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.
- E. Wood Species: Any closed-grain hardwood listed in referenced woodworking standard.

2.08 WOOD CABINETS (CASEWORK) FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets.
 - 1. Grade: Premium.
 - 2. Grade: Custom
- B. AWI Type of Cabinet Construction: As indicated.
- C. Wood Species for Exposed Surfaces: As indicated.
 - 1. Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels.
 - 2. Matching of Veneer Leaves: Book match.
 - 3. Vertical Matching of Veneer Leaves: End match.
 - 4. Veneer Matching Within Panel Face: Running match.
- D. Semiexposed Surfaces: Provide surface materials indicated below:
 - 1. Surfaces Other than Drawer Bodies: Match species and cut indicated for exposed surfaces.
 - 2. Drawer Sides and Backs: Solid hardwood lumber, same species indicated for exposed surfaces, shop finished.
 - 3. Drawer Bottoms: Hardwood plywood, same species indicated for exposed surfaces, shop finished.
- E. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers except where located directly under tops.

2.09 INTERIOR ORNAMENTAL WORK FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 700.
 - 1. Grade: Custom
- B. Wood Species: Eastern white pine, sugar pine, or Idaho white pine.

2.10 INTERIOR FRAMES AND JAMBS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 900.
- B. Quality Standard: Comply with WIC Section 12, "Interior Jambs."
 - 1. Grade: Custom.
- C. Wood Species: White oak, rift sawn.
- D. Wood Species: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building unless otherwise indicated.
- E. Fire-Rated Interior Frames and Jambs: Products fabricated from fire-retardant particleboard or fire-retardant, medium-density fiberboard with veneered, exposed surfaces and identical in construction to units tested for use in fire door assemblies per ASTM E 152 by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fire-rated frames with appropriate label of applicable testing and inspecting agency.
 - 1. Fire Rating: 20 minutes.

2.11 INTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

- A. Quality Standard: Comply with AWI Section 900.
 - 1. 2. Grade: Custom.
- B. Wood Species: Any closed-grain hardwood listed in referenced woodworking standard.
- C. Wood Species: Eastern white pine, sugar pine, or Idaho white pine.
- D. Fire-Rated Door Frames: Provide fire-rated wood frames for wood doors that are identical to units tested in door and frame assemblies per ASTM E 152 and labeled and listed for ratings indicated by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

2.12 SHOP FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
 - 1. Grade: Provide finishes of same grades as items to be finished.
- B. General: The entire finish of interior architectural woodwork is specified in this Section, regardless of whether shop applied or applied after installation.
 - 1. Shop Finishing: To the greatest extent possible, finish architectural woodwork at the fabrication shop. Defer only final touch up, cleaning, and polishing until after installation.
 - 2. Shop Finishing: The extent to which the final finish is applied to architectural woodwork at the fabrication shop is the Contractor's option, except shop apply at least the prime/base coat to the greatest extent possible before delivery.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including backs of trim, cabinets, paneling,

and ornamental work and the underside of countertops. Apply 2 coats to back of paneling. Concealed surfaces of plastic laminate-clad woodwork do not require backpriming when surfaced with plastic laminate or thermoset decorative overlay.

- D. Washcoat for Stained Finish: Apply a vinyl washcoat to woodwork made from closed-grain wood before staining and finishing.
- E. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
- F. Filled Finish for Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
- G. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.
 - 1. Grade: Custom
 - 2. AWI Finish System TR-6: Catalyzed polyurethane.
 - 3. Staining: Match approved sample for color.
- H. Opaque Finish: Comply with requirements indicated below for grade, finish system, color, effect, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.
 - 1. Grade: Custom
 - 2. AWI Finish System OP-6: Catalyzed polyurethane.
 - 3. Color: As selected by Architect from the full range of colors available in finish system specified.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.02 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) for plumb and level (including tops).
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.

- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where necessary. Stagger joints in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
 - 1. Install standing and running trim with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) variation from a straight line.
- G. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
- H. Tops: Anchor securely to base units and other support systems as indicated. Calk space between backsplash and wall with specified sealant.
 - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c.
- I. Complete the finishing work specified in this Section to the extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in the shop.
- J. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.04 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

3.05 CABINET HARDWARE AND ACCESSORY SCHEDULE

- A. BHMA numbers are used below to designate hardware requirements, except as otherwise indicated.
- B. Butt Hinges: 2-3/4-inch (70-mm), 5-knuckle steel hinges made from 0.095-inch- (2.4-mm) thick metal, and as follows:
 - 1. Butt Hinges for Flush Doors: B01361.
 - 2. Semiconcealed Hinges for Overlay Doors: B01521.
- C. Concealed (European Type) Hinges: B01602.
- D. Pulls: Wire pulls, 4 inches (100 mm) long, 5/16 inches (8 mm) in diameter.
- E. Catches: As follows:
 - 1. Magnetic Catches: B03141.
 - 2. Push-in Magnetic Catches: B03131.
 - 3. Friction Catches: B03033.
 - 4. Ball Friction Catches: B03013.
- F. Shelf Rests: B04013.
- G. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, complying with BHMA A156.9, Grade 1 and rated for the following loads:
 - 1. Box Drawer Slides: 75 lbf (330 N).
 - 2. Box Drawer Slides: 100 lbf (440 N).
 - 3. File Drawer Slides: 150 lbf (670 N).
 - 4. File Drawer Slides: 200 lbf (890 N).
 - 5. Pencil Drawer Slides: 45 lbf (200 N).

3.06 SCHEDULE OF TRIM, COLUMNS AND CABINETS

- A. Refer to Interior Design Drawings.

END OF SECTION

SECTION 06444
MANUFACTURED TRIM AND ORNAMENTS, URETHANE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this section.

1.02 SUMMARY

- A Section includes furnishing and installing all selected high density urethane foam manufactured trim and ornament products.
 - 1. Standing and running trim
 - 2. Louvers
 - 3. Shutters
 - 4. Brackets
 - 5. Corbels

1.03 RELATED SECTIONS

- A. Section 01300 - Submittal Procedures.
- B. Section 01400 - Quality Requirements.
- C. Section 01600 - Product Requirements.
- D. Section 04200 – Unit Masonry
- E. Section 06100 - Rough Carpentry.
- F. Section 06402 – Interior Architectural woodwork.
- G. Section 07900 - Joint Sealers.
- H. Section 09900 - Paints and Coatings.
- I. Section 10000 - Louvers and Vents.

1.04 DEFINITIONS:

- A. Manufactured Trim and Ornaments: Standing and running trim, entrance units, louvers, gable vents, ceiling and wall ornaments, etc. manufactured by molding high density polyurethane foam to certain shapes and characteristics as presented in manufacturer's literature. These products are used in place of other natural and man-made materials shaped or manufactured by other processes.

1.05 SUBMITTALS:

- A. Conform to requirements of Agreement, General Conditions and Division 1 for submittal procedures and handling.
- B. Provide standard product data for products required on this project.

1.06 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Manufacturer shall have not less than 10 years successful experience in producing the type of prefabricated components required for project applications equivalent to the requirements for this project.
- B. Installer Qualifications: Installer shall have a minimum of 5 years' experience installing products of similar type and scope as those specified in this section.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas as designated by Architect.
 - 2. Include mock-up for each profile combination indicated on the drawings.
 - 3. Do not proceed with remaining work until workmanship, color and sheen are approved by Architect.
 - 4. Rework mock-up areas as required to produce acceptable work.
 - 5. Mock-up may remain as finished work if approved by Architect.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original packaging, unopened with no visible damage.
- B. Label each package with product contents, and stock number of contents, with warranty, installation, handling and storage recommendations enclosed or on packaging. Where manufacturer standards do not include this information with the products delivered to the project, necessary information will be provided by contact with product representatives.
- C. Allow for receiving, unloading, handling, and movement to approved storage areas within the project, and finally movement to point of installation.
- D. Store and protect all materials in accordance with manufacturer's requirements for environmental and physical protection. Protect from high temperatures such as solar heat in storage trailers exposed to direct sun. Allow at least 24 hours for materials to adapt to conditions at project site prior to installation. Protect un-coated portions of high density molded polyurethane materials from ultraviolet exposure.

1.08 PROJECT CONDITIONS:

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommendations.
- B. Allow at least 24 hours for materials to adapt to conditions at project site prior to installation.
- C. Protect un-coated portions of high density moulded polyurethane materials from ultraviolet exposure.

1.09 WARRANTY

- A. Product warranty limited to warranty provided with products as delivered, posted on website, or provided with printed materials. Additional copies will be furnished upon written request. Warranty does not cover installation. Warranty may be voided by

failure to properly follow installation instructions or proper painting and maintenance after installation.

Lifetime Limited Warranty

Fypon, Ltd. warrants to the original consumer purchaser that our exterior white primer paint finish will be free from UV ray degradation, blistering, and paint peeling under normal use for a period of one (1) year from the date of purchase. We further provide a LIFETIME WARRANTY to the original purchaser on the urethane material. This LIFETIME WARRANTY provides that the urethane material will be free from defects in material and workmanship under normal use. If a defect is found in a Fypon product and the above conditions have been met, a customer should notify Fypon in writing within thirty (30) days of discovering the defect. The customer may be required to return the product to Fypon (at his or her expense) for evaluation. Fypon will then review the situation and determine if replacement, repair or refund of the product is appropriate. This warranty does not include labor, transportation costs or any other expenses of any kind incurred in connection with the purchase, use or installation of the product. Replacement, repair or refund is the sole and exclusive option under this limited warranty.

This limited warranty does not cover damage resulting from mishandling in transit (if within the customer's control), acts of God, customer alteration, vandalism, misuse, abuse, improper maintenance, unreasonable care or other causes not arising from defects in workmanship and materials. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OTHER THAN AS EXPRESSED HEREIN. No person, agent, distributor, dealer, service facility, or company is authorized to change, modify or amend the terms of this limited warranty in any manner or fashion whatsoever, except to the extent provided in this limited warranty. Fypon, Ltd. shall not be liable to the customer or to any other person for any incidental or consequential damages or loss of profit resulting from any defect in the product. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so that the above limitation or exclusion may not apply. This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide Fypon, Ltd. products as specifically listed in Article 2.2, below. Manufacturer can be contacted at: Fypon, Ltd.
960 West Barre Road
Archbold, OH 43502
Phone: 800/446-3040 (U.S. or Canada) or 419/445-0116
Fax: 800/446-9373 (U.S. or Canada) or 419/445-4440

2.02 MATERIALS

- A. Manufactured polyurethane trim and ornaments:
 - 1. Louvered Shutters: Model Number LVSH18X66FNB. Prime coated.
 - 2. Decorative Millwork: Model Number BKT36X36X6. Prime coated.

2.03 ACCESSORIES

- A. Manufactured Trim and Ornaments:
 - 1 PL Premium adhesive.
- B. Fypon, Ltd. exterior white paint (also available as custom color from Sherwin Williams dealers, see catalog.)
 - 1. Fypon, Ltd. filler putty, off-white.
 - 2. Sealant approved for use with Fypon, Ltd. products.
 - 3. Installation kits.

2.04 FACTORY FINISHES

- A. Provide protective barrier coat primer, resistant to UV degradation, providing interim UV protection of products which, is suitable for field application of oil base or latex finish paints on all polyurethane foam products.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Site Verification of Conditions:
 - 1. Prior to start of installation, inspect all preceding work to ensure that there are no conditions which will cause an unsatisfactory installation of work involving products.
 - 2. Notify Architect in writing of any unacceptable conditions.
 - 3. Do not install any work involving products until unsatisfactory conditions are corrected and acceptable for proper installation of work.
 - 4. Correct any unacceptable work involving products which was installed over unsatisfactory conditions at no cost to Owner. If Contractor has directed, in writing, that products be installed over unacceptable field conditions, this paragraph 4 is void and Contractor accepts the cost of corrective work.

3.02 PREPARATION

- A. Protection: Protect surrounding and adjacent work to prevent damage to preceding work during execution of this work.
- B. Surface Preparation: Perform all preparation necessary for a successful installation of Fypon, Ltd. products, as specified in installation instructions for product.

3.03 INSTALLATION

- A. Obtain instructions for successful installation of work to be preformed. Become knowledgeable on material handling and installation recommendations. Carefully follow printed instructions.
- B. Ensure full compliance with instructions in all aspects of tasks required by this work.
- C. Coordinate work installing products with other contractors and provide proper accommodation for following work by other trades.

- D. Install sealant in accordance with installation recommendations. Use only sealant products which are approved for use with materials.
- E. Install adhesives at joints and for fastening in accordance with recommendations for proper installation of products. Use only adhesives approved for use with materials.
- F. Apply finish paint to all exposed surfaces of Manufactured Trim and Ornament prime coated materials installed on exterior of project.

3.04 PROTECTION

- A. Install temporary protective materials necessary to prevent significant damage to materials installed in this work. Remove protection when required to permit project completion.

END OF SECTION

**SECTION 06650
SIMULATED WOOD TRIM**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Free-Foam Cellular PVC Trim Boards for:
 - 1. Column wraps.
 - 2. Decorative brackets.

1.02 RELATED SECTIONS

- A. Section 06 - Finish Carpentry.
- B. Section 06 - Architectural Woodwork.
- C. Section 09 - Gypsum Board.
- D. Section 09 - Painting and Coating.

1.03 REFERENCES

- A. ASTM D 792 - Density and Specific Gravity of Plastics by Displacement.
- B. ASTM D 570 - Water Absorption of Plastics.
- C. ASTM D 638 - Tensile Properties of Plastics.
- D. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D 1761 - Mechanical Fasteners in Wood.
- F. ASTM D 5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by means of a Striker Impacted by a Falling Weight.
- G. ASTM D 256 - Determining the Pendulum Impact Resistance of Plastics.
- H. ASTM D 696 - Coefficient of Linear Thermal Expansion of Plastics Between minus 30 degrees C and plus 30 degrees C with a Vitreous Silica Dilatometer.
- I. ASTM D 635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- J. ASTM E 84 - Surface Burning Characteristics of Building Materials.
- K. ASTM D 648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
- L. ASTM D 3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.
- M. ASTM D 2240 - Rubber Property - Durometer Hardness

- N. ASTM D 3345 - Standard Test Method for Laboratory Evaluation of Wood and Other Cellulosic Materials for Resistance to Termites.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and finish.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum of 5 years producing PVC trim products.
- B. Installer Qualifications: Installer with a minimum of 3 years experience with the installation of PVC trim products.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
 - 4. Accepted mock-ups shall be comparison standard for remaining Work

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners.
- B. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.07 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

- A. Provide manufacturer's transferable limited lifetime warranty against defects in manufacturing that causes the products to rot, corrode, delaminate, or excessively swell from moisture.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Basis of Design: Versatex, which is located at: 400 Steel St.; Aliquippa, PA 15001; Other acceptable manufacturers are as follows:
1. CertainTeed - PVC Trim
 2. AZEK Building Products
 3. KLEER Lumber – The Trapco Group

2.02 MATERIALS

- A. PVC: Free Foam Cellular PVC material with a small-cell microstructure and density of .55 grams/cm³.
1. Performance and physical characteristic requirements:
 - a. Physical:
 - 1) Density: 0.55 g/cm³ when tested in accordance with ASTM D 792.
 - 2) Water Absorption: Less than 0.50 percent when tested in accordance with ASTM D 570
 - b. Mechanical:
 - 1) Tensile Strength: 3582 psi when tested in accordance with ASTM D 638.
 - 2) Tensile Modulus: 107,000 psi when tested in accordance with ASTM D 638.
 - 3) Flexural Strength: 5179 psi when tested in accordance with ASTM D 790.
 - 4) Flexural Modulus: 215,600 psi when tested in accordance with ASTM D 790.
 - 5) Modulus of Elasticity: 209,500 psi when tested in accordance with ASTM D 638.
 - 6) Elongation: 9.0 percent when tested in accordance with ASTM D 638.
 - 7) Nail Hold: 398 lbf/in of penetration when tested in accordance with ASTM D 1761.
 - 8) Compressive Strength: 6,553 psi (thickness dependent)
 - 9) Compressive modulus: 2,305 lbf/in (thickness dependent)
 - 10) Screw Hold: 240 lbf/in of penetration when tested in accordance with ASTM D 1761.
 - 11) Staple Hold: 69 lbf/in of penetration when tested in accordance with ASTM D 1761.
 - 12) Gardner Impact: 34 In-lbs when tested in accordance with ASTM D 5420.
 - 13) Notched Izod Impact: 0.270 Ft-lbs/inch when tested in accordance with ASTM D 256.
 - 14) Termite Resistance: Rating of 10 as tested in accordance with ASTM D 3345.
 - 15) Hardness: 60+ when tested in accordance with ASTM D 2240.

- 16) Parking Garage Ceiling Soffit System: 225 psf when tested in accordance with UL 580.
- c. Thermal:
 - 1) Coefficient of Linear Expansion: 3.25×10^{-5} in/in/degrees F when tested in accordance with ASTM D 696.
 - 2) Burning Rate: Failed to Ignite when tested in accordance with ASTM D 635.
 - 3) Flame Spread Index: 20 when tested in accordance with ASTM E 84.
 - 4) Heat Deflection Temp (264 psi): 146 degrees F when tested in accordance with ASTM D 648.
 - 5) Heat Deflection Temp (66 psi): 153 degrees F when tested in accordance with ASTM D 648.
 - 6) Oil Canning (@ 140 degrees F: Passed when tested in accordance with ASTM D 648.
2. Manufacturing Tolerances:
 - a. Variation in component length: Minus 0.00 / plus 1.00.
 - b. Variation in component width: plus or minus 1/32 inch.
 - c. Variation in component thickness: plus or minus 1/32 inch.
 - d. Variation in component edge cut: plus or minus 2 degrees.
 - e. Variation in Density plus or minus 0.02 grams per cubic centimeter.
3. Workmanship, Finish, and Appearance:
 - a. Free Foam Cellular PVC that is homogeneous and free of voids, holes, cracks, foreign inclusions and other defects. Edges must be square and top and bottom surfaces shall be flat with no convex or concave deviation.
 - b. Uniform surface free from cupping, warping, and twisting.

2.03 SIMULATED WOOD TRIM

- A. Sheet Board: S4S (Smooth) Sheet. For use as sheet materials or to create columns and decorative brackets.
 1. Size:
 - a. Width/Length: 4 foot by 8 foot
 - b. Thickness: As recommended by manufacturer for panel size indicated
 2. Finish:
 - a. Smooth/Smooth finish

2.04 SIMULATED WOOD TRIM

- A. PVC Frieze and Fascia: Versatex Soffit Advantage Frieze and Notched Fascia. Trims designed with 3/4 inch pocket to accommodate Vented or Solid Soffit product.
 1. Fascia Size:
 - a. Nominal Width:
 - 1) 1 inch by 8 inches
 - 2) 1 inch by 10 inches
 - b. Length:
 - 1) 18 feet.
 - 2) Custom lengths.
 2. Frieze Size:
 - a. Nominal Width:
 - 1) 5/4 inch by 6 inches
 - 2) 5/4 inch by 8 inches

- b. Length:
 - 1) 18 feet.
 - 2) Custom lengths.
 - 3. Finish:
 - a. Smooth finish.
 - b. Timber Ridge finish.
- B. PVC Columnwrap: Versawrap one-piece column wraps.
 - 1. Size:
 - a. Nominal Width:
 - 1) 4 inches by 4 inches (inside dimensions 3-3/4 inches)
 - 2) 6 inches by 6 inches (inside dimensions 5-3/4 inches)
 - 3) 8 inches by 8 inches (inside dimensions 7-1/2 inches)
 - b. Length:
 - 1) 8 feet 6 inches
 - 2) 10 feet
 - c. Thickness:
 - 1) 1/2 inch
 - 2) 3/4 inch
 - 2. Finish:
 - a. Smooth finish.
- C. PVC Column-wrap: Accessories.
 - 1. Accent Wrap Size:
 - a. Nominal Width:
 - 1) 4 inches by 4 inches (inside dimensions 4-3/4 inches)
 - 2) 6 inches by 6 inches (inside dimensions 6-3/4 inches)
 - 3) 8 inches by 8 inches (inside dimensions 8-1/2 inches)
 - b. Length:
 - 1) 10 inches.
 - c. Thickness:
 - 1) 1/2 inch
 - 2) 3/4 inch
 - 2. Post Caps Nominal Sizes:
 - a. 4-3/4 inches by 4-3/4 inches
 - b. 6-3/4 inches by 6 inches-3/4
 - 3. Trim Kits
 - a. Base Cap
 - b. Bed Mold
 - c. Bed Mold XL
 - d. 4 inch Crown Molding
 - 4. Finish:
 - a. Smooth finish.

2.05 ACCESSORIES

- A. Fasteners:
 - 1. Use 12 gauge stainless steel fasteners designed for wood trim and siding. Fastener should have sufficient flexural and tensile strength to resist bending.
 - 2. Use fasteners with thin shanks, blunt points, and full round heads that are long enough to penetrate the substrate a minimum of 1-1/4 inches.

3. Do not use staples, small brads and wire nails. Avoid using fine threaded wood screws and ring-shank fasteners.
 4. Use standard nail guns with a pressure setting between 70 psi and 100 psi. The recommended pressure depends on the type of gun, type of nail, ambient temperature, and the substrate. Care should be taken not to overdrive the nail into the material.
 5. Pre-drilling is not typically required unless large fasteners are used or the product is installed during temperatures below 40 degrees F.
 6. Use two fasteners for every framing member for trim-board applications. Sheet and trim-boards 8 inches and wider require additional fasteners.
 7. Install fasteners no more than 2 inches from the end of each board.
 8. Avoid fastening simulated wood trim over hollow or uneven areas. Fasten onto flat, solid substrates.
 9. 3/8 inch and 1/2 inch thick Sheet and Bead-board is not designed to be ripped and used for trim applications. These products must be glued and mechanically fastened to the substrate.
- B. Adhesives: Finishing System.
1. All bonded surfaces must be smooth, clean, and in complete contact with each other for best results.
 2. Adhere simulated wood trim to itself with PVC cement or cellular PVC adhesives to prevent joint separation. Acceptable adhesives are PVC Trim Welder, IPS Weld-On 705 (white), and Zevo PVC Trim adhesive.
 3. PVC cements cure quickly (3-5 minutes or less), and have a limited working time.
 4. Scarf cut joints are recommended where applicable.
 5. Bonded joints should be secured with fasteners and fastened with two rows on each side of the joint.
 6. When bonding simulated wood trim to other substrates, consult the adhesive manufacturer to determine suitability.
- C. Nail Hole Filler: Cortex plug system by Fasten Master.
- D. Sealants:
1. Use urethane, polyurethane, polymer blends or acrylic based sealants that do not contain silicone as specified in Section 07.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Cutting:
 - 1. Simulated wood trim can be cut using standard woodworking saws. Conventional carbide-tipped blades designed for cutting wood are preferred. Avoid using fine-tooth metal-cutting blades.
 - 2. Rough-cut edges are typically caused by excessive friction, poor board support, or worn or improper tooling.
- C. Drilling:
 - 1. Simulated wood trim can be drilled using standard woodworking drill bits. Do not use drill bits made for rigid PVC.
 - 2. Avoid frictional heat build-up.
 - 3. Remove shavings periodically from a drill hole as necessary.
- D. Milling and Molding:
 - 1. Simulated wood trim can be milled or molded using standard milling or molding machines found in millwork shops.
 - 2. Rake angle 20 to 30 degrees. 25 degrees is recommended.
 - 3. Cutting speed to be optimized with the number of knives and feed rate.
- E. Routing:
 - 1. Simulated wood trim can be routed with virtually any piece of equipment used to rout wood.
 - 2. Carbide tipped router bits are recommended.
 - 3. Machinery that allows for multiple cutting speeds will allow you to optimize the process obtaining a smoother finished part.
- F. Edge Finishing:
 - 1. Traditional sanding, grinding or filing tools used for woodworking are preferred.
- G. Nail Location:
 - 1. For trim-board applications use two fasteners per framing member.
 - 2. Use additional fasteners (3/4 inch preferred) for trim-board 8 inches and wider.
 - 3. Install fasteners a maximum of 2 inches from the end of each board.
- H. Expansion and Contraction:
 - 1. Simulated wood trim expands and contracts with changes in temperature. Properly fastening along the entire length is required to minimize expansion and contraction.
 - 2. Allow 3/16 inch space per 18-foot run of trim for expansion and contraction.
 - 3. Bond joints between pieces of simulated wood trim to eliminate separation.
 - 4. Allow expansion and contraction space at the ends of long runs.

- I. Cleaning:
 - 1. Clean simulated wood trim with mild detergent and water.
 - 2. Products with pumice, such as Soft Scrub, may be applied with a nylon brush.
 - 3. For more stubborn stains use a mild household cleaner and degreaser like Clorox Cleanup, Clorox Outdoors, Denatured Alcohol, Bleach, Mr. Clean Magic Eraser or Corte Clean with nylon brush.
- J. Painting:
 - 1. Be sure surface to be painted is clean, dry, and free of dirt, loose or peeling paint, mildew, chalk, grease and any other surface contaminants before paint application.
 - 2. Finish nail holes with nail hole filler or a UV resistant acrylic caulk.
 - 3. Paint as specified in Section 09 90 00 - Painting and Coating.
 - a. Use 100 percent acrylic latex or 100 percent acrylic latex with urethane additive paint with a light reflective value (LRV) equal to or greater than 55 units.
 - b. Follow the paint manufacturer's application recommendations.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 06660
PLASTIC FABRICATIONS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY OF THE WORK

- A. This Section includes the Plastic Fabrication as shown and specified in the described system(s):
1. Appliqués
 2. Backsplashes
 3. Balustrade Panels
 4. Bar fronts
 5. Cabinet Doors
 6. Ceiling Panels
 7. Door Lights
 8. Elevator cabs
 9. Feature Wall
 10. Flooring
 11. Furniture
 12. Lighting
 13. Partitions
 14. Projection screens
 15. Retail Shelving
 16. Sculpture
 17. Shower doors & enclosures
 18. Side lights
 19. Signage (Interior only)
 20. Tabletops
 21. Transaction Tops
 22. Vanity tops
 23. Wall Cladding
 24. Wall Cladding-back-lit
 25. Wall Panels-back-lit
 26. Wall Sculpture
 27. Water walls
 28. Worktops
- B. The extent of Solid Polymer Fabrication is shown on the drawings.
1. Additional fabrication and installation details can be found on the 3form Partner Preliminary Project Review, if applicable
- C. Related Sections include the following:
1. Section 05520 Decorative Metal Railings
 2. Section 06402 Schedules for Finish Carpentry; Section 06402 Schedules for Architectural Woodwork
 3. Section 08160 Molded Composite Interior Doors

**PLASTIC FABRICATIONS
SECTION 06660-1**

4. Section 10000 Toilet, Bath and Laundry Accessories
5. Section 06650 Plastic Countertops

1.03 SUBMITTALS

- A. General: Submit the following in accordance with conditions of contract and Division 1 specification section 01300 "Submittal Procedures".
- B. Product Data: Submit manufacturer's product data; include product description, fabrication information, and compliance with specified performance requirements.
- C. Submit product test reports from a qualified independent 3rd party testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if for current manufacturer and indicative of products used on this project.
 1. Test reports required are:
 - a. Rate of Burning (ASTM D 635)
 - b. Self-Ignition Temperature (ASTM D 1929)
 - c. Density of Smoke (ASTM D 2843)
 - d. Flame spread and Smoke developed testing (ASTM E 84)
 - e. Room Corner Burn Test (NFPA 286)
- D. Shop Drawings: Include plans, elevations, sections, panel dimensions, details, and attachments to other work.
- E. Samples for Initial Selection:
 1. Submit minimum 2-inch by 2-inch samples. Indicate full color, texture and pattern variation.
- F. Samples for Verification:
 1. Submit minimum 4-inch by 4-inch sample for each type, texture, pattern and color of solid plastic fabrication.
- G. Mockups:
 1. Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 2. Build mockup of each type of Plastic Fabrication.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

1.04 QUALITY ASSURANCE

- A. Manufacturers Qualifications
 1. Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least three (3) consecutive years and which can show evidence of those materials being satisfactorily used on at least three (3) projects of similar size,

scope and location. At least one (1) of the projects shall have been successful for use one (1) year or longer.

2. Manufacturer must offer a documented reclaim process that will take back, at the manufacturers cost, panels that are at their end-of life cycle.
3. Manufacturer must have documented training and qualification program for fabrication and installation of plastic fabrications.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Plastic Fabrications, systems and specified items in manufacturer's standard protective packaging.
- B. Do not deliver Plastic Fabrications, system, components and accessories to Project site until areas are ready for installation.
- C. Store materials in a flat orientation in a dry place that is not exposed to exterior elements.
- D. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent damage or staining following installation for duration of project.
- E. Before installing Plastic Fabrications, permit them to reach room temperature.

1.06 PROJECT CONDITIONS

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

1.07 WARRANTY

- A. Manufacturer's Special Warranty on Plastic Fabrications: Manufacturer's standard form agreeing to repair or replace panels that fail in material or workmanship within the specified warranty period.
- B. Warranty Period: 1 year after ship date

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer: 3form, Inc., Salt Lake City, Utah, USA / telephone 801-649-2500

2.02 MATERIALS

- A. 3form Alabaster
 1. Engineered resin
 2. Sheet Size: Maximum 4' x 6'
 3. Thickness: 3/8"
 4. Basis of Design Product: The design of Plastic Fabrications is based on Alabaster as provided by 3form, Inc.

- B. Sheet minimum performance attributes:
 - 1. Rate of Burning (ASTM D 635). Material must attain CC1 Rating
 - 2. Self-Ignition Temperature (ASTM D 1929). Material must have a Self-ignition temperature greater than 980°F.
 - 3. Density of Smoke (ASTM D 2843). Material must have a smoke density less than 12%.
 - 4. Flame spread and Smoke developed testing (ASTM E 84). Material must be able to meet a level of Class A (Flame spread less than 25 and smoke less than 450)
 - 5. Room Corner Burn Test (NFPA 286). Material must meet Class A criteria as described by the Florida Building Code.

2.03 FABRICATION

- A. General: Fabricate Plastic Fabrications to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes, profiles and other characteristics are indicated on the drawings, additional fabrication and installation details can be found on the 3form Partner Preliminary Project Review, if applicable.
- B. Comply with manufacturer's written recommendations for fabrication.
- C. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations.
 - 1. Sawing: Select equipment and blades suitable for type of cut required.
 - 2. Drilling: Drills specifically designed for use with plastic products.
 - 3. Milling: Climb cut where possible.
 - 4. Routing
 - 5. Tapping
- D. Laminating: Laminate to substrates indicated using adhesives and techniques recommended by manufacturer.

2.04 MISCELLANEOUS MATERIALS

- A. General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaner: Type recommended by manufacturer.
- C. Fasteners: Use screws designed specifically for plastics. Provide threaded metal inserts for applications requiring frequent disassembly such as light fixtures.
- D. Bonding Cements: May be achieved with adhesives suitable for use with product and application.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. General: Comply with manufacturer's written instructions for the installation of Plastic Fabrications. Sizes, profiles and other characteristics are indicated on the drawings, additional installation details can be found on the 3form Partner Preliminary Project Review, if applicable.
- B. Manufacturer's shop to fabricate items to the greatest degree possible.
- C. Installation should be performed by an authorized 3form Partner, if available.
- D. Utilize fasteners, adhesives and bonding agents recommended by manufacturer for type of installation indicated. Material that is chipped, warped, hazed or discolored as a result of installation or fabrication methods will be rejected.
- E. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
- F. Form field joints using manufacturer's recommended procedures. Locate seams in panels so that they are not directly in line with seams in substrates.

3.2 CLEANING AND PROTECTION

- A. Protect surfaces from damage until date of substantial completion. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

Solid Polymer Fabrication #1 (SPF-1)

Product: [Replace with Collection and product name]

Color: [Replace with color name]

Surface Finish: [standard] [renewable patina]

Expansion/Contraction Allowance:

Orientation: [Horizontal] [Vertical]

END OF SECTION

**SECTION 07111
COMPOSITE SHEET WATERPROOFING**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
 - 1. Below-grade wall waterproofing.
 - 2. Below-grade roof deck waterproofing.
 - 3. Plaza deck waterproofing.
 - 4. Planter waterproofing.
 - 5. Parking deck waterproofing.
 - 6. Bridge deck waterproofing.
 - 7. Waterproofing under basement slabs.

1.03 RELATED SECTIONS:

- A. Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing.
- B.
- C. Division 5 Section "Expansion Joint Cover Assemblies" for expansion-joint cover assemblies and installation.
- D. Division 7 Section "Sheet Metal Flashing and Trim" for sheet metal flashings.
- E. Division 7 Section "Joint Sealants" for joint sealant materials and installation.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Provide waterproofing that prevents the passage of liquid water under hydrostatic pressure and complies with requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current sheet membrane.

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of waterproofing specified, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties.
- C. Shop Drawings showing locations and extent of waterproofing, including details for substrate joints and cracks, sheet flashings, penetrations, tie-ins with adjoining construction, and other termination conditions.

- D. Samples, 3-by-6-inch (75-by-150-mm) minimum size, of each waterproofing material required for Project.
- E. Installer certificates signed by manufacturer certifying that Installers comply with requirements under the "Quality Assurance" Article.
- F. Product test reports from a qualified independent testing agency evidencing compliance of waterproofing with requirements and other physical properties reported by manufacturer based on comprehensive testing of products according to current standard test methods within previous 5 years.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who is certified in writing by waterproofing manufacturer as qualified to install manufacturer's waterproofing.
- B. Installer Qualifications: Engage an Installer who has completed waterproofing similar to that indicated for this Project and who is acceptable to waterproofing manufacturer.
- C. Single-Source Responsibility: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing waterproofing.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
 - 1. Before installing waterproofing, meet with Owner, Architect, consultants, independent testing agency, waterproofing manufacturer, and other concerned entities.
 - 2. Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, inspection and testing procedures, and protection and repairs.
 - 3. Notify participants at least 7 days before conference.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.

1.08 PROJECT CONDITIONS

- A. Environmental Conditions: Apply waterproofing within range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
 - 2. Do not apply waterproofing to concrete surfaces until concrete has fully cured.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.09 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
1. Warranty Period: 5 years after date of Substantial Completion.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
1. Rubberized-Asphalt Composite Sheet:
 - a. PQ 7100; American Permaquik Inc.
 - b. QSC 701; Carlisle Corporation, Carlisle Coatings & Waterproofing Inc.
 - c. Bituthene; Grace: W.R. Grace & Co.
 - d. Elasto-Ply; Karnak Corporation.
 - e. Mel-rol; Meadows: W.R. Meadows, Inc.
 - f. Miradri; Nicolon/Mirafi Inc.
 - g. Nordtene; Nord Bitumi U.S. Inc.
 - h. Duramem 700-SM; Pecora Corporation.
 - i. Polyguard 650; Polyguard Products, Inc.
 - j. Plastiwrap 60; Progress Unlimited, Inc.
 2. Reinforced Rubberized-Asphalt Composite Sheet:
 - a. Royal-Gard; Chase Corporation, Royston Laboratories Div.
 - b. Jiffy Seal 140/60; Protecto Wrap Co.
 3. Heavy-Duty, Rubberized-Asphalt Composite Sheet:
 - a. QSC 711; Carlisle Corporation, Carlisle Coatings & Waterproofing Inc.
 - b. 10A Easy Pave ER; Chase Corporation, Royston Laboratories Div.
 - c. Bituthene 5000; Grace: W.R. Grace & Co.
 - d. Mel-Dek; Meadows: W.R. Meadows, Inc.
 - e. Miradri 700; Nicolon/Mirafi Inc.
 - f. Duramem 712 Pre-Pave; Pecora Corporation.
 - g. Polyguard 665; Polyguard Products, Inc.
 - h. Plastiwrap 65; Progress Unlimited, Inc.
 - i. M-400A(R); Protecto Wrap Co.
 4. Butyl Rubber Composite Sheet:
 - a. Polyken 660, Kendall Co., Polyken Technologies Div.
 5. Bituminous Composite Panel and Protection Course:
 - a. Melnar; Meadows: W.R. Meadows, Inc.
 6. Adhesive-Coated HDPE Composite Sheet:
 - a. Bituthene Pre-Pour; Grace: W. R. Grace & Co.
 - b. Bituthene Pre-Pour HD; Grace: W. R. Grace & Co.

2.02 SELF-ADHERING COMPOSITE SHEET

- A. Rubberized-Asphalt Composite Sheet: 60-mil- (1.5-mm-) thick self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated to a 4-mil- (0.10-mm-) thick polyethylene film with release liner on adhesive side.
1. Sheet Type: Manufacturer's standard composite sheet for use when ambient and substrate temperatures exceed 40 deg F (5 deg C).
 2. Sheet Type: Composite sheet formulated for low temperature use when ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and 5 deg C).
 3. Sheet Type: Composite sheet formulated for use with primer or surface conditioner meeting VOC limits of authorities having jurisdiction.
 4. Physical Properties: Provide waterproofing complying with the following:
 - a. Tensile Strength: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Pliability: No cracks when bent 180 degrees over a 1-inch (25-mm) mandrel at minus 25 deg F (minus 32 deg C); ASTM D 146.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3.2-mm) movement; ASTM C 836.
 - e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154.
 - f. Hydrostatic-Head Resistance: 150 feet (45 m) minimum; ASTM D 5385.
 - g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
- B. Reinforced Rubberized-Asphalt Composite Sheet: 55-mil- (1.4-mm-) thick, minimum, self-adhering sheet consisting of rubberized-asphalt membrane embedded in spun-bonded polyester or fiberglass nonwoven fabric reinforcement laminated to a 0.50-mil- (0.01-mm-) thick polyester film with a release liner on adhesive side, complying with the following:
1. Pliability: No cracks when bent 180 degrees over a 1-inch (25-mm) mandrel at minus 25 deg F (minus 32 deg C); ASTM D 146.
 2. Hydrostatic-Head Resistance: 150 feet (45 m) minimum.
- C. Heavy-Duty, Rubberized-Asphalt Composite Sheet: One of the following:
1. 65-mil- (1.6-mm-) thick self-adhering sheet consisting of 53 to 56 mils (1.3 to 1.4 mm) of rubberized asphalt laminated to a heat-resistant, 9- to 12-mil- (0.2- to 0.3-mm-) thick woven polypropylene geotextile with release liner on adhesive side.
 2. 55-mil- (1.4-mm-) thick self-adhering sheet consisting of rubberized asphalt embedded in fiberglass woven fabric reinforcement laminated to a 0.50-mil- (0.01-mm-) thick polyester mat with a release liner on adhesive side.
 3. 70-mil- (1.8-mm-) thick self-adhering sheet consisting of rubberized asphalt embedded in inert fabric reinforcement laminated to a reflective geotextile with a release liner on adhesive side.
 4. Physical Properties: Provide waterproofing complying with the following:
 - a. Tensile Strength, Membrane: 250 lbf (1112 N) minimum; ASTM D 882.
 - b. Pliability: Unaffected when bent 180 degrees over a 1/4-inch (6.4-mm) mandrel at minus 15 deg F (minus 26 deg C); ASTM D 146.

- c. Puncture Resistance, Mesh: 200 lbf (890 N) minimum; ASTM E 154.
- D. Butyl Rubber Composite Sheet: 60-mil- (1.5-mm-) thick self-adhering sheet consisting of butyl rubber core bonded to a polyethylene film with release liner on adhesive side complying with the following:
 - 1. Tensile Strength: 500 psi (3.4 MPa); ASTM D 412, Die C, modified.
 - 2. Ultimate Elongation: 300 percent; ASTM D 412, Die C, modified.
 - 3. Pliability: Unaffected when bent 180 degrees over a 1/4-inch (6.4-mm) mandrel at 0 deg F (minus 18 deg C); ASTM D 146.
 - 4. Crack Cycling: Unaffected after 100 cycles of 1/4-inch (6.4-mm) movement.
 - 5. Puncture Resistance: 70 lb (310 N) minimum; ASTM E 154.
 - 6. Hydrostatic-Head Resistance: 150 feet (45 m) minimum.
 - 7. Water Absorption: 0.12 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.

2.03 SELF-ADHERING COMPOSITE PANEL

- A. Bituminous Composite Panel and Protection Course: 135-mil- (3.4-mm-) thick, self-adhering, 7-ply panel consisting of 62.5-mil- (1.58-mm-) thick rubberized asphalt embedded into a reinforced carrier felt and a bitumen-encased matrix topped by a weather-coated, inert reinforcing ply protection course with a release liner on adhesive side, complying with the following:
 - 1. Water-Vapor Resistance: 0.00 grains/h x sq. ft. (0.00 g/h x sq. m); ASTM E 96, Procedure B.
 - 2. Hydrostatic-Head Resistance: 75 feet (23 m) minimum.

2.04 HIGH-DENSITY POLYETHYLENE (HDPE) COMPOSITE SHEET

- A. Adhesive-Coated HDPE Composite Sheet: 42-mil- (1.1-mm-) thick, uniform, flexible sheet consisting of 16-mil- (0.4-mm-) thick high-density polyethylene sheet coated with a pressure-sensitive rubber adhesive, a protective adhesive coating, and a release liner.
- B. Adhesive-Coated HDPE Composite Sheet: 56-mil- (1.4-mm-) thick, uniform, flexible sheet consisting of 30-mil- (0.75-mm-) thick high-density polyethylene sheet coated with a pressure-sensitive rubber adhesive, a protective adhesive coating, a detackifying surface treatment, an uncoated self-adhering side lap strip and a release liner.
 - 1. Physical Properties: Provide waterproofing complying with the following:
 - a. Tensile Strength, Film: 4000 psi (27.6 MPa) minimum; ASTM D 412.
 - b. Low-Temperature Flexibility: Unaffected at minus 25 deg F (minus 32 deg C); ASTM D 1970.
 - c. Peel Adhesion to Concrete: 5 lbf (22 N); ASTM D 903, modified.
 - d. Lap Adhesion: 3 lbf (13 N) minimum; ASTM D 1876, modified.
 - e. Hydrostatic-Head Resistance: 231 feet (70 m); ASTM D 5385, modified.

2.05 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing sheet membrane.
 - 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

- B. Primer: Liquid primer recommended by manufacturer of sheet waterproofing material for substrate.
- C. Sheet Flashing: Self-adhering, rubberized-asphalt composite sheet of same material, construction, and thickness as waterproofing sheet membrane.
- D. Liquid Membrane: Elastomeric, 2-component, liquid, cold fluid-applied, trowel grade or low viscosity as recommended by waterproofing manufacturer for application.
- E. Patching Membrane: Low-viscosity, 2-component, asphalt-modified coating.
- F. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
- G. Penetration Seal: Self-adhering reinforced membrane, 2-1/2 inches (64 mm) wide, with a tack-free protective adhesive coating on 1 side and a release film on self-adhering side.
- H. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick, predrilled at 9-inch (225-mm) centers.
- I. Joint Tape: 62.5-mil- (1.58-mm-) thick felt-reinforced self-adhesive tape, 6 inches (152 mm) wide, with a release film on adhesive side.
- J. Protection Course: As follows:
 - 1. Semirigid sheets of fiberglass or mineral-reinforced asphaltic core, pressure laminated between 2 asphalt-saturated fibrous liners and as follows:
 - a. Thickness: 1/8 inch (3 mm), nominal.
 - b. Thickness: 1/4 inch (6 mm), nominal.
 - c. Thickness: 1/8 inch (3 mm), nominal, for vertical applications; 1/4 inch (6 mm), nominal, elsewhere.
 - 2. Molded-Polystyrene Insulation Board: ASTM C 578, Type I, 0.90-lb/cu. ft. (15-kg/cu. m) minimum density, and 1-inch (25-mm) minimum thickness.

2.06 MOLDED-SHEET DRAINAGE PANELS

- A. Composite drainage panels, 3-dimensional, nonbiodegradable, manufactured with a permeable geotextile bonded to molded-plastic-sheet drainage core and designed to effectively convey water.
 - 1. Geotextile: Nonwoven geotextile fabric of polypropylene or polyester fibers, or combination of both.
 - 2. Geotextile: Woven geotextile fabric of polypropylene or polyester fibers, or combination of both.
 - 3. Minimum Flow Rate: 7 gpm/foot (1.45 L/s/1000 mm) at a hydraulic gradient of 1.0 and 3600-psf (172-kPa) normal pressure when tested according to ASTM D 4716.

2.07 INSULATION

- A. Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed by the expansion of polystyrene base resin in an extrusion process using hydrochlorofluorocarbons as the blowing agents to comply with ASTM C 578 for type and other requirements indicated below:
 - 1. Type VI, 1.8-lb/cu. ft. (29-kg/cu. m) minimum density and 40-lb/sq. in. (276-kPa) minimum compressive strength.

2. Type VII, 2.2-lb/cu. ft. (35-kg/cu. m) minimum density and 60-lb/sq. in. (414-kPa) minimum compressive strength.
 3. Type V, 3-lb/cu. ft. (48-kg/cu. m) minimum density and 100-lb/sq. in. (690-kPa) minimum compressive strength.
- B. Fabric-Faced, Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed by the expansion of polystyrene base resin in an extrusion process using hydrochlorofluorocarbons as the blowing agents to comply with ASTM C 578 for type and other requirements indicated below. Provide products fabricated with tongue-and-groove edges and with one side having a matrix of vertical and horizontal drainage channels faced with manufacturer's standard nonwoven filtration fabric.
1. Type IV, 1.6-lb/cu. ft. (26-kg/cu. m) minimum density and 25-lb/sq. in. (173-kPa) minimum compressive strength.
 2. Type VI, 1.8-lb/cu. ft. (29-kg/cu. m) minimum density and 40-lb/sq. in. (276-kPa) minimum compressive strength.
 3. Type VII, 2.2-lb/cu. ft. (35-kg/cu. m) minimum density and 60-lb/sq. in. (414-kPa) minimum compressive strength.
 4. Minimum Flow Rate: 10 gpm/foot (2 L/s/1000 mm) at a hydraulic gradient of 1.0 and 1500-psf (72-kPa) normal pressure when tested according to ASTM D 4716.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with Installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.
1. Do not proceed with installation until after minimum concrete curing period recommended by waterproofing manufacturer.
 2. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 3. Notify Architect in writing of anticipated problems using waterproofing over substrate.

3.02 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.
- C. Remove grease, oil, form release agents, paints, and other penetrating contaminants from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrate. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install membrane strip and center over construction and control joints and cracks exceeding a width of 1/16 inch (1.6 mm).
- F. Inside Corners: Prepare, prime, and treat inside corners according to waterproofing manufacturer's written instructions.
1. Install membrane strip centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of liquid membrane on horizontal inside corners and as follows:
 - a. At footing-to-wall intersections, extend liquid membrane each direction from corner or install membrane strip centered over corner.
 - b. At deck-to-wall intersections, extend liquid membrane or sheet membrane flashing onto deck waterproofing and to finished height of sheet flashing.
- G. Outside Corners: Prepare and treat outside corners according to waterproofing manufacturer's written instructions.
1. Install strip of membrane 12 inches (300 mm) wide, centered over corner.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to waterproofing manufacturer's written instructions.
1. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge and cover with sheet membrane strips.

3.03 SELF-ADHERING COMPOSITE SHEET APPLICATION

- A. Install self-adhering composite sheet according to waterproofing manufacturer's written instructions.
- B. Apply primer to substrate at required rate and allow to dry. Limit priming to areas that will be covered by waterproofing membrane in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheet membrane over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
1. When ambient and substrate temperatures exceed 40 deg F (5 deg C), install manufacturer's standard rubberized-asphalt composite sheet.
 2. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and 5 deg C), install manufacturer's standard, low-temperature, rubberized-asphalt composite sheet.
 3. On substrates to receive hot-mixed asphalt paving, install heavy-duty, rubberized-asphalt composite sheet.
- D. Two-Ply Application: Install sheet membrane with a lap width not less than 50 percent of sheet width to provide a minimum 2 thicknesses of sheet membrane over area to receive waterproofing.
- E. Apply sheet membrane from low point to high point of deck to ensure side laps shed water.
- F. Apply continuous sheet membrane over membrane strips bridging each type of joint to dimensions indicated or required by manufacturer.

- G. Seal exposed edges of membrane terminations not concealed by metal counterflashings or ending in reglets with mastic or sealant.
- H. Install sheet membrane and auxiliary materials to tie in adjacent waterproofing.
- I. Repair tears, voids, and lapped seams in waterproofing not meeting requirements. Slit and flatten fishmouths and blisters. Patch with sheet membrane extending 6 inches (150 mm) beyond repaired areas in all directions.

3.04 SELF-ADHERING COMPOSITE PANEL APPLICATION

- A. Install self-adhering composite panels according to waterproofing manufacturer's written instructions.
- B. Apply primer to substrate at required rate and allow to dry. Limit priming to areas that will be covered by waterproofing membrane in same day. Reprime areas exposed for more than 24 hours.
- C. Install and firmly adhere panels over area to receive waterproofing. Accurately align and butt vertical and horizontal joints.
- D. Tape vertical and horizontal butt joints and exposed top, side, and bottom edges at panel terminations with joint tape.

3.05 ADHESIVE-COATED HDPE COMPOSITE SHEET APPLICATION

- A. Install adhesive-coated HDPE composite sheet according to waterproofing manufacturer's written instructions.
- B. Place and secure drainage panels over substrate. Lap edges and ends of geotextile to maintain continuity.
- C. Install sheet membrane with high-density polyethylene face against substrate and fasten.
 - 1. Walls: Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams and stagger and tape end laps to ensure watertight installation.
 - 2. Slabs: Accurately align sheets and maintain uniform 3-inch- (75-mm-) minimum lap widths and end laps. Overlap and seal seams and stagger and tape end laps to ensure watertight installation.
- D. Securely fasten top termination of wall-mounted sheet membrane with continuous metal termination bar anchored through drainage panel into substrate.
- E. Seal penetrations through membrane to provide watertight seal with penetration seal patches or wrapping and liquid membrane fillet.
- F. Install sheet membrane and auxiliary materials to tie in adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not meeting requirements. Tape perimeter of damaged or nonconforming area extending 6 inches (150 mm) beyond repaired areas in all directions. Firmly apply a patch of sheet membrane.

3.06 PROTECTION COURSE INSTALLATION

- A. Install protection course over waterproofing membrane using tape or adhesive according to manufacturer's written instructions and before commencing subsequent construction operations. Minimize exposure of membrane.
 - 1. Molded-sheet drainage panels may be used in lieu of protection course to vertical applications when approved by waterproofing manufacturer.

3.07 DRAINAGE PANEL INSTALLATION

- A. Place and secure drainage panels according to manufacturer's written instructions. Use adhesives and mechanical fasteners recommended by manufacturer that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed panels during subsequent construction.
 - 1. For vertical applications, install insulation used as a protection course before installing drainage panel.

3.08 INSULATION INSTALLATION

- A. Install one or more layers of insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.
- B. On vertical surfaces, set insulation units in adhesive or tape applied according to manufacturer's written instructions.
- C. On horizontal surfaces, loose-lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation.

3.09 FIELD QUALITY CONTROL

- A. Test each deck area for leaks after waterproofing and before protection course and overlaying construction are placed. Plug or dam drains and fill with water to a depth of 2 inches (50 mm) or to within 3 inches (75 mm) of top of sheet flashings. Maximum water depth shall not exceed 4 inches (100 mm). Flood each area for 24 hours.
- B. Owner will engage an independent testing agency to perform field inspections, sample and test materials being used, observe flood tests, and report whether tested Work conforms to or deviates from requirements.
 - 1. Testing agency will examine underside of decks and terminations for evidence of leaks.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.
 - 1. After flood tests, repair leaks and make further repairs until waterproofing installation is watertight.
- D. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.

3.10 PROTECTING AND CLEANING

- A. Protect waterproofing from damage and wear during application and remainder of construction period, according to manufacturer's written instructions.
- B. Protect installed insulation from damage due to ultraviolet light exposure, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07142
ELASTOMERIC WATERPROOFING BENEATH TILE

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Section includes: Provide a complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at locations indicated.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Product data:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades;
 - 4. Manufacturer's current recommended installation procedures which, when reviewed by Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work;
 - 5. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.
- C. Mock-up: Prior to installation, prepare a sample panel of the work of this Section at a location on the job site where approved by the Architect.
 - 1. Make the sample panel in dimensions approved by the Architect and with one panel for each of the various types of installation.
 - 2. Show all aspects of the work of this Section to the quality specified.
 - 3. Make necessary adjustments in the sample panel(s) and secure the Architect's approval.
 - 4. The sample panel(s), when approved by the Architect, will be used as a datum point for comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.
 - 5. Upon approval of the Architect, the sample panel(s) may become actual part of the installation required for this Work.

1.04 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

- B. Applicator qualifications:
 - 1. Applicator shall have at least three years' experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 - 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.
- C. Convene a pre-installation job-site conference four weeks prior to commencing work of this Section:
 - 1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
 - 2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- C. Comply with pertinent provisions of Section 01600.

1.06 SUBSTRATE CONDITIONS

- A. General:
 - 1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
 - 2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.
- B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom.
- C. Plywood: Where work of this Section will be applied to plywood, provide exterior grade plywood, 5/8" thick minimum, with A-side up, fastened with ring-shank nails.
- D. Decks:
 - 1. Slope deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
 - 2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.

- E. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.
- F. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.07 WARRANTY

- A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship for a period of two years following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure.
 - 1. Manufacturer's standard warranty covering materials;
 - 2. Applicator's standard warranty covering workmanship.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide a complete fluid applied elastomeric waterproofing membrane system having the following minimum attributes:
 - 1. 100 percent solids pure polyurethane designed for waterproofing concealed building components subject to hydrostatic head;
 - 2. Designed for use under ceramic tile on mortar bed;
 - 3. Complying with ASTM C836-89a.
 - 4. Acceptable products:
 - a. Vulkem 450
 - b. Vulkem 360 NF
 - c. or prior approved equal

2.02 ACCESSORIES

- A. Primer: As recommended by waterproofing membrane system manufacturer;
- B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;
- C. Reinforcing fabric: Woven fiberglass scrim cloth;
- D. Elastomeric sheet flashing: 1/16 inch thick by 12 inch wide uncured neoprene sheeting;
- E. Sealant:
 - 1. Dymeric 240/240 FC - two-part
 - 2. Vulkem 227 – two-part

2.03 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

PART 3 - EXECUTION**3.01 SURFACE CONDITIONS**

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
 - 1. Verify conformance with manufacturer's requirements;
 - 2. Report unsatisfactory conditions in writing to the Architect;
 - 3. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Surface preparation and detailing procedures to be in accord with waterproofing membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.
- B. Clean all surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membrane immediately prior to installation.
- C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.
- D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.
- E. Prime surfaces in accord with manufacturer's instructions.
- F. Install 1/4" diameter backer rod into corner of all horizontal-to-vertical junctures subject to movement and cover with 1" detail cant of approved sealant; install 1" detail cants at projections, curbs and other horizontal-to-vertical junctures.
- G. Install detail coats, joint and crack treatments, and liquid flashings in accord with manufacturer's instructions.
- H. Allow detail applications to cure in accord with manufacturer's instructions prior to general application of membrane.

3.03 APPLICATION

- A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
 - 1. Waterproofing membrane shall have a minimum 60 mil dry-film thickness on concrete and block masonry substrates,
 - 2. Waterproofing membrane shall have a minimum 60 mil dry-film thickness on plywood substrates.
 - 3. Grid deck surfaces to assure proper coverage rates and verify membrane wet-film mil thickness with gauges as work progresses.
 - 4. Retain empty product containers during course of work to aid in determining whether completed membrane complies with required average dry-film thickness.

- B. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.
- C. Mask off adjoining surfaces not to receive membrane system.
- D. Wipe clean all detail coats with white rags wetted with Xylene solvent; do not saturate detail coat.
- E. Apply membrane uniformly and allow to cure in accord with manufacturer's instructions.
- F. Feather edge when entire area cannot be completed in one day; clean area 6" wide along edge of membrane with Xylene solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.
- G. Flood test: Plug drains on deck surfaces and use sand bags or other means to restrict runoff. Flood deck with water to depth of 2" (50 mm) and allow to stand at least 48 hours; repair leaks if occurs and retest.
- H. 24 Hours after application of base coat membrane at 50 mils, apply a second coat of membrane at 10 mils wet, approximately 160 s.f. per gallon coverage, and broadcast silica sand to rejection.
- I. 72 Hours following second coat of membrane with sand, blow off extra sand, and apply approved thin-set material as per manufacturer's instructions and set approved ceramic tile into thin-set.
- J. Any distance greater than 10' in either direction shall receive an approved urethane sealant joint, instead of a hard grout joint, to allow movement of ceramic tile floor.

3.04 FIELD QUALITY CONTROL

- A. Applicator shall inspect completed work one day prior to final covering and effect repairs.

3.05 PROTECTION AND CLEAN-UP

- A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.
- B. Prohibit traffic over completed work and protect membrane from damage until protected beneath overlaying work.

END OF SECTION

**SECTION 07210
BUILDING INSULATION**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. All labor, material, and services necessary to provide insulation with vapor barrier for locations shown on drawings and specified herein.
 - 1. Rigid board insulation
 - 2. Masonry cell insulation
 - 3. Batt insulation
 - 4. Safing insulation
 - 5. Radiant barriers
 - 6. Vapor barriers

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver in original unopened packages with legible intact labels indicating brand names, type and thermal resistance (R) value. Store out of weather in locations to preserve original condition.

1.04 RELATED SECTIONS

- A. Metal Stud Framing System – Section 09255

PART 2 - PRODUCTS**2.01 BATT OR BLANKET INSULATION WITH VAPOR BARRIER**

- A. Type: Conform to requirements of current issue of ASTM C665, Type III. Kraft faced Batts.
- B. Thickness: As shown on the Construction Drawings.
- C. Width: Full width to fit tightly between studs at walls.
- D. Sound attenuation batts: provide at areas as noted on finish schedule and partition details.
- E. Polyethylene self-adhering type, translucent, mesh reinforced, 2 inches wide.

2.02 ACCEPTABLE MANUFACTURERS

- A. Johns Manville
- B. Owens Corning
- C. GAF

D. Certainteed
2.03 LOOSE FILL FOR CONCRETE MASONRY UNITS

- A. Zonolite water repellent type.

2.04 RIGID BOARD INSULATION

- A. Material Properties
1. Rigid cell extruded polystyrene thermal board insulation.
 2. Comply with ASTM C-58-95, Type X, Density 1.35 lb./cu. Ft. min, compressive strength 15 psi.
 3. Thermal resistance 5 year aged R-values of 5.4 and 5.0 min, °F-FT²-H/BTU²/inch at 40°F and 75°F respectively.
- B. Thickness as shown on Construction Documents.
- C. Acceptable manufacturer's product: The Dow Chemical Company "Styrofoam Brand WallMate or Thermax" insulation.

2.05 SAFING INSULATION AND ACCESSORIES

- A. Slag-Wool-Fiber Board Safing Insulation: Semirigid boards designed for use as fire stop at openings between edge of slab and exterior wall panels, produced by combining slag-wool fibers with thermosetting resin binders to comply with ASTM C 612, Type IA and IB; nominal density of 4 lb/cu. ft. (64 kg/cu. m); passing ASTM E 136 for combustion characteristics; thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
- B. Caulking Compound: Material approved by manufacturer of safing insulation for sealing joint between foil backing of safing insulation and edge of concrete floor slab against penetration of smoke.
- C. Safing Clips: Galvanized steel safing clips approved by manufacturer of safing insulation for holding safing insulation in place.

2.06 RADIANT BARRIERS

- A. Radiant Barrier Coating: Silver-colored, not thickness-dependent, low-emissivity coating, formulated for adherence to substrates indicated.
- B. Foil-Polymer Laminate: 2 layers of aluminum foil laminated to polyester inner layer, with maximum flame spread of 25, in sheets 48 inches (1219 mm) wide and up to 250 feet (76 m) long.
- C. Foil-Scrim-Polyethylene Laminate: 2 layers of aluminum foil laminated with scrim reinforcing to polyethylene inner layer with an overall weight of 14.3 lb/1000 sq. ft. (7 kg/100 sq. m), with maximum flame-spread and smoke-developed indices of 5 and 10, respectively, in sheets 48 inches (1219 mm) wide and up to 375 feet (114 m) long.
- D. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Radiant Barrier Coating:
 - a. LO/MIT-1; Solar Energy Corp.

2. Foil-Polymer Laminate:
 - a. R + Heatshield Radiant Barrier; Innovative Energy, Inc.
3. Foil-Scrim-Polyethylene Laminate:
 - a. Super R Diamond; Innovative Insulation, Inc.

2.07 VAPOR RETARDERS

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
- B. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).
- C. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either a nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.53 ng/Pa x s x sq. m) and flame-spread and smoke-developed indices of not more than 5 and 75, respectively.
- D. Foil-Polyester Film Vapor Retarder: 2 layers of 0.5-mil- (0.013-mm-) thick polyester film laminated to an inner layer of 1-mil- (0.025-mm-) thick aluminum foil, with maximum water-vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame-spread and smoke-developed indices of 15 and 5, respectively.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 1. Reinforced-Polyethylene Vapor Retarders:
 - a) DURA-SKRIM 6WW; Raven Industries, Inc.
 - b) Griffolyn T-65; Reef Industries, Inc., Griffolyn Div.
 2. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders:
 - a) DURA-SKRIM 2FR; Raven Industries, Inc.
 - b) Griffolyn T-55 FR; Reef Industries, Inc., Griffolyn Div.
 3. Foil-Polyester Film Vapor Retarder:
 - a) Alumiseal Zero Perm; Alumiseal Corporation.

2.08 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- B. Asphalt Coating for Cellular Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by cellular glass block insulation manufacturer.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Karnak 100; Karnak Corp.
 - b. PITTCOTE 300 Coating; Pittsburgh Corning Corporation.
- C. Protection Board: Premolded, semirigid asphalt/fiber composition board, 1/4 inch (6

mm) thick, formed under heat and pressure, standard sizes.

- D. Eave Ventilation Troughs: Preformed rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.09 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation, of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches (2.67 mm) in diameter, length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle, capable of holding insulation securely in position indicated with self-locking washer in place, and complying with the following requirements:
1. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches (2.67 mm) in diameter, length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.
- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of dimension indicated between face of insulation and substrate to which anchor is attached.
1. Air Space: 1 inch (25 mm).
 2. Air Space: 2 inches (50 mm).
 3. Air Space: 3 inches (76 mm).
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Adhesively Attached, Spindle-Type Anchors:
 - a) TACTOO Insul-Hangers; AGM Industries, Inc.
 - b) Spindle Type Gemco Hangers; Gemco.
 2. Adhesively Attached, Angle-Shaped, Spindle-Type Anchor:
 - a) 90 Degree Insulation Hangers; Gemco.
 3. Insulation-Retaining Washers:

- a) RC150; AGM Industries, Inc.
- b) SC150; AGM Industries, Inc.
- c) Dome-Cap; Gemco.
- d) R-150; Gemco.
- e) S-150; Gemco.
- 4. Insulation Standoff:
 - a) Clutch Clip; Gemco.
- 5. Anchor Adhesives:
 - a) TACTOO Adhesive; AGM Industries, Inc.
 - b) Tuff Bond Hanger Adhesive; Gemco.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas shown to receive insulation to ensure protection against inclement weather and other hazards, and to ensure that work of preceding trades is complete.
- B. Examine space allocated for insulation for proper depth to receive material.

3.02 PREPARATION

- A. Preparation: Remove projections in construction framing that may damage or prevent proper installation.

3.03 INSTALLATION

- A. Installation, GENERAL
 - 1. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
 - 2. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to water.
 - 3. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
 - 4. Apply single layer of insulation to produce thickness indicated.
 - 5. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.04 INSTALLATION OF CAVITY WALL AND MASONRY CELL INSULATION

- A. On units of plastic insulation, install small pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Supplement adhesive attachment of insulation by securing boards with 2-piece wall ties designed for this purpose and specified in Division 4 Section "Unit Masonry."
- B. On units of cellular glass insulation, apply insulation with closely fitting joints using

method indicated below:

1. Gob Method: Install 4 gobs of adhesive per unit and apply firmly against inside wythe of masonry or other construction as shown. Apply gobs at each corner; spread gobs to form pads 4 inches (101 mm) in diameter by 1/4 inch (6 mm) thick.
 2. Serrated-Trowel Method: Apply adhesive to entire surface of each cellular-glass insulation unit with serrated trowel complying with insulation manufacturer's specifications.
 3. Coat edges of insulation units with full bed of adhesive to seal joints between insulation and between insulation and adjoining construction.
 4. Coat exterior face (cold face) of installed cellular glass block insulation course with asphalt coating recommended by insulation manufacturer for this purpose.
- C. Pour granular insulation into cavities indicated to receive insulation, taking care to fill voids completely. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close ports after confirming complete coverage. Limit fall of insulation to 1 story in height, but not exceeding 20 feet (6 m).
- D. Batt Insulation:
1. Locations:
 - a. Stud cavities behind exterior wall on building interior, in locations shown on drawings.
 - b. Miscellaneous crevices in exterior construction as required insulating between interior conditioned spaces and building exterior.
 - c. At pipes or conduit in insulated cavities, place insulation between exterior wall and the pipe, compressing insulation as necessary.
 2. Install insulation moisture barrier toward warm-air side.
 3. Fit insulation snugly between framing. Insulate total width and length of framing cavity. Install with tight butt joints or overlapping between pieces of insulation and framing.
 4. Carefully cut and fit insulation around pipes, conduits, and other obstructions to maintain integrity of the insulation and to neatly and tightly fit non-standard framing spacing.
 5. Insulate small crevices to ensure insulation continuity.
 6. Exercise care to insure vapor barrier is continuous over entire surface. Patch, tape and seal punctures, tears, voids and other damaged areas in vapor barrier.
 7. Tape and seal all joints between pieces of insulation and joints around perimeters of pipes, conduits and other obstructions to prevent infiltration of air between joints.
 8. Methods of securing insulation in position shall be the responsibility of the applicator.
 9. Install insulation so that it will not be displaced.
 10. For walls, secure insulation flange to framing members to retain it in position, using staples or nails or other approved methods.
- E. Friction fit rigid board insulation between metal stud framing at exterior wall locations.

3.05 INSTALLATION OF GENERAL BUILDING INSULATION

- A. P is in place.

- B. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
 - a. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 - b. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- G. Install board insulation in curtain wall construction as indicated on Drawings and according to curtain wall manufacturer's written instructions.
 - 1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width between insulation and glass of dimension indicated.
 - 2. Brace insulation where it contacts safing insulation to prevent insulation from bowing under pressure from safing insulation.
- H. Place loose-fill insulation into spaces and onto surfaces as shown, either by pouring or by machine blowing to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
 - 1. For cellulosic loose-fill insulation, comply with the Cellulose Insulation Manufacturers Association's "Special Report – Standard Practice for Installing Cellulose Insulation."
- I. Apply self-supported, spray-applied, cellulosic insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it even with studs by using method recommended by insulation manufacturer.
- J. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.06 INSTALLATION OF SAFING INSULATION

- A. Install safing insulation to fill gap between edge of concrete floor slab and back of exterior spandrel panels on safing clips spaced as needed to support insulation, but not further apart than 24 inches (610 mm) o.c. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of slab with calking approved by safing insulation manufacturer for this purpose. Leave no voids in completed installation.

3.07 INSTALLATION OF RADIANT BARRIERS

- A. Install radiant barriers in locations indicated according to ASTM C 1158 and radiant

barrier insulation manufacturer's written instructions.

3.08 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
- C. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.
- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.09 PROTECTION

- A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

**SECTION 07211
THERMAL INSULATION**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - a. Extruded-Polystyrene Board Insulation
 - b. Un-faced Wall Insulation
 - 2. Glass-fiber blanket insulation.
 - 3. Vapor retarders.
- B. Related Sections:
 - 1. Division 07 Section(s) for insulation specified as part of roofing construction.
 - 2. Division 07 Section "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire- resistive joint system.
 - 3. Division 09 Section(s) "Gypsum Board Shaft Wall Assemblies" for installation in wood- and metal-framed assemblies of insulation specified by referencing this Section.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.04 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. In no case shall added insulation values be less than the prescriptive requirements listed in the current Energy Code published in the state where the work will be installed.
- C. Minimum R-Value Requirements
 - 1. Steep Roofs: R-38 inside the vented truss space with R-19 between bottom-chord with R-19 perpendicular and continuous across the first layer and the bottom-chord.
 - 2. Low Slope Roofs: Above the roof deck; R-20 continuous rigid insulation.
 - 3. Exterior Metal Studs: R19 with R-7.5 continuous on exterior of studs, R-13 between metal studs with craft face behind exterior sheathing and facing in an outward direction.

4. Exterior CMU: R-7.5 continuous rigid Extruded Polystyrene (XPS) 2.0 lbs density on interior of block. Insulation to be un-faced and within type X GWB assembly.
5. Exterior EIFS on CMU: R-7.5 continuous rigid Extruded Polystyrene (XPS) 2.0 lbs density on exterior of block with drainage plane at block exterior face.
6. Exterior EIFS on Metal Studs: R19 with R-7.5 continuous on exterior of studs, R-13 between metal studs with craft face behind exterior sheathing and facing in an outward direction.
7. Interior Walls: R-11
8. Common Party Walls: R-11 Stud; R-6 CMU
9. Bathroom / Restroom Ceilings: R-11

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.01 FOAM-PLASTIC BOARD INSULATION

- A. For walls on exterior face in EIF Systems: Extruded-Polystyrene Board Insulation: ASTM C 578, of type IV, density 1.6 lb/cu. ft. density minimum, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- B. For walls on exterior face: Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class I, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- C. For CMU walls on interior face: Un-faced Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class I, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Atlas Roofing Corporation.
 - b. Dow Chemical Company (The).
 - c. Owens Corning
 - d. Rmax, Inc.
 - e. Elliott Company Inc.

- D. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

2.02 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville.
 - 4. Knauf Insulation.
 - 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.03 VAPOR RETARDERS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- B. Single-Component Non-sag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
- C. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates
- D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.02 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.03 INSTALLATION LOCATION

- A. Locations:
1. Provide un-faced blanket insulation in interior partition unless otherwise noted below.
 2. Provide faced kraft, blanket insulation in exterior walls and ceiling areas unless otherwise noted below.
- B. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt form with thermal resistances indicated.
1. 3 inch thick with a thermal resistance of 11 deg F x h x sq.ft./ Btu at 75 deg F.
 2. 3-1/2 inches thick with a thermal resistance of 13 deg F x h x sq.ft./ Btu at 75 deg F.
 3. 5-1/2 inches thick with a thermal resistance of 19 deg F x h x sq.ft./ Btu at 75 deg F.
 4. 6-1/2 inches thick with a thermal resistance of 21 deg F x h x sq.ft./ Btu at 75 deg F.
 5. 9-1/2 inches thick with a thermal resistance of 30 deg F x h x sq.ft./ Btu at 75 deg F.

3.04 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members to specified thickness in wall. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed 96 inches, support un-faced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over

flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
 - a. Exterior Walls: Set units with facing placed toward exterior of construction.
 - b. Interior Walls: Set units with facing placed toward areas of high humidity.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.05 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches up either side of partitions. Continue vapor barrier and seal to top of wall and bottom of roof deck where steep roof and low slope roofing systems intersect.

3.06 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

**SECTION 07212
WEATHER BARRIERS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Building paper.
 - 2. Building wrap.
 - 3. Flexible flashing.
- B. Related Requirements:
 - 1. Division 06 Section "Sheathing" for sheathing joint and penetration treatment.
 - 2. Division 07 Section "Modified Bituminous Sheet Air Barriers" for sheet air barrier applied over wall sheathing.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

1.04 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS**2.01 WATER-RESISTIVE BARRIER**

- A. Building Paper: ASTM D 226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.
- B. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction. Including all components as required by manufacturers for a complete system meeting warranty requirements.
 - 1. Products: Subject to compliance with requirements and basis of design, provide a product from the following manufacturers:
 - a. DuPont (E. I. du Pont de Nemours and Company) Basis of Design; Tyvek Stucco wrap.
 - b. Reemay, Inc.; Typar.
 - c. James Hardie Building Products.
 - d. Green Guard; Pactiv
 - 2. Water-Vapor Permeance: Not less than 150 g through 1 sq. m of surface in 24 hours per ASTM E 96/E 96M, Desiccant Method (Procedure A).

3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E 2178.
 4. Allowable UV Exposure Time: Not less than three months.
- C. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.02 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.
1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.
 - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Butyl Self Adhered Flashing.
 - c. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- C. Nails and Staples: ASTM F 1667.

PART 3 - EXECUTION

3.01 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion-or control-joint locations.
 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- C. Apply 1 layer of building wrap over sheathing then apply one layer of building paper, prior to installation of exterior finish system. (masonry, stucco, siding, etc.)
- D. Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.
- E. Building Wrap: Comply with manufacturer's written instructions.
1. Seal seams, edges, fasteners, and penetrations with tape.
 2. Extend into jambs of openings and seal corners with tape.

3.02 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
 - 4. Lap water-resistive barrier over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION

**SECTION 07220
COATED ARCHITECTURAL FOAM SHAPES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 specifications, apply to this section.

1.02 DESCRIPTION OF THE WORK

- A. Provide all labor, material and equipment necessary to install Architectural Foam Supply coated shapes.
- B. Description of Systems
 - 1. Coated Expanded Polystyrene (EPS) Shapes: Base-Coated, paint ready and textured shapes consisting of a polymer-modified cementitious coating (recommended with reinforcing mesh) over a closed cell, resilient, lightweight formed plastic with a minimum standard density of one pound cubic foot to be produced by Foam Supply, Inc., 1631 S. Dixie Hwy, Bldg B., Pompano, FL 33060. Contact is Patricia Barrowcal at 954-482-4080. www.foamsupply.com.
 - 2. Reinforcing Mesh: A fiberglass mesh used to strengthen the base coat. To be approved by Foam Supply, Inc.
 - 3. Base-Coat and/or Adhesive: To be produced or approved by Foam Supply, Inc.
 - 4. Interior smooth, exterior base & mesh and textured finishes: To be produced or approved by Foam Supply, Inc.

1.03 RELATED SECTIONS

- A. Gypsum Wallboard- Section 09255
- B. Portland Cement Stucco- Section 09220
- C. Concrete Masonry units- Section 04200

PART 2 - PRODUCTS**2.01 GENERAL**

- A. All components of Architectural Foam Supply shapes shall be obtained from Architectural Foam Supply or its authorized distributors.

2.02 MATERIAL

- A. Provide all labor, material and equipment necessary to install Architectural Foam Supply coated shapes.
 - 1. Shall be coated with polymer-modified cementations base-coat or gypsum based coatings depending on your application.
 - 2. Foam shapes shall be produced by Foam Supply, Inc.
 - 3. Shall meet current specifications of molded expanded polystyrene shapes.
 - 4. Minimum nominal density shall be available in 1#, 1½#, and 2# density.

**COATED ARCHITECTURAL FOAM SHAPES
SECTION 07220-1**

- B. Reinforcing Mesh
 - 1. Shall be produced or approved by Foam Supply, Inc.
 - 2. Shall be treated, open weave glass fiber type.
 - 3. Available in standard 4 oz.
- C. Base Coat and/or Adhesive
 - 1. Based on your application, cementitious or gypsum base-coat and/or adhesive, or acrylic primer to approved substrate. (approved by AFS)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examination of Substrate
 - 1. The substrate surface shall be free of foreign materials such as oils, dust, dirt, form release agents, paint, wax, glaze, moisture, frost, etc.
 - 2. The substrate shall be examined for compliance with contrast documents.
 - 3. The substrate shall be examined for soundness, such as tightness of connections, crumbling, or looseness of surface, voids and projections. It is the General Contractor's responsibility to make sure the substrate is flat, straight, and ready to receive Architectural Foam Supply details.
- B. The Architect and General Contractor shall be advised of all discrepancies. Work shall not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Architectural Foam Supply shapes are pre-coated and/or finished under factory controlled conditions.
- B. EPS Foam to Brown Coat
 - 1. Adhesive should be mixed to a heavy-bodied, paste like consistency.
 - 2. Cover the entire back side of the shape with adhesive where the shape will join the substrate.
 - 3. Press shape into position on the substrate. Generally the adhesive to the substrate will be sufficient to hold the shape in place. On larger shapes, use temporary fasteners to prevent the shape from sliding until the adhesive is dry. Remove temporary fasteners and fill holes with adhesive or sealant.
 - 4. Plaster-Ready Product: base-coat and mesh must be applied to all joints. Exterior Paint-Ready, Product: apply to substrate same as above. Pre-finished pieces: Joints to be filled with backer rod and proper sealant.
- C. EPS foam to EPS
 - 1. It is recommended that all joints be coated with approved adhesive base-coat and mesh to prevent cracking.
- D. EPS foam to Drywall
 - 1. Clean surface
 - 2. Use enerfoam or PL premium for adhering materials to a smooth and level surface. Apply ¼" continuous zigzag bead of adhesive within 2" of each other.

Temporary blocking or fasteners may be needed until adhesive dries. (enerfoam & PL Premium Construction adhesive is available at Architectural Foam Supply or your local building supply).

3. Interior Paint Ready Product: Use enerfoam, PL Premium to apply to substrate same as above or using a 3/8" notched trowel, spread approved base-coat on back of the entire shape detail.
 4. Interior Paint Ready Product: It is recommended that all joints be kept tight and coated with approved adhesive. Drywall compound can be applied on top and lightly sanded smooth.
- E. EPS foam to Wood or Plastic
1. Clean Surface
 2. Use enerfoam or PL Premium for applying material to smooth and level surfaces. Apply 1/4" continuous zigzag bead of adhesive within 2 inches of each other for plastic or wood. Temporary blocking or fasteners may be needed until adhesive dries. (enerfoam and PL Premium construction Adhesive is available at Foam Supply, Inc.).
- F. EPS foam
1. For larger shapes and details, permanent mechanical fasteners may be needed. Fasteners to be approved in writing by Foam Supply, Inc.
- G. Cutting
1. Wait a minimum of 24 hours before further work on the surface of bonded components in order to avoid any movement, which would weaken the bond between the components.

3.03 FINISH COAT

- A. Exterior Paint Finish
1. Per paint manufacturer's specifications
 2. Conventional water-based paint may be applied after 48 hours of curing.
- B. Acrylic Finish
1. For other exterior finishes (stucco) – to be approved by Architectural Foam
- C. Supply
1. Per acrylic manufacturer's specifications.
 2. Surface must be completely dry for minimum 48 hours.

3.04 CLEAN UP

- A. Material left over by the subcontractor at the job site shall be removed by subcontractor.
- B. The sub-contractor shall clean adjacent materials and surfaces and the work area of foreign material resulting from the work.

END OF SECTION

**SECTION 07270
FIRESTOPPING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. All labor, material, and services necessary to provide fire-stopping and smoke seals complete including the following:
 - 1. Openings in fire-rated floors and walls, both empty and those accommodating penetrating items such as cables, conduits, pipes and ducts.
 - 2. Openings at each floor level in shafts and stairwells.

1.03 SUBMITTALS

- A. Product data: Submit on product characteristics, performance and limitation criteria. Include manufacturer's preparation and installation instructions for each type of firestop required.
- B. Certification: Submit certification that firestop product meets or exceeds specific requirements.

1.04 QUALITY ASSURANCE

- A. Material shall conform to flame (F) and temperature (T) ratings per nationally accepted testing agencies ASTM E814 or UL 1479 fire tests. The F and T ratings must be a minimum of one hour but not less than the fire resistance rating of the assembly being penetrated. Conduct fire test with minimum positive pressure difference of 0.03" of water column.

1.05 PROJECT CONDITIONS

- A. Coordinate work with related trades to properly execute work and to maintain hourly rating of walls and floors where fire-stopping and smoke seals are applied; sequence work to permit fire-stop material to be installed after adjacent surrounding work is complete.
- B. Maintain temperatures of substrate materials and ambient air temperatures as recommended by manufacturer; provide ventilation in areas to receive solvent cured materials.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. General:
 - 1. Material shall be asbestos free, conforming to ASTM E814, UL 1479, ASTM E119, UL 723, ASTM E84 and UL 263.

2. No more than two different manufacturers to be used on project.
- B. Contractor shall choose the appropriate product for the application (substrate, type penetrating item, expansion, and weatherability).
- C. Accessories:
 1. Dam material: Mineral fiberboard, plywood or particle board, sheet metal or other approved material.
 2. Retainer Clips: As recommended by fire-stop manufacturer.
 3. Mineral fiber matting.

2.02 ACCEPTABLE MANUFACTURERS

- A. Metalines Metacaulk is specified. Equivalent material or other manufacturers will be considered per requirements of Section 01300.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas shown to receive fire-stopping to ensure there are no defects or errors interfering with installation. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Clean surfaces and substrates from dirt, oil, loose material and other foreign materials, which may affect proper bond and installation of fire-stops; comply with fire-stop material manufacturer's recommendations.
- B. Provide primers required for various substrates and conditions as recommended by manufacturer.
- C. Mask adjoining areas to protect finishes.

3.03 INSTALLATION

- A. Install and cure in strict accordance with manufacturer's instructions. Apply to provide rating of at least one hour but not less than the fire resistance rating of the penetrated assembly.
- B. Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other materials used in actual fire tests are used.
- C. Install fire-stops with sufficient pressure to properly fill and seal openings.
- D. Tool and trowel exposed surfaces.

3.04 CLEANING

- A. Where visible, clean fire-stopping materials from adjacent surfaces.
- B. Remove debris and excess material from site.

END OF SECTION

**SECTION 07311
FIBERGLASS SHINGLES**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Fiberglass shingle roofing, with moisture shedding underlayment, eave, valley, and ridge protection and associated protective flashings.

1.03 RELATED WORK

- A. Section 06001 – Rough Carpentry
- B. Section 07710 – Prefabricated Roofing Specialties

1.04 REFERENCES

- A. ANSI/ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ANSI/ASTM D225 – Asphalt Shingles Surfaced with Mineral Granules.
- C. ANSI/ASTM D226 – Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- D. ANSI/ASTM D249 – Asphalt Roll Roofing Surfaced with Mineral Granules.
- E. ANSI/ASTM D2822 – Asphalt Roof Cement.
- F. ANSI/ASTM D3018 – Class A Asphalt Shingles Surfaced with Mineral Granules.
- G. ASTM A361 – Sheet Steel, Zinc-Coated (Galvanized) by the Hot-Dip Process for Roofing and Siding.
- H. ASTM B370 – Copper Sheet and Strip for Building Construction.
- I. FS L-P-375 – Plastic Film, Flexible, Vinyl Chloride.
- J. NRCA-1989 – Roofing and Waterproofing Manual.

1.04 SUBMITTALS

- A. Indicate general construction, configurations, jointing methods and locations, fastening methods and locations, and installation details.
- B. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 - PRODUCTS**2.01 ACCEPTABLE DIMENSIONAL FIBERGLASS SHINGLES MANUFACTURERS**

- A. Certainteed
- B. Georgia Pacific
- C. GAF Building Corporation

2.02 ROOFING MATERIALS

- A. Fiberglass Shingles: Lifetime warranty, Dimensional Shingles, organic felt base, mineral granule surfaced type; 210 lb/square; self-sealing type; square tab; color selected by Architect.
- B. Underlayment: Fiber building paper, water repellent type. No. 15 (73 kg/sq m) unperforated asphalt saturated felts as recommended for use in waterproofing and in construction of built-up roofs.
- C. Nails: Standard round wire shingle type of hot-dipped zinc-coated steel; minimum 13/64 inch (5 mm) head diameter and 0.080 inch (2 mm) shank diameter; minimum 1-1/4 inch (31 mm) long.
- D. Plastic Cement: Cutback asphaltic type with mineral fiber components as recommended for sealing and coating flashings in buildings; free of toxic solvents; capable of setting within 24 hours at temperatures of approximately 75
- E. Lap Cement

2.03 FLASHING MATERIALS

- A. Sheet Flashings: ASTM A361; 26 gage thick steel with minimum 1.25 oz/sq ft. galvanized coating.
- B. Bituminous Paint: Acid and alkali resistant type; black color.
- C. Nails: Standard round wire roofing type of hot-dipped zinc-coated steel; minimum 19/64 inch (8 mm) head diameter and 0.104 inch (3 mm) shank diameter; minimum 7/8 inch (22.2 mm) long.

2.04 FLASHING FABRICATION

- A. Form flashings to profiles indicated on Drawings, and to protect roof assembly and shed water. Form sections square, true, and accurate to profile, in maximum possible lengths, free from distortion and other defects detrimental to appearance or performance.
- B. Hem exposed edges of flashings minimum ¼ inch on underside.

PART 3 - EXECUTION**3.01 INSTALLATION - GENERAL**

- A. Install asphalt shingle roofing over dry surfaces, free of ridges, warps, and voids.
- B. Coordinate installation of roof mounted components or work projecting through roof. Verify roof openings are framed, sized, and located prior to installing work of this Section.
- C. Completed installation to provide weathertight service.

3.02 EAVE PROTECTION INSTALLATION

- A. Place eave edge and gable flashing tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure deck flange per manufacturer's instructions.
- B. Apply 4 inch (100 mm) wide band of plastic cement over deck flange of eave edge flashings, and embed an 18 inch wide strip of underlayment. Place underlayment with eave edge flush with face of flashings. Secure in place. Lap ends minimum 6 inches. .
- C. Apply lap cement at rate of approximately 1-1/4 gal/square on underlayment starter strip.
- D. Starting from eave edge of starter strip, lay additional 36 inch (900 mm) wide strips of underlayment in lap cement, to produce a two ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches. Stagger end joints of each consecutive ply.
- E. Extend eave protection membrane minimum 2 feet beyond interior face of walls.

END OF SECTION

**SECTION 07411
MANUFACTURED ROOF PANELS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
 - 1. Metal "S" tile roof panels.
- B. Description.
 - 1. Provide all materials, labor, equipment and services, and perform all operations in connection with the furnishing and installation of roofing complete, in accordance with the drawings and specifications, and including, but not limited to, the following:
 - a. A pre-formed and pre-finished metal roofing system, complete with roof insulation.
 - b. Include perimeter flashing, trim, ridge and gable closures and flashing as applicable fasteners, supplementary furring and supports and sealants required for complete roofing system.
 - c. Soffits.
 - d. Gable Wall Panels.
 - e. Fascia Wall Panels.
 - f. Insulation.
 - g. Roof Curbs.
 - h. Roof Jacks.
 - i. Workmanship.
 - j. Inspection of Surfaces.
 - k. Protection.
 - l. Delivery, Samples and Shop Drawings.
 - m. Guarantee and Warranty.

1.03 RELATED SECTIONS

- A. Section 05120 "Structural Steel"
- B. Section 05400 "Cold-Formed Metal Framing."
- C. Section 06100 "Rough Carpentry"
- D. Section 07901 "Joint Sealants"

1.04 PERFORMANCE REQUIREMENTS

- A. General: Provide manufactured roof panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

- B. Air Infiltration: Provide manufactured roof panel assemblies with permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq. ft. Of fixed roof area when tested according to ASTM E 1680 at static air pressure difference of 4.0 lb/sq. ft.
- C. Water Penetration: Provide manufactured roof panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind load design pressure of not less than 6.24 lb/sq. ft. and not more than 12.0/sq. ft.
- D. Wind Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for Class 90 wind uplift resistance.
- E. Structural Performance: Provide manufactured roof panel assemblies capable of safely supporting design loads indicated under in-service conditions with vertical deflection no greater than the following, based on testing manufacturer's standard units according to ASTM E 1592 by a qualified independent testing and inspecting agency.
- F. Quality Assurance: The roof system manufacturer shall meet and provide written certification stating:
 - 1. The manufacturer has been regularly engaged in the fabrication of metal standing seam roof systems for at least ten (10) years and is an American Owned Company. A brief list of similar projects shall be submitted with the shop drawings.
 - 2. The manufacturer is a member of the Metal Building Manufacturer's Association (MBMS).
 - 3. The manufacturer is currently certified by the American Institute of Steel Construction (AISC) for category MB.
 - 4. The manufacturer maintains a CERTIFIED installer program for its products and maintains an up-to-date authorized roofing contractor list.
 - 5. The manufacturer has a written warranty covering durability, color and weathertightness of its roof system. Sample warranties shall be provided with the bid proposal.
 - 6. The manufacturer will provide an approved and certified independent third party inspection firm. The inspection firm will provide a certificate of compliance in a start-up, in progress and final inspection mode, certifying that the roof system will be approved to receive a 20-year extended manufacturer's warranty. Recognized approved independent firms will consist of IRWC (Institute of Roofing & Water Proofing Consultants) or RCI (Roof Consultants Institute).
- G. Roofers Qualifications
 - 1. Installation of the Standing Seam metal roofing system sans roof related accessories should be performed by **CERTIFIED/PREFERRED ROOFERS** authorized by the manufacturer as trained and qualified to erect the manufacturer's product.
 - 2. Roofing contractor must submit, as part of the bid package, a letter from the manufacturer of the standing seam roofing system, certifying the date of certification from the manufacturer and the dates and year the roofing contractor attended school, prior to full certification.

H. Design Criteria

1. The following standards and criteria shall be used where covered by the specification:
 - a. Manual of Steel Construction, American Institute of Steel Construction – 7th Edition.
 - b. Cold Formed Iron and Steel Institute, 1976 Edition.
 - c. Low Rise Metal Building Systems Manual, American Iron and Steel Institute, 1976 Edition.
 - d. Test for Wind Uplift Resistance of Roof Assemblies (1970) Underwriters Laboratories, Inc. UL-90.
2. Design Labs
 - a. Design loads shall be developed using the procedures contained in “Design Practices and Building Practices” commentary in the MBMA publication, Mid Rise Metal Building Systems Manual. The following data shall be used in developing design loads in addition to dead loads:
 - (1) Vertical Live Loads: Roof system shall be designed for a 20 PSF live load.
 - (2) Wind Loads: Basic wind speed of 120 miles per hour.
 - (3) Other superimposed dynamic and/or static loads such as exhaust fans and air conditioning equipment, shall be considered as part of the design requirements and combined with the normal design (live and wind) loads.
 - (4) Combination of normal loads and auxiliary loads or design purposes shall be as prescribed and recommended in the Florida Building Code.

1.05 SUBMITTALS

A. Proposal Drawings

1. Submit proposal drawings, clearly indicating scope of spacing for attachment to existing structure, roof panels, insulation and ventilation, typical flashing details and Typical accessory details.
2. Submit manufacturer’s specification on all sealants.
3. Submit applicable sample warranties of products with bid proposals.
4. After awarding of contract, structural analysis of the sub framing system shall be submitted.
5. Submit for approval descriptive data on all material to be provided. Data shall be sufficient to indicate conformance to specified requirements.
6. Submit manufacturer’s recommended installation method showing all requirements for panel installation, sealant application and sub framing connections.
7. Submit manufacturer’s suggested material handling and material protection requirements.
8. Proposal drawings and structural analysis shall be sealed and signed by a professional engineer, registered in the state where roof will be installed.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver panels and other components so they will not be damaged or deformed. Package for protection against damage during transportation or handling.

- B. Handling: Exercise care in unloading, storing, and erecting roof panels to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Store panels to endure dryness. Do not store panels in contact with other materials that might cause staining, denting or other surface damage.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify location of structural members and openings in substrates by field measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.08 WARRANTY

- A. Roof Panels
 - 1. Durability of the metallic coated and unpainted roof panels due to rupture, structural failure or perforation shall be warranted for a period of twenty (20) years by the manufacturer.
 - 2. The exterior color finish for painted wall panels shall be warranted by the Manufacturer for twenty (20) years against blistering, peeling, cracking, flaking, chalking and chipping.
 - 3. Excessive color change and caulking shall be warranted for twenty (20) years. Color change shall not exceed 5 NBS units per ASTM D2233.68T, chalking shall not be less than a rating of 6 (white) or 9 (other colors) per ASTM D-659-70.
- B. WEATHERTIGHTNESS: The entire installation (sub-framing, clips, panels, fasteners, miscellaneous flashings, rakes, eaves, hips, roof to wall flashings, penetration flashings, as well as all materials supplied by manufacturer) shall be guaranteed weathertight for a minimum of twenty (20) years. Provide written warranty, signed by metal roofing manufacturer and his authorized installer, agreeing to replace/repair defective materials and workmanship during the warranty period, certified by the third party inspection from as started under **QUALITY ASSURANCE** Line Item 6.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Steel Roof Panels: Subject to compliance with requirements, provide panels by one of the following:
 - 1. ATAS.
 - 2. Butler Manufacturing Co.
 - 3. Ceco Building.
 - 4. Metal Building Components, Inc.
 - 5. SteeloX Roofing Systems, Inc.
 - 6. Varco Pruden
 - 7. Met-tile

2.02 METALS AND FINISHES

- A. System Type – Uninsulated system consisting of roof panels with concealed attachment clips in panel; clips secured directly to rigid substrate..
 - 1. Seam type: Factory-formed for self-interlocking without field crimping..
 - 2. Fabricate panels from galvanized sheet steel, minimum 26 gage (0.022 inch thick).
 - 3. Exterior finish: Fluoropolymer KYNAR 500 paint system with textured, stucco-like finish to enhance appearance and reduce gloss.
 - 4. Interior (underside) finish: Manufacturer's standard corrosion-inhibiting wash coat.
 - 5. Panel width (nominal coverage): 36 inches.
 - 6. Panel profile: MET-TILE, manufactured by Met-Tile, Inc..
- B. Underlayment: Unperforated asphalt-saturated felt: ASTM D 226, Type II or ASTM D 4601, Type II.
- C. Concealed Panel Clips:
 - 1. Fabricated from galvanized steel.
 - 2. Provide roof system manufacturer's standard type clips to suit project requirements including but not limited to the following:
 - a. Live loads.
 - b. Thermal movement: accommodate expansion and contraction without introducing stress into roof system.
 - c. Slope of roof
 - d. Special conditions at transitions, penetrations, and terminations.
- D. Fasteners:
 - 1. Threaded fasteners – general: Provide manufacture's standard corrosion resistant.

2.03 UNDERLAYMENT MATERIALS

- A. Building Paper: Minimum 15 lb/100 sq.ft., rosin sized.
- B. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organized felts.

2.04 ROOF ACCESSORIES

- A. Roof Jacks – Openings 7" in diameter or smaller may be flashed and sealed to the roof panel by jacks.
 - 1. Material shall be an EPDM material with aluminum sealing ring base.
 - 2. Jacks are acceptable providing attachment in flat of panel and no standing seam rib had been altered. If rib must be cut, a curb must be used.
 - 3. Installation of roof jacks must comply with manufacturer's instructions.
- B. Roof Curbs
 - 1. The roof curb units shall be fabricated to the specifications of the roofing manufacturer, thus assuring its compatibility with the roof construction's framing and covering.
 - 2. Roof curbs shall be of size and design to accommodate the various projecting elements to be retained. The contractor is responsible for verification of the

- various sizes, configurations and requirements. It is expected than the contractor use the existing conditions, surfaces, and elements as a source material for these requirements.
3. The roof curb shall be of size and design required for fan, vent or air conditioning equipment. It shall support the specific ventilating device in a nominally horizontal position above the weather surface of the roof and adequately deflect storm drainage around its periphery.
 4. All sealants, closures and fasteners, etc., shall be included for proper installation and performance. Roof subframing and/or headers between purlins shall be provided for additional rigidity and support of the curb and its ventilating device.
 5. Roof vent curb and supporting framing shall provide for expected expansion and contraction of roof panels.
- C. Ventilation – The new roof and existing roof shall be ventilated with eave, ridge or sidewall vents. Proper determination of rate of air exchange “CFM'S” shall be determined by a mechanical engineer, not by the roofing contractor.
- D. Materials And Construction
1. Metal roof curb shall be provided with a horizontal flanged top projecting a minimum of 8” above the weather surface plane. Curb design shall incorporate a built-in water deflector on the up slope side to prevent ponding and direct water around the curb. The base shall fit the roof slope and shall be compatible with the roofing panels to which is flashed and/or sealed and fastened. Curb design shall
 2. The curb shall be fabricated of 18 gauge galvalume material. Shell and base plate assembly shall be fully mitered and welded. All exposed welds shall be cleaned and coated with the manufacturer’s standard zinc rich or aluminum based primer. Curbs longer than three feet shall have internal angle reinforcement designed by the manufacturer. Curbs called for on the drawings to be insulated shall have one and one-half inch thick three-pound density fiberglass board insulation at curbs and base.
 3. Miscellaneous materials:
 - a. Sealing compounds shall be as specified and supplied by the roofing manufacturer.
 - b. Closures and fasteners shall conform to the roofing manufacturer’s standards compatible with the roof covering furnished.
 - c. Provide flexible preformed “Deck Tight” units at pipes 10” in diameter and smaller; at larger than 10” diameter, provide curbs as described above.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation – Shall conform to the roofing manufacturer’s details and instructions shown on the assembly drawings, together with accepted trade practices.

END OF SECTION

**SECTION 07468
HORIZONTAL FIBER CEMENT SIDING**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Horizontal fiber-cement siding for walls, soffit panels and trim with related flashings, accessory components and underlayment.
- B. Building paper underlayment.

1.03 RELATED WORK

- A. Division 4 Section "Unit masonry"
- B. Division 6 Section "Rough Carpentry"

1.04 REFERENCES

- A. APA siding Performance Rating Standards PRP108.

1.05 SUBMITTALS

- A. Submit manufacturer's standard color samples for selection under provisions of Section 01300.
- B. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. James Hardie Building Products
- B. Georgia Pacific
- C. CertainTeed

2.02 MATERIAL

- A. Fiber Cement Board Panels - General: CertainTeed Fiber Cement Board Panels consist of cement, recycled content and cellulose fiber formed under high pressure into boards with integral surface texture; complying with ASTM C 1186 Type A Grade II; machined edges; for nail attachment.
 - 1. Surface Burning Characteristics: Flame spread index of 0, smoke developed index of 5, maximum; when tested in accordance with ASTM E 84 (Class I/A).

2. Flammability: Noncombustible, when tested in accordance with ASTM E 136.
 3. Flexural Strength: At least 1450 psi (10 MPa) when in equilibrium condition, and at least 1015 psi (7 MPa) when in wet condition, tested in accordance with ASTM C 1185.
 4. Coefficient of Thermal Expansion: Less than 1×10^{-5} /inch/inch/degree F (0.5×10^{-5} /degree C), when tested in accordance with ASTM E 228.
 5. Freeze Thaw Resistance: At least 80 percent flexural strength retained, when tested in accordance with ASTM C 1185.
 6. UV Resistance: No cracking, checking, or erosion, when tested for 2000 hours in accordance with ASTM G 26.
 7. Water Tightness: No water droplets on underside, when tested in accordance with ASTM C 1185.
- B. Horizontal Siding:
1. Thickness: 5/16 inch (7.9 mm), plus or minus .04 inch (1 mm).
 2. Length: 12 feet (3657 mm), plus 0, minus 1/8 inch (3 mm).
 3. Style: wood grain finish.
 - a. Width: 7-1/4 inches (185 mm) wide.
 4. Sealant/Primer: FiberTect Sealant/Primer.
 5. Field Finish Paint: 100 percent acrylic latex as specified in Section 09900.

2.03 ACCESSORY COMPONENTS

- A. Accessory Components: Starter strips, trim, inside corners, outside corners, drip caps, of same material and finish as siding.
- B. Nails and Staples: Manufacturer's standard corrosion resistant type; size and strength to securely and rigidly retain siding and accessory components in place.
- C. Underlayment: Cellulose fiber building paper; water repellent breather type, No. 15, unperforated asphalt saturated felts of type recommended for use by manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to commencing installation, verify governing dimensions of building and condition of substrate.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Examine, clean, and repair as necessary any substrate conditions that would be detrimental to proper installation.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and Drawing details.
 - 1. Read warranty and comply with all terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - 3. Use trim details indicated on drawings.
 - 4. Touch up all field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood Studs Without Sheathing: Install building paper over studs prior to installing siding.
- C. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- D. Over Foam Sheathing: Read and comply with sheathing manufacturer's recommendations. For sheathing of 1 inch (25 mm) thickness or less, nail through sheathing into studs using correspondingly longer nails.
- E. Over Masonry Walls: Install furring strips of adequate thickness to accept full length of nails and spaces at 16 inches (406 mm) on center.
- F. Over Steel Studs: Minimum 20 gauge steel, 3 5/8" (92 mm) C-studs. Use 1-5/8" (41 mm) long, #8-18 x 3/8" HD self-tapping, corrosion-resistant ribbed bugle head screws. Attach siding at each stud insuring that at least 3 screw threads penetrate the studs.
- G. Diagonal Siding: Follow manufacturer's instructions
- H. Allow space between both ends of siding panels that butt against trim for thermal movement; seal joint between panel and trim with exterior grade sealant.
- I. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- J. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- K. Furred Installation: Leave space at top and bottom open; top may be behind soffit; at bottom install insect screen over opening by wrapping a strip of screen over bottom ends of vertical furring strips.
- L. Install sheet metal flashing above door and window casings and horizontal trim in field of siding.
- M. Do not install siding less than 6 inches (150 mm) from surface of ground nor closer than 1 inch (25 mm) to roofs, patios, porches, and other surfaces where water may collect.
 - 1. After installation, seal all joints except lap joints of lap siding. Seal around all penetrations. Paint all exposed cut edges.
 - 2. Finish Painting: Specified in Section 09900.
 - 3. Finish Painting: Within 24 months after installation, paint siding and trim with one coat finish paint.

4. Finish Painting: Within 24 months after installation, paint siding and trim with one coat primer and two coats finish paint.

3.04 CLEANING

- A. At completion of work, remove debris caused by siding installation from project site.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07542
THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
1. Adhered membrane roofing system.
 2. Mechanically fastened membrane roofing system.
 3. Vapor retarder.
 4. Roof insulation.
- B. This Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 5 Section "Steel Deck."

1.03 RELATED SECTIONS

- A. Related Sections include the following:
1. Division 5 Section "Steel Deck" for furnishing acoustical deck rib insulation.
 2. Division 6 Section "Carpentry" for wood nailers, curbs, and blocking and for wood-based, structural-use roof deck panels.
 3. Division 7 Section "Building Insulation" for insulation beneath the roof deck.
 4. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter-flashings.
 5. Division 7 Section "Roof Expansion Assemblies."
 6. Division 7 Section "Joint Sealants."
 7. Division 15 Section "Plumbing Specialties" for roof drains.

1.04 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
- D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
- E. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist the factored design uplift pressures calculated according to SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems."

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Insulation fastening patterns.
- C. Samples for Verification: For the following products:
 - 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. 12-by-12-inch (300-by-300-mm) square of roof insulation.
 - 3. 10 lb (4.5 kg) of aggregate ballast in color and gradation indicated.
 - 4. Full-size concrete roof paver in each color and texture required.
 - 5. 12-by-12-inch (300-by-300-mm) square of walkway pads or rolls.
 - 6. 12-inch (300-mm) length of metal termination bars.
 - 7. 12-inch (300-mm) length of battens.
 - 8. Six insulation fasteners of each type, length, and finish.
 - 9. Six roof cover fasteners of each type, length, and finish.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements.

- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Research/Evaluation Reports: For components of membrane roofing system.
- I. Maintenance Data: For roofing system to include in maintenance manuals.
- J. Warranties: Special warranties specified in this Section.
- K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing or FMG approval for membrane roofing system identical to that used for this Project.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane and approved by roofing membrane manufacturer.
- E. Roofing System Manufacturer's Representative: Shall attend Preliminary Roofing Conference, make timely inspection of the work to insure consistency with warrantee requirements and provide written acceptance of installation prior to architect's final review of project.
- F. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
 - 2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.
- G. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for pre-installation conferences in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
 - 1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- H. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.09 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing accessories, roof insulation, fasteners, cover boards, substrate board, vapor retarder, walkway products and other components of membrane roofing system.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

2.02 PVC ROOFING MEMBRANE

- A. PVC Sheet: ASTM D 4434, Type II, Grade 1, fiber reinforced and fabric backed, as follows:
 - 1. Product: Subject to compliance with requirements, provide "Sarnafil G410" by Sarnafil Inc.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.
- B. PVC Sheet: ASTM D 4434, Type III, fabric reinforced and fabric backed.
 - 1. Manufacturers:
 - a. Duro-Last Roofing, Inc.
 - b. Firestone Building Products Company.
 - c. Flex Membrane International, Inc.
 - d. GAF Materials Corporation.

- e. GenFlex Roofing Systems.
 - f. Johns Manville International, Inc.
 - g. Sarnafil Inc.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.
- C. PVC Sheet: ASTM D 4434, Type IV, fabric reinforced and fabric backed.
- 1. Manufacturers:
 - a. Cooley Engineered Membranes; Div. of Cooley Group.
 - b. Duro-Last Roofing, Inc.
 - c. Seaman Corporation.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.

2.03 THERMOPLASTIC POLYLEFIN ROOFING MEMBRANE

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced, and as follows:
- 1. Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products Company.
 - c. GAF Materials Corporation.
 - d. GenFlex Roofing Systems.
 - e. Johns Manville International, Inc.
 - f. Sarnafil Inc.
 - g. Stevens Roofing Systems; Div. of JPS Elastomerics.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.
 - 4. Physical Properties:
 - a. Breaking Strength: 225 lbf (1 kN); ASTM D 751, grab method.
 - b. Elongation at Break: 15 percent; ASTM D 751.
 - c. Tearing Strength: 55 lbf (245 N) minimum; ASTM D 751, Procedure B.
 - d. Brittleness Point: Minus 22 deg F (30 deg C).
 - e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- (75-mm-) diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F (40 deg C) and an ozone level of 100 pphm (100 mPa); ASTM D 1149.
 - f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F (116 deg C); ASTM D 573.
 - g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F (70 deg C); ASTM D 471.
 - h. Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.

2.04 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
- C. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as sheet membrane.
- D. Bonding Adhesive: Manufacturer's standard solvent or water-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
- E. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.
- F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.05 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 36, Type X gypsum wall board, 5/8 inch (16 mm) thick.
- B. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch (16 mm) thick.
 - 1. Product: Subject to compliance with requirements, provide "Dens-Deck" manufactured by Georgia-Pacific Corporation.
- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

2.06 VAPOR RETARDER

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, FMG approved for vapor-retarder application.
- B. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.

2.07 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.6-lb/cu. ft. (26-kg/cu. m), X, 1.3-lb/cu. ft. (21-kg/cu. m) minimum density, square edged.
 - 1. Manufacturers:
 - a. DiversiFoam Products.

- b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Tenneco Building Products.
- C. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, 1.8 lb/cu. ft. (29 kg/cu. m), Type VII, 2.2 lb/cu. ft. (35 kg/cu. m) with 2 or 4 edges rabbeted.
 - 1. Manufacturers:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Tenneco Building Products.
- D. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers:
 - a. Apache Products Company.
 - b. Atlas Roofing Corporation.
 - c. Carlisle SynTec Incorporated.
 - d. Celotex Corporation.
 - e. Firestone Building Products Company.
 - f. GAF Materials Corp.
 - g. GenFlex Roofing Systems.
 - h. Johns Manville International, Inc.
- E. Composite Polyisocyanurate Board Insulation: ASTM C 1289, faced with insulation board on one major surface, as indicated below by type, and felt or glass-fiber mat facer on the other.
 - 1. Manufacturers:
 - a. Apache Products Company.
 - b. Atlas Roofing Corporation.
 - c. Celotex Corporation.
 - d. Firestone Building Products Company.
 - e. GAF Materials Corp.
 - f. GenFlex Roofing Systems.
 - g. Johns Manville International, Inc.
- F. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
- G. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.08 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

- D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) thick.
 - 1. Product: Subject to compliance with requirements, provided "Dens-Deck" manufactured by Georgia-Pacific Corporation.

2.09 ASPHALT MATERIALS

- A. Roofing Asphalt: ASTM D 312, Type III or IV or ASTM D 6152, SEBS modified.
- B. Asphalt Primer: ASTM D 41.

2.10.1 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, rolls, pads or rolls, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.
- B. Rubber Roof Pavers: Interlocking, lightweight rubber units, 24 by 24 by 2-1/4 inches (600 by 600 by 57 mm), 6 lb/sq. ft. (30 kg/sq. m); with grooved back for 4-way drainage, beveled and doweled; and as follows:
 - 1. Products:
 - a. Carlisle SynTec Incorporated; Interlocking Rubber Paver.
 - 2. Color: Black.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 5 Section "Steel Deck."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 - 7. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Install acoustical roof deck rib insulation strips, specified in Division 5 Section "Steel Deck," according to acoustical roof deck manufacturer's written instructions.

3.03 SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.04 VAPOR-RETARDER INSTALLATION

- A. Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively.
 - 1. Seal side and end laps with tape or adhesive.
- B. Install laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively. Bond vapor retarder to deck as follows:
 - 1. Apply adhesive at rate recommended by vapor-retarder manufacturer. Seal laps with adhesive.
 - 2. Apply ribbons of hot roofing asphalt at spacing, temperature, and rate recommended by vapor-retarder manufacturer. Seal laps with hot roofing asphalt.
- C. Install 2 glass-fiber felt plies lapping each felt 19 inches (483 mm) over preceding felt. Embed each felt in a solid mopping of hot roofing. Glaze-coat completed surface with hot roofing asphalt. Apply hot roofing asphalt within plus or minus 25 deg F (14 deg C) of equiviscous temperature and at a rate of 20 lb/100 sq. ft. (1 kg/sq. m), plus or minus 25 percent.
- D. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.05 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.

- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches (50 mm) or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
 - 1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m) and allow primer to dry.
 - 2. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
 - 3. Set each layer of insulation in a cold fluid-applied adhesive.
- H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- I. Mechanically Fastened and Adhered Insulation: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 3. Install subsequent layers of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
 - 4. Install subsequent layers of insulation in a cold fluid-applied adhesive.

3.06 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
 - 1. Install sheet according to ASTM D 5036.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

- D. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- E. Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- F. Hot Roofing Asphalt: Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer and install fleece-backed roofing membrane. Do not apply roofing asphalt to splice area of roofing membrane.
- G. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- H. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- I. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
- J. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- K. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.07 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
 - 1. Install sheet according to ASTM D 5082.
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
- G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
- I. Through-Membrane Attachment: Secure roofing membrane using fastening plates or metal battens and mechanically fasten roofing membrane to roof deck. Cover battens and fasteners with a continuous cover strip.
- J. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.08 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.09 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.
- B. Rubber Roof-Paver Walkways: Install rubber roof-paver walkways according to manufacturer's written instructions, loosely laid, in locations indicated.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.12 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: <Insert name of Owner.>
 - 2. Address: <Insert address.>
 - 3. Building Name/Type: <Insert information.>
 - 4. Address: <Insert address.>
 - 5. Area of Work: <Insert information.>
 - 6. Acceptance Date: <Insert date.>
 - 7. Warranty Period: <Insert time.>
 - 8. Expiration Date: <Insert date.>
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding <Insert wind speed> mph (m/sec);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

- e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 - 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 - 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 - 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 - 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 - 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 - 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
- E. IN WITNESS THEREOF, this instrument has been duly executed this **< Insert day >** day of **< Insert month >**, **< Insert year >**.
- 1. Authorized Signature: **< Insert signature. >**
 - 2. Name: **< Insert name. >**
 - 3. Title: **< Insert title. >**

END OF SECTION

**SECTION 07620
SHEET METAL FLASHING AND TRIM**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Roof curb, roof penetrations, exterior doors and exterior window flashings.
- B. Work of this Section is to physically protect membrane roofing, base flashings, and their connections from damage that would permit water leakage to building interior.

1.03 RELATED WORK

- A. Section 04200 Unit Masonry.
- B. Section 06001 Wood blocking, nailers, and grounds.
- C. Section 07900 Joint Sealers
- D. Section 08111 Hollow Metal Doors and Frames
- E. Section 08520 Aluminum Windows
- F. Section 09220 Portland Cement Stucco.
- G. Section 09900 Painting: Prime and finish painting.

1.04 REFERENCES

- A. AA (Aluminum Association) – Aluminum Construction Manual: Aluminum Sheet Metal Work and Building Construction.
- B. ANSI/ASTM B 32 – Solder Metal
- C. ASTM B 209 – Aluminum and Aluminum Alloy Sheet and Plate.
- D. ASTM D 226 – Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- E. NRCA (National Roofing Contractors Association) – Roofing Manual.
- F. SMACNA – Architectural Sheet Metal Manual

1.05 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with three years minimum experience.

1.06 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Describe material profile, jointing pattern, details, fastening methods, and installation details.

1.07 STORAGE AND HANDLING

- A. Store products under provisions of Section 01600.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration, staining or damage.

PART 2 - GENERAL**2.01 PRODUCTS**

- A. Aluminum Sheet: ASTM B 209, 24 gauge shop pre-coated with coating of selected color as selected by Architect.

2.02 ACCESSORIES

- A. Fastener: Galvanized steel or cadmium plating soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Underlayment: ASTM D 266; No. 90 asphalt saturated roofing felt.
- C. Sealant: Type specified in Section 07900.
- D. Plastic cement: FS SS-C-153, Type 1- Asphaltic base cement.
- E. Reglets: Surface mounted .032 inch mill finish aluminum models RC-1 and RC-2; manufactured by M-M Systems; face and ends covered with plastic tape.
- F. Solder: ANSI/ASTM B 32; 60/40 or 80/20 type.
- G. Flux: FS O-F-506

2.03 REGLETS

- A. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.
- B. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- C. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

- D. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
- E. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
- F. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
- G. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing lower edge.
 - 1. Material: Stainless steel, 0.0187 inch (0.5 mm) thick.
 - 2. Material: Aluminum, 0.024 inch (0.6 mm) thick.
 - 3. Material: Galvanized steel, 0.0217 inch (0.55 mm) thick.
- H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Fry Reglet Corporation.
 - 2. Hickman: W.P. Hickman Co.
 - 3. Keystone Flashing Company.

2.04 FABRICATION

- A. Form sections true to shape, accurate in size, square and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside ½" (13mm); miter and seam corners.
- E. Form material with standing flat lock cover plate seam.
- F. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam solder for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward ¼" (6mm) and hemmed to form drip.
- I. Fabricate flashings to allow toe to extend two inches over roofing. Return and brake edges.

2.05 FINISH

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations on applying and designation finishes.

- B. Fluoropolymer two-coat coating system: Manufacturer's standard two-coat thermocured system complying with AAMA 605.2, composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene resin by weight, complying with AAMA 605.2.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- D. Insert flashings into reglets to form tight fit. Secure in place with lead plastic wedges at maximum 12 inches on center. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
- E. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect/Engineer.
- F. Lap and seal all joints.
- G. Apply plastic cement compound between metal flashings and felt flashing.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Solder metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- J. Seal metal joints watertight.

3.03 INSTALLATION

- A. Conform to drawing details and details included in SMACNA and NRCA manual.

3.04 SCHEDULE

- A. Flashing at exterior doors and windows.
- B. Flashing at roof curb openings and other roof and wall penetrations.

END OF SECTION

**SECTION 07710
PREFABRICATED ROOF SPECIALTIES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Copings.
- B. Gutters.
- C. Downspouts.
- D. Aluminum Soffits.
- E. Scuppers and Collector Boxes

1.03 RELATED WORK

- A. Section 06100 Carpentry: wood curbs.
- B. Section 07526 APP-Modified Bituminous Sheet Roofing: Roofing system and base flashings.
- C. Section 07620 Sheet metal flashing and trim: Metal flashings.

1.04 SUBMITTALS

- A. Submit shop drawings and products data under provisions of Section 01300.
- B. Indicate on shop drawings, configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- C. Provide product data on shape of components, materials and finishes, anchor types and locations. .
- D. Submit samples under provisions of Section 01300.
- E. Submit two (2) samples 6 x 6 inches in size illustrating components shape, finish and color.
- F. Submit manufacturer's installation instructions under provisions of Section 01300.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. Milcor
- B. M-M Systems
- C. Hickman
- D. Alcoa
- E. Peterson Aluminum Products.

2.02 COMPONENTS

- A. Copings, Gravel Stops, Spillout Scupper, Scupper Drain, Overflow Drains and Reglets: As manufactured by W. P. Hickman Company, or equal. Metal shall be .050" thick and prefinished, color shall be selected by Architect from standard and custom colors.
- B. Gutters shall be 6" x 6" factory finish aluminum, white, unless otherwise noted on the drawings.
- C. Downspouts shall be 4" x 6" factory finish aluminum, color to be white, or as noted on the construction drawings. Connect to storm drains as noted on the civil engineering drawings. Verify locations on site plan and building elevations.
- D. Ventilated aluminum soffit to be equal to Alcoa, .019" gauge with 1/16" diameter holes at 5/32" centers staggered providing 15 square inches of net free area per lineal foot. Soffit shall be pre-finished with color white, unless otherwise noted.
- E. Scuppers: .050" aluminum flashing material, by W.P. Hickman Company. Conductors shall be .050" aluminum architectural sheet.
- F. Collector boxes shall be style #LH028 fabricated in aluminum as manufactured by Rutland. Size shall be 1'-10" wide x 2'-0" high x 12" deep. See construction drawings for profiles required.
- G. Scupper roof drains – Zurn roof drains model # 59231.
- H. Submittals on all components are required.

2.03 ACCESSORIES

- A. Sealants: See Section 07900.
- B. Resilient Filler: Elastomer sized per drawings.
- C. Exposed Fasteners: Stainless steel, nonmagnetic, of manufacturer's standard type and size for product and application indicated. Match finish of exposed heads with material being fastened.
- D. Concealed Fasteners: Same metal as item fastened or other noncorrosive metal as recommended by manufacturer.

- E. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- F. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.
- G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.04 FINISHES

- A. Aluminum: Prefinished baked enamel finish as selected by Architect from standard and custom colors.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range of colors and glosses.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.
- B. Beginning of installation means acceptance of existing.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions.
- B. Coordinate roofing membrane and base flashings with installation of components of this Section.
- C. Coordinate installation of sealants and roofing cement with work of this Section to ensure watertightness.
- D. Coordinate installation of flashing flanges into reglets.

END OF SECTION

**SECTION 07720
ROOF ACCESSORIES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
 - 1. Prefabricated curb and equipment support units.
 - 2. Roof hatches.
 - 3. Static Roof louvers
 - 4. Ridge Vents

1.03 RELATED SECTIONS

- A. Division 5 Sections for ladders and support framing.
- B. Division 6 Section "Rough Carpentry" for roof deck and nailers.
- C. Division 7 Section for roofing types and roofing accessories included as part of roofing Work.
- D. Division 7 Section "Roof Expansion Assemblies" for roof expansion joint covers.
- E. Division 7 Section "Manufactured Roof Specialties" for fascia, coping, gravel stops, and roof expansion joint covers.
- F. Division 7 Section "Flashing and Sheet Metal" for metal flashing, valleys, gutters, and downspouts.

1.04 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified. Submit manufacturer's detailed technical product data, installation instructions and recommendations, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Shop drawings showing fabrication and installation of each roof accessory specified including fully dimensioned plans, elevations, sections, details of components, and attachments to other units of Work. Also show layout, anchorage details, rough-in requirements, and conditions on the roof or for other accessories.
- D. Samples for initial selection purposes in the form of manufacturer's color charts showing full range of colors, textures, shapes, and sizes available for each type of roof accessory indicated.

- E. Samples for verification purposes in full-size units or representative section of each type of roof accessory indicated for each color, texture, shape, and sizes specified.
- F. Coordination Drawings: Submit coordination drawings for items interfacing with or supporting mechanical or electrical equipment, ductwork, piping, or conduit. Indicate dimensions and locations of items provided under this Section, together with relationships and methods of attachment to adjacent construction and to mechanical or electrical items.

1.05 QUALITY ASSURANCE

- A. Heat-and-Smoke Vent Compliance: Provide units that have been tested, listed, or approved as follows:
 - 1. Construction/Operation: UL-listed.
 - 2. Construction/Operation: FM-approved.
 - 3. Fire Resistance of Lids: UL Class A rating.
- B. Standards: Comply with the following:
 - 1. SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated.
 - 2. NRCA "Roofing and Waterproofing Manual" details for installation of units.
 - 3. NFPA 204M for smoke-and-heat vent design constraints, operation, and location.
 - 4. TAS No. 100(A)-95 Test Procedure for Wind Driven Rain

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Prefabricated Curb and Equipment Support Units:
 - a. Curbs, Inc.
 - b. Custom Curb, Inc.
 - c. The Pate Co.
 - d. ThyCurb Div./ThyBar Corp.
 - 2. Roof Hatches:
 - a. Babcock-Davis Hatchways, Inc.
 - b. Bilco Co.
 - c. Bristolite Skylights.
 - d. Milcor, Inc.
 - e. O'Keeffe's, Inc.
 - f. Wasco Products, Inc.
 - 3. Static Roof Louvers:
 - a. Air Vent, Inc.
 - b. Active Ventilation Products, Inc.
 - c. GAF Industries, Inc. ("Basis of Design")
 - 4. Ridge Vents:
 - a. Air Vent, Inc.

- b. Alcoa Building Products.
 - c. Ampcor, Div. of The Solar Group.
 - d. GAF Industries, Inc. ("Basis of Design")
 - e. ThyCurb Div./ThyBar Corp.
5. Hatch-Type Heat-and-Smoke Vents:
- a. Babcock-Davis Hatchways, Inc.
 - b. Bilco Co.
 - c. Bristolite Skylights.
 - d. Milcor, Inc.
 - e. O'Keeffe's, Inc.
 - f. Wasco Products, Inc.

2.02 MATERIALS, GENERAL

- A. Aluminum Sheets: ASTM B 209 (ASTM B 209M) for Alclad alloy 3005H25 or alloy and temper required to suit forming operations with mill finish, unless indicated otherwise.
- B. Extruded Aluminum: ASTM B 221 (ASTM B 221M) alloy 6063-T52 or alloy and temper required to suit structural and finish requirements. Mill finish, unless indicated otherwise.
- C. Structural-Quality Galvanized Steel Sheet: ASTM A 446 (ASTM A 446M) with G90 (Z275) coating complying with ASTM A 525 (ASTM A 525M), Grade C, or to suit manufacturer's standards.
- D. Commercial-Quality Galvanized Steel Sheet: ASTM A 526 (ASTM A 526M) with G90 (Z275) coating complying with ASTM A 525 (ASTM A 525M).
- E. Galvalume-Coated Steel Sheet: ASTM A 792 (ASTM A 792M) with class AZ-50 (AZ-150) coating, Grade 40 (Grade 275), or to suit manufacturer's standards.
- F. Plastic Sheets: Except where additional thickness is required for light transmittances, provide glazing plastic sheet thickness required for 40-lbf/sq. ft. (1.9 kPa) external loading and 20-lbf/sq. ft. (0.95 kPa) internal loading pressures as recommended by the manufacturer for the size and shape indicated.
 - 1. Acrylic: ASTM D 4802, thermoformable, cast or continuous-cast acrylic (methacrylate), Category C-1 or C-2, Type UVA containing ultraviolet (UV) absorber, with smooth or polished finish 1, unless otherwise indicated.
 - 2. Polycarbonate: Thermoformable, monolithic polycarbonate sheets manufactured by the extrusion process, burglar-resistance rated per UL 972 with average impact strength of 16 ft-lb/inch (850 J/m) of width when tested according to ASTM D 256, Test Method A (Izod).
- G. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- H. Wood Nailers: Softwood lumber, pressure treated with water-borne preservatives for above-ground use, complying with AWPA C2; not less than 1-1/2 inch (38 mm) thick.
- I. Security Grilles: 3/4-inch (19-mm) diameter hardened steel bars spaced 6 inches (150 mm) o.c. in one direction and 12 inches (300 mm) o.c. in the other. Weld bar

intersections and weld ends of bars to structural frame or primary curb walls. Clean and paint with rust-inhibitive metal primer.

- J. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removal of exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
- K. Gaskets: Manufacturer's standard tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.
- L. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4 mm) dry film thickness per coating.
- M. Mastick Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- N. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, and, A.
- O. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.03 FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations on applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system for designating aluminum finishes established by the Aluminum Association.
- C. Baked Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.

2.04 PREFABRICATED CURBS AND EQUIPMENT SUPPORTS

- A. General: Comply with loading and strength requirements as indicated where units support other work. Coordinate dimensions with rough-in information or shop drawings of equipment to be supported.
 - 1. Fabricate of structural-quality, hot-dip galvanized or galvalume sheet steel, factory-primed and prepared for painting with welded or sealed mechanical corner joints.
 - 2. Provide complete with cant strips and base profile coordinated with roof insulation thickness. Provide preservative-treated wood nailers at tops of curbs, coordinate with thickness of insulation and roof flashing as indicated, tapered as necessary to compensate for roof deck slopes of 1/4 inch per foot (1:48) and less.

3. Unless otherwise indicated or required for strength, fabricate units of minimum 0.0747-inch (1.9-mm) thick metal, and to minimum height of 12 inches (300 mm).
4. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate curb/support units with height tapered to match slope to level tops of units.

2.05 ROOF HATCHES

- A. General: Fabricate units to withstand 40-lbf/sq. ft. (1.9 kPa) external loading and 20-lbf/sq. ft. (0.95 kPa) internal loading pressure. Frame with 9-inch (225 mm) high, integral-curb, double-wall construction with 1-1/2 inch (38 mm) insulation, cant strips and cap flashing (roofing counterflashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1 inch insulation core. Provide gasketing and equip corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.
- B. Type: Single-leaf personnel access.
 1. For Ladder Access: 30 x 36 inches (750 x 900 mm).
- C. Type: Double-leaf for equipment access.
 1. Size: 72 x 96 inches (1800 x 2400 mm).
- D. Material: Aluminum, sheets and extrusions.
- E. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot (1:48), fabricate hatch curbs with height tapered to match slope to level tops of units.

2.06 RIDGE VENTS

- A. Aluminum: Fabricate of sheet aluminum with baffles to prevent snow and rain entering and weep holes to allow water to drain to roof. Provide splice plates and end caps required.
- B. Plastic: High-density polypropylene or other UV-stabilized plastic designed to be installed under shingles at ridge.
- C. Must meet TAC 100 (A) per FBC 5th Edition (2014)

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, vapor barriers, roof insulation, roofing and flashing, as required, to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses, as well as inward and outward loading pressures.
 1. Except as otherwise indicated, install roof accessory items according to construction details of NRCA "Roofing and Waterproofing Manual."

- B. Isolation: Where metal surfaces of units are to be installed in contact with incompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- D. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counterflashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- E. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.
- F. Heat-and-Smoke Vents: Locate, install, and test according to NFPA 204M.

3.02 CLEANING AND PROTECTION

- A. Clean exposed metal and plastic surfaces according to manufacturer's instructions. Touch up damaged metal coatings.

END OF SECTION

**SECTION 07812
FIREPROOFING****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. All labor, material, and services necessary to provide cementitious and intumescent fireproofing and related work as indicated on the drawings or specified herein.
- B. All work shall conform to the applicable building codes and the authorities having jurisdiction.

1.03 RELATED WORK

- A. Structural Steel – Section 05120
- B. Steel Joists – Section 05212
- C. Metal Decking – Section 05300

1.04 REFERENCES

- A. ASTM D256 – Impact Resistance Test
- B. ASTM D638 – Tensile Strength
- C. ASTM D695 – Standard Test Method for Compressive Strength
- D. ASTM D790 – Standard Test Method for Flexural Strength
- E. ASTM D1002 – Standard Test for Bond Strength
- F. ASTM D1044 – Standard Test for Abrasion Resistance Test
- G. ASTM D4541 – Bond Strength
- H. ASTM E84 – Surface Burning Characteristics
- I. ASTM E119 – Fire Tests of Building Construction and Materials
- J. ASTM E605 – Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members.
- K. ASTM E736 – Cohesion/ Adhesion of Sprayed Fire-Resistive Material Applied to Structural Members
- L. ASTM E759 – Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
- M. ASTM E760 – Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
- N. ASTM E761 – Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members

- O. ASTM E859 – Air Erosion of Sprayed Fire-Resistive Material Applied to Structural Members
- P. ASTM E937 – Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members
- Q. ASTM E1354 – Cone Calorimeter
- R. ASTM F433 – Thermal Resistivity
- S. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- T. SSPC-SP-1 – Solvent Cleaning – Steel Structures Painting Council
- U. SSPC-SP-2 – Hand Tool Cleaning – Steel Structures Painting Council
- V. SSPC-SP-3 – Power Tool Cleaning – Steel Structures Painting Council
- W. SSPC-SP-6 – Commercial Blast Cleaning – Steel Structures Painting Council

1.04 SUBMITTALS

- A. Product data: Submit on product characteristics, performance and limitation criteria. Include manufacturer's preparation and installation instructions for each type of fireproofing specified.
- B. Test Data for the following:
 - 1. Bond Strength
 - 2. Fire Test Reports
 - 3. Compressive Strength (cementitious type only)
 - 4. Deflection (cementitious type only)
 - 5. Bond Impact (cementitious type only)
 - 6. Air Erosion (cementitious type only)
 - 7. Corrosion Resistance (cementitious type only)
 - 8. High Speed Air Erosion (cementitious type only)
 - 9. Surface Burning Characteristics (cementitious type only)
 - 10. Combustibility (cementitious type only)
 - 11. Mold Resistance (cementitious type only)
 - 12. Impact Penetration (cementitious type only)
- C. Certified Test Reports indicating UL Design listings.

1.05 QUALITY ASSURANCE

- A. Manufacturer shall be one specializing in the products specified in this section with a minimum of five years documented experience.
- B. Applicator shall be a company specializing in applying the work of this section with a minimum of three years documented experience and approved by the manufacturer.
- C. No more than two different manufacturers shall be used on project.

1.06 PROJECT CONDITIONS

- A. A minimum temperature of 40 degrees before application of fireproofing. Maintain temperature during application and for 24 hours after application.
- B. Provide ventilation in poorly ventilated areas to achieve a minimum total air exchange rate of 4 per hour until material is substantially dry.

PART 2 – PRODUCTS**2.01 MATERIALS****A. Spray Applied Fireproofing:**

1. A cementitious mixture equal to Monokote MK-6/HY factory blended fireproofing as manufactured by Grace Construction Products Division of W. R. Grace & CO.
2. Minimum average dry density shall be that listed in the UL Fire Resistance Directory for each rating indicated, ICBO Evaluation Report, as required by the authority having jurisdiction, or minimum average of 15 pcf whichever is greater.
3. Deflection: material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.
4. Bond Impact: Material subject to impact tests per ASTM E760 shall not crack or delaminate from the surface to which it is applied.
5. Bond Strength: Material when tested per ASTM E736 shall have minimum average bond strength of 200psf and minimum individual bond strength of 150psf.
6. Air Erosion: Max. allowable total weight loss of fireproofing material shall be .005g/sq. ft. when tested per ASTM E859. Sample surface shall be as applied (not pre-purged) and the total reported weight loss shall be the total weight loss over a 24-hour period from beginning of the test.
7. High Speed Air Erosion: Material to be used in plenums or ducts shall exhibit no continued erosion after 4 hours at an air speed of 2500 ft/min. (29mph) when tested per ASTM E859.
8. Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 1200 psf when tested per ASTM E761.
9. Corrosion Resistance: Fireproofing applied to steel shall be tested in accordance with ASTM E 937 and shall not promote steel corrosion.
10. Surface Burning: Material shall have the following characteristics when tested per ASTM E84: Flame Spread – 0, Smoke Development – 0.
11. Resistance to Mold: Fireproofing material shall be formulated with a mold inhibitor. When tested per ASTM G21 it shall show resistance to mold growth for a period of 28 days for general use and 60 days for materials used in plenums.
12. Combustibility: Material shall have a maximum total heat release of 20 MJ/sq. meter and a maximum 125 kW/sq. meter peak rate of heat release 600 seconds after insertion when tested per ASTM E1354, at a radiant heat flux of 75 kW/sq. meter, with the use of electric spark ignition. Sample to be tested horizontally.
13. Fire Resistance Classification: The spray applied fireproofing material shall have been tested and reported by Underwriters Laboratories Inc. in accordance with the procedures of ASTM E119 and shall be listed in the UL Fire Resistance Directory.
14. Mixing water for use in this product shall be clean, fresh and suitable for consumption, and free from such amounts of mineral or organic substances as would affect the setting of the fireproofing material. Provide water with sufficient pressure and volume.

B. Intumescent Fireproofing:

1. An intumescent, single component, solvent based, factory mixed, asbestos free material blended for uniform texture equal to Albi Clad 800 as manufactured by. Albi Manufacturing, East Berlin, CT/ 860-828-0571.
2. Minimum Bond Strength: 200-lb./sq. ft when set and dry when tested per ASTM

E736.

3. Bond Impact: When tested per ASTM E760 exhibits no cracking, flaking or delamination.
4. Dry Density: When tested per ASTM E605, minimum average density of 15 lb./ cu ft, with minimum individual density of 14-lb./cu ft.
5. Surface burning: Tested per ASTM E84 – Flame Spread 15, Smoke Developed 40.
6. Compressive Strength: Minimum 500-lb./ sq. ft.
7. Primer: Albi 487s, 490w or type recommended or approved by manufacturer.
8. Reinforcing Mesh: shall be fiberglass minimum weight 6.0 grams per square foot.
9. Metal Lath: 1" hexagonal expanded metal lath – 3.4-lb./ sq. yd – galvanized.
10. Solvent: type recommended or approved by fireproofing manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas shown to receive fireproofing to ensure there are no defects or errors interfering with installation. This shall include verifying that surfaces to receive fireproofing are free of oil, grease, paints/primers, and loose mill scale, dirt or other foreign substance. Where necessary, cleaning or other corrections or surfaces to receive fireproofing shall be the responsibility of the supplier of the incompatible substrate. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Provide primers or bonding agents required for various substrates and conditions as recommended by manufacturer.
- B. Other trades shall install any clips, hangers, support sleeves or other attachments required to penetrate the fireproofing prior to application of the fireproofing material.
- C. Mask adjoining areas to protect finishes from damage by overspray, dusting, fallout or any by-product of application of the fireproofing material.
- D. Complete concrete placement on metal decks and roofing applications on roof deck prior to application of the fireproofing. Prohibit traffic on the roof deck where fireproofing is installed until fireproofing material is dry.

3.03 INSTALLATION

- A. Apply primers and fireproofing material in strict accordance with manufacturer's instructions. Apply to provide rating as noted in the drawings including as many passes as necessary to provide sufficient thickness to achieve the required rating.
- B. Perform field-testing by an independent testing laboratory to randomly sample and verify the thickness and density of the applied fireproofing per ASTM E605 or manufacturer's guidelines.
- C. Patch and repair any damage to fireproofing caused by other trades so as to maintain complete coverage to the required thickness.

3.04 CLEANING

- A. Where visible, clean fireproofing materials from adjacent surfaces.

- B. Remove debris and excess material from site.

END OF SECTION

SECTION 07841
THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Floors.
 - 2. Roofs.
 - 3. Walls and partitions.
 - 4. Smoke barriers.
 - 5. Construction enclosing compartmentalized areas.

1.03 RELATED SECTIONS

- A. Division 3 Section "Cast-in-Place Concrete" for construction of openings in concrete slabs and walls.
- B. Division 7 Section "Building Insulation" for safing insulation and accessories.
- C. Division 7 Section "Sprayed Fire-Resistive Materials."
- D. Division 15 Sections specifying duct and piping penetrations.
- E. Division 16 Sections specifying cable and conduit penetrations.

1.04 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.
 - 4. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
1. Penetrations located outside wall cavities.
 2. Penetrations located outside fire-resistive shaft enclosures.
 3. Penetrations located in construction containing fire-protection-rated openings.
 4. Penetrating items larger than 4-inch- (100-mm-) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.05 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, Factory Manual or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) Factory Manual
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.09 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS**2.01 PRODUCTS AND MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. A/D Fire Protection Systems Inc.
 - 2. DAP Inc.
 - 3. Firestop Systems Inc.
 - 4. Hilti Construction Chemicals, Inc.
 - 5. Instant Firestop Mfg. Inc.
 - 6. International Protective Coatings Corp.
 - 7. Isolatek International.
 - 8. Nelson Firestop Products.
 - 9. RectorSeal Corporation (The).
 - 10. Specified Technologies Inc.
 - 11. 3M Fire Protection Products.
 - 12. Tremco.
 - 13. United States Gypsum Company.

2.02 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.03 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.04 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.03 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.05 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.

4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.06 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.07 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where ITS-listed systems are indicated, they refer to the design numbers listed in ITS's "Directory of Listed Products," "Firestop Systems" Section.
- C. Firestop Systems with No Penetrating Items: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, F-A, W-J, W-L.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- D. Firestop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, C-BK, F-A, F-B, F-C, W-J, W-K, W-L.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- E. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, C-BK, F-A, F-B, F-C, W-J, W-L .
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Intumescent wrap strips.
 - e. Firestop device.
- F. Firestop Systems for Electrical Cables: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, F-A, F-B, F-C, W-J, W-L .

2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Silicone foam.
- G. Firestop Systems for Cable Trays : Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, F-A, F-B, F-C, W-J, W-K, W-L.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Pillows/bags.
- H. Firestop Systems for Insulated Pipes: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, F-A, F-C, W-J, W-L.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Intumescent wrap strips.
- I. Firestop Systems for Miscellaneous Electrical Penetrants: Comply with the following:
 1. UL-Classified Systems: C-AJ, F-A-, W-L
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Mortar.
- J. Firestop Systems for Miscellaneous Mechanical Penetrations: Comply with the following:
 1. UL-Classified Systems: C-AJ, F-C, W-J, W-L.
 2. Type of Fill Materials: One or both of the following:
 - a. Latex sealant.
 - b. Mortar.
- K. Firestop Systems for Groupings of Penetrations: Comply with the following:
 1. UL-Classified Systems: C-AJ, C-BJ, F-A, F-C, W-J, W-L.
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Mortar.
 - c. Intumescent wrap strips.
 - d. Firestop device.
 - e. Intumescent composite sheet.

END OF SECTION

**SECTION 07920
JOINT SEALERS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing

1.03 RELATED SECTIONS

- A. Section 08800 – Glazing: Sealants used in conjunction with glazing methods.

1.04 REFERENCES

- A. ANSI/ASTM D 1056 Flexible Cellular Materials- Sponge or Expanded Rubber.
- B. ANSI/ASTM D 1565 Flexible Cellular Materials- Vinyl Chloride Polymers and Co-polymers (Open-Cell Foam).
- C. ASTM C 790 Use of Latex Sealing Compounds
- D. ASTM C 804 Use of Solvent-Release Type Sealants.
- E. ASTM C 834 Latex Sealing Compounds
- F. FS TT-C-00598 Caulking Compound, Oil and Resin Base Type
- G. FS TT-S-001657 Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- H. FS TT-S-00227 Sealing Compound: Elastomeric Type, Multi-Component.
- I. FS TT-S-00230 Sealing Compound: Elastomeric Type, Single Component
- J. FS TT-S-001543 Sealing Compound: Silicone Rubber Base.
- K. SWI Sealant and Caulking Guide Specification.
(Sealing & Waterproofer's Institute)

1.05 SUBMITTALS

- A. Submit samples under provisions of Section 01300.
- B. Submit two (2) samples 6 inches in size illustrating colors selected.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

- D. Submit Manufacturer's certificate under provisions of Section 01400 that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years' experience and approved by the manufacturer.
- B. Applicator: Company specializing in applying the work of this section with minimum three (3) years' experience.
- C. Conform to Sealant and Waterproofers Institute (SWI) requirements for installation

1.07 FIELD SAMPLES

- A. Provide samples under provisions of Section 01300.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the work of this Section with all Sections referencing this Section.

1.10 WARRANTY

- A. Provide five (5) year warranty under provisions of Section 01740.
- B. Warranty: Include coverage of installed sealants and accessories which fails to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SEALANTS

- A. Acrylic Sealant: FS TT-S-00230, Type II, Class A; color as selected as manufactured by Tremco Acrylic Latex Caulk, Sonneborn Sonolastic or Pecora AC – 20.
- B. Polysulphide Sealant: FS TT-S-00227, Type II – non-sag, Class A; color as selected; Shore A, Average 23 manufactured by Sonnenborn Sonolastic or Pecora Synthacalk.
- C. Polyurethane Sealant: Single component, FS TT-S-00230, Type 1, self-leveling, Class A; color as selected; manufactured by Sonneborn Sonolastic Paving Joint Sealant or Pecora NR-200 Urespan.

- D. Polyurethane Sealant: Multi-component, FS TT-S-00230, Type II, non-sag, Class A; color as selected; Shore A, Average 35, manufactured by Tremco Dymeric, Sonolastic NPPII or Pecora Dynatrol II.
- E. Silicone Sealant: FL TT-S-01543, Class A, low modulus type; color as selected; Shore A, Average 22, manufactured by General Electric Silpruf, Dow Corning 795 Building Sealant or Pecora 864 Architectural Silicone.
- F. Silicone Sealant: : FS TT-S-01543, Class A, high modulus type; color as selected; Shore A, Average 35, manufactured by General Electric 1200, Dow Corning 795 Building Sealant or Pecora 863.
- G. Firewall/Smokewall Penetration Sealant: UL and Factory Mutual approved, non-sag formulation as manufactured by 3M Fire Protection Products, #CP25 N/S or 7900 series.
- H. Preformed Foam Sealants: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellent agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:
 - 1. "Emseal," Emseal Corp.
 - 2. "Emseal Greyflex," Emseal Corp.

2.02 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming material.
- C. Joint Backing: Open cell with silicone sealant and closed cell with all others.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing surfaces.

3.02 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.

- D. Protect elements surrounding the work of this Section from damage or disfiguration.
- E. Ensure that joints are dry prior to installing joint sealants.

3.03 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Tool joints as detailed.

3.04 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01700.
- B. Clean adjacent soiled surfaces.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01500.
- B. Protect sealants until cured.

3.06 SCHEDULE

	<u>Location</u>	<u>Type</u>	<u>Color</u>
A.	Metal/wood to Masonry or concrete	Polysulphide, (B) single component	to match Stone, Brick or Concrete color
B.	Vinyl siding or to wood	(A) Acrylic, latex	to match siding or wood Wood trim
C.	Door frame/Walls	(A) Acrylic, Solvent Cure	White
D.	Under Thresholds	Butyl	Black
E.	Bathtub/Ceramic tile	(E) Silicone, Fungus Resistant	White
F.	Masonry to masonry Concrete to concrete	(E) Silicone low modules	

END OF SECTION

JOINT SEALERS
SECTION 07920-4

SECTION 08110
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
1. Standard hollow metal doors, panels and frames.
- B. Related Sections:
1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
 2. Division 08 Section "Wood Doors" for wood doors in hollow metal frames.
 3. Division 08 Section "Door Hardware (Scheduled by Describing Products)" for door hardware for hollow metal doors and frames.
 4. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
 5. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.
- C. References:
1. ANSI/SDI A250.8 (2003) - Recommended Specifications for Standard Steel Doors and Frames.
 2. ANSI/SDI A250.4 (2001) -Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
 3. ANSI/SDI A250.6 (1997) - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
 4. ANSI/SDI A250.10 (1998) - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 5. ANSI/SDI A250.11 (2001) - Recommended Erection Instructions for Steel Frames.
 6. ANSI/SDI A250.13 (2003) –Testing and Rating of Severe Windstorm Resistant Components.
 7. SDI 115 (1993) - Recommended Specifications for Steel Doors and Frames for Hardware Preparation.
 8. SDI 122 (1998) - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
 9. SDI 124 (1998) - Maintenance of Standard Steel Doors and Frames.
 10. ASTM A1008 (2003) - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

11. ASTM A568 (2003) - Standard Specification for General Requirements for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
12. ASTM A653 (2007) - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
13. ASTM A879 (2006) – Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
14. ASTM A924 (1999) - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
15. ASTM A1011 (2007) – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
16. ASTM A153 (2005) – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
17. ASTM E 90 (1990) - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
18. ASTM E 283 (1991) - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
19. ASTM E 330 – 02 – Test method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
20. ASTM E 331 (1996) - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences.
21. ASTM E 1886 - 02 - Test method for Structural Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
22. ASTM E 1996 – 02 - Test method for Structural Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes.
23. ANSI/NFPA 80 (1999) - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
24. ANSI/UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies.
25. ANSI/NFPA 101 - Life Safety Code.
26. FBC-TPHVHZ – 04 - Florida Building Code, Test Portocols for High Velocity Hurricane Zone, TAS-201, TAS-202, TAS-203
27. Door and Hardware Institute (DHI) (1992) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.
28. Florida Building code and Florida Fire Prevention Code.

1.03 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door design.
 - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of electrical knockout boxes and preparations for power, signal, and control systems.
 - 10. Product approval numbers for all exterior openings.
- C. Samples for Verification:
 - 1. Samples are only required by request of the architect and for manufactures that are not current members of Steel Door Institute.
 - 2. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 125 mm).
 - 3. For the following items, prepared on Samples about 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.
- D. Other Action Submittals:
 - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.
- E. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on

testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.
- D. Smoke-Control Door Assemblies: Comply with NFPA 105.
- E. Pre-Installation Conference: Conduct conference at Project site for hollow metal frames requiring electrical knockout boxes to verify installation of conduit on frames.
- F. Windstorm rated openings within affected coastal states to show approval documentation and labels on both doors and frames showing compliance to the standards adopted by the state. The products that are being used must bear a label showing the standards tested, design pressure, the manufacturer name, and label number.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation. Doors and frames to be stacked in vertical upright position.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.08 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Pioneer Doors.
 2. Republic Steel Doors
 3. Jen-Weld
 4. Steelcraft; an Ingersoll-Rand company.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 1008 (ASTM A 1008M), commercial quality.
- B. Metallic-Coated Steel Sheet: Hot dipped zinc-coated (galvanized) or zinc-iron alloy coated (galvannealed) carbon steel complying with ASTM A 653 (ASTM A 653M), Commercial Steel (CS), Type B; with an A60 coating designation, mill phosphatized.
- C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Glazing: Comply with requirements in Division 08 Section "Glazing."

2.03 STANDARD HOLLOW METAL DOORS

- A. General: Provide 1 3/4" thick doors of design indicated, fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
1. Design: Flush panel
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 3. Vertical Edges for Single-Acting Doors: Beveled edge
 - a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).
 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch (54-mm) radius.
 5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
 6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheets. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), minimum 16 gage (0.053-inch - 1.3-mm-) thick steel, Model 2 (Seamless face and edges).
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 2 and Physical Performance Level B (Heavy Duty), minimum 18 gage (0.042-inch - 1.0-mm-) thick steel, Model 2 (Seamless face and edges).
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.04 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheets.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as face welded joints and back weld joints continuously, unless otherwise indicated.
 - 3. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
- C. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as face welded unless otherwise indicated.
 - 3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
 - 4. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - 5. Frames 48-inches and wider in opening width are required to be 0.067-inch- (1.7-mm-) thick steel sheet.
 - 6. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - 7. Frames for Borrowed Lights: 0.053-inch- (1.3-mm-) thick steel sheet.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.05 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.

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2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 2. Separate Topping Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.06 HOLLOW METAL PANELS

- A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.07 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.08 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches (0.4 mm) thick.

2.09 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8
- C. Hollow Metal Doors:
1. Exterior Doors:
 - a. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Top of door to be flush and sealed joints in top edges of doors against water penetration.
 - b. Provide Polyurethane core.
 2. Glazed Lites: Factory cut openings in doors with applied flush trim to fit.
 3. Astragals: Provide overlapping astragal as noted in door hardware sets in Division 8 Door Hardware on one leaf of pairs of doors where required by

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- NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 8 Door Hardware.
 5. Electrical Raceways: Provide raceways for electrified door hardware specified in hardware sets in Division 8 Door Hardware.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Continuously backweld joints at exterior frames.
 2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops required wider dimension on glass side of frame.
 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inch and wider with mortise/butt type hinges at top hinge location.
 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 8 Door Hardware.
 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 7. Grout Guards: Weld guards boxes to frame at back of hardware mortises in frames at all hinge and strike preps regardless of grouting requirements.
 8. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; includes but not limited to electric thru wire hinges, electrical raceways, door position switches, electric strikes, and magnetic locks as noted in door hardware sets in Division 8 Door Hardware.
 - a. Electrical knock out boxes are required at door position switches, electric strikes, and middle hinge locations for all exterior locations regardless of electrical hardware specified in Division 8 Door Hardware.
 - b. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
 - c. Conduit to be coordinated and installed in field from middle hinge box and strike box to door position box.
 - d. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 8 Door Hardware.
 - e. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
 9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

10. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 - 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
 11. Door Silencers: Except on weather-stripped or gasketed doors, drill stops to receive door silencers as follows. Keep holes clear during construction. Silencers to be supplied by frame manufacture regardless if specified in division 8 Door Hardware.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricators shop
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that glazed lites are capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
 5. Gap for butted or mitered joints in glass stop should not exceed .0625-inch.

2.10 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
 - 6. Field Supplied Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
 - 7. Grouting Requirements:
 - a. Do not grout head of frames unless reinforcing has been installed in head of frame.
 - b. Do not grout vertical or horizontal closed mullion members.

8. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.
 - a. Secure exterior removable stops with security head screws.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

**SECTION 08141
FLUSH WOOD DOORS**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Flush Wood doors, hollow core, frames and panels fire rated and non-rated.

1.03 RELATED WORK

- A. Section 06402 - Finish carpentry for wood door frames and jambs
- B. Section 08111 – Hollow Metal Doors and Frames
- C. Section 08710 – Hardware
- D. Section 09900 – Painting: Site finishing doors

1.04 REFERENCES

- A. ANSI/NWMA I.S.1 – Industry standard for Wood Flush Doors (includes Standards I.S.1.1 through I.I.S.1.7).
- B. ANSI A135.4 – Basic Hardboard.
- C. ASTM E90 – Measurement of Airborne Sound Transmission Loss of Building Partitions.
- D. ASTM E152 – Methods of Fire Tests of Door Assemblies
- E. AWI – Quality Standards of Architectural Woodwork Institute
- F. NFPA 80 – Fire Doors and Windows
- G. NFPA 252 – Standard Method of Fire Tests for Door Assemblies
- H. UL 10B – Fire Tests of Door Assemblies

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the following standard:
 - 1. NWWDA Quality Standard: NWWDA I.S.1-A, "Architectural Wood Flush Doors."

2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, core, construction, finish, and other requirements.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 1. Test Pressure: Test at atmospheric pressure.
- D. Oversized, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate stating that doors comply with all standard construction requirements of tested and labeled fire-door assemblies except for size.
 1. Temperature-Rise Rating: At stairwell enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
 2. Temperature-Rise Rating: At stairwell enclosures, provide doors that have a temperature-rise rating of 250 deg F (139 deg C) maximum in 30 minutes of fire exposure.

1.06 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes for fire rated doors and panels.

1.07 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.

1.08 DELIVERY, STORAGE AND PROTECTION

- A. Protect products under provisions of Section 01600.
- B. Protect doors with resilient packaging, sealed with heat shrunk plastic. Break seal on site to permit ventilation.
- C. Package, deliver and store doors in accordance with AWI ANSI/AWMA requirements.

1.09 WARRANTY

- A. Provide five (5) year manufacturer's warranty under provisions of Section 01740.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. VT Industries
- B. Algoma
- C. Marshfield Door systems
- D. Florida made Doors

2.02 DOOR AND PANEL TYPES

- A. Flush Interior Doors: 1-3/4" thick; solid core construction; fire rated as required, panel design per drawings.
- B. Flush interior doors in resident units: 1 3/8" thick, hollow core construction, panel design per drawings, with wood frames

2.03 DOOR AND PANEL CONSTRUCTION (ANSI/AWMA – I.S.1 STANDARD)

- A. Solid, Non-Rated Core: ANSI/NWMA I.S.1; solid wood block glued.
- B. Solid, Special Function Core: ANSI/NWMA I.S.1; labeled fire performance.

2.04 FLUSH DOOR AND PANEL FACING

- A. Facing Quality: AWI premium grade
- B. Wood Species for Opaque Finish: birch.

2.05 ADHESIVES

- A. Interior doors: AWI, ANSI/NWMA, Type II.

2.06 FABRICATION

- A. Fabricate flush wood doors in sizes indicated for Project site fitting.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 - 1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.
- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- D. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
 - 1. Fixed Transom Panels: Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- E. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Louvers: Factory install louvers in prepared openings.

- F. Exterior Doors: Factory treat exterior doors with water repellent after manufacturing has been completed.
 - 1. Flash top of out-swinging doors (with manufacturer's standard metal flashing).

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Machine cut relief for hinges and closers and coring for handsets and cylinders.
- C. Trim door width by cutting equally on both jamb edges. Trim fire door width from lock edge only, to a maximum of 3/16 inch (5mm).
- D. Trim door height by cutting equally on top and bottom edges to a maximum of 3/4 inch (19mm). Trim fire door height at bottom edge only, to a maximum of one inch (25mm).
- E. Pilot drill screw and bolt holes. Use threaded through bolts for half surface hinges.
- F. Prepare doors to receive finish hardware in accordance with AWI ANSI/AWMA requirements.
- G. Conform to ANSI/AWMA requirements for fit tolerances.
- H. Coordinate installation of glass and glazing.
- I. Install door louvers.

3.02 INSTALLATION TOLERANCES

- A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08160
MOLDED COMPOSITE INTERIOR DOORS

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SECTION INCLUDES

- A. Molded wood composite doors for interior use.
 - 1. Passage Doors.
 - 2. Commercial Doors.

1.03 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. ANSI Z97.1: Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
- B. National Fire Protection Association (NFPA)
 - 1. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.
- C. Underwriters Laboratories, Inc. (UL)
 - 1. UL10B: Standard for Fire Tests of Door Assemblies (Note: Neutral pressure testing standard.)
 - 2. UL10C: Standard for Positive Pressure Fire Tests of Door Assemblies.
- D. Underwriters' Laboratories of Canada (ULC)
 - 1. CAN4-S104: Standard Method for Fire Tests of Door Assemblies.
- E. Uniform Building Code Standard 7-2 (UBC)
 - 1. UBC 7-2 (1994): Fire Tests of Door Assemblies. (Note: Neutral pressure testing standard.)
 - 2. UBC 7-2 (1997): Fire Tests of Door Assemblies. (Note: Positive pressure testing standard.)

1.04 DESIGN REQUIREMENTS

- A. Fire-Rated Door Assemblies: Fire door assemblies shall meet or exceed fire-protection ratings indicated when tested in accordance with [NFPA 252] [UL 10 [B] [C]] [CAN-4S104] [and] [UBC 7-2].

1.05 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data.

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- C. Certificate of Compliance: Submit manufacturer's certificate of compliance indicating composite doors comply with specified requirements.
- D. Application: Submit manufacturer's application instructions.
- E. Closeout Submittals: Refer to Section 01 78 00 – Closeout Submittals.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in accordance with manufacturer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

1.07 WARRANTY

- A. Refer to Section 01 78 36 – Warranties.
- B. Warranty: Provide 5-year material warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. CMI, 500 West Monroe Street, Suite 2010, Chicago, Illinois 60661. Toll Free (800) 405-2233. Fax (312) 382-8703. Website www.craftmasterdoors.com. E-mail info@cmicompany.com.
- B. Basis of Design: Colonist.
- C. Specify CraftMaster molded interior door.
 - 1. Stiles and Rails: Finger joint

2.02 PASSAGE DOORS

- A. Door Design
 - 1. Surface Finish: Smooth.
 - 2. Panels and Profile:
 - a. Colonist 6'8" height: Six-panel, square top with an INP profile.
- B. Core and frame
 - 1. Hollow core.
Thickness: 1-3/8"
 - 2. Solid core.
 - a. Thickness: 1-3/8"
 - b. Thickness: 1-3/4"
 - 3. Solid core with GreenLite fiberboard door core.
 - a. Thickness: 1-3/8"

- D. Jambs
 - 1. Refer to the door unit manufacturer.
- E. Hardware
 - 1. Refer to the hardware provider.
- F. Finish
 - 1. Primed with a low VOC primer.
 - a. Paint doors in accordance with manufacturer's finishing recommendations.
 - 2. Pre-Finished White [six-panel, square top with a bead and cove profile].
 - a. Color: White.

2.03 COMMERCIAL DOORS

- A. Door Design
 - 1. Surface Finish: Smooth.
 - 2. Panels and Profile:
 - a. Colonist Commercial 6'8" height: Six-panel, square top with an INP profile.
- B. Core
 - 1. Hollow core.
 - a. Thickness: 1-3/8"
 - 2. Solid core.
 - a. Thickness: 1-3/8"
 - b. Thickness: 1-3/4" [with 20-minute fire rating] [45-minute fire rating] [with 60-minute fire rating]
 - 3. Solid core with GreenLite fiberboard door core.
 - a. Thickness: 1-3/8"
- C. Hardware
 - 1. Refer to the hardware provider.
- D. Finish
 - 1. Paint doors in accordance with manufacturer's finishing recommendations.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install doors in accordance with the door unit manufacturer's installation guidelines and recommendations.

3.02 EXAMINATION

- A. Inspect door unit prior to installation.
- B. Inspect rough opening for compliance with the door unit manufacturer's recommendations. Verify rough opening conditions are within recommended tolerances.

3.03 PREPARATION

- A. Prepare door for installation in accordance with door unit manufacturer's recommendations.
- B. Trim bottom of jamb sides to achieve desired distance between door bottom and finished floor height.

3.04 PASSAGE DOOR INSTALLATION

- A. Place door unit into opening and level hinge side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
- B. Level latch side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
- C. Verify spacing between jamb and door is uniform on all sides. Adjust as necessary.
- D. Shim top of jamb in center of opening and fasten with nail.
- E. Re-check for square, level and even spacing around door. Nail securely in place through stop, jamb, shims and into studs every 12 inches.
- F. Set nails.
- G. Install trim on both sides using nails every 12 to 16 inches.

3.05 BIFOLD DOOR INSTALLATION

- A. Attach door hardware to door.
- B. Attach jamb hardware.
 - 1. Fasten overhead track in center of finished opening by inserting screws through pre-drilled holes.
 - 2. Attach jamb brackets flush to finished floor in line with overhead track.
- C. Install door assemblies.
 - 1. Place pivot pin in hole at top corner bracket and place guide wheel in track.
 - 2. Lift door assembly and drop bottom pin into bottom bracket hole.
- D. Check positioning and operation. Adjust hardware if necessary.

END OF SECTION

**SECTION 08305
ACCESS DOORS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Fire Rated and Non-rated access doors and frames for walls and ceilings

1.03 RELATED SECTIONS

- A. Section 09260 – Gypsum Board Systems
- B. Section 09900 – Painting: Field paint finish
- C. Division 15- Mechanical and plumbing systems and valves
- D. Division 16- Electrical junction boxes and controls

1.04 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Include sizes, types, finishes, scheduled locations, and details of adjoining work.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. J.L. Industries
- B. Nystrom
- C. Milcor

2.02 ACCESS UNITS

- A. In Gypsum Board Ceilings: Concealed frame flush access panels, Model WB, 24" x 24", manufactured by J.L. Industries, or equal.
- B. In Gypsum Board Walls: Concealed frame flush access panels, Model WB, 12" x 12", manufactured by J.L. Industries.
- C. Fire-rated access panels: Concealed frame flush access panels, Model FDWB, sizes as shown on the drawings, manufactured by J. L. Industries, or equal.

2.03 FABRICATION

- A. Fabricate frames and flanges of 16 gauge steel and door panels of 18 gauge steel
- B. Weld, fill and grind joints to assure flush and square unit.
- C. Hardware: Screw driver slot, quarter turn cam lock.

2.04 FINISH

- A. Galvanized units to hot-dipped wiped coat finish. Prime coat units with alkyd baked on primer.
- B. Finish units with baked enamel, color as selected by architect.

PART 3 - EXECUTION**3.01 INSPECTION**

- A. Verify rough openings for door and frame are correctly sized and located.
- B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Install frame plumb and level in wall and ceiling openings.
- B. Position to provide convenient access to concealed work requiring access.
- C. Secure rigidly in accordance with manufacturer's instructions.
- D. Install fire-rated access panels where located in fire-rated ceilings and assemblies.

END OF SECTION

SECTION 08351
WOOD ACCORDION FOLDING DOORS

PART 1 - GENERAL**1.01 SUMMARY**

- A. Section Includes:
 - 1. Wood accordion folding doors.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 08 7100 - Door Hardware.
 - 3. Section 09 9100 - Painting.

1.02 REFERENCES

- A. ASTM International (ASTM) (www.astm.com) - E336 - Standard Method of Measurement of Airborne Sound Insulation in Buildings.
- B. Forest Stewardship Council (FSC) (www.fscus.org) STD-40-004 - Chain of Custody Standard.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Class 1 fire retardant door panel core material.

1.04 SUBMITTALS

Include the following for submission of shop drawings, product data, and samples for the Architect's review"

- A. Submittals for Review:
 - 1. Shop Drawings: Indicate opening sizes, jamb, sill, and head conditions.
 - 2. Product Data: Manufacturer's descriptive literature for door units, and hardware.
 - 3. Samples:
 - a. Color chips illustrating manufacturer's full range of available colors and finishes.
- B. Closeout Submittals:
 - 1. Operation and Maintenance Data.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Primary products supplied by single manufacturer with minimum five (5) years documented experienced in fabrication of accordion folding wood doors.
- B. Installer Qualifications: Minimum two (2) years documented experience in work of this Section.
- C. Regulatory Requirements: Comply with A.D.A. for door opening force.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver doors until proper protection can be provided, and until needed for installation.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.07 PROJECT CONDITIONS

- A. Maintain temperature and humidity within manufacturer's recommended limits.
- B. Do not install products under environmental conditions outside manufacturer's limits.

1.08 WARRANTIES

- A. Provide manufacturer's standard limited warranty against manufacturing defects.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Contract Documents are based on products by Woodfold Mfg., Inc.
(www.woodfold.com)

2.02 ACCORDION FOLDING DOORS

- A. Source: Series 240 door.
- B. Components:
 - 1. Track: 1-1/8 x 1 inch aluminum, pre-punched for screw fasteners for surface mounting. Roller assembly: Nylon wheels on ball-bearing steel axles; riveted to hinge, dual trolley at lead post, single trolley at alternate panels, type for specified track.
 - 2. Roller assembly: Nylon wheels on ball-bearing steel axles; riveted to hinge, dual trolley at lead post, single trolley at alternate panels, type for specified track.
 - 3. Hinge assembly: 18 gage steel, continuous pin, riveted to top and bottom of door panel, with automatic stop at full extension.
 - 4. Panel core: 1/4 inch thick medium density fiberboard with rabbeted edge for panel connector.
 - 5. Panel facings: Vinyl laminate.
 - 6. Panel connectors: Continuous non-rigid vinyl, inserted and glued into panel rabbet.
 - 7. Lead post: Extruded aluminum, 3/4 x 2-3/4 inch cross-section.
 - 8. Intersecting jamb molding: Types required for indicated configurations.
 - 9. Handle: Rigid molded polyvinyl chloride.
 - 10. Latching: Magnetic catch
- C. Finishes:
 - 1. Panels: Vinyl laminate, Walnut pattern.

2. Aluminum: Manufacturer's standard finish, in color complementing panel finish.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install door assembly in accordance with manufacturer's instructions.
- B. Anchor to adjacent construction without distortion or stress.
- C. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.

3.02 ADJUSTING

- A. Adjust doors for smooth operation throughout full operating range.

END OF SECTION

SECTION 08410
ALUMINUM ENTRANCES AND STOREFRONTS

PART I - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Aluminum doors, frames, and glazed lites and transoms.
- B. Glass.
- C. Anchors, brackets, and attachments.
- D. Door hardware.
- E. Perimeter sealant.

1.03 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 08710 – Door Hardware: Door hardware items other than specified in this Section.
- B. Section 08800 - Glazing

1.04 RELATED WORK

- A. Section 05500 – Metal Fabrications: Fabricated metal attachment devices.
- B. Section 06100 – Carpentry Work: Framed blocking and wood perimeter shims.
- C. Section 07900 – Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08520 – Aluminum Windows: Fixed and Operable individual aluminum windows.
- E. Section 08800 - Glazing

1.05 REFERENCES

- A. ANSI/ASTM A36 – Structural Steel.
- B. ANSI/ASTM A386 – Zinc Coating (Hot-Dip) on Assembled Steel Products.
- C. ANSI/ASTM A446 – Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality.
- D. ANSI/ASTM B221 – Aluminum Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- E. ANSI/ASTM E283 – Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.

- F. ANSI/ASTM E330 – Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- G. ASTM B209 – Aluminum and Aluminum Alloy Sheet and Plate.
- H. FS TT-P-31 – Paint, Oil: Iron Oxide, Ready Mixed, Red and Brown.
- I. FS TT-P-641 – Primer Coating: Zinc Chromate, Alkyd Type.

1.06 PERFORMANCE

- A. System to provide for expansion and contraction within system components caused by a cycling temperature range 170 F degrees without causing detrimental effects to system or components.
- B. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with all applicable codes.
- C. Limit mullion deflection to 1/200, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- D. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior.
- E. Limit air infiltration through assembly to 0.10 cu ft/min/sq ft of assembly surface areas, as measured in accordance with ANSI/ASTM E283.
- F. System to accommodate, without damage to system or components, or deterioration or perimeter seal: Movement within system; movement between system and perimeter framing components; and deflection of structural support framing.

1.07 SUBMITALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Include system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit samples under provisions of Section 01300.
- E. Submit one sample, illustrating prefinished aluminum surface.
- F. N.O.A. Hurricane Winds of 150 mph.
- G. Submit Statement of Compliance with ADA regulations. Doors to have 12" base for protection of wheel chair feet pads.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle system components under provisions of Section 01600.
- B. Store and protect system components under provisions of Section 01600.

- C. Provide wrapping strippable coating to protect prefinished aluminum surfaces.

1.09 WARRANTY

- A. Provide two-year manufacturer's warranty under provisions of Section 01740.
- B. Warranty: Cover complete system for failure to meet specified requirements.
- C. Finish Warranty: Five year for Kynar or anodized finish.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Kawneer Company, Inc.
 - 2. EFCO Corporation
 - 3. Tubelite Architectural Systems.
 - 4. YKK AP America Inc.
 - 5. Oldcastle

2.01 MATERIALS

- A. Extruded Aluminum: ANSI/ASTM B221: aluminum alloy.
- B. Sheet Aluminum: ASTM B209: aluminum alloy
- C. Fasteners: Stainless Steel

2.02 FABRICATED COMPONENTS

- A. Frames: profile as shown on drawings, thermally broken with interior portion of frame insulated from exterior portion, flush applied glazing stops. Frames for interior glazing need not be thermally broken.
- B. Doors: 3-1/2 inch wide top rail, 6-1/2 inch wide bottom rail; square beveled glazing stops.
- C. Reinforced Mullion: profile as shown on drawings; of extruded sheet aluminum cladding with internal reinforcement of steel shaped structural section.

2.03 GLASS AND GLAZING MATERIALS

- A. See Section 08800.

2.04 HARDWARE

- A. Weather-stripping, Sill Sweep Strips, Thresholds, Hinges: Manufacturers standard type to suit application.
- B. Hinges: Center butt type, full mortised.

- C. Pivots: M-19 Intermediate by Rixson.
- D. Push/Pull: Custom stainless as selected by the Architect.

2.05 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearance and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit and secure joints and corners with screw and spline. Make joints and connections flush, hairline, and weatherproof.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devises. Fabricate anchorage items.
- E. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

2.06 FINISHES

- A. Interior Exposed Aluminum Surfaces: Prefinished Aluminum.
- B. Concealed Aluminum Steel Items: Galvanized in accordance with ANSI/ASTM A386 to 2.0 oz/sq ft.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 - 1. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
 - 2. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
 - 3. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."
 - 4. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

5. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
- B. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- C. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.
- D. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
- E. Install structural silicone sealant according to sealant manufacturer's written instructions.
- F. Mechanically fasten glazing in place until structural sealant is cured.
- G. Remove excess sealant from component surfaces before sealant has cured.
- H. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.
- I. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.
- J. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
 1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.02 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing agency to perform field quality-control testing indicated.
- B. Testing Agency: Engage a qualified independent testing agency to perform field quality-control testing indicated.
 1. Structural-Silicone-Sealant Adhesion Test: Test installed structural silicone sealant according to field adhesion test method described in AAMA CW #13, "Structural Sealant Glazing Systems (A Design Guide)."
 2. Test a minimum of 2 areas.
 3. Water Spray Test: After completing the installation of test areas indicated, test storefront system for water penetration according to AAMA 501.2 requirements.
 4. Repair or remove and replace Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

3.03 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.
 - 1. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.04 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 08411
ALUMINUM FRENCH PATIO DOORS

PART I - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Aluminum doors, frames, and glazed lites and transoms.
- B. Glass.
- C. Anchors, brackets, and attachments.
- D. Door hardware.
- E. Perimeter sealant.

1.03 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 08720 – Door Hardware: Door hardware items other than specified in this Section.
- B. Section 08800 - Glazing

1.04 RELATED WORK

- A. Section 05500 – Metal Fabrications: Fabricated metal attachment devices.
- B. Section 06100 – Carpentry Work: Framed blocking and wood perimeter shims.
- C. Section 07900 – Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08520 – Aluminum Windows: Fixed and Operable individual aluminum windows.
- E. Section 08800 - Glazing

1.05 SUBMITALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Include system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit one sample, illustrating prefinished aluminum surface.
- E. N.O.A. Miami/Dade for Hurricane Winds of 140 mph.
- F. Submit Statement of Compliance with ADA regulations. Doors to have low profile sill wheel chair access.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle system components under provisions of Section 01600.
- B. Store and protect system components under provisions of Section 01600.
- C. Provide wrapping strippable coating to protect prefinished aluminum surfaces.

1.09 WARRANTY

- A. Provide three five-year manufacturer's warranty under provisions of Section 01740.
- B. Warranty: Cover complete system for failure to meet specified requirements.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. PGT
- B. Lawson Doors

2.02 MATERIALS

- A. Extruded Aluminum: ANSI/ASTM B221: 6063 aluminum in T5 and T6 temper.
- B. Sheet Aluminum: ASTM B209: aluminum alloy
- C. Fasteners: Stainless Steel

2.03 FABRICATED COMPONENTS

- A. Frames: profile as shown on drawings, thermally broken with interior portion of frame insulated from exterior portion, flush applied glazing stops. Frames for interior glazing need not be thermally broken.
- B. Doors: 4-1/2 inch wide top rail, side rail, bottom rail; square beveled glazing stops.
- C. Mullion: profile as shown on drawings; of extruded sheet aluminum flat 1 1/4" interior bar and profile radiused exterior extrusion.

2.04 GLASS AND GLAZING MATERIALS

- A. 7/16" laminated glass consisting of one lite of 3/16" thick annealed glass on in board and outboard side of 0.90" inter layer glass, grey tint.

2.05 HARDWARE

- A. Weather-stripping, Sill Sweep Strips, Thresholds, Hinges: Manufacturers standard type to suit application.
- B. Hinges: Two heavy duty extruded aluminum hinges with stainless steel hinge pin each leaf.
- C. Flush bolts: Inactive leaf (concealed face) top & bottom bolts with stainless steel shaft.

- D. Balance of Hardware – See Section 08710 Door Hardware.

2.06 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearance and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit and secure joints and corners with screw and spline. Make joints and connections flush, hairline, and weatherproof.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

2.07 FINISHES

- A. Interior Exposed Aluminum Surfaces: Prefinished Aluminum.
- B. Electro statically applied 1.0 mil thick dry film coating meeting performance requirements of AAMA 603.5, white color. Sills to be mill finish.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify wall openings are ready to receive work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Install doors, frames, glazing and hardware in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Coordinate attachment and seal of air and vapor barrier materials. Install sill flashings.
- E. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install hardware using templates provided. Refer to Section 08712 for installation requirements.

- G. Install perimeter type sealant, backing materials, and installation requirements in accordance with Section 07900.
- H. Adjust operating hardware.

3.03 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

**SECTION 08530
VINYL WINDOWS**

PART I - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specifications apply to this section.

1.02 DESCRIPTION OF WORK

- A. Casement Windows
- B. Fixed, Radius and Geometric Windows
- C. Single-Hung Tilt Windows

1.03 REFERENCES

- A. American Architectural Manufacturer Association (AAMA) (for use in non-HVHZ areas)
 - 1. ANSI/AAMA/NWDA 101/I.S.2 /NAFS; Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
- B. ASTM International
 - 1. ASTM E 1886; Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
 - 2. ASTM E 1996; Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- C. National Fenestration Rating Council (NFRC)
 - 1. NFRC 100; Procedure for Determining Fenestration Thermal Properties
 - 2. NFRC 200; Solar Heat Gain Coefficient and Visible Transmittance

1.04 DESIGN REQUIREMENTS

- A. Provide windows capable of complying with requirements indicated, based on testing manufacturer's window that are representative of those specified and that are of test size required by ANSI/AAMA/NWDA 101 I.S.2/NAFS or TAS.
- B. Structural Requirements – Provide windows capable of complying with requirements indicated:
 - 1. Design pressure (+/-): As indicated on drawings.
- C. NFRC Requirements – Provide windows capable of complying with the following total window ratings:
 - 1. U-Factor: 0.40 in accordance with NFRC 100.
 - 2. Solar Heat Gain Coefficient (SHGC): 0.25 in accordance with NFRC 200.
 - 3. Visible Transmittance (VT): 0.66 in accordance with NFRC 200.

1.05 SUBMITTALS

- A. Refer to Section 01300 Submittals.
- B. Product Data: Submit window manufacturer current product literature, including installation instruction.
- C. Samples: Provide finish samples for all products.
- D. Quality Assurance Submittals
 - 1. Design Data, Test Reports: Provide manufacturer test certification approvals indicating product compliance with indicated requirements.
 - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
 - 3. P.E. certified anchor drawings.
 - 4. Certification for impact resistance for 150 mph winds.
- E. Closeout Submittals
 - 1. Refer to Section 01700 Closeout Submittals.

1.06 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have successfully completed training through JELD-WEN's Product Integrity Group approved installation method course.
- B. Mock-ups
 - 1. Window mock-up shall incorporate surrounding construction, including wall assembly fasteners, flashing, and other related accessories installed in accordance with window manufacturer's approved installation methods.
 - a. Mock-up size: 3'-0" wide x 4'-0" high
 - b. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver windows materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store windows as recommended by manufacturer.

1.08 WARRANTY

- A. Refer to Section 01740 Warranties.
- B. Manufacturer standard warranty indicating that the window unit will be free from material and workmanship defects from the date of substantial completion for the time periods indicated below:
 - 1. Window Unit: 10 years
 - 2. Glazing:
 - a. Insulated Glass: 10 years against seal breakage
 - b. Laminated Glass: 5 years
 - c. ImpactGard® Glass: 10 years

PART 2 - PRODUCTS**2.01 MANUFACTURER**

- A. Provide products by one of the following manufacturers:
 - 1. Doors Window Manufacturing _ 9000 Series
 - 2. JELD-WEN Windows and Doors - Premium Atlantic
 - 3. PGT Custom Windows – Winguard Series
 - 4. CGI Windows and Doors, Inc. – Commercial Series
 - 5. EAS, Eastern Architectural Systems – Bertha Impact

2.02 MANUFACTURED WINDOW UNITS

- A. Frame
 - 1. Jamb Depth
 - a. Casement: 3" (operating and fixed)
 - b. Single-Hung: 3"
 - c. Fixed: 3"
- B. Exterior Trim: standard: (Front) Flange. (Fin/Flange on Bay Units)
- C. Weather-stripping
 - 1. Casement Windows: Fin pile combined with foam filled bulb
 - 2. Fixed Windows: N/A
 - 3. Single-Hung Windows and horizontal sliding windows: Fin pile
- D. Hardware:
 - 1. Single-Hung Windows
 - a. Balance: Not Specified
 - b. Lock: Cam Lock
 - c. Finish: Color match window frame extrusion
 - 2. Fixed
 - a. Rectangle, radius and geometric
 - b. Finish: Color match window frame extrusion
 - 3. Limit Device: Provide manufacturer's standard, concealed friction adjustor, adjustable stay bar, limit device designed to restrict ventilator opening.
- E. Glazing
 - 1. See Section 08800 Glazing

2.03 WINDOW ACCESSORIES

- A. Insect Screens
 - 1. Material: High Visibility fiberglass screen cloth (18 x 16 mesh) set in painted roll formed or extruded aluminum frame.
 - 2. Frame Finish: Color match frame extrusion

- B. Grilles
 - 1. Simulated Divided Lites (SDL)
 - a. Exterior Muntins
 - 1) Material: Extruded permanently applied to exterior and interior of insulating glass unit.
 - 2) Pattern: As shown on the drawings.
 - 3) Width: 3/4 inch
 - 4) Finish: Match finish
- C. Mullions
 - 1. 1"x3" with color matched interior and exterior covers
 - 2. 'T'-clip (typical masonry application)
 - 3. Goal Post clip (typical nail fin application)
 - 4. 'C'-clip (mullion intersect)

2.04 FABRICATION

- A. General:
 - 1. Frame: Fusion Welded Corners
 - 2. Sash: Fusion Welded Corners (not applicable to fixed windows)
 - 3. Glass: Mounted with silicone glazing compound

2.05 FINISH

- A. Color: standard: as selected by the Architect.
- B. Color: standard: as selected by the Architect.

2.06 MANUFACTURED PATIO DOOR UNITS

- A. Frame
 - 1. Jamb Depth
 - a. Frame: 4 9/16" cellular vinyl
- B. Exterior Trim: standard cellular vinyl bottom style
- C. Weather-stripping
 - 1. Continuous on perimeter: Fin pile combined with foam filled bulb
- D. Exterior Trim: standard cellular vinyl bottom style

2.07 DOOR ACCESSORIES

- A. Grilles
 - 1. Simulated Divided Lites (SDL)
 - a. Britany / Prairie Grid Pattern
 - 1) Material: Extruded permanently applied to exterior and interior of insulating glass unit.
 - 2) Pattern: As shown on the drawings.
 - 3) Width: 3/4 inch
 - 4) Finish: Match finish
- B. Hardware: As Scheduled

PART 3 - EXECUTION**301 GENERAL**

- A. Install windows in accordance with manufacturer's installation guidelines and recommendations. All windows have P.E. certified anchor details and requirements.

3.02 EXAMINATION

- A. Inspect window prior to installation.
- B. Inspect rough opening for compliance with window manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

3.03 PREPARATION

- A. Prepare windows for installation in accordance with manufacturer's recommendations.

3.04 INSTALLATION

- A. Insert window into rough opening:
 - 1. Shim side jambs, head and sill straight.
 - 2. Inspect window for square, level and plumb.
 - 3. Fasten window in accordance with certified anchor drawing through shim (per anchor drawings) and into rough opening.
 - 4. Test and adjust for smooth operation of window.
 - 5. Ensure weep holes are clear of debris for proper drainage.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.06 PROTECTION

- A. Protect installed windows from damage.

END OF SECTION

**SECTION 08710
DOOR HARDWARE**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for steel (hollow metal) doors.
 - 2. Door hardware for aluminum doors.
 - 3. Door hardware for wood doors.
 - 4. Door hardware for other doors indicated.
 - 5. Keyed cylinders as indicated.
- B. Related Sections:
 - 1. Division 6: Rough Carpentry.
 - 2. Division 8: Aluminum Doors and Frames
 - 3. Division 8: Hollow Metal Doors and Frames.
 - 4. Division 8: Wood Doors.
 - 5. Division 26 Electrical
- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities 2009
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. Florida Building Codes
 - 9. Miami-Dade requirements for Hurricane (NOA) for exterior openings.
- D. Intent of Hardware Groups
 - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.
- E. Allowances
 - 1. Refer to Division 1 for allowance amount and procedures.

- F. Alternates
 - 1. Refer to Division 1 for Alternates and procedures.

1.03 SUBMITTALS

- A. Comply with Division 1
- B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit 6 copies of catalog cuts with hardware schedule.
 - 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2.
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
 - 1. List groups and suffixes in proper sequence.
 - 2. Completely describe door and list architectural door number.
 - 3. Manufacturer, product name, and catalog number.
 - 4. Function, type, and style.
 - 5. Size and finish of each item.
 - 6. Mounting heights.
 - 7. Explanation of abbreviations and symbols used within schedule.
 - 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
 - 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Architect)
 - 1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 - 2. 3 samples of metal finishes.
- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
 - 1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.

- c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
- 2. Copy of final hardware schedule, edited to reflect, "As installed".
- 3. Copy of final keying schedule
- 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
- 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.04 QUALITY ASSURANCE

- A. Comply with Division 1.
 - 1. Exterior Openings Severe Windstorm Components testing: Listed and labeled by a testing and inspecting agency acceptable to authority having jurisdiction, based on testing according to ANSI A250.13. Further compliance with Florida Building Codes for Hurricane (NOA) for Exterior Openings.
 - 2. Statement of qualification for distributor and installers.
 - 3. Statement of compliance with regulatory requirements and single source responsibility.
 - 4. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
 - 5. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
 - 6. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
 - 7. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.
- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Comply with Division 1.
 - 1. Deliver products in original unopened packaging with legible manufacturer's identification.
 - 2. Package hardware to prevent damage during transit and storage.
 - 3. Mark hardware to correspond with "reviewed hardware schedule".
 - 4. Deliver hardware to door and frame manufacturer upon request.

- B. Storage and Protection: Comply with manufacturer's recommendations.

1.06 PROJECT CONDITIONS

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.07 WARRANTY

- A. Refer to Conditions of the Contract
- B. Manufacturer's Warranty
 - 1. Closers: Limited Lifetime
 - 2. Exit Devices: Limited Lifetime
 - 3. Locksets & Cylinders: Limited Lifetime
 - 4. All other Hardware: Two years.

1.08 OWNER'S INSTRUCTION

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.09 MAINTENANCE

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
 - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
 - 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Hinges	Stanley	Bommer, McKinney
Continuous Hinges	Stanley	Select, ABH
Locksets & Cylinders	Stanley Comm. Hdwe	Schlage, Sargent
Exit Devices	Stanley Comm. Hdwe	Von Duprin, Sargent
Closers	Stanley Comm. Hdwe	LCN, Sargent
Hold-Open Closers	Dorma	
Automatic Operators	See Section 084229	
Protection Plates	Trimco	Burns, Rockwood
Overhead Stops	ABH	Rixson, Glynn Johnson
Door Stops	Trimco	Burns, Rockwood
Flush Bolts	Trimco	ABH, Burns
Coordinator & Brackets	Trimco	ABH, Burns
Threshold & Gasketing	National Guard	Reese, K.N. Crowder

2.01 MATERIALS

- A. Hinges: Shall be Five Knuckle Ball bearing hinges
1. Template screw hole locations
 2. Bearings are to be fully hardened.
 3. Bearing shell is to be consistent shape with barrel.
 4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
 5. Equip with easily seated, non-rising pins.
 6. Non Removable Pin screws shall be slotted stainless steel screws.
 7. Hinges shall be full polished, front, back and barrel.
 8. Hinge pin is to be fully plated.
 9. Bearing assembly is to be installed after plating.
 10. Sufficient size to allow 180-degree swing of door
 11. Furnish five knuckles with flush ball bearings
 12. Provide hinge type as listed in schedule.
 13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
 14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
 15. UL10C listed for Fire rated doors.
- B. Mortise Type Locks and Latches:
1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
 2. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.
 3. Provide 9001-Quality Management and 14001-Environmental Management.
 4. Fit ANSI A115.1 door preparation
 5. Functions and design as indicated in the hardware groups
 6. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
 7. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel

8. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
9. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
10. Provide sufficient curved strike lip to protect door trim
11. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
12. Lock shall have self-aligning, thru-bolted trim
13. Levers to operate a roller bearing spindle hub mechanism
14. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
15. Spindle to be designed to prevent forced entry from attacking of lever
16. Provide locksets with 7-pin removable and interchangeable core cylinders
17. Each lever to have independent spring mechanism controlling it
18. Core face must be the same finish as the lockset.

C. Cylindrical Type Locks and Latchsets:

1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Fit modified ANSI A115.2 door preparation.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
5. Locksets to have anti-rotational studs that are thru-bolted
6. Keyed lever shall not have exposed "keeper" hole
7. Each lever to have independent spring mechanism controlling it
8. 2-3/4 inch (70 mm) backset
9. 9/16 inch (14 mm) throw latchbolt
10. Provide sufficient curved strike lip to protect door trim
11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
12. Keyed lever to be removable only after core is removed, by authorized control key
13. Provide locksets with 7-pin removable and interchangeable core cylinders
14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
16. Core face must be the same finish as the lockset.
17. Functions and design as indicated in the hardware groups.

D. Cylindrical Grade 2 Type Locks and Latchsets:

1. Certified by BHMA for ANSI A156.3, Series 4000, Operational Grade 2.
2. Fit modified ANSI A115.3 door preparation
3. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
4. 2-3/4 inch (70mm) backset, or 2 3/8 inch backset as needed

5. 1/2 inch (14mm) throw latchbolt
 6. Provide locksets with 7-pin core.
 7. Functions and design as indicated in the hardware groups
- E. Exit Devices shall:
1. Tested and approved by BHMA for ANSI 156.3, Grade 1
 2. Provide 9001-Quality Management and 14001-Environmental Management.
 3. Furnish UL or recognized independent laboratory certified mechanical operational testing to 10 million cycles minimum.
 4. Provide a deadlocking latchbolt
 5. Non-fire rated exit devices shall have cylinder dogging.
 6. Touchpad shall be "T" style
 7. Exposed components shall be of architectural metals and finishes.
 8. Lever design shall match lockset lever design
 9. Provide strikes as required by application.
 10. Fire exit devices to be listed for UL10C
 11. UL listed for Accident Hazard
 12. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
 13. Provide vandal resistant or breakaway trim
 14. Aluminum vertical rod assemblies are acceptable only when provide with the manufacturers optional top and bottom stainless steel rod guard protectors.
- F. Door Closers shall:
1. Tested and approved by BHMA for ANSI 156.4, Grade 1
 2. UL10C certified
 3. Provide 9001-Quality Management and 14001-Environmental Management.
 4. Closer shall have extra-duty arms and knuckles
 5. Conform to ANSI 117.1
 6. Maximum 2 7/16 inch case projection with non-ferrous cover
 7. Separate adjusting valves for closing and latching speed, and backcheck
 8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 9. Full rack and pinion type closer with 1½" minimum bore
 10. Mount closers on non-public side of door, unless otherwise noted in specification
 11. Closers shall be non-handed, non-sized and multi-sized.
- G. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- H. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- I. Door Bolts: Flush bolts for wood or metal doors.
1. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.

2. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
 3. Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
 4. Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.
- J. Coordinator and Brackets: Provide a surface mounted coordinator when automatic bolts are used in the hardware set.
1. Coordinator, Certified ANSI/BHMA A1156.3 Type 21A for full width of the opening.
 2. Provide mounting brackets for soffit applied hardware.
 3. Provide hardware preparation (cutouts) for latches as necessary.
- K. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.

2.02 FINISH

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.03 KEYS AND KEYING

- A. Cylinders, removable and interchangeable core system: Schlage 6 pin.
- B. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- C. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- D. Furnish keys in the following quantities:
1. 1 each Grand Masterkeys
 2. 4 each Masterkeys
 3. 2 each Change keys each keyed core
- E. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 HARDWARE LOCATIONS

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
 - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.03 INSTALLATION

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.04 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
 - 1. Check and adjust closers to ensure proper operation.
 - 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 - 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.05 SCHEDULE OF FINISH HARDWARE

Manufacturer List

<u>Code</u>	<u>Name</u>
BE	Best Access Systems
BY	By Others
DM	Dorma Door Controls
NA	National Guard
SH	Stanley Commercial Hardware
ST	Stanley
SY	Stanley MultiFamily
TR	Trimco

Option List

<u>Code</u>	<u>Description</u>
F	Full Size Cover
AL	Adj. BS Rad/Sq Latch Face & Strike
CL	Classic Rose (619,626,626)
HC	Hurricane Compliant - Rim Devices
KD	Keyed Different
L4	2 3/4" Radius/Square Latch Face & Strike
L8	2 3/8" Radius/Square Latch Face & Strike
MK	Master Keyed (Sgl)
SC	SC Keyway
SC	Schlage "C" Keyway
SN	Sex Nuts
8FT	8' Height (QED100 Series)
B4E	BEVELED 4 EDGES - KICK PLATES
CSK	COUNTER SINKING OF KICK and MOP PLATES
GBK	Glass Bead Kit (100/200 Ser.-Rim/CVR)
GMK	Grand Master Keyed (Sgl)
48" Bar	48" Bar (QED100)

Finish List

<u>Code</u>	<u>Description</u>
AL	Aluminum
619	Satin Nickel Plated, Clear Coated
625	Bright Chromium Plated
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
BLACK	Black
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Hardware Sets

SET #1

Doors: A101A, A110A, A201, A210, A301, A310, B110A, B201, B210, B301, B310

3 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Exit Device-Passage	QED113 x QET130 M	626	SH
1 Door Closer	QDC311 F SN	689	SH
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #2

Doors: B101B

4 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Exit Device-Passage	QED113 x QET130 M	626	SH
1 Door Closer	QDC311 F SN	689	SH
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #3

Doors: A101B, A110B, B101A, B110B

4 Hinges	FBF191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	QED112 HC	626	SH
1 Door Closer (Cush)	QDC313 F SN	689	SH
1 Gasketing	5050C Head & Jambs		NA
1 Drip Cap	16 A - 4" ODW		NA
1 Door Sweep	101 VA 36"		NA
1 Threshold	896 S 36"	AL	NA

SET #4

Doors: A102, A108, B102, B108

4 Hinges	FBF191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	QED112 GBK HC	626	SH
1 Mortise Cylinder	6EQM 6SC2	626	SH
1 Rim Cylinder	6EQR 6SC2	626	SH
1 Door Closer (Cush)	QDC313 F SN	689	SH
1 Gasketing	5050C Head & Jambs		NA
1 Drip Cap	16 A - 4" ODW		NA
1 Door Sweep	101 VA 36"		NA
1 Threshold	896 S 36"	AL	NA

SET #5

Doors: A104A, B104A, C106A, D102, D104, D106

2 Mortise Cylinder	Cylinder as Required x GMK	626	SH
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NOTE: Balance of hardware devices to hang, secure, close and seal as supplied by Aluminum Door Supplier.

SET #6

Doors: A104B, B104B

8 Hinges	FBF168 4 1/2 X 4 1/2	US26D	ST
2 Exit Device	QED119 x QET130 M 48" Bar 8FT	626	SH
2 Closer/Coordinator	TS9315 GSR/EMF 2	689	DM
2 Kick Plate	K0050 8" x 41" B4E CSK	630	TR
2 Floor Stop	1211	626	TR
2 Gasketing	5050C Head & Jambs		NA

NOTE: Astragal as supplied by Door Supplier. All wiring and installation per Section 260000 & Section 280000.

SET #7

Doors: A103, A107, A203, A303, B103, B107, B203, B303, C109

6 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Set Auto Flush Bolts	3820 X 3810	626	TR
1 Lockset	QCL270 M MK SC	626	SH
1 Coordinator	3094B2	BLACK	TR
2 Door Closer	QDC311 F SN	689	SH
2 Wall Bumper	1270WV	630	TR
1 Dustproof Strike	3910	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #8

Doors: C101, C106B

1 Mortise Cylinder	6EQM 6SC2	626	SH
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NOTE: Balance of hardware devices to hang, secure, close and seal as supplied by Aluminum Door Supplier.

SET #9

Doors: A109B, B109B

8 Hinges	FBF191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Lockset	45H-7TD14S L/C	630	BE
1 Mortise Cylinder	6EQM 6SC2	626	SH
2 Door Closer (Cush)	QDC313 F SN	689	SH
2 Mounting Bracket	3096	BLACK	TR
2 Surface Bolt	3923	630	TR
1 Coordinator	3094B2	BLACK	TR
1 Astragal	139 SP 94"		NA
1 Threshold	896 S 72"	AL	NA

SET #10

Doors: D101, D103, D105

8 Hinges	FBF191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Keyed Removable Mullion	QRM111 HC KR 8'0"	689	SH
2 Exit Device	QED112 x QET160 M HC	626	SH

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2	Mortise Cylinder	6EQM 6SC2	626	SH
3	Rim Cylinder	6EQR 6SC2	626	SH
2	Door Closer (Cush)	QDC313 F SN	689	SH
1	Gasketing	5050C Head & Jambs		NA
1	Mullion Seal	5100S-96 96"		NA
2	Door Sweep	101 VA 36"		NA
1	Threshold	896 S 72"	AL	NA

SET #11

Doors: A105, B105

3	Hinges	FBF168 4 1/2 X 4 1/2	US26D	ST
1	Lockset	QCL270 M MK SC	626	SH
1	Door Closer	QDC311 F SN	689	SH
1	Wall Bumper	1270WV	630	TR
1	Gasketing	5050C Head & Jambs		NA

SET #12

Doors: A106, A206, A306, B106, B206, B306

3	Hinges	FBF199 4 1/2 X 4 1/2	US32D	ST
1	Passage Set	QCL230 M	626	SH
1	Door Closer	QDC311 SN	689	SH
1	Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1	Mop Plate	KM050 6" x 35" B4E CSK	630	TR
1	Wall Bumper	1270WV	630	TR
1	Gasketing	5050C Head & Jambs		NA

SET #13

Doors: A109A, A209, A309, B109A, B209, B309

3	Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1	Passage Set	QCL230 M	626	SH
1	Door Closer	QDC311 F SN	689	SH
1	Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1	Wall Bumper	1270WV	630	TR
1	Gasketing	5050C Head & Jambs		NA

SET #14

Doors: A111, B111

4	Hinges	FBF191 4 1/2 X 4 1/2 NRP	US32D	ST
1	Lockset	45H-7TD14S L/C	630	BE
1	Mortise Cylinder	6EQM 6SC2	626	SH
1	Door Closer (Cush)	QDC313 F SN	689	SH
1	Gasketing	5050C Head & Jambs		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Door Sweep	101 VA 36"		NA
1	Threshold	896 S 36"	AL	NA

SET #15

Doors: A205, A305, B112, B205, B305, C108

3 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Lockset	QCL270 M MK SC	626	SH
1 Door Closer	QDC311 F SN	689	SH
1 Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #16

Doors: C102A, C102B, C103

3 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Lockset	QCL250 M GMK SC	626	SH
1 Door Closer	QDC311 F SN	689	SH
1 Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #17

Doors: C110, C111

3 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Deadlock	QDB285	626	SH
1 Passage Set	QCL230 M	626	SH
1 Door Closer	QDC311 F SN	689	SH
1 Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1 Mop Plate	KM050 6" x 35" B4E CSK	630	TR
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #18

Doors: C105, C113

3 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Lockset	QCL260 M GMK SC	626	SH
1 Wall Bumper	1270WV	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #19

Doors: C107

6 Hinges	FBF179 4 1/2 X 4 1/2	US26D	ST
1 Set Auto Flush Bolts	3820 X 3810	626	TR
1 Lockset	QCL260 M GMK SC	626	SH
2 Wall Bumper	1270WV	630	TR
1 Dustproof Strike	3910	630	TR
1 Gasketing	5050C Head & Jambs		NA

SET #20

Doors: AA

3 Hinges	FBB179 4 1/2 X 4 1/2	US26D	ST
1 Deadlock	QGD280 AL KD SC	626	SY
1 Passage Set	QGT230 T CL L4	626	SY
1 Door Closer	QDC311 F SN	689	SH
1 Kick Plate	K0050 8" x 34" B4E CSK	630	TR
1 Base Stop	1208	626	TR
1 Door Viewer	976U-CAP	625	TR
1 Gasketing	5050C Head & Jambs		NA

SET #21

Doors: BB

3 Hinges	By Prehanger		BY
1 Privacy Set	QGT240 T CL L8	626	SY
1 Wall Bumper	1270WV	630	TR

SET #22

Doors: DD

3 Hinges by Prehanger	By Prehanger		BY
1 Passage Set	QGT230 T CL L4	626	SY
1 Hinge Pin Stop	1240	619	TR

SET #23

Doors: EE

3 Hinges by Prehanger	By Prehanger		BY
1 Passage Set	QGT230 T CL L4	626	SY
1 Wall Bumper	1270WV	630	TR

SET #24

Doors: FF

3 Hinges by Prehanger	By Prehanger		BY
1 Passage Set	QGT230 T CL L4	626	SY
1 Base Stop	1208	626	TR

Opening List

<u>Opening</u>	<u>Hdw Set</u>
AA	20
BB	21
DD	22
EE	23
FF	24
A101A	1
A101B	3
A102	4
A103	7
A104A	5
A104B	6
A105	11
A106	12
A107	7
A108	4
A109A	13
A109B	9
A110A	1
A110B	3
A111	14
A201	1
A203	7
A205	15
A206	12
A209	13
A210	1
A301	1
A303	7
A305	15
A306	12
A309	13
A310	1
B101A	3
B101B	2
B102	4
B103	7
B104A	5
B104B	6
B105	11
B106	12
B107	7
B108	4
B109A	13
B109B	9
B110A	1
B110B	3
B111	14
B112	15
B201	1
B203	7

B205	15
B206	12
B209	13
B210	1
B301	1
B303	7
B305	15
B306	12
B309	13
B310	1
C101	8
C102A	16
C102B	16
C103	16
C105	18
C106A	5
C106B	8
C107	19
C108	15
C109	7
C110	17
C111	17
C113	18
D101	10
D102	5
D103	10
D104	5
D105	10
D106	5

END OF SECTION

**SECTION 08800
GLAZING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Window units.
 - 2. Entrances and other doors.

1.03 RELATED SECTIONS

- A. Division 8 Section "Hollow Metal Doors and Frames"
- B. Division 8 Section "Wood doors"
- C. Division 8 Section "Stile and Rail Wood Doors"
- D. Division 8 Section "Aluminum Entrances and Storefronts"
- E. Division 8 Section "Vinyl Windows"
- F. Division 8 Section "Aluminum French Doors."
- G. Division 8 Section "Automatic Entrance Doors"

1.04 DEFINITIONS

- A. Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.
- B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's directions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's directions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.
- D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film on the interior surfaces of glass. Improper practices for maintaining and cleaning glass do not comply with the manufacturer's directions.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Minimum glass thickness, nominally, of lites in exterior walls is 6 mm.
 - 2. Tinted and heat-absorbing glass thicknesses for each tint indicated are the same throughout Project.
 - 3. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following:
 - a. 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.
 - b. 1 lite per 1000 for lites set over 15 degrees off vertical and under action of wind or snow.
- C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 F deg (67 C deg), ambient; 180 F deg (100 C deg), material surfaces.

1.06 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each glass product and glazing material indicated.
- C. Samples for verification purposes of 12-inch (300 mm) square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch (300 mm) long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.
- D. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
 - 1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification

agency or independent testing agency acceptable to authorities having jurisdiction.

- E. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.
- F. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.
- G. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
- H. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.
- I. Submit required documentation to show compliance with State of Florida Building Code requirements and Miami-Dade Notice of Approval.

1.07 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. FGMA Publications: "FGMA Glazing Manual."
 - 2. AAMA Publications: AAMA TIR-A7 "Sloped Glazing Guidelines" and "Glass Design for Sloped Glazing."
 - 3. LSGA Publications: "LSGA Design Guide."
 - 4. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines" and TB-3001 "Sloped Glazing Guidelines."
- B. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
 - 1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
- C. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Fire-Resistive Glazing Products for Window Assemblies: Products identical to those tested per ASTM E 163, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
 - 1. Insulating Glass Certification Council (IGCC).

2. Associated Laboratories, Inc. (ALI).
 3. National Certified Testing Laboratories (NCTL).
- F. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.
- G. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:
1. Primary glass of each (ASTM C 1036) type and class indicated.
 2. Heat-treated glass of each (ASTM C 1048) condition indicated.
 3. Laminated glass of each (ASTM C 1172) kind indicated.
 4. Insulating glass of each construction indicated.
- H. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- I. Preconstruction Compatibility and Adhesion Testing: Submit to sealant manufacturers, samples of each glass, gasket, glazing accessory, and glass-framing member that will contact or affect glazing sealants for compatibility and adhesion testing as indicated below:
1. Use test methods standard with sealant manufacturer to determine if priming and other specific preparation techniques are required for rapid, optimum glazing sealants adhesion to glass and glazing channel substrates.
 - a. Perform tests under normal environmental conditions during installation.
 2. Submit not less than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, insulating units) for adhesion testing, as well as one sample of each glazing accessory (gaskets, setting blocks and spacers) for compatibility testing.
 3. Schedule sufficient time to test and analyze results to prevent delay in the Work.
 4. Investigate materials failing compatibility or adhesion tests and get sealant manufacturer's written recommendations for corrective measures, including using special primers.
 5. Testing is not required when glazing sealant manufacturer can submit required preparation data that is acceptable to Architect and is based on previous testing of current sealant products for adhesion to and compatibility with submitted glazing materials.
- J. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

1.09 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Install liquid sealants at ambient and substrate temperatures above 40 deg F (4 deg C).

1.10 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Warranty on Coated Glass Products: Submit written warranty signed by coated glass manufacturer agreeing to furnish replacements for those coated glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
 1. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- C. Manufacturer's Warranty on Laminated Glass: Submit written warranty signed by insulating glass manufacturer agreeing to furnish replacements for those laminated glass units that deteriorate as defined in the "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
 1. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- D. Manufacturer's Warranty on Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.
 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, products manufactured by the following;
1. Viracon
 2. PPG Industries
 3. Guardian Industries
 4. Pilkington/ Libby Owens Ford
 5. Cardinal Glass Industries
 6. Oldcastle Glass
 7. Vetrotech Saint Gobain

2.02 PRIMARY FLOAT GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select).
1. Class 1 (clear) unless otherwise indicated.
 2. Class 2 (tinted, heat-absorbing, and light-reducing) where indicated.
 3. Class as indicated in each Product Data Sheet at end of this Section.
- B. Refer to Primary Clear Float Glass Product Data Sheet for Class 1 uncoated tinted glass for monolithic glazing.
- C. Refer to Primary Tinted Float Glass Product Data Sheet for tint color and nominal performance characteristics of Class 2 uncoated tinted glass for monolithic glazing relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.
- D. Refer to coated glass product requirements for tint color and performance characteristics of coated tinted glass for monolithic glazing relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.
- E. Refer to requirements for sealed insulating glass units for performance characteristics of assembled units composed of tinted glass, coated or uncoated, relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.

2.03 HEAT-TREATED FLOAT GLASS PRODUCTS, GENERAL

- A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- B. Fabrication Process: By vertical (tong-held) or horizontal (roller-hearth) process, at manufacturer's option, except provide horizontal process where indicated as tongless or free of tong marks.

2.04 HEAT-TREATED FLOAT GLASS

- A. Uncoated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below.

1. Kind HS (heat strengthened) where indicated.
 2. Kind FT (fully tempered) where indicated.
- B. Uncoated, Tinted, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality q3 (glazing select), with tint color and performance characteristics for 6 mm thick glass matching those indicated for annealed primary tinted float glass; kind as indicated below:
1. Kind HS (heat strengthened) where indicated.
 2. Kind FT (fully tempered) where indicated.
- C. Coated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), with coating type and performance characteristics complying with requirements specified under coated glass products; kind as indicated below:
1. Kind HS (heat strengthened) where indicated.
 2. Kind FT (fully tempered) where indicated.
- D. Coated, Tinted, Heat-Treated Float Glass: ASTM C 1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality q3 (glazing select), with kind, coating type, and performance characteristics complying with requirements specified under coated glass products.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering heat-treated glass products that may be incorporated in the Work include, but are not limited to, the following companies.
1. AFG Industries, Inc.
 2. Artistic Glass Products Co.
 3. Cardinal IG.
 4. Saint-Gobain.
 5. Falconer Glass Industries.
 6. Guardian Industries Corp.
 8. PPG Industries, Inc.
 9. Spectrum Glass Products, Inc.
 10. Tempglass.
 11. Viracon, Inc.
 12. Fire Lite Glass Inc. mfg by Nippon Elec. Co.
 13. Oldcastle Glass

2.05 COATED MONOLITHIC GLASS PRODUCTS

- A. General: Performance characteristics designated for coated monolithic glass products are nominal values based on manufacturer's published test data for glass products 6 mm thick, unless otherwise indicated. Comply with requirements specified including those for primary and heat-treated float glass products as they relate to properties of glass to which coatings are applied.
1. U-values are expressed as Btu/hr x sq. ft. x deg F (W/sq. m x K).
 2. Provide heat-treated coated float glass of kind indicated or, if not otherwise indicated, Kind HS (heat strengthened) where recommended by manufacturer to

- comply with system performance requirements specified and Kind FT (fully tempered) where coated safety glass is designated or required.
3. Provide Kind HS (heat-strengthened) coated float glass except provide Kind FT (fully tempered) products where coated safety glass is designated or required.
- B. Pyrolytically Coated Glass Products: Float glass with solar-reflective metallic oxide coating applied pyrolytically either during initial manufacture or during heat treatment, complying with requirements specified in Pyrolytically Coated Monolithic Glass Product Data Sheet at the end of this Section.
- C. Sputter-Coated Glass Products: Float glass with metallic oxide or metallic nitride coating deposited by magnetic sputtering process after manufacture and heat treatment (if any), complying with requirements specified in Sputter-Coated Monolithic Glass Product Data Sheet at the end of this Section.
- D. Coated, Heat-Treated Spandrel Glass: Class of glass, tint (if any), and type, color, and location of coating matching that specified for vision lites in Coated Monolithic Glass Product Data Sheet and complying with the following:
1. Kind HS (heat strengthened).
 2. Kind FT (fully tempered).
 3. Fallout Resistance: Provide spandrel units identical to those passing ASTM C 1048 fallout resistance test for spandrel glass.
 4. Factory apply manufacturer's standard opacifier of the following material to second surface of lites with resulting products complying with GTA Specification No. 89-1-6.
 - a. Manufacturer's standard opacifier material.

2.06 LAMINATED GLASS PRODUCTS

- A. Laminated Glass Products: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified, including those in Laminated Glass Product Data Sheet at the end of this Section. Refer to primary and heat-treated glass requirements relating to properties of glass products comprising laminated glass products.
- B. Interlayer: Interlayer material as indicated below, in clear or colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
1. Interlayer Material: Polyvinyl butyral sheets.
 2. Available Products: Subject to compliance with requirements, the plastic interlayer products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Polyvinyl Butyral Interlayer:
 - 1) Saflex, Monsanto Co.
 - 2) Butacite, E. I. du Pont de Nemours & Co., Inc.
- C. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
1. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.
 2. Laminate lites with urethane acrylate resin by exposing assembled units to ultraviolet light after pumping interlayer material into space between lites.

2.07 INSULATING GLASS PRODUCTS

- A. Sealed Insulating Glass Units: Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated, including those in Insulating Glass Product Data Sheet at the end of this Section.
1. For properties of individual glass lites making up units, refer to requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units.
 2. Provide heat-treated, coated float glass of kind indicated or, if not otherwise indicated, Kind HS (heat strengthened) where recommended by manufacturer to comply with system performance requirements specified and Kind FT (fully tempered) where safety glass is designated or required.
 3. Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's published test data for units with lites 6 mm thick and nominal 1/2-inch (13 mm) dehydrated space between lites, unless otherwise indicated.
 4. U-values are expressed as Btu/hr x sq. ft. x deg F (W/sq. m x K).
 5. Shall comply with ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation. Units shall be certified for compliance by the IGCC in accordance with the above ASTM test method

2.08 FIRE-RESISTIVE GLAZING PRODUCTS

- A. Fire-Resistive, Ceramic Glazing Material: Proprietary product in the form of clear flat sheets of 3/16 inch (5 mm) nominal thickness, weighing 2.5 psf (4.7 kg/sq m), permanently labeled with appropriate marks of testing and inspecting agency, acceptable to authorities having jurisdiction, showing product complies with fire-resistive installation indicated, and as follows:
1. Polished on both surfaces, transparent with visible light transmission of 76.9 percent.
 2. Unpolished on both surfaces, transparent.
 3. Patterned (textured) on one surface, translucent.
 4. Product: Subject to compliance with requirements, provide the following product manufactured by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products:
 - a. Premium FireLite.
 - b. Standard FireLite.
 - c. Patterned FireLite.

2.09 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.

3. Colors: Provide color of exposed joint sealants to comply with the following:
 - a. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- B. Elastomeric Glazing Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements indicated on each Elastomeric Glazing Sealant Product Data Sheet at the end of this Section, including those referencing ASTM classifications for Type, Grade, Class and Uses.
 1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Glazing Sealant Product Data Sheet, provide products, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, with the capability to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- C. Glazing Sealant for Fire-Resistant Glazing Products: Identical to product used in test assembly to obtain fire-resistive rating.

2.10 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:
 1. AAMA 804.1.
 2. AAMA 806.1.
 3. AAMA 807.1.
- B. Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner protecting adhesive, and complying with AAMA 800 for product 810.5.
- C. Available Products: Subject to compliance with requirements, glazing tape that may be incorporated in the Work include, but is not limited to, the following:
 1. Back-Bedding Mastic Glazing Tape Without Spacer Rod:
 - a. PTI 303 Glazing Tape (shimless), Protective Treatments, Inc.
 - b. S-M 5700 Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
 - c. Tremco 440 Tape, Tremco Inc.
 - d. Extru-Seal, Pecora Corp.
 - e. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.
 - f. Dyna-Seal, Pecora Corp.
 - g. PTI 626 Architectural Sealant Tape, Protective Treatments, Inc.
 - h. S-M 5710 H.P Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
 - i. SST-800 Tape, Tremco, Inc.
 2. Back-Bedding Mastic Glazing Tape With Spacer Rod:
 - a. PTI 303 Glazing Tape (with shim), Protective Treatments, Inc.
 - b. Pre-shimmed Tremco 440 Tape, Tremco, Inc.
 - c. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.

3. Expanded Cellular Glazing Tape:
 - a. Norseal V-980 Closed-Cell Glazing Tape, Norton Company.

2.11 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).
- F. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistive rating.

2.12 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.
- B. Clean cut or flat grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 2. Presence and functioning of weep system.
 3. Minimum required face or edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.03 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass from edge damage during handling and installation as follows:
 - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
 - 2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches (1250 mm) (length plus height) as follows:
 - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.
 - 2. Provide 1/8-inch (3 mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

- K. Square cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

- A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each lite is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- C. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.06 PROJECT SCHEDULE

All products shall comply with ASTM Standards and requirements in Part 2 above.

PRODUCT DATA SHEET 7 – LAMINATED GLASS NO. 7 (INTERIOR WINDOWS & DOORS)

- A. Laminated Glass: 9/16" nominal thickness consisting of ¼" heat strengthened tinted exterior light, ¼" heat strengthened clear interior light, bonded with 0.090" polyvinyl butyral sheet.

PRODUCT DATA SHEET 8 – FIRE-RATED GLASS NO. 8

- A. Underwriters Laboratories label fire-rated glass.
- B. Fire Rated Glass: Glass shall be equal to FireLite Nt as supplied by Technical Glass Products, Kirkland, Washington, 1-800-426-0279, 1-800-451-9857 fax, e-mail sales @fireglass.com, web site www.fireglass.com.
1. Properties:
- a. Thickness 3/16" Firelite
 - b. Film: 3M Scotchshield Ultra Film.
 - c. Weight: 2.4 pounds per square foot.
 - d. Approximate Visible Transmission: 88 percent.
 - e. Approximate Visible Reflection: 7 percent.
 - f. Hardness: 700 (Vicker's scale).
 - g. Fire Rating: 20 minutes or as noted on the drawings
 - h. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I & II).
 - i. Positive Pressure Test: passes UL 10C
 - j. Surface Finish: Standard (unpolished).
- C. Maximum Sheet Size: 48 inches by 96 inches.
- D. Labeling: Permanently label each piece of fire rated glazing with the UL logo and fire rating.
- E. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with UL9, 10B and 10C and NFPA 257.

**PRODUCT DATA SHEET 10 – INSULATING IMPACT-RATED GLASS NO. 10
(EXTERIOR WINDOWS & DOORS)**

- A. Insulating Gray Low – E Vision Glass: Manufacturer's standard insulating glazing system in conformance with Florida Building Code 5th Edition (2014) Energy Conservation Chapter 4 [CE] Commercial Energy Efficiency, Table C402.3 for climate zone indicated., 7/8" thick. Comprised of:
1. Properties:
- a. 3/16" annealed exterior glass, tint on surface #2
 - b. 11/32" air gap filled with argon gas
 - c. 1/8" clear annealed glass
 - d. 0.090" PVB interlayer
 - e. 1/8" clear annealed glass interior

- B. NFRC Requirements – Provide for Climate Zone 2, windows and exterior door lights capable of complying with the following totals:
 - 1. Properties:
 - a. U-Factor: Windows Fixed Fenetration 0.50, Operable 0.65, Entrance Door 0.83 minimum performance requirement.
 - b.. Solar Heat Gain Coefficient (SHGC): 0.25 in accordance with NFRC 200.
 - c. Visible Transmittance (VT): 0.66 in accordance with NFRC 200.

END OF SECTION

**SECTION 08801
MIRRORS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Tempered glass mirrors qualifying as safety glazing.
- B. Related Sections:
 - 1. Division 08 Section "Glazing" for glass with reflective coatings used for vision and spandrel lites.
 - 2. Division 10 Section "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.
- C. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.
- D. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
- E. Maintenance Data: For mirrors to include in maintenance manuals.
- F. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

- D. Glazing Publications: Comply with the following published recommendations:
 - 1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
 - 2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- E. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.
- F. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SILVERED FLAT GLASS MIRRORS

- A. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.
 - 1. Nominal Thickness: 6.0 mm.

2.02 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Franklin International; Titebond Division.
 - 2. Laurence, C. R. Co., Inc.
 - 3. Macco Adhesives; Liquid Nails Division.
 - 4. OSI Sealants, Inc.
 - 5. Palmer Products Corporation.
 - 6. Pecora Corporation.
 - 7. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
 - 8. Sommer & Maca Industries, Inc.
- E. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.03 MIRROR HARDWARE

- A. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- B. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.04 FABRICATION

- A. Mirror Sizes: To suit Project conditions, and before tempering cut mirrors to final sizes and shapes.
- B. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished.
- D. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
- E. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.
- F. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.02 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.03 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.

3.04 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

**MIRRORS
SECTION 08801-4**

10/12/2017

**SECTION 08900
LOUVERS AND VENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed and formed-metal louvers.
- B. Related Sections:
 - 1. Division 15 Sections for louvers that are a part of mechanical equipment.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Vertical Louver: Louver with vertical blades; i.e., the axes of the blades are vertical.
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- D. Storm-Resistant Louver: Louver that provides specified wind-driven rain and wind borne debris, as required by the Florida Building Code (FBC), 5th edition.
- E. Louvers installed and mounted to the exterior of PTAC units that are provided and specified by the manufacturer. AMCA 540 compliance is specific to these units and not AMCA 550, in accordance to the Florida Building Commission.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads and Windborne Debris: Determine loads based on pressures as indicated on Structural Drawings, Florida Building Code, 5th edition, current code, local ordinances and authorities having jurisdiction whichever is most stringent.

- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.
 - 1. Temperature Change (Range): 120o F, ambient; 180 o F material surfaces.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.. Louvers in hurricane prone region as defined by the FBC 5th edition must meet the requirements of AMCA Standard 550, except PTAC louver as noted above.
- E. Windborne-Debris-Impact-Resistance Performance: Provide aluminum-framed systems that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996, TAS 201 and TAS 203. Louvers in wind borne debris region, as defined by the FBC 5th addition must meet the requirements of AMCA Standard 540.
- F. Missile Impact test
 - 1. Missile Level D - Required for "Basic Protection" where louvers are required to be impact qualified per the FBC 5th edition
 - 2. Missile Level E - Required for "Enhanced Protection" where louvers are required to be impact qualified per the FBC 2014 for Critical or Essential Facilities

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation in the state where the project is located.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.
- F. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

- G. Product/Code Certification: Provide written verification that the products provided and installed as a system or assembly in this Project meet or exceed requirements of the FBC 5th edition with supplements, including the high velocity hurricane zone requirements, for wind resistance of components and cladding with any local code amendment requirements. Exterior products shall be designed and tested to be impact resistant as a system in accordance with the FBC 5th edition with Supplements. Provide design data and verification documentation signed and sealed by a professional engineer registered in the State of Florida including, but not limited to, the following:
1. Manufacturer's written certification indicating the type, grade, and size unit provided meets requirements.
 2. Manufacturers test data and engineering data developed indicating that requirements have been met.
 3. Independent testing laboratory reports and certifications verifying that products meet requirements.
 4. Calculations and definition of the code required loading for each unit in the Project. Include location schedules for clarification.
 5. Installation requirements describing types of fasteners and spacing.
 6. Submit certification prior to or in conjunction with other submittals required herein. Other submittals received prior to receipt of this certification will be rejected.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
 3. AWS D1.6, "Structural Welding Code - Stainless Steel."
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.
- D. UL and NEMA Compliance: Provide motors and related components for motor-operated louvers that are listed and labeled by UL and comply with applicable NEMA standards.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum: Color selected by Architect from full range of colors.

- B. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
 - 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- C. Post-installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless- steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
 - 1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
 - 2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
 - 1. Frame Type: Channel, exterior flange or interior flange unless otherwise indicated.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacing indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.
 - 1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.
 - 2. Semi-recessed Mullions: Where indicated, provide mullions partly recessed behind louver blades so louver blades appear continuous. Where length of louver exceeds fabrication and handling limitations, fabricate with interlocking split mullions and close-fitting blade splices designed to permit expansion and contraction.

3. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
 4. Exterior Corners: Prefabricated corner units with mitered and welded blades and with fully recessed mullions at corners.
- G. Provide sub-sills mad of same material as louvers or extended sills for recessed louvers.
- H. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, FORMED-METAL LOUVERS

- A. Louvers that comply with the FBC 5th edition:
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below or comparable product by one of the following:
Metal, Wood, Attic Ventilation, at 30 feet above grade: (Basis of Design) (Ruskin Model EME3625D)
All louvers below 30 feet above grade excluding PTAC Unit louvers: (Basis of Design) (Greenheck Model EHV-501D)
All PTAC louvers: (Basis of Design) (Reliable AEL-42D-760)
 - a. Airolite Company, LLC (The).
 - b. Greenheck Fan Corporation.
 - c. NCA Manufacturing, Inc.
 - d. Ruskin Company; Tomkins PLC.
 - e. All-lite
 - f. Construction Specialties, Inc.
 - g. Pottorff
 2. Louver Depth: as required to meet wind load.
 3. Blade Profile: One part Vertical with drainage.
 4. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.064 inch.
 5. Mullion Type: Fully recessed.
 6. Louver Performance Ratings: To match Models indicated as "Basis or Design"
 7. Free Area, Water Penetration, and Air Performance: To match Models indicated as "Basis or Design"
- B. Free Area, Water Penetration, and Air Performance: Not more than 0.10-inch wg static pressure drop at 550-fpm free-area exhaust velocity.

2.2 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
1. Screen Location for Fixed Louvers: Interior face.
 2. Screening shall be compliant to the Florida Building Code, 5th addition.
- B. Secure screen frames to louver frames with stainless steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Re-wirable frames with a driven spline or insert.
- D. Louver Screening for Galvanized Steel Louvers:

2.3 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.
 - 1. Galvanized-steel sheet for galvanized-steel louvers, not less than 0.052-inch nominal thickness, with R7.5 rigid insulation between sheets and covered with steel sheet on all sides.
 - 2. Panel Finish: Same finish applied to louvers.
 - 3. Attach blank-off panels with sheet metal screws.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.5 GALVANIZED-STEEL SHEET FINISHES

- A. Finish louvers after assembly.
- B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780.
- C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range of standard and premium colors.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 07 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
- B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 09220
PORTLAND CEMENT PLASTER (STUCCO)

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Portland cement stucco system
- B. Special rendered surface finish
- C. Applied rigid foam shapes and trim

1.03 RELATED WORK

- A. Section 04200 – Unit Masonry
- B. Section 07900 – Joint Sealers
- C. Section 09255 – Gypsum Board Systems

1.04 REFERENCES

- A. ANSI/ASTM C91 – Masonry Cement
- B. ASTM C150 – Portland Cement
- C. ANSI/ASTM C206 – Finishing Hydrated Lime
- D. ANSI/ASTM C207 - Hydrated Lime for Masonry Purposes
- E. ANSI/ASTM C631 – Bonding Compounds for Interior Plastering
- F. ANSI/ASTM C897 – Aggregate for Job-Mixed Portland Cement-Based Plasters
- G. ANSI/ASTM C926 – Application of Portland Cement-Based Plaster
- H. FS HH-I-521 - Insulation Blankets, Thermal (Mineral Fiber for Ambient Temperatures).

1.05 QUALITY ASSURANCE

- A. Applicator: Company specializing in cement plaster work with three (3) years documented experience.
- B. Apply cement plaster in accordance with ASTM C 926.

1.06 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes for fire rated assemblies in conjunction with Section 09260 as follows:
 - 1. Fire Rated Partitions: Listed assembly by UL as shown on drawings.
 - 2. Fire Rated Ceilings and Soffits: Listed assembly by UL as shown on drawings.

1.07 SUBMITTALS

- A. Provide product data on plaster materials, characteristics and limitations of products specified.

1.08 FIELD SAMPLES

- A. Construct field sample panel, 48 inches long by 48 inches wide, illustrating surface finish.
- B. Locate where directed.
- C. Accepted sample may remain as part of the Work.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees Fahrenheit.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. Florida Stucco Corporation
- B. Rinker Materials Corporation

2.02 PLASTER BASE COAT MATERIALS

- A. Cement: ASTM C150, Normal – Type 1 Portland, Grey color.
- B. Lime: ANSI/ASTM C207, Type S
- C. Aggregate: In accordance with ANSI/ASTM C897
- D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.
- E. Bonding Agent: ANSI/ASTM C631; type recommended for bonding plaster to concrete masonry surfaces.

2.03 CEMENT PLASTER MIXES

- A. Mix and proportion cement plaster in accordance with manufacturer's instructions.
- B. Mix only as much plaster as can be used in three (3) hours.

- C. Mix materials dry, to uniform color and consistency before adding water.
- D. Protect mixtures from frost, contamination and evaporation
- E. Do not re-temper mixes after initial set has occurred.

2.04 RIGID BOARD SHAPES

- A. Molded polystyrene Board Insulation: Rigid Cellular Thermal insulation formed by the expansion of polystyrene resin beads or granules in a closed mold, complying with ASTM C578.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Grounds and blocking: Verify items within walls for other Sections of Work have been installed.
- C. Mechanical and Electrical: Verify services within walls have been tested and approved.
- D. Beginning of Installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Protect surfaces near the Work of this Section from damage or disfiguration.

3.03 CONTROL AND EXPANSION JOINTS

- A. Locate exterior control joints every ten (10) feet or 100 square feet.
- B. Establish control and expansion joints by Brooksville with specified PVC joint device.

3.04 STUCCO

- A. Apply plaster in accordance with manufacturer's instructions.
- B. Apply scratch coat, brown coat, and a finish coat to 5/8 inch over self-furring masonry.
- C. Apply brown coat immediately following initial set of scratch coat.
- D. After curing, dampen base coat prior to applying finish coat.
- E. Apply finish coat to a smooth and consistent finish texture to match sample panel.
- E. Apply finish coat to a smooth and consistent finish texture. See Schedule section below for stucco finishes and locations.
- F. Avoid excessive working of surface. Delay trowelling as long as possible to avoid drawing excess fines to surface.

- G. Hand Machine apply aggregate surfacing to full surface coverage.
- H. Moist cure finish coat for minimum period of 48 hours.
- I. Apply stucco over foam or pressure treated wood at built-up areas or utilize Dryvit or equal system.

3.05 INSTALLATION OF EXTERIOR FOAM INSULATION TRIM AND ORNAMENTATION

- A. All foam insulation bands, trim, moldings, and ornamentations shall be installed in a full bed of adhesive to properly bond to concrete and/or masonry surfaces.

3.06 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

3.07 SCHEDULE

- A. Field – medium, {heavy, smooth} texture
- B. Bands – sand texture

END OF SECTION

**SECTION 09256
TILING**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Ceramic wall tile, quarry tile, porcelain tile.
 - 2. Stone thresholds.
 - 3. Crack isolation membrane.
 - 4. Sound-suppression membrane (at elevated living units only).
- B. Related Sections:
 - 1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

1.03 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.04 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028; and as indicated by current code local ordinances and authorities having jurisdiction, whichever is most stringent.
 - 1. Level Surfaces: Minimum 0.60 (wet or dry)
 - 2. Step Treads: Minimum 0.60 (wet or dry)
 - 3. Ramp Surfaces: Minimum 0.80 (wet or dry)

1.2 SUBMITTALS

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

- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Stone thresholds in 6-inch lengths.
 - 5. Metal edge strips in 6-inch lengths.
- D. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- E. Product Certificates: For each type of product, signed by product manufacturer.
- F. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.3 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Crack isolation membrane.
 - 3. Joint sealants.
 - 4. Sound-suppression membrane.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.5 PROJECT CONDITIONS

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

1.6 EXTRA MATERIALS

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

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

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- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

- A. Refer to interior design documents for selection of tiles and accessories.

2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
- B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
 - 1. Description: Uniform, fine- to medium-grained white stone with gray veining.
 - 2. Description: Match Architect's sample.

2.4 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Schluter Systems L.P.; KERDI.
- C. Sound-Suppression Membranes: manufacturer's standard product which complied with requirements in the current code, local ordinances and authorities having jurisdiction, whichever is most stringent.
 - 1. Products: Provide product from one of the following:
 - a. Acousticork Products.
 - b. Maxxon's – Acousti Matt II.

2.5 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Boiardi Products; a QEP company.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo, Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.

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- i. Mer-Kote Products, Inc.
 - j. Southern Grouts & Mortars, Inc.
 - k. Summitville Tiles, Inc.
 - l. TEC, a subsidiary of H.B. Fuller Company.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- B. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Atlas Minerals & Chemicals, Inc.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Mer-Kote Products, Inc.
 - j. Southern Grouts & Mortars, Inc.
 - k. Summitville Tiles, Inc.
 - l. TEC; a subsidiary of H. B. Fuller Company.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.6 GROUT MATERIALS

- A. Standard Cement Grout: ANSI A118.6.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Boiardi Products; a QEP company.
 - b. Bonsal American; an Oldcastle company.
 - c. Bostik, Inc.
 - d. C-Cure.
 - e. Custom Building Products.
 - f. Jamo Inc.
 - g. Laticrete International, Inc.
 - h. MAPEI Corporation.
 - i. Southern Grouts & Mortars, Inc.
 - j. Summitville Tiles, Inc.
 - k. TEC; a subsidiary of H. B. Fuller Company.

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2.7 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
 - 1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 - 1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; Dow Corning 786.
 - b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
 - c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
 - d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - e. Tremco Incorporated; Tremsil 600 White.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

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- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors composed of tiles 8 by 8 inches or larger.
 - f. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch.
 - 2. Quarry Tile: 1/4 inch.
 - 3. Paver Tile: 1/4 inch
 - 4. Glazed Wall Tile: 1/16 inch.
 - 5. Decorative Thin Wall Tile: 1/16 inch.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
 2. Do not extend or crack isolation membrane under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on crack isolation membrane with elastomeric sealant.
- I. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.5 SOUND-SUPPRESSION MEMBRANE INSTALLATION

- A. Install sound-suppression membrane to comply with current membrane and tile manufacturer's instructions including all accessories.

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Tile Installation F125A: Thin-set mortar on crack isolation membrane and sound-suppression membrane; TCA F125A.
 - a. Tile Type:
 - b. Thin-Set Mortar: Latex- portland cement mortar.
 - c. Grout: Standard sanded cement grout.
- B. Interior Wall Installations, Metal Studs or Furring:
 - 1. Tile Installation W243: Thin-set mortar on gypsum board; TCA W243.
 - a. Thin-Set Mortar: Latex portland cement mortar.
 - b. Grout: Standard sanded cement grout.
 - 2. Tile Installation W245: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board; TCA W245.
 - a. Thin-Set Mortar: Latex-portland cement mortar.
 - b. Grout: Standard sanded cement grout.

END OF SECTION

**SECTION 09290
GYPSUM BOARD ASSEMBLIES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
 - 1. Non-load-bearing steel framing members for gypsum board assemblies.
 - 2. Gypsum board assemblies attached to steel framing.
 - 3. Gypsum board bonded adhesively to interior concrete and masonry substrates.
 - 4. Cementitious backer units installed with gypsum board assemblies.
 - 5. Glass-mat, water-resistant gypsum backing board installed with gypsum board assemblies.

1.03 RELATED SECTIONS

- A. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
- B. Division 6 Section "Rough Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.
- C. Division 7 Section "Firestopping" for firestopping systems and fire-resistance-rated joint sealants.
- D. Division 9 Section "Gypsum Board Shaft-Wall Assemblies" for framing, gypsum panels, and other components forming shaft wall assemblies.
- E. Division 9 Section "Tile" for cementitious backer units installed as substrates for ceramic tile.

1.04 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.05 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
- B. Fire Resistance: Provide gypsum board assemblies with fire-resistance ratings indicated.

1.06 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.07 QUALITY ASSURANCE

- A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
- B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- D. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:
 - 1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Mockups: Prior to finishing gypsum board assemblies, construct mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects of finishes as well as qualities of materials and execution. Simulate finished lighting conditions for review of in-place unit of Work.
 - 1. Construct mockups for each of the following applications:
 - a. Wall surfaces indicated to receive non-textured paint finishes.
 - b. Ceiling surfaces indicated to receive non-textured paint finishes.
 - c. Surfaces indicated to receive textured paint finishes.
 - d. Surfaces indicated to receive textured finishes and textured finishes specified in this Section.

2. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
 - a. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - b. Notify Architect one week in advance of the dates and times when mockups will be constructed.
 - c. Demonstrate the proposed range of aesthetic effects and workmanship.
 - d. Obtain Architect's approval of mockups before start of final unit of Work.
 - e. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 1) When directed, demolish and remove mockups from Project site.
 - 2) Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
 - f. Gypsum board used on exterior walls to be mold resistant.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.09 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 1. Steel Framing and Furring:
 - a. Clark Steel Framing, Inc.
 - b. Dale Industries, Inc.

- c. Dietrich Industries, Inc.
 - d. Marino/Ware (formerly Marino Industries Corp.).
 - e. National Gypsum Co.; Gold Bond Building Products Division.
 - f. Unimast, Inc.
- 2. Grid Suspension Assemblies:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corp.
 - c. USG Interiors, Inc.
 - d. Worthington Steel Company (formerly National Rolling Mills).
- 3. Gypsum Board and Related Products:
 - a. Domtar Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co.; Gold Bond Building Products Division.
 - d. United States Gypsum Co.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work where proprietary gypsum wallboard is indicated include, but are not limited to, the following:
 - 1. Gyprock Fireguard C Gypsum Board; Domtar Gypsum.
 - 2. Firestop Type C; Georgia-Pacific Corp.
 - 3. Fire-Shield G; National Gypsum Co.; Gold Bond Building Products Division.
 - 4. SHEETROCK Brand Gypsum Panels, FIRECODE C Core; United States Gypsum Co.
 - 5. SHEETROCK Brand Gypsum Panels, ULTRACODE Core; United States Gypsum Co.

2.02 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. General: Provide components complying with ASTM C 754 for conditions indicated.
- B. Cast-in-Place and Post installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Cast-in-place type designed for attachment to concrete forms.
- C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.
- D. Wire Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.062 inch (1.6 mm) thick.
- E. Wire Hangers: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper, 0.162-inch (4.1-mm) diameter.
- F. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.
- G. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.

- H. Angle-Type Hangers: Angles with legs not less than 7/8 inch (22.2 mm) wide, formed from 0.0635-inch- (1.6-mm-) thick galvanized steel sheet complying with ASTM A 653, G 90 (ASTM A 653M, Z 180) coating designation, with bolted connections and 5/16-inch (8-mm) diameter bolts.
- I. Channels: Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, and as follows:
 - 1. Carrying Channels: 1-1/2 inches (38.1 mm) deep, 475 lb. /1000 feet (70 kg/100 m), unless otherwise indicated.
 - 2. Furring Channels: 3/4 inch (19.1 mm) deep, 300 lb. /1000 feet (45 kg/100 m), unless otherwise indicated.
 - 3. Finish: ASTM A 653, G 60 (ASTM A 653M, Z 180) hot-dip galvanized coating for framing for exterior soffits and where indicated.
- J. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.

2.03 STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General: Provide steel framing members complying with the following requirements:
 - 1. Protective Coating: Manufacturer's standard corrosion-resistant coating.
- B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 - 1. Thickness: 0.0179 inch (0.45 mm), unless otherwise indicated.
 - 2. Thickness: 0.027 inch (0.7 mm) where indicated.
 - 3. Thickness: 0.0329 inch (0.84 mm) as follows:
 - a. For head runner, sill runner, jamb, and cripple studs at door and other openings.
 - b. In locations to receive cementitious backer units.
 - c. Where indicated.
 - 4. Depth: 3-5/8 inches (92.1 mm), unless otherwise indicated.
 - 5. Depth: 6 inches (152.4 mm) where indicated at plumbing walls.
 - 6. Depth: 2-1/2 inches (63.5 mm) where indicated.
 - 7. Depth: 1-5/8 inch (41.3 mm) where indicated.
- C. Deflection Track: Manufacturer's top runner complying with the requirements of ASTM C 645 and with 2-inch- (50.8-mm-) deep flanges.
- D. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, minimum thickness of base (uncoated) metal of 0.0329 inch (0.84 mm), designed for screw attachment to steel studs and steel rigid furring channels used for furring.
- E. Z-Furring Members: Manufacturer's standard Z-shaped furring members with slotted or non-slotted web, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M); with a minimum base metal (uncoated) thickness of 0.0179 inch (0.45 mm), face flange of 1-1/4 inch (31.8 mm),

wall-attachment flange of 7/8 inch (22.2 mm), and of depth required to fit insulation thickness indicated.

- F. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

2.04 GYPSUM BOARD PRODUCTS

- A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.
1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36 and as follows:
1. Type: Regular for vertical surfaces, unless otherwise indicated.
 2. Type: Type X where required for fire-resistance-rated assemblies.
 3. Type: Sag-resistant type for ceiling surfaces.
 4. Type: Proprietary type as required for specific fire-resistance-rated assemblies.
 5. Edges: Tapered.
 6. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
 7. Thickness: 5/8 inch (15.9 mm) where indicated.
- C. Gypsum Board Base Layer(s) for Multilayer Applications: Gypsum wallboard, ASTM C 36, and as follows:
1. Type: Regular for vertical surfaces, unless otherwise indicated.
 2. Type: Type X where indicated or required for fire-resistance-rated wall assemblies.
 3. Type: Type C where indicated or required for fire-resistance-rated ceiling assemblies.
 4. Type: Sag-resistant for ceiling surfaces, unless otherwise indicated.
 5. Type: Proprietary type matching that indicated for face layer and as required for specific fire-resistance-rated assemblies.
 6. Edges: Manufacturer's standard.
 7. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
 8. Thickness: 5/8 inch (15.9 mm) where indicated.
- D. Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:
1. Type: Regular, unless otherwise indicated.
 2. Type: Type X where required for fire-resistance-rated assemblies and where indicated.
 3. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
 4. Thickness: 1/2 inch (12.7 mm) where indicated.

- E. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178, of type and thickness indicated below:
1. Type and Thickness: Regular, 1/2 inch (12.7 mm) thick, unless otherwise indicated.
 2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick, where required for fire-resistance-rated assemblies and where indicated.
 3. Available Product: Subject to compliance with requirements, a product that may be incorporated in the Work includes, but is not limited to, "Dens-Shield Tile Backer" manufactured by Georgia-Pacific Corp.

2.05 CEMENTITIOUS BACKER UNITS

- A. Provide cementitious backer units complying with ANSI A118.9, of thickness and width indicated below, and in maximum lengths available to minimize end-to-end butt joints.
1. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
 2. Thickness: 5/8 inch (15.9 mm), where indicated.
 3. Width: Manufacturer's standard width, but not less than 32 inches (813 mm).
- B. Available Products: Subject to compliance with requirements, cementitious backer units that may be incorporated in the Work include, but are not limited to, the following:
1. The Original Wonderboard; Custom Building Products.
 2. Wonderboard Multi + Board; Custom Building Products.
 3. DomCrete Cementitious Tile-Backer Board; Domtar Gypsum.
 4. Util-A-Crete Concrete Backer Board; FinPan, Inc.
 5. DUROCK Cement Board; United States Gypsum Co.

2.06 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:
1. Material: Formed metal or plastic, with metal complying with the following requirement:
 - a. Steel sheet zinc coated by hot-dip process or rolled zinc.
 2. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:
 - a. Corner bead on outside corners, unless otherwise indicated.
 - b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
 - c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
 - d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
 - e. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
- B. Accessory for Curved Edges: Corner bead formed of metal, plastic, or metal combined with plastic, with either notched or flexible flanges that are bendable to curvature radius.

- C. Accessories for Exterior Installations: Corner bead, edge trim, and control joints formed from steel sheet zinc coated by hot-dip process or rolled zinc complying with ASTM C 1047, in shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
1. Corner bead on outside corners, unless otherwise indicated.
 2. Edge trim complying with shape LC-bead per Fig. 1, unless otherwise indicated.
 3. One-piece control joint formed from rolled zinc with V-shaped slot and removable strip covering slot opening.

2.07 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
1. Use pressure-sensitive or staple-attached, open-weave, glass-fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.
- C. Joint Tape for Cementitious Backer Units: As recommended by cementitious backer unit manufacturer.
- D. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
 4. For topping compound, use sandable formulation.
- E. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.
1. Ready-Mixed Formulation: Factory-mixed product.
 - a. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
 - b. Topping compound formulated for fill (second) and finish (third) coats.
 - c. All-purpose compound formulated for both taping and topping compounds.
- F. Joint Compound for Cementitious Backer Units: Material recommended by cementitious backer unit manufacturer.

2.08 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
- C. Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:
 1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. PL Acoustical Sealant; ChemRex, Inc.; Contech Brands.
 - b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
 - c. SHEETROCK Acoustical Sealant; United States Gypsum Co.
 2. Acoustical Sealant for Concealed Joints:
 - a. BA-98; Pecora Corp.
 - b. Tremco Acoustical Sealant; Tremco, Inc.

2.09 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum panels.
- C. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.
- D. Fastening Adhesive for Wood: ASTM C 557.
- E. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum panels to steel framing.
- F. Steel drill screws complying with ASTM C 1002 for the following applications:
 1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
- G. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- H. Steel drill screws of size and type recommended by unit manufacturer for fastening cementitious backer units.
- I. Gypsum Board Nails: ASTM C 514.
- J. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
- K. Foam Gaskets: Closed-cell vinyl foam adhesive-backed strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit metal stud size indicated.

- L. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
 - 1. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.
- M. Thermal Insulation: Material indicated below, of thickness and width to fill voids formed by Z-furring members:
 - 1. Unfaced Mineral-Fiber Blanket Insulation: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).

2.10 TEXTURE FINISHES

- A. Available products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Polystyrene Aggregate Finish:
 - a. United States Gypsum Company; Sheetrock brand Tuf-Tex wall and ceiling texture.
 - b. National Gypsum Company; Proformwall and ceiling spray.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Ceiling Anchorage: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.
- B. Do not use power actuated nailers into post tensioned slab.
- C. All structural anchors are to be approved by KEM Engineers.

3.03 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."

- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
 - 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
 - 2. Where partition framing and wall furring abut structure, except at floor.
 - a. Provide slip- or cushioned-type joints as detailed to attain lateral support and avoid axial loading.
 - b. Install deflection track top runner to attain lateral support and avoid axial loading.
 - c. Install deflection and firestop track top runner at fire-resistance-rated assemblies where indicated.
 - 1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.04 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

- A. Screw furring members to wood framing.
- B. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 48 inches (1219 mm) o.c.
 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- E. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.
- F. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- G. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- H. For exterior soffits, install cross-bracing and additional framing to resist wind uplift according to details on Drawings.

3.05 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
 2. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Terminate partition framing at suspended ceilings where indicated.
- E. Install steel studs and furring in sizes and at spacings indicated.
1. Single-Layer Construction: Space studs 16 inches (610 mm) o.c., unless otherwise indicated.
 2. Cementitious Backer Unit Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.
 3. Cementitious Backer Unit Construction: Space studs 406 mm o.c., unless otherwise indicated.

- F. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- G. For curved partitions, install steel framing as follows:
1. Cut top and bottom runners through leg and web at 2-inch (50-mm) intervals for arc length. In cutting lengths of runners, allow for uncut straight lengths of not less than 12 inches (300 mm) at ends of arcs.
 2. Bend runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.
 3. Support outside (cut) leg of runners by clinching a 1-inch- (25-mm-) high-by-0.0209-inch- (0.55-mm-) thick steel sheet strip to inside of cut legs using metal lock fasteners.
 4. Attach runners to structural elements at floor and ceiling with fasteners located 2 inches (50 mm) from ends and spaced 24 inches (610 mm) o.c.
 5. Attach runners to structural elements at floor and ceiling with fasteners located 50 mm from ends and spaced 600 mm o.c.
 6. Attach runners to suspended ceilings with toggle bolts or hollow wall anchors located 2 inches (50 mm) from ends and spaced 16 inches (406 mm) o.c. in between where attached to suspended ceilings.
 7. Attach runners to suspended ceilings with toggle bolts or hollow wall anchors located 50 mm from ends and spaced 400 mm o.c. in between where attached to suspended ceilings.
 - a. Screw runners directly to suspension grid of suspended acoustical tile ceilings where runners intersect grid.
 8. Position studs vertically with open sides facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radii indicated. Attach studs to runners with 3/8-inch- (9.5-mm-) long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches (150 mm) o.c. with last stud left free standing.
- H. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
1. Install 2 studs at each jamb, unless otherwise indicated.
 2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- I. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.
- J. Install thermal insulation as follows:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.

2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.
 4. Until gypsum board is installed, hold insulation in place with 10-inch (250-mm) staples fabricated from 0.0625-inch (1.6-mm) diameter tie wire and inserted through slot in web of member.
- K. Install polyethylene vapor retarder where indicated to comply with the following requirements:
1. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with mechanical fasteners or adhesives. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose mineral-fiber insulation.
 2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings, and at lap joints; space fasteners 16 inches (400 mm) o.c.
 3. Seal joints in vapor retarders caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape.
 4. Repair any tears or punctures in vapor retarder immediately before concealing it with the installation of gypsum board or other construction.

3.06 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.
- I. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches (813 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- J. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- L. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- M. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.
- N. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- O. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
 - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- P. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.07 GYPSUM BOARD APPLICATION METHODS

- A. Single-Layer Application: Install gypsum wallboard panels as follows:
 - 1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

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2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.
 3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally.
 4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
1. Install cementitious backer units to comply with ANSI A108.11 at showers, tubs, and where indicated.
 2. Install cementitious backer units to comply with ANSI A108.11 at locations indicated to receive wall tile.
 3. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
 4. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at locations indicated to receive wall tile. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
 5. Install water-resistant gypsum backing board panels at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
 6. Install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
- C. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers prior to applying base layers on walls/partitions; apply gypsum wallboard face layers in same sequence. Offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints. Apply base layers at right angles to framing members, unless otherwise indicated.
- D. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.
1. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- E. Acoustical Tile Base: Where gypsum panels form the base for adhesively applied acoustical tile, install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface.

- F. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
 - 1. Fasten with screws.
- G. Multilayer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers as follows:
 - 1. Fasten both base layers and face layers separately to supports with screws.
 - 2. Fasten base layers with screws and face layer with adhesive and supplementary fasteners.
 - 3. Fasten base layers to wood supports with nails and face layer with adhesive and supplementary fasteners.
- H. Direct-Bonding to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- I. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports.
 - 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.
- J. For curved partitions, install gypsum panels as follows:
 - 1. Select gypsum panel lengths and cut them as required to produce one unbroken panel covering each curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
 - 2. Wet gypsum panels on surfaces that will become compressed when panels are installed over a curve and where curve radius prevents using dry panels. Comply with gypsum board manufacturer's recommendations relative to curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
 - 3. Apply gypsum panels horizontally with wrapped edges perpendicular to studs. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around the curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches (300 mm) o.c.
 - 4. For double-layer construction, apply gypsum board base layer horizontally and fasten to studs with screws spaced 16 inches (400 mm) o.c. Center gypsum board face layers over joints in base layer and fasten to studs with screws spaced 12 inches (300 mm) o.c.
 - 5. Allow wetted gypsum panels to dry before applying joint treatment.

3.08 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner bead at external corners.

- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
 - 1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - 2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
 - 3. Install U-bead where indicated.
 - 4. Install aluminum trim and other accessories where indicated.
- D. Install control joints at locations indicated or per Gypsum mfg. recommendations.
- E. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

3.09 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, flanges of corner bead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.
- D. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
- E. Base for Acoustical Tile: Where gypsum board is indicated as a base for adhesively applied acoustical tile, install joint tape and a 2-coat compound treatment, without sanding.
- F. Finish water-resistant gypsum backing board forming base for ceramic tile to comply with ASTM C 840 and gypsum board manufacturer's directions for treatment of joints behind tile.
- G. Finish glass-mat, water-resistant gypsum backing board to comply with gypsum board manufacturer's directions.
- H. Finish cementitious backer units to comply with unit manufacturer's directions.
- I. Gypsum board finish levels.
 - 1. Level 4: Embed tape and apply first, second and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated. Sand between each layer application.

3.10 APPLYING TEXTURE FINISHES

- A. Surface preparation and primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry and smooth.

- B. Texture Finish Application: Mix and apply finish using powered spray equipment to provide a uniform texture, light orange peel texture, free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming in contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite the precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish MFR's recommendations.

3.10 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 - 1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
 - 2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control air tubing.
 - f. Installation of ceiling support framing.

3.12 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

**SECTION 09311
TILE AND STONE**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This section includes the provision and installation of all materials, equipment and incidentals necessary and/or required for a complete installation of the following items as specified herein, including, but not limited to, the following:
 - 1. Glazed porcelain tile floor and base finish using the thin-set application method.
 - 2. Ceramic tile wall finish.
 - 3. Edge strip at door openings

1.03 RELATED SECTIONS

- A. Section 03300 – Cast-in-Place Concrete
- B. Section 09260 – Gypsum Board Systems

1.04 REFERENCES

- A. ANSI/TCA A108.4 – Installation of Ceramic Tile with Water Resistant Organic Adhesive.
- B. ANSI/TCA A108.5 – Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- C. ANSI/TCA A108.6 – Ceramic Tile Installed with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
- D. ANSI/TCA A118.1 – Dry-Set Portland Cement Mortar.
- E. ANSI/TCA A118.3 – Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
- F. ANSI/TCA A136.1 – Organic Adhesives for Installation of Ceramic Tile, Type 1 and Type 2.
- G. ANSI/TCA A137.1 – Specifications for Ceramic Tile.
- H. TCA (Tile Council of America) – Handbook for Ceramic Tile Installation.

1.05 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit product data and samples under provisions of Section 01300.

- C. Submit manufacturer's certificate under provisions of section 01400 that products meet or exceed specified requirements.
- D. Submit maintenance data under provisions of Section 01700. Include recommended cleaning and stain removal methods, cleaning materials and polishing waxes.
- E. Submit two samples, 12 X 12 inch in size illustrating color and pattern for each material.

1.06 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1
- B. Conform to TCA Handbook for Ceramic Tile Installation ANSI/TCA A108.4.
- C. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- D. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.
- E. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- F. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Cementitious backer units.
 - 3. Joint sealants.
 - 4. Waterproofing.
- G. Mockups: Before installing tile, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before proceeding with final unit of Work.
 - 4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockups from Project site.
 - b. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed work.

1.07 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Attic Stock – Specify a minimum of 50 SF or 10% whichever is greater, of attic stock of each type and of each color of ceramic tile used. Except for borders and accents where 5% of each type is required.

1.08 PERFORMANCE STANDARDS

- A. Static Coefficient of Friction: Tile installed on walkway surfaces shall have the following values as determined by testing identical products per ASTM C1028.
 - 1. Level Surfaces: Minimum 0.6 wet.
 - 2. Step Treads: Minimum 0.6 wet.
 - 3. Ramp Surfaces: Minimum 0.8 wet.
- B. Traffic Level Performance: floor tiles to meet heavy common/public areas and light for residential units traffic level performance passing ASTM C627, cycles 1 through [14] [12] [10], as described in TTMAC Tile Specification Guide 09300.
 - 1. Heavy: Passes cycles 1 through 12.
 - 2. Light: Passes cycles 1 through 6.
- C. Exterior Tiles provided for Work in this Section to be frost resistant in accordance with CAN/CGSB 75.1 and shall have a moisture absorption rating of 3.0% or less.

PART 2 - PRODUCTS**2.01 MANUFACTURERS – TILE**

- A. American Olean
- B. Dal-Tile Corporation
- C. Crossville Tile, Inc.
- D. Approved Equal

2.02 PRODUCTS - GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Match Architect's samples.
 2. Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.
 3. Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for products of type indicated.
 4. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: Where factory-mounted tile is required, provide back or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.
1. Where tile is indicated for installation in swimming pools, on exteriors, or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.03 TILE MATERIAL

- A. Ceramic Glazed Porcelain Floor and Wall Tile: ANSI/TCA A137.1, conforming to the following:
Size and color: See interior design finish schedule
- B. Base: Match floor tile for moisture absorption, surface finish and color: See Interior Design Finish Schedule, bull-nosed top edge, coved internal corner.

2.04 WATERPROOFING FOR THIN-SET TILE INSTALLATIONS

- A. General: Provide products that comply with ANSI A118.10 and the descriptions in this Article.
- B. Polyethylene-Sheet Waterproofing: Manufacturer's standard proprietary product consisting of composite sheets, 60 inches (152 mm) wide by a nominal thickness of 0.030 inches (0.76 mm), composed of an inner layer of non-plasticized, chlorinated polyethylene sheet faced on both sides with laminated, high-strength, nonwoven polyester material, designed for embedding in latex-portland cement mortar and as the substrate for latex-portland cement mortar setting bed.
- C. PVC-Sheet Waterproofing: Manufacturer's standard proprietary product consisting of composite sheets, 60 inches (152 mm) wide by a nominal thickness of 0.040 inches (1.01 mm), composed of an inner membrane of 2 layers of PVC sheet heat-fused together and to facings of bondable nonwoven polyester, designed for embedding in latex-portland cement mortar and as the substrate for latex-portland cement mortar setting bed.

- D. Latex-Rubber Waterproofing: Manufacturer's standard factory-packaged, job-mixed, proprietary, 2-part formulation consisting of liquid-latex rubber and powder for trowel application and glass-fiber-fabric reinforcing.
- E. Acrylic-Latex Waterproofing: Manufacturer's standard proprietary product consisting of one-part acrylic-latex additive and flexible cementitious fiber mortar, factory packaged for job-mixing and trowel application.
- F. Urethane Waterproofing and Tile-Setting Adhesive: Manufacturer's standard proprietary product consisting of 1-part liquid-applied urethane in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a 2-step process.
- G. Available Products: Subject to compliance with requirements, products which may be incorporated into the Work include, but are not limited to, the following:
 - 1. Polyethylene-Sheet Waterproofing:
 - a. Nobleseal TS; Noble Company (The).
 - 2. PVC-Sheet Waterproofing:
 - a. Composeal Gold; Compotite Corporation.
 - 3. Latex-Rubber Waterproofing:
 - a. Trowel & Seal Waterproof Membrane; Custom Building Products.
 - b. Laticrete 9235 Waterproof Membrane; Laticrete International, Inc.
 - c. S-9000; Summitville Tiles, Inc.
 - 4. Acrylic-Latex Waterproofing:
 - a. PRP 315; Mapei Corporation.
 - 5. Urethane Waterproofing and Tile-Setting Adhesive:
 - a. Hydroment Ultra-Set; Bostik.
 - b. Deck-Seal 1000; Southern Grouts & Mortars, Inc.

2.05 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1A and as specified below:
 - 1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15), or polyethylene sheeting ASTM D 4397, 4.0 mils (0.1 mm) thick.
 - 2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185 and ASTM A 82, except for minimum wire size.
 - 3. Expanded Metal Lath: Provide diamond-mesh lath complying with ASTM C 847 for requirements indicated below:
 - a. Base Metal and Finish for Interior Applications: Fabricate lath from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Fabricate lath from zinc-coated (galvanized) steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self-furring.
 - e. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m).
 - f. Weight: 3.4 lb/sq. yd. (1.8 kg/sq. m).
 - 4. Latex additive (water emulsion) described below, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive

- manufacturer for use with job-mixed portland cement and aggregate mortar bed.
 - a. Latex Additive: Manufacturer's standard.
 - b. Latex Additive: Styrene butadiene rubber.
 - c. Latex Additive: Acrylic resin.
- B. Dry-Set Portland Cement Mortar: ANSI A118.1.
 - 6. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
- C. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:
 - 1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
 - d. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
 - 2. Mixture of Dry-Mortar Mix and Latex Additive: Mixture of prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements:
 - a. Latex Additive: Styrene butadiene rubber.
 - b. Latex Additive: Acrylic resin.
 - c. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.
- D. Medium-Bed, Latex-Portland Cement Mortar: Provide materials composed as follows, with physical properties equaling or exceeding those required for thin-set mortars based on testing of medium-bed specimens according to ANSI A118.4:
 - 1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
 - 2. Mixture of Dry-Mortar Mix and Latex Additive: Mixture of prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements:
 - a. Latex Additive: Styrene butadiene rubber.
 - b. Latex Additive: Acrylic resin.
- E. Conductive Dry-Set Mortar: ANSI A118.2.
- F. Chemical-Resistant, Water-Cleanable, Ceramic Tile-Setting and -Grouting Epoxy: ANSI A118.3.
 - 1. Provide product capable of resisting continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, as certified by mortar manufacturer for intended use.
- G. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3.
- H. Chemical-Resistant Furan Mortar: ANSI A118.5, with carbon filler, unless otherwise indicated.
- I. Modified-Epoxy Emulsion Mortar: ANSI A118.8.
- J. Organic Adhesive: ANSI A136.1, Type I.

2.06 GROUTING MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Commercial Portland Cement Grout (Sanded Grout): ANSI A118.6, color as indicated, for joints 1/8 inch (3.2 mm) or wider.
- C. Dry-Set Grout: ANSI A118.6, color as indicated.
- D. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:
 - 1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:
 - a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
 - b. Sanded grout mixture for joints 1/8 inch (3.2 mm) and wider.
 - 2. Mixture of Dry-Grout Mix and Latex Additive: Mixture of factory-prepared, dry-grout mix and latex additive complying with the following requirements:
 - a. Unsanded Dry-Grout Mix: Dry-set grout complying with ANSI A118.6 for materials described in Section H-2.3, for joints 1/8 inch (3.2 mm) and narrower.
 - b. Sanded Dry-Grout Mix: Commercial portland cement grout complying with ANSI A118.6 for materials described in Section H-2.1, for joints 1/8 inch (3.2 mm) and wider.
 - c. Latex Additive: Styrene butadiene rubber.
 - d. Latex Additive: Acrylic resin.
- E. Chemical-Resistant Epoxy Grout: ANSI A118.3, color as indicated.
 - 1. Provide product capable of resisting continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, as certified by mortar manufacturer for intended use.
- F. Chemical-Resistant Furan Grout: ANSI A118.5.
- G. Grout for PregROUTED Tile Sheets: Same silicone rubber used in factory to pregROUT tile sheets.

2.07 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
- E. Chemical-Resistant Sealants: For chemical-resistant floors, provide sealants compatible with chemical-resistant mortars and grouts, approved for use indicated by manufacturers of both mortar/grout and sealant and with chemical-resistance properties equivalent to mortar/grout.
- F. Available Products: Subject to compliance with requirements, products which may be incorporated into the Work include, but are not limited to, the following:
 - 1. One-Part, Mildew-Resistant Silicone Sealants:
 - a. Dow Corning 786; Dow Corning Corporation.
 - b. Sanitary 1700; GE Silicones.
 - c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
 - d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
 - e. Tremsil 600 White; Tremco, Inc.
 - 2. Multipart, Pourable Urethane Sealants:
 - a. Chem-Calk 550; Bostik.
 - b. Vulkem 245; Mameco International, Inc.
 - c. NR-200 Urexpan; Pecora Corp.
 - d. THC-900; Tremco, Inc.

2.08 CEMENTITIOUS BACKER UNITS

- A. Provide cementitious backer units complying with ANSI A118.9, of thickness and width indicated below, and in maximum lengths available to minimize end-to-end butt joints.
 - 1. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
 - 2. Thickness: 5/8 inch (15.9 mm), where indicated.
 - 3. Width: 48 inches (1219 mm).
- B. Products: Subject to compliance with requirements, provide one of the following products:
 - 1. The Original Wonderboard; Custom Building Products.
 - 2. Wonderboard Multi + Board; Custom Building Products.
 - 3. DomCrete Cementitious Tile-Backer Board; Domtar Gypsum.
 - 4. DUROCK Cement Board; United States Gypsum Co.

2.09 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: White-zinc-alloy terrazzo strips, 1/8 inch (3.2 mm) wide at top edge with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.
- C. Temporary Protective Coating: Provide product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; is compatible with tile, mortar, and grout products; and is easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as a temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

2.11 ADHESIVE MATERIALS

- A. Organic adhesive: ANSI/TCA A136.1, Type 2 silicone, rubber or latex thinset bond type.

2.12 MANUFACTURERS – TILE AND GROUT

- A. L & M Construction Chemicals
- B. Custom Building Products/Polyblend
- C. U.S. Grout
- D. Master Builders
- E. Approved Equal

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
 1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent adhesion or staining of exposed tile surfaces by grout, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating them with a continuous film of temporary protective coating indicated below, taking care not to coat unexposed tile surfaces:
 1. Petroleum paraffin wax, applied hot.
 2. Grout release.
 3. Petroleum paraffin wax or grout release.

3.03 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- H. Grout tile to comply with the requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.
 - 2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.
 - 3. For chemical-resistant furan grouts, comply with ANSI A108.8.
- I. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.04 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 INSTALLATION – THINSET METHOD

- A. Install adhesive, tile and grout. Handbook for Ceramic Tile Installation, Handbook Number F113-12 for slab-on-grade and F122-12 for all above grade slabs.
- B. Request tile pattern from Architect/Engineer. Do not interrupt tile pattern around openings.
- C. Place thresholds edge strips at exposed tile edges as indicated on Drawings.
- D. Apply clear sealer to grout joints.

3.06 INSTALLATION – MUD SETTING BED METHOD

- A. Install adhesive, tile and grout. Handbook for Ceramic Tile Installation, Handbook Number F114-12 for slab-on-grade and F121-12 for all above grade slabs.

- B. Request tile pattern from Architect/Engineer. Do not interrupt tile pattern around openings.
- C. Place thresholds edge strips at exposed tile edges as indicated on Drawings.
- D. Apply clear sealer to grout joints.

END OF SECTION

SECTION 09511
ACOUSTICAL PANEL CEILINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section includes ceilings composed of acoustical panels and exposed suspension systems.

1.03 RELATED SECTIONS

- A. Division 9 Section "Gypsum Wall Board."

1.04 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Coordination drawings for reflected ceiling plans drawn accurately to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching suspension system hangers to building structure.
 - 3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 - 4. Minimum Drawing Scale: 1/4 inch = 1 foot.
- D. Samples for initial selection in the form of manufacturer's color charts consisting of actual acoustical panels or sections of panels and sections of suspension system members showing the full range of colors, textures, and patterns available for each ceiling assembly indicated.
- E. Samples for verification of each type of exposed finish required, prepared on samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 - 1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
 - 2. Full-size samples of each acoustical panel type, pattern, and color.
 - 3. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.
- F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- G. Product test reports from a qualified independent testing agency that are based on its testing of current products for compliance of acoustical panel ceilings and components with requirements.
- H. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that show compliance of acoustical panel ceilings and components with the building code in effect for the Project.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
 - 1. Fire-response tests are performed by a qualified testing and inspecting agency. Qualified testing and inspecting agencies include Underwriters Laboratories (UL), Warnock Hersey, or another agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
 - 2. Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
 - 3. Acoustical panel ceilings indicated are identical in materials and construction to those tested for fire resistance per ASTM E 119.
 - 4. Fire-resistance-rated, acoustical panel ceilings are indicated by design designations listed in the UL "Fire Resistance Directory," in the Warnock Hersey "Certification Listings," or in the listing of another qualified testing and inspecting agency.
 - 5. Products are identified with appropriate markings of applicable testing and inspecting agency.
- C. Single-Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling panel from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
 - 1. Obtain both acoustical panels and suspension system from the same manufacturer.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.07 PROJECT CONDITIONS

- A. Space Enclosure and Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

1.08 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition assemblies (if any).

1.09 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 2.0 percent of amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Available Products: Subject to compliance with requirements, acoustical panels that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Non-Fire-Resistance-Rated, Water-Felted, Mineral-Base Panels:
 - a. Type A
 - (1) Cirrus tegular, 2'-0" x 2'-0" x ¾" model number 584; Armstrong World Industries, Inc.
 - (2) Eclipse Clima Plus, model # 76775, USG Corporation
 - b. Type B
 - (1) Cirrus tegular, 2'-0" x 4'-0" x ¾", model number 535; Armstrong World Industries, Inc.
 - (2) Eclipse Clima Plus, model # 78975, USG Corporation
 - c. Type C
 - (1) Cirrus Second Look II tegular, 2'-0" x 4'-0" x ¾", scored to 2'-0" x 2'-0", model number 513, Armstrong World Industries, Inc.
 - (2) USG Corporation equal
 - d. Type D
 - (1) Clean Room Ultima, 2'-0" x 4'-0" x 1", model number 3115; Armstrong World Industries, Inc.

- (2) Mars Clima Plus weathcare ceiling panels, model #88189,
USG Corporation

2.02 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring Noise Reduction Coefficient (NRC): Type E-400 [plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from the test surface] per ASTM E 795.
 2. Test Method for Ceiling Attenuation Class (CAC): Where acoustical panel ceilings are specified to have a CAC, provide units identical to those tested per ASTM E 1414 by a qualified testing agency.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Where appearance characteristics of acoustical panels are indicated by reference to ASTM E 1264 pattern designations and not to manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Panel Characteristics: Comply with requirements indicated on each Acoustical Panel Ceiling Product Data Sheet at the end of this Section, including those referencing ASTM E 1264 classifications.

2.03 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.
1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
1. Cast-In-Place and Postinstalled Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attachment of hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing per ASTM E 488, conducted by a qualified testing agency.
 - a. Type: Cast-in-place anchors.
 - b. Type: Expansion anchors.
 - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 alloy 304 or 316 for bolts; alloy 304 or 316 for anchor.
 2. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or

other accessory devices for attachment of hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing agency.

- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
 - 2. Nickel-Copper Alloy Wire: ASTM B 164, nickel-copper alloy UNS N04400.
 - 3. Size: Select wire diameter so that its stress at 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
- E. Hanger Rods: Mild steel, zinc coated, or protected with rust-inhibitive paint.
- F. Flat Hangers: Mild steel, zinc coated, or protected with rust-inhibitive paint.
- G. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide, formed with 0.0396-inch-(1-mm) thick galvanized-steel sheet complying with ASTM A 446, G 90 (ASTM A 446M, Z 275) Coating Designation, with bolted connections and 5/16-inch- (8-mm) diameter bolts.
- H. Sheet-Metal Edge Moldings and Trim: Type and profile indicated, or if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. For lay-in panels with reveal edge details, provide stepped-edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
 - 3. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.
 - 4. Baked-Enamel Finish: AA-C12C42R1x [Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel according to paint manufacturer's specifications for cleaning, conversion coating, and applying organic coating.
 - a. Organic Coating: Manufacturer's standard thermosetting coating system with a minimum dry film thickness of 0.8 to 1.2 mil ((0.0203 to 0.0305 mm)).
 - b. Color: As selected by Architect from manufacturer's standard colors.
 - c. Color: Match color of finish on flanges of suspension system surfaces.
 - d. Color: Match Architect's sample.
 - 5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering aluminum accessories that may be incorporated in the Work include, but are not limited to, the following:
 - a. Fry Reglet Corporation.
 - b. Gordon, Inc.
 - c. MM Systems, Inc.

- I. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For interior ceilings composed of acoustical panels weighing less than 1 lb per sq. ft. (4.88 kg per sq. m), provide hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
- J. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system design to absorb impact forces against acoustical panels.

2.04 NON-FIRE-RESISTANCE-RATED, DIRECT-HUNG SUSPENSION SYSTEMS

- A. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from prepainted or electrolytic zinc-coated, cold-rolled steel sheet, with prefinished 15/16-inch- wide metal caps on flanges; other characteristics as follows:
 - 1. Face Design: Flush capped faces without slot or reveal, with device built into runners to center panels in openings.
 - 2. Structural Classification: Intermediate-duty system.
 - 3. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 - 4. Cap Material and Finish: Steel sheet painted white.
- B. Available Products: Subject to compliance with requirements, suspension systems that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Narrow-Face, Capped, Double-Web, Steel Suspension Systems with Flush Face:
 - a. Prelude ML 15/16" Exposed Tee System ; Armstrong World Industries, Inc.
 - b. Prelude XL 15/16" Exposed Tee System; Armstrong World Industries, Inc.
 - c. Centricitee DXT 24 System; USG Interiors, Inc.
 - d. Centricitee DXT 26 System; USG Interiors, Inc.
 - e. Centricitee DXTA 24 System; USG Interiors, Inc.
 - f. Temptra 4000; Chicago Metallic Corporation.

2.05 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:
 - 1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90.
 - 2. Product has flame-spread and smoke-developed ratings of less than 25 per ASTM E 84.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
- C. Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
 - b. SHEETROCK Acoustical Sealant; United States Gypsum Company.

2. Acoustical Sealant for Concealed Joints:
 - a. BA-98; Pecora Corp.
 - b. Tremco Acoustical Sealant; Tremco, Inc.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
 1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.
- B. Measure each ceiling area and establish the layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans.

3.03 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's instructions and CISCA "Ceiling Systems Handbook."
 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
 2. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
 3. CISCA Recommendations for Acoustical Ceilings: Comply with CISCA "Recommendations for Direct-Hung Acoustical Tile and Lay-In Panel Ceilings."
 4. CISCA Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies."
 5. U.B.C. Standard for Ceiling Suspension Systems: U.B.C. Standard No. 47-18.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Splay hangers only where required, and if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of 3 tight turns. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 7. Secure bracing wires to ceiling suspension members and to supports with a minimum of 4 tight turns. Fasten bracing wires to concrete with cast-in-place or postinstalled anchors.
 8. Do not support ceilings directly from permanent metal forms. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
 9. Do not attach hangers to steel deck tabs.
 10. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 11. Do not attach hangers to rated membrane projecting the structure.
 12. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise shown; and provide hangers not more than 8 inches (200 mm) from ends of each member.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not over 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.18 mm in 3.66 m). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. In the manner indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to long axis of space.
 - c. Install panels with pattern running in one direction parallel to short axis of space.
 - d. Install panels in a basket-weave pattern.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

4. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
5. Paint the cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated and in areas required by governing regulations, or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.
7. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: A qualified independent testing agency employed and paid by Owner will perform field quality-control services.
- B. Extent and Testing Frequency: Testing will take place in successive stages in areas of extent described below. Do not proceed with installation of acoustical panel ceilings until test results for previously installed hangers show compliance with requirements.
 1. Extent of Each Test Area: When the installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 2. Within each test area, testing agency will select 1 of every 10 powder-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select 1 of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 3. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 consecutively pass, and then will resume initial testing frequency.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace those fasteners and anchors that test results indicate do not comply with requirements.

3.05 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

**SECTION 09512
RESILIENT BASE AND ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient stair accessories (enclosed stairs only).
 - 3. Resilient molding accessories.
- B. Related Sections:
 - 1. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.
 - 2. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

- C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Provide products as indicated on interior design drawings.

2.2 RESILIENT STAIR ACCESSORIES

- A. Resilient Stair Treads:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Endura Rubber Flooring; Division of Burke Industries, Inc.
 - c. Estrie Products International; American Biltrite (Canada) Ltd.
 - d. Flexco, Inc.
 - e. Johnsonite.
 - f. Mondo Rubber International, Inc.
 - g. Musson, R. C. Rubber Co.
 - h. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - i. PRF USA, Inc.
 - j. R.C.A. Rubber Company (The).
 - k. Roppe Corporation, USA.
 - l. VPI, LLC; Floor Products Division.
- B. Resilient Stair Treads Standard: ASTM F 2169.
 - 1. Material Requirement: Type TP (rubber, thermoplastic).
 - 2. Surface Design:
 - a. Class 1, Smooth (flat).
 - 3. Manufacturing Method: Group 2, tread with contrasting color for the visually impaired.
- C. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
- D. Nosing Height: 1-1/2 inches.
- E. Thickness: 1/4 inch and tapered to back edge.
- F. Size: Lengths and depths to fit each stair tread in one piece.

- G. Risers: Smooth, flat, toeless, height and length to cover risers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
 - 1. Thickness: 0.125 inch.
- H. Stringers: Of same thickness as risers, height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- I. Colors and Patterns: As selected by Architect from full range of manufacturer's standard and premium colors or as indicated on interior design documents.

2.3 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. R.C.A. Rubber Company (The).
 - e. Roppe Corporation, USA.
 - f. VPI, LLC; Floor Products Division.
- B. Description: Carpet edge for glue-down applications, nosing for resilient floor covering, reducer strip for resilient floor covering, transition strips.
- C. Material: Rubber.
- D. Profile and Dimensions: As indicated.
- E. Colors and Patterns: As selected by Architect from full range of manufacturer's standard and premium colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic- cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: Not more than 50 g/L.
 - b. Rubber Floor Adhesives: Not more than 60 g/L.
- C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

- E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

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

- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION

**RESILIENT BASE
SECTION 09512 -5**

10/12/2017

**SECTION 09650
RESILIENT FLOORING**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of contract, including General and Special conditions and Division 1 specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

- A. Provide and install vinyl composition tile, vinyl plank, rubber base and vinyl reducers, and special flooring as indicated on drawings. Include all accessories necessary to provide a complete installation.
- B. Locations for resilient flooring are indicated on drawings.

1.03 SUBMITTALS

- A. Manufacturer's product data for each product to be provided, including installation information.
- B. Provide a minimum of two samples of each of the following for approval:
 - 1. 3 X 3 inch section of specified tile(s),
 - 2. 3 inch section of vinyl base and vinyl reducer in manufacturer's full range of standard colors.
 - 3. All transition materials:
 - a) VCT to sealed concrete

1.04 DELIVERY AND STORAGE OF MATERIALS

- A. Manufacturer's product data for each product to be provided, including installation information.
- B. Maintain a temperature of not less than 70°F or more than 90°F in building day and night while the tiles are being installed and for a period of at least 48 hours before installation and 48 hours after installation.
- C. Install materials only when weather conditions are favorable for such work and when weather conditions are within the limits of the manufacturer's recommendations.

1.05 EXTRA STOCK

- A. Attic Stock – Provide the following:
 - a. VCT – 1 unopened carton of each color and type.
 - b. Vinyl plank flooring – 1 unopened carton of each color and type.
 - c. Sheet flooring – 120 sqft of each type and color used.
 - d. Rubber base – 1 unopened carton of each type and color
 - e. Rubber accessories – 50 linear feet (15 meters)
 - f. Rubber stair treads – 10 each of each color and type.

PART 2 - PRODUCTS**2.01 VINYL COMPOSITION TILE**

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include:
 - 1. Armstrong
 - 2. Johnsonite
 - 3. Tarkett
 - 4. Mannington
 - 5. Approved Equal
- B. Description
 - 1. Vinyl composition tile to be installed in rotated square pattern with tile centered on room, or as indicated on drawings.
 - 2. Flame Spread/Smoke Density:
 - a) ASTM E 648 – Class 1
 - b) ASTM E 662 – Less than 450
 - c) Critical radiant flux .45 watts/sq. cm
 - 3. Colors: refer to schedule

2.02 VINYL PLANK FLOORING

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include
 - 1. Patcraft
 - 2. Karndean
 - 3. Amtico
- B. Description
 - 1. PVC resin compound with high quality plasticizers and stabilizers.

2.03 VINYL BASE:

- A. Provide vinyl base, as scheduled with matching end stops and pre-formed corners. Base material to be roll goods.
 - 1. Manufacturers:
 - a) Johnsonite
 - b) Roppe
 - c) Allstate
 - d) Burke
 - e) Armstrong
 - f) Approved Equal
- B. Colors: refer to schedule

2.05 ADHESIVES

- A. Water resistant adhesives standard with manufacturer to secure tile to concrete floor, cove base to CMU and gypsum wallboard walls and stair accessories to surfaces required.
- B. Adhesives shall be non-flammable, non-toxic and waterproof.

2.06 TILE REDUCERS

- A. Solid vinyl, 1" x 1/8" with beveled edge.
- B. Colors to be match selected vinyl base.

PART 3 - EXECUTION**3.01 GENERAL**

- A. Do not begin installation of flooring until the work of all other trades, including painting, has been completed.
- B. Sweep surfaces to receive tile clean, and free from moisture, paint, oil or wax. Fill all cracks, rough areas and other surface defects in concrete floor with suitable plastic materials. Do not begin laying tile until other work, including painting, has been completed. Make certain that all surfaces over, which tile is to be laid are perfectly smooth, level and dry.

3.02 LAYING RESILIENT MATERIALS

- A. Tile and base shall be installed by experienced craftsmen in strict accordance with the instructions of the manufacturer.
- B. Maintain a temperature between 70°F and 90°F for 48 hours before, during and 48 hours after laying tile.
- C. Lay out the tile in each area so that the borders will not be more than nine inches (9") or less than four and one-half inches (4-1/2") wide. Start laying tile at room center and work toward the walls, adjusting the border as required by the run of the tile and scribing borders to walls and partitions after applying the field tiles. Lay all tile so as to be true, level and even with tight, straight joints. Provide a vinyl finishing edge at doors without thresholds.
- D. Direction of each color of vinyl tile to be consistent within scope of pattern.
- E. Perform all necessary cutting and fitting of flooring at all door openings. Provide tile reducers where edges of tile are exposed, and wherever tile floor coverings join another material.
- F. Install base in strict accordance with manufacturer's instructions. Make all joints neat and tight with adjacent pieces forming a plane surface.

3.03 VCT - CLEANING AND WAXING

- A. Follow manufacturer's recommendations for cleaning and waxing.
- B. After laying tile, floor shall be thoroughly cleaned of all cement spots, dirt, and other soiling and left in perfectly clean condition. Spots shall be removed by means of a putty knife and steel wool, or by a cloth moistened with a neutral soap of a type approved by tile manufacturer.
- C. Use of solvents, and wet mopping and washing is prohibited.

- D. VCT shall be waxed with a high-quality commercial floor polish with a percent of solids level usually between 16% and 22%, such as Armstrong S-480 Commercial Floor Polish.

3.04 EXTRA STOCK

- A. Furnish and deliver in the manufacturer's packing, amounts as required under Section 01730, Project Closeout Submittals.

END OF SECTION

**SECTION 09652
RESILIENT SHEET FLOORING (FLOTEX®)**

PART 1 - GENERAL**1.01 SUMMARY**

- A. Section Includes: Resilient Sheet Flooring
 - 1. Flotex® [Calgary] [Journeys] [Metro] [Vision] Flooring, Adhesive Installation, Sanitized® Treatment
 - 2. Flotex® [Calgary] [Journeys] [Metro] [Vision] Flooring, Adhesive and Flash Cove Installation, Sanitized® Treatment
 - 3. Forbo Flooring Systems Resilient Base
 - 4. Forbo Flooring Systems Resilient Transition Accessories
- B. Related Sections: Section(s) related to this section include:
 - 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 2. Wood Subflooring: Refer to Division 6 Carpentry Section for wood subflooring and wood underlayment.
 - 3. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.
 - 4. Expansion Joint Covers: Refer to Division 10 Specialties Section for expansion joint covers to be used with resilient flooring.

1.02 REFERENCES

- A. Forbo Installation Guide
- B. Forbo Floor Care Guide
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM F 1861 Standard Specification for Resilient Wall Base.
 - 2. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - 3. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 - 4. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 5. ASTM F 1482 Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.
 - 6. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 7. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 8. ASTM E 492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine.
 - 9. 1 E 989 Standard Classification for Determination of Impact Insulation Class (IIC)

- D. National Fire Protection Association (NFPA):
 - 1. NFPA 253 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 2. NFPA 258 Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- E. Standards Council of Canada
 - 1. CAN/ULC S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with "Conditions of the Contract" and Division 1 Submittal Procedures Section.
- B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit selection and verification samples for finishes, colors, and textures.
- E. Quality Assurance Submittals: Submit the following:
 - 1. Manufacturers Technical Data: Manufacturers document specifying performance characteristics and criteria, and physical requirements.
 - 2. Manufacturer's Instructions: Manufacturer's installation instructions.
 - 3. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- F. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - 1. Must be a Forbo Certified Installer.
 - 2. Proof of valid certification must be submitted to the GC and verified by Forbo Flooring Systems prior to the start of the project.

3. The Forbo Certified Installer must manage and be on site during installation at all times.
 4. Certificate: Submit certificate indicating installer qualifications for project. This project requires a [Forbo Associate Mechanic for standard installations] [Forbo Master Mechanic for complex installations].
- B. Regulatory Requirements:
1. Fire Performance Characteristics: Provide resilient linoleum sheet flooring with the following fire performance characteristics as determined by testing products in accordance with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Critical Radiant Flux: Class 1 Rating per NFPA 253 (ASTM E 648) (0.45 watts/cm² or greater).
 - b. Smoke Density: Less than 450 per NFPA 258 (ASTM E 662).
- C. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
- D. Pre-Installation Testing: Conduct pre-installation testing as follows: bond testing, pH testing, moisture and relative humidity testing.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
1. Material should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational, controlled and set at a minimum of 68° F (20° C) for at least 48 hours prior to the installation.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations, areas to receive flooring should be clean, fully enclosed and weathertight. The permanent HVAC must be fully operational, controlled and set at a minimum of 68° F (20° C) for a minimum of seven days prior to, during, and seven days after the installation. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring, and for final inspection.

- B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
 - 1. Temperature Conditions: 68° F (20° C) for a minimum of seven days prior to, during, and seven days after the installation.
- C. Existing Conditions: [Specify existing conditions affecting product use and installation.]
- D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.08 SEQUENCING AND SCHEDULING

- A. Finishing Operations: Install flooring after finishing operations, including painting and ceiling operations, have been completed.
- B. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by resilient flooring manufacturer's recommended bond testing, moisture testing, and pH testing.
 - 1. Flooring Contractor assigned to report responsibility back to owner/architect.

1.09 WARRANTY

- A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 - 1. Warranty Period: Ten (10) year limited warranty commencing on Date of Substantial Completion.

1.10 MAINTENANCE

- A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals (Maintenance Materials) Section.
 - 1. Quantity: Furnish quantity of flooring units equal to 10% of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 – PRODUCTS

2.01 FLOTEX® RESILIENT SHEET FLOORING

- A. Manufacturer: Forbo Flooring, Inc.
 - 1. Contact: Forbo Flooring, Inc.
P.O. Box 667
Hazleton, PA 18202
Telephone (800) 842-7839 or (570) 459-0771

2. Fax (570) 450-0258
 3. Representative Contact: Kris Keller, (407) 405-4904
- B. Proprietary Product(s): Flotex® Resilient Sheet and Adhesive
1. Description: Flocked textile sheet floor covering has 100% nylon type wear layer with an intermediate fiberglass layer and a closed cell vinyl cushioned base.
 2. Width: 6'-0"
 3. Length: 98.0 Linear Feet
 4. Gauge: 4.3mm
 5. Backing: Closed Cell Vinyl Cushioned Backing
 6. Pattern and Color: See Interior Design Finish Schedule.
 7. Adhesive: Eurosafe Special 540
- C. Product Criteria Forms: Refer to Product Criteria Forms as an attachment to this section.
1. Product Forms: Subject to compliance with specified requirements, provide products specified in each Technical Data Sheet.

2.02 RELATED MATERIALS

- A. Related Materials: Refer to other sections for related materials as follows:
1. Underlayment and Patching Compound: Refer to Division 3 Concrete Sections for Portland cement based underlayments and patching compounds.
 2. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient flooring accessories.
 3. Expansion Joint Covers: Refer to other specification section for expansion joint covers to be used with resilient flooring.

2.03 SOURCE QUALITY

- A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART 3 – EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (bond testing, pH testing, calcium chloride testing, relative humidity testing, etc.).
- B. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed and shall not be considered as a legitimate claim.

3.03 PREPARATION

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Surface Preparation:
 - 1. General: Prepare floor substrate in accordance with manufacturer's instructions.
 - 2. Floor Substrate: Floors shall be sound, smooth, flat, permanently dry, clean, and free of all foreign materials including, but not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue.
 - 3. Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3,000 psi. Refer to Division 3 Concrete sections for patching and repairing crack materials and leveling compounds with Portland cement based compounds.
 - a. Reference Standard: Comply with the latest version of ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- C. Concrete Moisture Testing: Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with the latest version of ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with the latest version of ASTM F 2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. Concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo FRS 885 adhesive. Concrete internal relative humidity must not exceed 85% when using Forbo FRS 885 adhesive. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.
- D. Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. The surface pH of concrete slabs must not exceed a pH of 10. Concrete substrates with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.
- E. Wood Subfloors: Wood floors should be double construction with a minimum total thickness of 1 inch. Wood floors must be rigid, free from movement and have at least 18" of well-ventilated air space below. Forbo floor coverings should not be installed over wooden subfloors built on sleepers over on or below grade concrete floors without first making sure that adequate precautions have been taken to ensure the structural integrity of the system, and to prevent moisture migration from the concrete slab.
 - 1. Refer to Division 6 Carpentry sections for wood subfloor construction.
 - 2. Reference Standard: Comply with the latest version of ASTM F 1482 Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

3.04 INSTALLATION

- A. Material Installation: Roll out the material with top surface up. All arrows on the back must point in the direction of the main natural light source whenever possible, never

away from the light source. Trim off any damaged edges. If not damaged, butt all factory edges while maintaining the pattern repeat. Apply adhesive and lay sheet flooring into semi-wet adhesive and roll with a 75 pound three section roller in both directions and repeat as necessary to ensure adequate transfer of adhesive to the backing.

- B. Adhesive Installation: Use trowel as recommended by flooring manufacturer for specific adhesive (1/16" x 1/16" x 1/16" square notch trowel). Spread rate is approximately 125 ft²/gallon.
- C. [Flash Cove Installation: Extend flooring up the wall in a flash-coved method to a height of [4] [6] inches ([102] [152] mm), as indicated.]
- D. Installation Techniques:
 - 1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 - 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 - 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 - 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 - 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 - 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 - a. Use adhesive applied to substrate in compliance with manufacturer's recommendations, including those for mixing, trowel notch, and adhesive open and working times.
 - 7. Roll resilient flooring as required by resilient flooring manufacturer.
- E. Finish Flooring Patterns: As selected by Architect.

3.05 FIELD QUALITY REQUIREMENTS

- A. Manufacturer's Field Services: Upon Owner's request and with at least 72 hours' notice, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
 - 1. Site Visits: [Specify number and duration of periodic site visits.]

3.06 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
 - 1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.

2. Vacuum floor after installation per manufacturer's recommendations.
3. Spot clean using the "Scrape, Scrub, and Rinse" procedures per the manufacturer's recommendations.

3.07 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.08 INITIAL MAINTENANCE PROCEDURES

- A. General: Include in Contract Sum Amount cost for initial maintenance procedures, and execute procedures after flooring installation as recommended by flooring manufacturer.
- B. Initial maintenance to be conducted by awarded Flooring Contractor using a Certified Forbo Floor Care Technician.

END OF SECTION

**SECTION 09655
CARPETING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Tufted carpet
- B. Public area carpet (i.e. corridors, lobbies, office, etc.) shall be furnished by the Owner. Contractor is responsible for delivery, inspection, storage and installation, including all installation materials. Carpet is custom pattern and colors. Installation drawings shall be provided. See interior design documents.
- C. Related Requirements:
 - 1. Division 09 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.04 ACTION SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
 - 1. Carpet: For each type indicated include manufacturer's written data on physical characteristics, durability, and fade resistance.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
 - 2. Pattern type, repeat size, location, direction, and starting point.
 - 3. Pile direction.
 - 4. Type, color, and location of insets and borders.
 - 5. Type, color, and location of edge, transition, and other accessory strips.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on interior design documents and in schedules.

1. Carpet: 12-inch square Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.
 3. Carpet Seam: 6-inch Sample.
 4. Mitered Carpet Border Seam: 12-inch square Sample. Show carpet pattern alignment.
- D. Product Schedule: For carpet. Use same designations indicated on interior design documents.

1.05 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For carpet, for tests performed by a qualified testing agency.
- B. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who is certified by the International Certified Floorcovering Installers Association at the Master II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet identical to those of assemblies tested for fire response per NFPA 253 by a qualified testing agency.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockups at locations and in sizes shown on interior design drawings.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, and delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS**2.01 TUFTED CARPET**

- A. Provide manufacturers and products as indicated in interior design documents.

2.02 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
 - 1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use adhesives that comply with the product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet [cushion] manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.03 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

3.04 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION

**SECTION 09688
CARPET-GLUE DOWN**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. This section includes the provision and installation of all materials, equipment and incidentals necessary and/or required for a complete installation of the following items as specified herein, including, but not limited to, the following:
1. Carpeting glue down method, carpet cushion and accessories

1.03 REFERENCES

- ANSI/ASTM 648 Critical Radiant Flux of Floor Covering Systems Using a Radiant HeatEnergy Source
- ASTM D5848 Standard Test Method for Mass per unit area of pile
- ASTM D6859 Test method for pile thickness
- ASTM D3936 Standard Test Method for resistance to delamination of the secondary backing.
- ASTM D1335 Standard Test Method for tuft bind.
- ASTM E662 Standard Test Method for specific optical density of smoke generated by solid materials.
- ASTM D2859 Methenamine Pill Test
- AATCC16 Color fastness to light
- AATCC164 Color fastness to oxides of nitrogen
- AATCC165 Color fastness to crocking
- AATCC171 Cleaning of hot water extraction method
- ASTM D5417 Standard Practice for operating of the Vetterman Drum Tester.
- ASTM D5116 Standard guide for small scale environmental chamber organic emissions

1.04 RELATED SECTIONS

- A. Division 3 sections for curing compounds and other concrete treatments compatible with carpet and carpet cushions.
- B. Division 6 sections for rough carpentry
- C. Division 9 section "Resilient Wall Base and Accessories" for materials and installations.

1.05 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate seaming plan, method of joining seams, direction of carpet, and accessories.

- C. Provide product data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, dye lot, and method of installation.
- D. Submit two (2) samples, 12 x 12 inch in size, illustrating color and pattern for each carpet material specified.
- E. Submit manufacturer's installation instructions under provisions of Section 01300.

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01700.
- B. Include maintenance procedures, recommended maintenance materials and suggested schedule for cleaning and shampooing.

1.07 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in tufted carpet with three (3) years minimum experience.
- B. Installer: Company with three (3) years minimum documented experience, as approved by manufacturer.
- C. Carpet Fire-Test-Response Characteristics: Provide caret with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by U.L. or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface Flammability: Passes CPSC 16 CFR, Part 1630
 - 2. Flame Spread: 25 or less per ASTM E 84.
 - 3. Smoke Developed: 450 or less per ASTM E 84.
- D. Carpet Cushion Fire-Test-Response Characteristics: Provide carpet cushion with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by U.L. or another testing and inspecting agency acceptable to the authority having jurisdiction. Identify carpet cushion with appropriate markings of applicable testing and inspecting agency
 - 1. Surface flammability: Passes CPSC 16 CFR, Pert 1630.
 - 2. Flame Spread: 25 or less per ASTM E 84
 - 3. Smoke Developed: 450 or less per ASTM E 84.

1.08 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes for carpet flammability requirements in accordance with ASTM E84.
 - 1. Critical Radiant Flux: .22 watts/sq. cm. per NFPA 253.
 - 2. Flooring Radiant Panel: meets NFPA Class I tested under ASTM-E glue down, corridors and exits only.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three (3) days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70 degrees Fahrenheit (21 degrees Celsius) ambient temperature three (3) days prior to, during and 24 hours after installation of materials.
- C. Subfloor Moisture Conditions: Moisture emission rate of not more than 3 lb/1000 sq. ft./24 hours when tested by calcium chloride moisture test in compliance with CRI 104, 6.2.1, with subfloor temperatures not less than 55 deg. F.

1.10 EXTRA MATERIALS

- A. Provide 5% of full-width units of carpeting of each color specified, under provisions of Section 01700.

PART 2 - PRODUCTS**2.01 ACCEPTABLE CARPET MANUFACTURERS**

- A. J & J Commercial
- B. Design Weave
- C. Shaw Carpets
- D. Masland
- E. Bigelow
- F. Constantine
- G. Mannington
- H. Substitutions: Under provisions of Section 01600.

2.02 MATERIALS

- A. Carpet: Throughout this contract shall be the same type and manufacture. Carpeting shall meet minimum performance standards, refer to Interior Design drawings and specifications for exact carpeting required:
 - 1. Yarn: 100% first quality, bulk continuous filament nylon type 6,6 offering a construction standards testing program by a fiber producer. Fiber shape to have maximum Modification Ratio of 2.5 for soil release capabilities. Fiber identification to AATCC 20.
 - 2. Static Control: By permanent means (i.e. antistatic filaments) and without chemical treatment, static generation below 3.5 kilovolts. Electrostatic Propensity (Step & Scoff): AATCC 134.
 - 3. Construction: Tufted, level or multi-level loop pile with maximum height variation of 1/16 inch.
 - 4. Dye Method: 100% Solution dyed
 - 5. Pile Weight: 20 oz/yd² minimum, ASTM5848
 - 6. Pile Density: Minimum 6200 for moderate to heavy traffic pile density = 36X pile wt(oz./sq yd)/ pile thickness (inches) (Pile thickness: ASTM D6859)

7. Primary Backing: Polypropylene
8. Secondary Backing: Woven polypropylene/latex
9. Delamination of Secondary Backing: ASTM D3936, 4.0 lbs/inch
10. Tuft Bind: ASTM D1335 minimum 10 lbs force
11. Flammability: ASTM 648, Class II, >0.22 watts/cm² critical radiant flux and/or federal, state or local requirements. Smoke Density: ASTM E662, Rating to be less than 450 Dm in flaming mode (or to State Code). Must meet Federal Flammability standard CPSC FF 1-70 (Methenamine Pill test ASTM D2859)
12. Colorfastness to Light: AATCC 16 part 3, 160 AFUs. Minimum rating of 3-4 using AATCC Gray Scale for Color Change.
13. Colorfastness to atmospheric contaminants: AATCC 164 (oxides of nitrogen) & AATCC 129 (ozone) for 2 cycles, AATCC Gray Scale for Color Change rating min 3.
14. Colorfastness to crocking: AATCC 165, minimum rating of 4 on AATCC Chromatic Transference Scale.
15. Stain Resistance – AATCC 171 for 2 HWE to simulate removal of topical treatments by hot water extraction, followed by AATCC 175. Minimum rating of 6 using AATCC Red 40 Stain Scale.
16. Soil Resistance: protective anti-soil treatment heat applied by carpet manufacturer.
17. Coloration: Minimum 3 color hues, and hue values to be in optimum light reflectance ratings for soil hiding enhancement.
18. Appearance Retention – Vetterman Drum ASTM D5417 for 22,000 cycles. A minimum rating of 3.0 using CRI-3 Loop Pile Reference Scale. Testing without underpad or brushing.
19. Indoor Air Quality – maximum 0.5 mg/m²hr total VOC emission, ASTM D5116.
20. Recycling: New carpet – must be eligible for recycling by the supplying mill or fiber producer within an existing program; submit program parameters.
21. Existing Used Carpet – the currently installed used carpet may not go to landfill but must be diverted to an industry reclamation program. Submit program parameters.

2.03 ACCESSORIES

- A. Sub-floor Filler: type recommended by carpet manufacturer.
- B. Primers and Adhesives: of types recommended by carpet manufacturer.
 1. Water resistant, mildew resistant, non-staining type to suit products and subfloor conditions indicated and to comply with flammability requirements for installed carpet as recommended by carpet manufacturer.
- C. Edge Strips: 1-1/2: type, hammered brass or equal
- D. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8" in 10 feet and are ready to receive work.
- B. Verify concrete floors are dry to a maximum moisture content of seven (7) percent; and exhibit negative alkalinity, carbonization of dusting.
- C. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- B. Apply, trowel and float filler to leave smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Vacuum floor surface.

3.03 INSTALLATION

- A. Apply carpet and adhesive in accordance with manufacturer's instructions.
- B. Lay out rolls of carpet for approval.
- C. Verify carpet matches before cutting to ensure minimal variation between dye lots.
- D. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true and unfrayed.
- E. Locate seams in area of least traffic.
- F. Fit seams straight, not crowded or peaked, free of gaps.
- G. Lay carpet on floors with run of pile in same direction as anticipated traffic. Lay carpet on stairs with the run of the pile in opposite direction of anticipated traffic to avoid peeking of backing at nosings.
- H. Do not change run of pile in any room where carpet is continuous through a wall opening in to another room. Locate change of color or pattern between rooms under door centerline.
- I. Cut and fit carpet around interruptions.
- J. Fit carpet tight to intersection with vertical surfaces without gaps.

3.04 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean and vacuum carpet surfaces.

3.05 PROTECTION

- A. Prohibit traffic from carpet areas for 24 hours after installation.

3.06 SCHEDULE

- A. All carpet to be supplied and installed by Contractor.
- B. Refer to schedule provided by Architect or Interior Designer.

END OF SECTION

**SECTION 09912
INTERIOR PAINTS AND COATINGS**

PART 1 - GENERAL**1.1 SECTION INCLUDES**

- A Interior paint and coatings systems including: paint, stains, transparent coatings, and opaque finishes

1.2 RELATED SECTIONS

- A Division 1 - General Data
- B Division 3 - Concrete
- C Division 4 - Metal, Primer and Coatings
- D Division 6 - Architectural Wood and Plaster Coating
- E Division 8 – Doors and Windows

1.3 REFERENCES

- A SSPC-SP 1 - Solvent Cleaning
- B SSPC-SP 2 - Hand Tool Cleaning
- C SSPC-SP 3 - Power Tool Cleaning
- D SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete

1.4 SUBMITTALS

- A Submit under provisions of Section 01300 Submittals
- B Product Data: Manufacturer's data sheets on each paint and coating product should include:
 - 1 Product characteristics
 - 2 Surface preparation instructions and recommendations
 - 3 Primer requirements and finish specification
 - 4 Storage and handling requirements and recommendations
 - 5 Application methods
 - 6 Cleanup Information
- C Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.
- D Coating Maintenance Manual: upon conclusion of the project, the Contractor or paint manufacture/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area

Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MOCK-UP

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

- A Finish surfaces for verification of products, colors, & sheens
- B Finish area designated by Architect
- C Provide samples that designate prime & finish coats
- D Do not proceed with remaining work until the Architect approves the mock-up samples

1.6 DELIVERY, STORAGE, AND HANDLING

- A Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacture's name, label, and the following list of information:
 - Product name and type (description)
 - Application & use instructions
 - Surface preparation
 - VOC content
 - Environmental handling
 - Batch date
 - Color number
- B Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- C Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A Preferred Manufacturer:
 - 1. Sherwin Williams: www.sherwin-williams.com
 - 2. Benjamin Moore & Co: www.benjaminmoore.com
 - 3. PPG Paint: www.ppg.com
 - 4. MDC: www.mdcwall.com

2.2 APPLICATION/SCOPE

- A Use this article to define the scope of painting if not fully defined in a Finish Schedule or on the drawings. This article must be carefully edited to reflect the surfaces actually found on the project. In some cases, it may be enough to use the first paragraph that says, in effect, "paint everything" along with a list of items not to paint, without exhaustively defining all the different surfaces and items that must be painted.
- B If the project involves repainting some but not all existing painted surfaces, be sure to indicate the extent of the repainting.
- C The descriptions of each system can also be used to further refine the definition of what is to be painted, stained, or clear finished.
- D Surfaces to Be Coated:
 Concrete: Poured, Precast, Tilt-Up, Cast-In-Place, Cement Board, Plaster
 Concrete: Floors
 Masonry: (CMU - Concrete, Split Face, Scored, Smooth, etc.)
 Metal: Aluminum/ Galvanizing
 Metal Ferrous: (Structural Steel, Joists, Trusses, Beams, Partitions, etc.)
 Wood: Walls, Ceilings, Doors, Trim, etc.
 Wood: Floors-Painted
 Drywall: Drywall board, Gypsum board

2.3 SCHEDULE

- A CONCRETE - (Walls & Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place)
 - 1. Latex Systems
 - a. Low Sheen Finish
 - 1st Coat: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300 (8 mils wet, 3.2 mils dry)
 - 2nd Coat: S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series
 - 3rd Coat: S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series (4 mils wet, 1.6 mils dry per coat)
- B. CONCRETE- FLOORS (Non-Vehicular)
 - 1. Concrete Stain (Water Base)
 - a. Low Luster Finish Opaque
 - 1st Coat: S-W H&C Concrete Stain Solid Color Water Based
 - 2nd Coat: S-W H&C Concrete Stain Solid Color Water Based (50-300 sq/ft per gallon)
- C. METAL Ferrous- (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Sashes, Doors, Partitions)
 - 1. Latex Systems
 - a. Semi-Gloss Finish

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry)

2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series

3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)

D. EXTERIOR FAUX BALCONY

1. Galvanized and non-ferrous metals
 - a. Clean with paint manufacturer's recommended product.
 - 1 Coat of Pro-Cryl Universal Metal Primer, B66-310 @ 5.0-10.0 mils wet, 2.0 4.0 mils dry
 - 2 Coat of Pro Industrial Waterbased Alkyd Urethane Semi-Gloss Enamel, B53-1150 Series @ 4.0-5.0 mils wet, 1.4-1.7 mils dry per coat.

E. WOOD- (Walls, Ceilings, Doors, Trim, Partitions, Frames)

1. Latex Systems
 - a. Semi-Gloss Finish
 - 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 (4 mils wet, 1.8 mils dry)
 - 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series
 - 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)
2. Stain, Sealer & Varnish
 - a. Clear Finish
 - 1st Coat: S-W Wood Classics 250 Oil Stain, A49-800 Series Or S-W Wood Classics Interior Oil Stain, A49 Series
 - 2nd Coat: S-W Wood Classics FastDry Sanding Sealer, B26V43
 - 3rd Coat: S-W Wood Classics FastDry Varnish, Gloss or Satin, A66 Series (4 mils wet, 1.3 mils dry per coat)

F. DRYWALL (Walls, Ceilings, Gypsum Board, Plaster Board, etc.)

1. Latex Systems
 - a. Egg-Shell Finish
 - 1st Coat: S-W Harmony Interior Latex Primer, B11 Series (4 mils wet, 1.3 mils dry per coat)
 - 2nd Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series
 - 3rd Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series (4 mils wet, 1.7 mils dry per coat)
 - b. Alternate:
 - 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry)
 - 2nd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series
 - 3rd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series (4 mils wet, 1.7 mils dry per coat)
 - c. Corridors – below chair rail:
 - Egg Shell finish
 - 1 coat Promar 200 Zero VOC Primer
 - 2 coats Pro Industrial Pre-Catalyzed Waterbase d Epoxy – K45-150 Series.

G. Interior Precast Concrete Ceilings

1. Decorative spray knock-down texture.
2. Key joints shall be infilled flush with covercoat.
3. Compound by United States Gypsum Company.
4. Fill deep voids or offsets with sheet rock brand durabond joint compound.

2.4 MATERIALS - GENERAL REQUIREMENTS

A Paints and Coatings - General:

1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B Primers:

1. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.5 ACCESSORIES

A Coating Application Accessories:

1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A Do not begin application of coatings until substrates have been properly examined and prepared. Notify Architect of unsatisfactory conditions before proceeding.
- B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- D Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup.

For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority. Removal must be done in accordance with EPA Renovation, Repair and Painting Rule and all related state and local regulations. Care should be taken to

follow all state and local regulations which may be more strict than those set under the federal RRP Rule.

- A Proper product selection, surface preparation and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.
- B Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.
- C The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
- D Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry a minimum of 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- E Methods
 - 1 Aluminum
Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
 - 2 Block (Cinder and Concrete)
Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
 - 3 Concrete, SSPC-SP13 or NACE 6
This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
 - 4 Cement Composition Siding/Panels
Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.

- 5 Drywall—Interior
Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
- 6 Galvanized Metal
Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
- 7 Plaster
Must be allowed to dry thoroughly for at least 30 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
- 8 Steel: Structural, Plate, etc.
Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
- 9 Solvent Cleaning, SSPC-SP1
Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
- 10 Hand Tool Cleaning, SSPC-SP2
Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
- 11 Power Tool Cleaning, SSPC-SP3
Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
- 12 White Metal Blast Cleaning, SSPC-SP5 or NACE 1
A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
- 13 Commercial Blast Cleaning, SSPC-SP6 or NACE 3

A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

14 Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4

A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

15 Power Tool Cleaning to Bare Metal, SSPC-SP11

Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.

16 Near-White Blast Cleaning, SSPC-SP10 or NACE 2

A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

17 High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials SSPC-SP12 or NACE 5

This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

18 Water Blasting, NACE Standard RP-01-72

Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

19 Wood

Must be clean and dry. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

- A Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.

- B Do not apply to wet or damp surfaces.
 - 1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
 - 2 Test new concrete for moisture content.
 - 3 Wait until wood is fully dry.
- C Apply coatings using methods recommended by manufacturer.
- D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to the application of each coat.

3.4 PROTECTION

- A Protect finished coatings from damage until completion of project.
- B Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

**SECTION 10000
MISCELLANEOUS SPECIALTIES**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Items furnished and installed under this Section:
1. Graphics
 2. Mailboxes
 3. Closet Shelves and Rods
 4. Toilet Room Accessories
 5. Louvers

1.03 SUBMITTALS

- A. Manufacturer's data. In accordance with Section 01330, submit copies of manufacturer's specifications, rough-in diagrams, model numbers, anchorages required for each item specified herein this Section.
- B. Shop Drawings.
1. Shop drawings are required for all items requiring fabrication and/or coordination with work of other Sections. Shop drawings shall be prepared to show the actual layout of installations pertinent to the job. Standard printed sheets containing information not applicable to the job will not be acceptable.
 2. Shop drawings shall indicate construction features, rough-in requirements, and relation to work of other Sections. Verify job conditions affecting the work of this Section and obtain accurate measurements covering all parts thereof for incorporation into the shop drawings.
- C. Samples. Submit two sets of manufacturer's complete range of colors and finishes for color selection.

1.04 DELIVERY AND STORAGE

- A. Delivery. Coordinate with progress of construction. Deliver all loose fasteners, fittings, embedded items, and accessories with instructions for their proper installation. When possible, deliver after masonry, plastering and painting, and other wet work has been completed. Items and accessories shall not be delivered until Contractor and/or installer is ready to receive and inventory such items.
- B. Storage. Upon receipt at the work site, units shall be stored where directed and placed so as to make the setting drawing markings easily discernible. Material exposed to the weather during storage shall be protected with weather resistant coverings.

PART 2 - PRODUCTS**2.01 GRAPHICS**

- A. ADA requirements. All interior signs shall be in accordance with the Federal Americans with Disabilities Act (ADA). These requirements include but are not limited to the following:
1. Raised tactile lettering (1/32" min.)
 2. Grade 2 Braille
 3. Upper and lower case Sans Serif type style
 4. Tactile character height – 5/8" min., 2" max.
 5. Restrooms to have International Symbol of Accessibility graphic
 6. Non-glare finish
 7. Characters to contrast with background
 8. Mounting ht. – 60" from centerline to floor, adjacent to latch side of door.
- B. Unit Identification. Engraved laminated plastic signs and numbers as directed by Architect. Secure to buildings with corrosion resistant fasteners. Provide apartment door numbers as indicated.
- C. Room Identification. Provide engraved laminated plastic signs and numbers for mounting to walls adjacent to doors. Provide one each for rooms identified on drawings.
- D. Directional Signage. Provide engraved laminated plastics signs for mounting on walls. Provide a total or signs floor directing visitors to units and common areas.
- E. Project Sign. Sign shall be etched cedar construction as indicated. The entry sign shall have name of the facility, street address, Owner's name, Owner's logo and the HUD Equal Housing Opportunity logo. Verify sign design with Architect at shop drawing submittal.
- F. Parking Signs for Handicapped. At each handicapped parking space, provide one heavy gauge galv., bonderized steel or aluminum sign with enamel paint finish, embossed white borders, legends and symbols contrasting with bright blue background. Sign shall have screen printed image of International Symbol of Accessibility logo in accordance with ANSI A-117.1. Include 1 ¼" ht. Letters indicating "Handicapped Parking". Sign shall be 12" wide x 18" high, radius corners, installed on hot rolled steel flanged channel sign post (min. wt. 2 lb/ft). Install post in concrete, min. 8" dia. x 2 ft. deep, 2" min. concrete cover at bottom, height as required for top of sign to be 5'-0" above finish grade. Provide a sign indicating "Van Accessible" where van parking space is indicated on drawings.
- G. Stair Identification. An approved sign shall be located at each floor level landing in all enclosed stairways of buildings four or more stories in height. The sign shall indicate the floor level and the availability of roof access from that stairway and an identification of the stairway. The sign shall also state the floor level of and direction to exit discharge. The sign shall be located approximately 5 feet above the floor landing in a position which is readily visible when the door is in the open or closed position. The floor level designation shall also be tactile in accordance with Chapter 11, Florida Building Code.

2.02 MAILBOXES

- A. Furnish and install front loading mailboxes. Mailboxes shall be of design approved by US Postal Service. Mailboxes shall be equipped with sheet aluminum removable front covers strengthened with formed sheet aluminum stiffeners. Framework supporting compartment doors shall be fabricated from high strength extruded aluminum alloy.
- B. Quantity of individual mail box units shall be: 65 regular size boxes and 4 large boxes (two parcel, two out-going, two office). Each door shall have recess to accommodate a tenant's identification number tab. Tabs shall be secured by pressure-sensitive permanent adhesive. Custom marking tabs engraved with assigned apartment numbers shall be provided. The lock on each compartment shall be key type as approved by the US Postal Service. Each key shall be keyed differently from all other mailbox locks in the building as prescribed by postal regulation. Two keys shall be supplied with each lock. Acceptable manufacturers include Bommer, American Device, Florence Manufacturing and Auth.

2.03 CLOSET SHELVING AND RODS

- A. Provide for each closet a full width shelf unit and rod as follows. Manufacturer's standard ventilated shelving fabricated from cold drawn steel wire (100,000 psi tensile strength) with PVC coating (9-11 mils min.) 12" depth shelving, 1" diameter steel PVC coated hanging rod continuous for length of closet (mount ends to walls), vertical rod supports 5 ft. maximum o.c., complete with mounting hardware. Shelving wall supports shall be 24" o.c. Acceptable product is "Closetmaid" by Clarison International or approved equivalent by Schulte Corp.

2.04 TOILET ROOM ACCESSORIES

- A. Handicap grab bars: Bobrick Series, or equal, 1-1/2" O.D. color to match wall finish as selected by Architect, concealed mounting, 2-1/4": dimension from wall to center line of grab bar (1-1/2" clear), manufacturer's standard flanges and anchorage to support at least 300 pounds. Provide grab bars of sizes indicated on plans.
- B. Paper towel/Soap dispensers: One (1) for each new sink and lavatory scheduled Bobrick Series, or equal, surface mounted stainless C-Fold/multifold or plastic.
- C. Mirrors: 1/4" with copper protective back. Provide ten (10) year silvering guard meter. Provide mirrors of sizes indicated on plans.
- D. Towel bars: chrome at areas indicated on plans, size as noted.
- E. Shower curtain rods to be chrome.
- F. Refer to interior design drawings for specific model numbers and specifications for all toilet accessories.

2.05 LOUVERS

- A. Fixed louvers shall be 4" deep extruded aluminum color as selected by Architect. Painted to match adjacent surface.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Set units level, plumb, square, and true, with uniform joints. Provide concealed anchors as indicated on approved shop drawings. Seal joints, including those between units and dissimilar materials with the use of an approved sealant. All joints shall be carefully wiped immediately after applying sealant. .
- B. Cover all work exposed to soiling or damage by subsequent construction operations with non-staining, reinforced building paper. Lap and tape all joints. All items shall be accurately located, carefully plumbed and leveled, and securely and rigidly attached and reinforced as necessary. Use manufacturer's mounting devices as best suited to installation conditions, and as approved by Architect. All attachments shall be by mechanical means; cemented installations will not be accepted. Provide concealed grounds and backing as necessary.

3.02 CLEANING

- A. Just prior to final inspection, remove temporary protection and thoroughly clean work. Do not use wire brushes, acids, abrasive cleansers, or solutions which might cause discoloration or abrasion. Clean by manufacturer's recommended procedures. Touch-up finishes as necessary for proper appearance.

END OF SECTION

**SECTION 10306
FIRE EXTINGUISHER CABINETS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguishers.
 - b. Alternate cabinet styles (provide individual pricing for each).
- B. Related Sections:
 - 1. Division 09 painting Sections for field painting fire protection cabinets.
 - 2. Division 10 Section "Fire Extinguishers."

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of fire protection cabinet indicated.
- D. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.04 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.05 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.06 SEQUENCING

- A. Apply vinyl lettering on field-painted, fire protection cabinets after painting is complete.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
 - 1. Sheet: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.

2.02 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. J. L. Industries, Inc., a division of Activar Construction Products Group. (Model 1017 – S21-PUF-LDCVBF - Basis of Design)
 - b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
 - c. Larsen's Manufacturing Company.
 - d. Modern Metal Products, Division of Technico Inc.
 - e. Potter Roemer LLC.
 - f. Watrous Divison, American Specialties, Inc.
- B. Cabinet Construction: Nonrated or 1-hour fire rated.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch-thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.

BASE BID

- D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.
 - 1. Rolled-Edge Trim: 2 ½" to 3-inch backbend depth.
- E. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
 - 1. Alternate #1: Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as drywall bead.
 - 2. Alternate #2: Exposed Flag Trim: One piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

- F. Cabinet Trim Material: Steel sheet.
- G. Door Material: Steel sheet.
- H. Door Style: Flush opaque panel, frameless, with no exposed hinges.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide concealed hinge permitting door to open 180 degrees.
- J. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked- enamel finish.
 - 2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
 - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
 - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER".
 - 1) Location: Applied to cabinet door. 2) Application Process: Silk-screened. 3) Lettering Color: Black. 4) Orientation: Vertical.
- K. Finishes:
 - 1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet door and trim except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet and door.

2.02 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Provide factory-drilled mounting holes.
 - 3. Prepare doors and frames to receive locks.
 - 4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
 - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 - 2. Fabricate door frames of one-piece construction with edges flanged.
 - 3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.03 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.04 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling".
- B. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
- C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine roughing-in for hose and cabinets to verify actual locations of piping connections before cabinet installation.
- B. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Fire Protection Cabinets: 54 inches above finished floor to top of cabinet.

- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
 - 4. Fire-Rated, Cabinets:
 - a. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.
 - b. Seal through penetrations with firestopping sealant as specified in Division 07 Section "Penetration Firestopping."
- C. Identification: Apply vinyl lettering at locations indicated.

3.2 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturers written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

**SECTION 10307
FIRE EXTINGUISHERS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes portable, fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
 - 1. Division 10 Section "Fire Extinguisher Cabinets."

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- D. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- C. Provide fire extinguishers approved, listed, and labeled by FMG.

1.05 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
2. Warranty Period: 6 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
 - h. Larsen's Manufacturing Company.
 - i. Moon-American.
 - j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
 - k. Potter Roemer LLC.
 - l. Pyro-Chem; Tyco Safety Products.
 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A: 60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked- enamel finish.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - g. Larsen's Manufacturing Company.
 - h. Potter Roemer LLC.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: 54 inches or as indicated on drawings above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

**SECTION 10309
CLOSET SHELVING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following types of closet shelving:
 - 1. Vinyl coated metal wire shelving (wardrobe)
- B. Related Sections: The following Sections contain requirements that relate to this Section:

1.03 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of closet shelving required, including construction details, dimensions of components, profiles, and finishes.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed installation of closet shelving similar in material, design, and extent to that indicated for this Project.
- B. Single-Source Responsibility: Provide each type of closet shelving as a complete unit produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings.
- C. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of closet shelving and are based on specific types and models. Other with equal performance characteristics, but differing dimensions and profiles, may be considered but not if the deviations change the design concept according to sole judgment of Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver closet shelving units until construction is ready for their installation. Protect units from damage during delivery, storage, handling, and installation.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Where closet shelving is indicated to be fitted to other construction, verify dimensions of other construction by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating closet shelving without field

measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CLOSETMAID.

2.02 MATERIALS

- A. Grade C-10008 basic cold drawn steel wire.
 - 1. Tensile strength: 100,000 PSI

2.03 ACCESSORIES

- A. Supports and Brackets as required for proper installation and as recommended by manufacturers written instructions.

2.04 FABRICATION

- A. Assemble units in shop to greatest extent practical, to minimize field assembly. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2.05 FINISHES

- A. Heavy duty vinyl coating, PVC.
 - 1. Thickness: 11 mils.
 - 2. Color: White. PART 3 – EXECUTION

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install closet shelving units at locations shown and according to manufacturer's written instructions. Provide clips, grounds, backing materials, brackets, anchors, trim, and accessories for a complete installation.

3.02 ADJUST AND CLEAN

- A. Repair damaged finishes so no evidence remains of corrective work. Use only materials and procedures recommended by manufacturer. Replace units that cannot be restored to factory-finished appearance.

END OF SECTION

SECTION 11175
TRASH CHUTE / WITH ADA COMPLIANT INTAKE DOORS

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. The general provisions of the contract, including General and Supplementary Conditions and Division 1, General Requirements, apply to the work specified in this section.

1.02 DESCRIPTION OF WORK

- A. Furnish and install Wilkinson ADA Compliant 15" x 18" bottom-hinged, self-closing, positive latching, pneumatically operated chute intake doors with palm button opening mechanism designed to preclude the need to grasp, twist, or pinch the control mechanism in order to operate the intake door. Doors shall be powered by a suitable 4 gallon capacity compressor fitted with a blow-off solenoid to prevent operation of the doors in the event of a general building alarm. Doors must close when power is interrupted. Compressor shall also be disabled for maintenance. Additionally, if a compactor is used, chute intake doors on each floor shall be disabled when the compactor receives one or more of the following signals: Emergency Stop activation, Compactor Hopper Time-Out Cycle, Charging Chamber Full, and Motor Overload, providing the compactor has these control circuits.

1.03 SUBMITTALS

- A. Catalog Cuts: Before the trash chute is delivered to the job site, submit catalog cuts to the Architect in accordance with these specifications, showing all details of installation and assembly and all requirements for work by other trades.
- B. Product Data: Manufacturer's product specifications, standard details and recommendations for project conditions; indicate selected sizes and installation details specific to the project.
- C. Shop Drawings:
 - 1. Plans: Scale 1/4 inch to 1 foot; indicate locations, dimensions, and required associated construction activities.
 - 2. Elevations/Sections: Scale 1/4 inch to 1 foot; indicate locations, dimensions, and required associated required construction activities.
 - 3. Details: Scale 1/4 inch to 1 foot; indicate:
 - a. Shop drawings specific to project conditions
 - b. Interface with adjacent construction
 - c. Dimensions and tolerances
 - d. Products required for installation of the trash chute, but not supplied by trash chute manufacturer.
- D. Close-out Submittals:
 - 1. Operation and Maintenance Data:
 - a. Manufacturer's printed Operation Manual
 - 2. Warranty Documents: Issued and executed by the manufacturer and installer of the system.

1.04 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Minimum five (5) years-documented experience producing products specified in this section.
 - 2. Installer: Approved by the Manufacture, and having a minimum of five (5) years experience.
- B. Pre-Installation Meetings:
 - 1. Convene at job site a minimum of seven (7) calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
 - 2. Require attendance by representatives of the following:
 - a. Trash chutes manufacturer or designated representative
 - b. Installer of this section
 - c. Other entities directly affecting, or affected by, construction activities of this section.
 - d. Notify Architect four (4) calendar days in advance of scheduled meeting date.

1.05 RELATED WORK BY OTHERS SPECIFIED ELSEWHERE

- A. The following work is excluded from the scope of work in this section 11175 and is included in other divisions of the specifications for inclusion in the scope of work of others.
 - 1. Electrical Standards: The following electrical circuits with disconnects are required and are to be installed by others. 1 each: 110VAC, 20 amp, 1-Phase, 60Hz Circuits, for the Compressor. Local disconnect box to be NEMA 13.
 - 2. Conduit: Flexible conduit, 1/2" diameter, installed from compressor area to each new door installation for connecting air tubing from self-contained compressor to chute intake doors.
 - 3. Water supply and valves to fire sprinkler heads.
 - 4. ADA-required Braille signage provided by others

1.06 WARRANTY

- A. Manufacturer's warranty: Furnish manufacturer's standard one (1) year warranty from date of temporary certificate of occupancy or similar, locally mandated permission to use the project common areas for their intended use. Warranty shall apply to defects in product workmanship and materials.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Manufacturers:
 - 1. Wilkinson-Hi-Rise, LLC., 2821 Evans St., Hollywood, FL 33020, Telephone: (800) 231-3888.
 - 2. Chutes International
 - 3. Allcity Metal

B. Components:

1. The chute shall be 24" diameter of U.S. #16 gauge aluminized steel.
2. The ADA Compliant Chute Intake Doors: 15 inches wide x 18 inches high self-closing, bottom hinged, push-button operated self-closing positive latching doors. The door and operating mechanism are a UL® approved, "B" Label, 1-1/2 hour assembly. The trash chute door carries an additional UL rating designating it to have a maximum temperature rise over 30-minute period of not more than 250°F. The chute intake door is stainless steel as are the trim for the door and the operating mechanism. The door trim is embossed with top hinged rubber baffles located just inside the intake.
3. Discharge: U.S. #16 gauge aluminized steel type "A" open end chute discharge rolling steel door with 165°F. fusible link hold open on an inclined steel track at the bottom of the chute to close automatically when the ambient temperature reaches 165°F. as required by city or state building and/or fire codes.
4. Vent: Chute shall extend full diameter through roof to metal top vent cap 4'-0" above roof level with counter flashing and insect screen. A roof curb (44"x 44" x minimum of 8" high) is required for flat roof conditions and is to be provided by others.
5. Accessories: 3/4 inch IPS flushing spray head and 1/2 inch sprinkler head above highest intake. Additional 1/2-inch sprinkler heads at every second intake (counting from the top) or as required by local code.
6. Provide Disinfecting & Sanitizing unit for installation in line to the flushing spray head. Connection to flushing spray head, back flow prevention valve and electric control switch by others.
7. Provide 12 inches wide x 12 inches high right side hinged, hand operated, self-closing, positive latching, UL 1 1/2-hour. "B" labeled, stainless steel plumbing access door having stainless steel door trim for installation by forces erecting enclosing shaft wall. Door to have master keyed lock. Cylinder provided by others. Door for access to disinfecting & sanitizing unit above the highest intake door of the chute.
8. Offsets (bends) in the chute, if required, shall be made the same diameter as the chute of #16 US gauge aluminized steel and have an additional layer of # 13 US gauge aluminized steel reinforcing the impact area. Offsets are not to deviate more than 15° off the vertical axis of the chute.
9. Provide Daubert 934 sound coat (or equal) vibration dampening compound to the exterior of the chute only. Include Korfund sound isolator pads at each floor support frame.
10. Sprinkler System: Chute shall be protected internally by automatic sprinklers. This requires a sprinkler at or above the top intake door of the chute, and in addition, a sprinkler shall be installed within the chute at alternate floor levels in building over two stories in height with mandatory sprinkler located at the lowest service level.

2.02 FABRICATION

- A. The trash chute shall be fully factory assembled and all joints, except those required to separate the sections for shipment and installation shall be welded or lock-seamed tight. The floor intake doors shall be bolted in place on throats formed into the chute. All chute sections shall flash inside the sections below and there shall be no bolts, clips, or other projections inside the chute to snag the flow of material. Pre-positioned support frames shall assure proper intake levels and there shall be an expansion joint in the

chute between all support joints. Discharge hoppers and offsets, where required, shall be reinforced and separately supported in the impact area.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of conditions:
 - 1. Area in which system is to be located is correct size and location, and is prepared for installation of trash chute and components.
- B. Installer's examination:
 - 1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if conditions under which construction activities of this section are to be performed are unacceptable.
 - 2. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
 - 3. General Contractor shall verify and record chute alignment with installer immediately following installation.

3.02 INSTALLATION

- A. Install trash chute in accordance with shop drawings and manufacturer's printed installation instructions.

3.03 DEMONSTRATION

- A. Arrange demonstration of system operation, conducted by manufacturer's representative, to Owner's maintenance personnel.

END OF SECTION

**SECTION 11400
RESIDENTIAL APPLIANCES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 DESCRIPTION OF WORK

- A. Work included in this Section:
Provide and install equipment as scheduled on drawings and specified in this Section.

1.03 QUALITY ASSURANCE

- A. For purposes of designing type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by manufacturers listed in the PRODUCTS Section. In case of equipment specified by description only, submit manufacturer's complete printed Specification for Architect's approval.
- B. Underwriter's Laboratory Label:
All equipment shall meet requirements of Underwriter's Laboratory and shall bear that label.

1.04 SUBMITTALS

- A. Manufacturer's Data: Submit for approval, three (3) copies of folder containing complete manufacturer's data and installation procedures for all materials to be used on work of this Section of specifications.
- B. Shop Drawings: Submit for approval, by Architect, in accordance with GENERAL CONDITIONS. Shop drawings shall provide complete information regarding materials of fabrication, mechanical characteristics for energizing, capacity limits and mechanical data required for providing service for each unit installed.
- C. Operating Instructions: Submit in triplicate, for each item of equipment, complete operating instructions and maintenance requirements.

1.05 MANUFACTURERS

- A. General Electric
- B. Kenmore
- C. L.G.

PART 2 - PRODUCTS

2.01 SCHEDULE OF EQUIPMENT

- A. All models indicated are General Electric for basis of design.

1. REFRIGERATOR/FREEZER
 - a. General Electric Model #GS5256SHSS, 25.4 cu.ft., Side by Side with ice maker.
2. RANGE
 - a. General Electric Model #JB450RKSS, 30" free standing, ADA compliant.
3. Hood
 - a. General Electric Model #JWX3300EJSS, 30" Under cabinet. Provide switch to wall for ADA requirement.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Furnish and install all items of equipment according to manufacturer's written instructions and shop drawings approved by Architect.

3.02 COORDINATION

- A. Coordinate all final connection with the Plumbing and Electrical contractors.

END OF SECTION

**SECTION 12352
RESIDENTIAL CASEWORK**

PART 1 - GENERAL**1.01 SECTION INCLUDES**

- A. Wood Cabinetry:
 - 1. Door Style: Thermofoil.

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry.
- B. Section 06200 - Finish Carpentry.

1.03 REFERENCES

- A. American National Standards Institute (ANSI).
- B. California Air Resources Board (CARB).
- C. National Kitchen Cabinet Association (NKCA).

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Indicate type, location, size, and hand of each component. Include requirements for blocking and relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum ten years experience manufacturing similar products.
- B. Installer Qualifications: Minimum two years experience installing similar products.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Remodel mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Acceptable Manufacturers:
 - 1. Doormark
 - 2. Southernstone Cabinetry
 - 3. Grandview Products Co., Inc.

2.02 THERMOFOIL DOOR STYLE

- A. Thermofoil Door Style:
 - 1. Style: Port Charlotte.
 - a. Door THERMOFOIL on MDF Core/Semi-full overlay/Square Raised Panel Profile. THERMOFOIL on MDF Core Drawer Header.
 - b. Drawer Front: Standard THERMOFOIL.
 - c. Thermofoil Color: See Interior Design Finish Schedule

2.03 CABINET BODY

- A. Cabinet Body: STANDARD
 - 1. Face Frames:
 - a. Construction: Mortise and tenon, glued and fastened.
 - b. Horizontal Rails: 3/4 inch by 1-1/2 inches (19 mm by 38 mm) kiln dried hardwood.
 - c. Vertical Stiles: 3/4 inch by 1-1/2 inches (19 mm by 38 mm) kiln dried hardwood.
 - 2. Cabinet Ends:
 - a. Exposed Ends: 1/2 inch (13 mm), 45 pound density premium particle board.
 - b. Wall Cabinet Ends: Rabbeted to receive tops and bottoms.
 - c. Base Cabinet Ends: Rabbeted to receive floor and shelf.
 - 3. Drawer Box Construction: Standard.
 - a. Drawer Header, Reduced rail
 - b. Sides: 7/16 inch (11 mm) MDF with a rigid topcoat.
 - 1) Wood grain.
 - c. Bottom: 1/8 inch (3 mm) hardboard inset 4 sides.
 - d. Joints: Lap jointed, glued and power nailed.
 - e. Sidemount Guides: Epoxy coated with 75 pound load capacity and a lifetime warranty.

4. Wall Cabinet and Base Cabinet Shelving:
 - a. Shelving: 5/8 inch (16 mm) premium particleboard banded with PVC tape and fully adjustable in all wall cabinets; no shelving in sink base.
 - b. Base Shelf: Half depth, fully adjustable.
5. Wall Cabinets Top and Bottom: Not less than 1/2 inch (13 mm) 45 pound density particleboard; let into sides and face frame. Joints glued and power nailed.
6. Base Cabinet Floors: Not less than 1/2 inch (13 mm) 45 pound density particleboard; let into sides and face frame. Joints glued and power nailed. Back of floor set on supporting member, glued and fastened.
7. Cabinet Backs: 1/8 inch (3 mm) printed high density fiberboard (HDF).
8. Door Hinges: Self-closing 108 degree opening concealed hinges.
9. Finish: Conversion varnish, non-yellowing durable finish which provides excellent chemical resistance. All exposed interior sides, shelving and wall cabinet bottoms, GrandLam clad (except hang rails).
10. Testing: Cabinet tested and certified by National Kitchen Cabinet Association (Spec. ANSI 161.1).

2.04 HARDWARE

- A. All cabinet drawers and doors shall have concealed hinges and finger pulls.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 12365
COUNTERTOPS AND WONDOW SILLS**

PART 1 - GENERAL**1.01 SECTION INCLUDES**

- A. Countertops, sides and backsplashes for architectural cabinet work.
- B. Materials include Quartz, marble and Solid Surface
- C. Wall-hung counters and vanity tops.
- D. Countertops with or without under-mount bowls.
- E. Window sills.

1.02 RELATED REQUIREMENTS

- A. Section 06200 - Interior Finish Carpentry: Installation of the products of this Section.
- B. Section 06400 - Wood Casework.
- C. Section 12353 - Residential Casework.
- D. Section 22400 - Plumbing Fixtures: Sinks.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- D. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; International Surface Fabricators Association; 2013.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

- A. Submit the following under provisions of Section 01300 - Submittals
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

- E. NSF/ANSI standards:
 - 1. Refer to www.nsf.org for the latest compliance to NSF/ANSI Standard 51 for food zone – all food types.
- F. Maintenance data:
 - 1. Submit manufacturer's care and maintenance data.
 - a. Maintenance kit for finishes shall be submitted.
 - 2. Include in project closeout documents.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
- B. Fabricator/installer qualifications:
 - 1. Use same fabricator as for cabinets on which tops are to be installed.
- C. Applicable standards:
 - 1. Standards of the following, as reference herein:
 - a. American National Standards Institute (ANSI)
 - b. American Society for Testing and Materials (ASTM)
 - c. National Electrical Manufacturers Association (NEMA)
 - d. NSF International
 - 2. Fire test response characteristics:
 - a. Provide with the following Class A (Class 1) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E 84) or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - b. Flame Spread Index: 25 or less.
 - c. Smoke Developed Index: 450 or less.
- D. Allowable tolerances:
 - 1. Variation in component size: $\pm 1/8"$ (3 mm) over a 10' length.
 - 2. Location of openings: $\pm 1/8"$ (3 mm) from indicated location.
 - 3. Maximum $1/8"$ (3 mm) clearance between countertop surfaces and each wall.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Deliver no components to project site until areas are ready for installation.
- D. Store components indoors prior to installation.
- E. Handle materials to prevent damage to finished surfaces.
 - 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.07 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS**2.01 COUNTERTOP ASSEMBLIES**

- A. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.
1. Laminate Sheet, Unless Otherwise Indicated: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
 - a. Finish: As scheduled.
 - b. Surface Color and Pattern: As scheduled.
 - c. Manufacturers:
 - 1) Wilsonart, LLC: www.wilsonart.com.
 - 2) Formica, [www. Formica.com](http://www.Formica.com)
 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
 3. Back and End Splashes: Same material, same construction.
 4. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 - Countertops, Custom Grade.
- B. Quartz Agglomerate Countertops: Agglomerate material bonded to substrate; use as large pieces as possible with inconspicuous adhesive joints.
1. Sheet Material: 93 percent quartz aggregate combined with polyester resin binders and proprietary pigments that are fabricated into slabs using vacuum technology.
 2. Thickness: 3/4 inch, minimum.
 3. Surface Finish: Polished.
 4. Exposed Edge Treatment: See Sections A-453.
 5. Manufacturers:
 - a. Cambria USA
 - b. Wilsonart, LLC
 - c. Dupont; Zodiaq
 - d. Silestone

2.02 STONE ACCESSORIES

- A. General: Use only adhesives formulated for stone and recommended by manufacturer for the application shown on Drawings.
- B. Water-Cleanable Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Cleanable Epoxy Grout: ANSI A118.3, chemical-resistant, water-cleanable, tile-setting and -grouting epoxy, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- D. Stone Adhesive: 2-part epoxy or polyester adhesive, formulated specifically for bonding stone to stone, with an initial set time of not more than 2 hours at 70 deg F, and with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Color: Match stone.
- E. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants" and will not stain the stone it is applied to.
 - 1. Single-component, neutral-curing silicone sealant.
 - 2. Color: As selected by Architect.
 - 3. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Stone Cleaner: Cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- G. Stone Sealer: Colorless, stain-resistant sealer that does not affect color or physical properties of stone surfaces, as recommended by stone producer for application indicated.

2.03 STONE FABRICATION, GENERAL

- A. General: Fabricate stone per requirements, including Drawings and Shop Drawings.
- B. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
 - 1. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically displeasing, as judged by Architect.
- C. Grade and mark stone for final locations to produce assembled countertop units with an overall uniform appearance.
- D. Fabricate stone countertops in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
 - 1. Clean sawed backs of stones to remove rust stains and iron particles.
 - 1. Dress joints straight and at right angle to face, unless otherwise indicated.
 - 2. Cut and drill sinkages and holes in stone for anchors, supports, and attachments.
 - 3. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
 - 4. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snipping, and matched at joints between units. Form corners of molded edges as indicated with outside corners slightly eased, unless otherwise indicated.
 - 5. Finish exposed faces of stone to comply with requirements indicated for finish of each type of stone required and to match approved Samples and mockups. Provide matching finish on exposed edges of countertops, splashes, and cutouts.

- E. Carefully inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates indicated to receive stone countertops and conditions under which stone countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives. Allow stone to dry before installing.

3.03 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches.
- B. Variation from Level: Do not exceed 1/8 inch in 96 inches, 1/4 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/4 of nominal joint width.
- D. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch difference between planes of adjacent units.
- E. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch difference between edges of adjacent units, where edge line continues across joint.

3.04 INSTALLATION OF COUNTERTOPS

- A. Install countertops over plywood subtops with full spread of water-cleanable epoxy adhesive.
- B. Do not cut stone in field. If stone countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- C. Set stone to comply with requirements shown on Drawings and Shop Drawings. Shim and adjust stone to location shown. Install countertops with uniform joints of widths shown and with edges and faces aligned.
- D. Bond joints with stone adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Space joints with 1/16-inch gap for filling with sealant. Use temporary shims to ensure uniform spacing.

- F. Install backsplash and end splash by adhering to wall with water-cleanable epoxy adhesive. Leave 1/16-inch gap between countertop and splash for filling with sealant. Use temporary shims to ensure uniform spacing.
- G. Grout joints to comply with ANSI A108.10. Remove temporary shims before grouting. Tool grout uniformly and smoothly with plastic tool.
- H. Apply sealant to joints; comply with Division 07 Section "Joint Sealants." Remove temporary shims before applying sealant.

3.05 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Remove and replace stone countertops of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective countertops.
 - 3. Defective joints, including misaligned joints.
 - 4. Interior stone countertops and joints not matching approved Samples and mockups.
 - 5. Interior stone countertops not complying with other requirements indicated.
- C. Replace in a manner that results in stone countertops matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Following installation and after sealants are cured, clean stone countertops using clean water and soft rags.
- E. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's instructions.

END OF SECTION

**SECTION 12400
FURNISHINGS AND ACCESSORIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Interior Design shall prepare specifications for furnishings that will be bid separately from the rest of the project. Interior Designer shall include furnishings in the overall FF&E budget.

END OF SECTION

**SECTION 12490
WINDOW TREATMENTS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Interior Design shall prepare specifications for window treatments that will be bid separately from the rest of the project. Interior Designer shall include window treatments in the overall FF&E budget.
- B. Draperies and hanging fabrics shall conform to the Florida Building Code for flame spread classification.

END OF SECTION

**SECTION 12511
HORIZONTAL LOUVER BLINDS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section includes the provision and installation of all materials, equipment and incidentals necessary and/or required for a complete installation of all horizontal louver blinds as specified herein.

1.03 RELATED SECTIONS

- A. Division 6 Section for wood blocking and grounds for mounting horizontal louver blinds.
- B. Division 8 Sections for window walls with horizontal louver blinds mounted on window frames.
- C. Division 8 Sections for windows with horizontal louver blinds mounted on window frames.
- D. Division 16 Sections for electrical service and connections for motorized blind operation.

1.04 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of horizontal louver blind specified. Include printed data on physical characteristics.
- C. Shop drawings showing location and extent of blinds. Show installation details at and relationship to adjoining work. Include elevations indicating blind units. Indicate location of blind controls.
- D. Samples for initial selection in the form of manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of horizontal louver blind indicated.
- E. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare samples from the same material to be used for the Work.
 - 1. Louver: Manufacturer's standard-size unit, not less than 12 inches (300 mm) long.

2. Valance: Manufacturer's standard-size unit, not less than 12 inches (300 mm) long.
- F. Schedule of horizontal louver blinds using same room designations indicated on Drawings.
- G. Maintenance data for horizontal louver blinds to include in the operation and maintenance manual specified in Division 1. Include the following:
 1. Methods for maintaining horizontal louver blinds and finishes.
 2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance.

1.05 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide horizontal louver blinds identical to those tested for the following fire-test-response characteristics as determined by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Test Method: NFPA 701.
 2. Rating: Pass.
- B. Electrical Component Standard: Provide components that comply with NFPA 70 "National Electrical Code" and that are listed and labeled by UL.
- C. Single-Source Responsibility: Obtain each type of horizontal louver blind from one source and by a single manufacturer.
- D. Mockups: Prior to installing horizontal louver blinds, construct mockups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
 1. Locate mockups on-site in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect one week in advance of the dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's acceptance of mockups before start of final unit of Work.
 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. When directed, demolish and remove mockups from Project site.
 - b. Accepted mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Check actual horizontal louver blind dimensions by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Enclosure and Environmental Limitations: Do not install horizontal louver blinds until space is enclosed and weatherproof, wet-work in space is completed and

nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.07 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Horizontal Louver Blinds: Before installation begins, furnish quantity of full-size units equal to 5 percent of amount of each size installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Horizontal Louver Blinds:

2.02 HORIZONTAL LOUVER BLINDS

- A. Louvers: Manufacturer's standard as follows:
 - 1. Faux wood composite
 - 2. Series: Lakeforest
 - 3. Finish: Textured.
 - 4. Color: As scheduled.
 - 5. Nominal Louver Width: 2 inches (50 mm).
- B. Tilt Operation: Cordless at Memory Care units.
 - 1. Length of Tilt Control: Full length of blind.
 - 2. Position of Tilt Control: Right side, unless otherwise indicated.
 - 3. Tilt: Full.
- C. Cord-Lock Operation: Top-locking cord lock; locks pull cord to stop blind in either fully opened or fully closed position only and is equipped with a ring pull not more than 10 inches (250 mm) long.
 - 1. Position of Cord Lock: Right side, unless otherwise indicated.
 - 2. Position of Cord Lock: Left side, unless otherwise indicated.
 - 3. Position of Cord Lock: As indicated.
- D. Cord Equalizers: Self-aligning to maintain horizontal louver blind position.
- E. Valance: Match color of louvers.
- F. Mounting: As required.
- G. Mounting: As indicated.
- H. Colors and Patterns: As scheduled.

2.03 FABRICATION

- A. Product Standard and Description: Comply with AWCMA Document 1029 for each horizontal louver blind unit consisting of louvers, rails, cord locks, tilting mechanisms, tapes, and installation hardware.
- B. Lifting and Tilting Mechanisms: Noncorrosive, self-lubricating materials.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 - 1. Blind Units Installed Between (Inside) Jambs: Width equal to 1/4 inch (6 mm) per side or 1/2 inch (12 mm) total, plus or minus 1/8 inch (3 mm), less than jamb to jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch (6 mm), plus or minus 1/8 inch (3 mm), less than head to sill dimension of opening in which each blind is installed.
 - 2. Blind Units Installed (Outside) Jambs: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- D. Installation Fasteners: Not less than 2 fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; support blind units under conditions of normal use.
- E. Hold-Down Brackets: Manufacturer's standard, as indicated.
- F. Side Channels: Manufacturer's standard, as indicated.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of horizontal louver blinds. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install blinds level, plumb, and located so exterior louver edges in any position are not closer than 1 inch (25 mm) to interior face of glass lites.

Optional Mounts

- 1. Flush Mounted: Install blinds with louver edges flush with finish face of wall.
- 2. Jamb Mounted: Install headrail flush with face of opening jamb and head.
- 3. Head Mounted: Install headrail on face of opening head.

3.03 ADJUSTING

- A. Adjust components and accessories for proper operation.

3.04 CLEANING

- A. Clean blind surfaces, according to manufacturer's instructions, after installation.

- B. Remove surplus materials, packaging, rubbish, and debris resulting from installation. Leave installation areas neat, clean, and ready for use.

3.05 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensure that horizontal louver blinds are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

**SECTION 14240
HYDRAULIC ELEVATORS**

PART 1 - GENERAL**1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

1.02 SUMMARY

- A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
1. Standard pre-engineered hydraulic passenger elevators.
 2. Elevator car enclosures, hoist-way entrances and signal equipment.
 3. Jack(s).
 4. Operation and control systems.
 5. Accessibility provisions for physically disabled persons.
 6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
 7. Materials and accessories as required to complete the elevator installation.
- B. Related Sections:
1. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
 2. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
 3. Division 5 Metals:
 - a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
 - b. Providing steel angle sill supports and grouting hoist-way entrance sills and frames.
 4. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
 5. Division 15 Plumbing:
 - a. Sump pit and oil interceptor.
 6. Division 15: Heating, Ventilation and Air Conditioning
 - a. Heating and ventilating hoist-ways and machine rooms.
 7. Division 16 Sections:
 - a. Providing electrical service to elevators, including fused disconnect switches.
 - b. Emergency power supply, transfer switch and auxiliary contacts.
 - c. Heat and smoke sensing devices.
 - d. Convenience outlets and illumination in machine room, hoistway and pit.
- C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.

1. Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.
2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.
3. Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point.
4. Elevator hoistways shall have barricades, as required.
5. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide divider beams between hoistway at each floor and roof.
7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
8. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.
9. Machine room to be enclosed and protected.
10. Machine Room temperature must be maintained between 55° and 90° F.
11. If machine room is remote from the elevator hoistway, clear access must be available above the ceiling or metal/concrete raceways in floor for oil line and wiring duct from machine room.
12. Access to the machinery space and machine room must be in accordance with the governing authority or code.
13. Provide an 8" x 16" cutout through machine room wall, for oil line and wiring duct, coordinated with elevator contractor at the building site.
14. All wire and conduit should run remote from either the hoistways or the machine room.
15. When heat, smoke or combustion sensing devices are required, connect to elevator machine room terminals. Contacts on the sensors should be sided for 120 volt D.C.
16. Install and furnish finished flooring in elevator cab.
17. Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.
18. Where sheet rock or drywall construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Drywall contractor to coordinate with elevator contractor.
19. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
20. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.
21. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.

22. General Contractor shall fill and grout around entrances, as required.
23. Elevator sill supports shall be provided at each opening.
24. All walls and sill supports must be plumb where openings occur.
25. For applications with jack hole, free and clear access to the elevator pit area for the jack hole-drilling rig is required.
26. Where jack hole is required, remove all spoils from jack hole drilling.
27. When not provided by Elevator Contractor, jack hole shall accommodate the jack unit. If required the jack hole is to be provided in strict accordance with the elevator contractor's shop drawings.
28. Locate a light fixture and convenience outlet in pit with switch located adjacent to the access door.
29. A light switch and fused disconnect switch for each elevator should be located inside the machine room adjacent to the door, where practical, per the National Electrical Code (NFPA No. 70).
30. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway (or in the machine room).
31. For signal systems and power operated door: provide ground and branch wiring circuits, including main line switch. For car light and fan: provide a feeder and branch wiring circuits, including main line switch.
32. Wall thickness may increase when fixtures are mounted in drywall. These requirements must be coordinated between the general contractor and the elevator contractor.
33. Provide supports, patching and recesses to accommodate hall button boxes, signal fixtures, etc.
34. Locate telephone and convenience outlet on control panel.

1.04 SUBMITTALS

- A. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.
- B. Shop drawings:
 1. Show equipment arrangement in the machine room/control space, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
 3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
 4. Indicate electrical power requirements and branch circuit protection device recommendations.
- C. Powder Coat Paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- D. Plastic laminate selection: See Interior Design drawings for upgraded cab finishes.
- E. Metal Finishes: Upon request, standard metal samples provided.

- F. Operation and maintenance data. Include the following:
 - 1. Owner's Manual and Wiring Diagrams.
 - 2. Parts list, with recommended parts inventory.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing elevators of the type required for the project.
 - 1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
 - a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
 - 2. The manufacturer shall have a documented, on-going quality assurance program.
 - 3. ISO-9001:2000 Manufacturer Certified
 - 4. ISO-14001:2004 Environmental Management System Certified
- B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.
- C. Regulatory Requirements:
 - 1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
 - 2. Building Code: National.
 - 3. NFPA 70 National Electrical Code.
 - 4. NFPA 80 Fire Doors and Windows.
 - 5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- D. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).
- E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
 - 1. Arrange for inspections and make required tests.
 - 2. Deliver to the Owner upon completion and acceptance of elevator work.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.07 PROJECT CONDITIONS

- A. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance

by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

- B. Provide the hole for the jack unit (if required by the type of jack provided), based on excavation through normal soil or clay which can be removed by manual digging or by standard truck-mounted regular drilling unit. Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.
1. If a physical obstruction or hindrance is encountered below the ground surface, including boulders, rock, gravel, wood, metal, pilings, sand, water, quick sand, caves, public utilities or any other foreign material, obtain written authorization to proceed with excavating using special excavation equipment.
 2. Maintain a daily log of time and material costs involved.
 3. Elevator contractor will be compensated on a time and material basis for additional costs incurred after encountering the physical obstruction or hindrance, including the cost of the special excavation equipment.

1.08 WARRANTY

- A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion.

1.09 MAINTENANCE

- A. Furnish maintenance and call back service for a period of 12 months for each elevator from date of Substantial Completion during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: ThyssenKrupp Elevator

2.02 MATERIALS, GENERAL

- A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.
- B. Steel:
1. Shapes and bars: Carbon.
 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
 3. Finish: Factory-applied baked enamel.
- C. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness.
- D. Carpet: By others.

2.03 HOISTWAY EQUIPMENT

- A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.
- B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.
- C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.
- D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.
- E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor or continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.
- F. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction. Provide the following jack type: Twin post holeless telescopic 2-stage. Two jacks piped together, mounted one on each side of the car with each having two telescopic sections designed to extend in a synchronized manner when oil is pumped into the Assembly. Each jack section will be guided from within the casing or the plunger assembly used to house the section. Each plunger shall have a high pressure sealing system which will not allow for seal movement or displacement during the course of operation. Each Jack Assembly shall have a check valve built into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in the section.
- G. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.
- H. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade oil as specified by the manufacturer of the power unit.

2.04 POWER UNIT

- A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit consisting of the following items:
 - 1. Oil reservoir with tank cover.
 - 2. An oil hydraulic pump.
 - 3. An electric motor.

4. Oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.
- B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.
- C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.
- D. Control System: Shall be microprocessor based and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure.
- E. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
 1. Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
 2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
 3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
 4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.
- G. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

2.05 HOISTWAY ENTRANCES

- A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
 1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
 2. Main landing door & frame finish: ASTM A1008 steel panels, factory applied powder coat finish.
 3. Typical door & frame finish: ASTM A 366 steel panels, factory applied powder coat enamel finish.
- B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.
- C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
 1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.

2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
 3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
- D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.06 CAR ENCLOSURE

- A. Car Enclosure:
1. Walls: Cab type TKAP, reinforced cold-rolled steel with two coats factory applied baked enamel finish, with applied vertical wood core panels covered on both sides with high pressure plastic laminate.
 - a. Reveals and frieze: Powder Coated
 2. Canopy: Cold-rolled steel with hinged exit.
 3. Ceiling: Downlight type, metal pans with suspended halogen downlights and dimmer switch. Number of downlights shall be dependent on platform size with a minimum of six.
 4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
 5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
 - a. Door Finish: ASTM A1008 steel panels, factory applied powder coat enamel finish.
 - b. Cab Sills: Extruded aluminum, mill finish.
 6. Handrail: Provide 1.5" diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.
 7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
- B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.07 DOOR OPERATION

- A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.
1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.

2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
 3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
 4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.
 5. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
 6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.
 7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.
 8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.
- B. Door Protection Devices: Provide a door protection system using 150 or more microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.08 CAR OPERATING STATION

- A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. All polycarbonate pushbuttons shall be manufactured with Microban® antimicrobial protection. Switches for car light and accessories shall be provided.
- B. Emergency Communications System: Integral phone system provided.
- C. Auxiliary Operating Panel: Not Required
- D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate

the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

- E. Battery Powered lowering: if power fails, cars that are at a floor remain at that floor, cycle their doors, and shut down with the doors open. Cars in between floors are lowered to a field programmable floor, cycle their doors, and shut down with the doors open. Cars that are below the field programmable floor are lowered to the next lower floor, cycle their doors, and shut down with the doors closed. System includes rechargeable battery and automatic recharging system.
- F. Special Equipment: Not Applicable

2.09 CONTROL SYSTEMS

- A. Controller: The elevator control system shall be microprocessor based and software oriented. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
- B. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.
- C. Special Operation: Not Applicable

2.10 HALL STATIONS

- A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.
Provide one pushbutton riser with faceplates having a brushed stainless steel finish.
 - 1. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.
 - 2. All polycarbonate pushbuttons be manufactured with have Microban® antimicrobial protection.
- B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.
- C. Hall Position Indicator: An electronic dot matrix position indicator shall be provided and mounted for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. When hall lanterns are provided, the position indicator shall be combined with the hall lanterns in the same faceplate. Faceplates shall match hall stations. Provide at all typical landings.
- D. Hall lanterns: Not Applicable
- E. Special Equipment: Not Applicable

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

- A. Oil Hydraulic Silencer: Install an oil hydraulic silencer (muffler device) at the power unit location. The silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

- A. Install elevator systems components and coordinate installation of hoistway wall construction.
 - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
 - 2. Comply with the National Electrical Code for electrical work required during installation.
- B. Jack unit excavation (if required by the type of jack provided): Drill or otherwise excavate below elevator pit construction as required to install the jack unit.
 - 1. Install casing for jack unit.
 - 2. Provide HDPE jack protection system for all in ground jacks.
 - 3. Set casing for jack unit assembly plumb, and partially fill with water-settled sand, eliminating voids. Back fill depth shall be sufficient to hold the bottom of the jack in place over time.
- C. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- D. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- E. Lubricate operating parts of system where recommended by manufacturer.

3.03 FIELD QUALITY CONTROL

- A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local

authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.

- B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

- A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.
- B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.06 PROTECTION

- A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

- A. Elevator Qty. 3 – (3000 lb capacity) Elevators #1 & 2
 1. Elevator Model: endura Above-Ground (2-Stage)
 2. Rated Capacity: 3500 lbs.
 3. Rated Speed: 110 ft./min.
 4. Operation System: TAC32
 5. Travel: 23'-"
 6. Landings: 6 total
 7. Openings:
 - a. Front: 6
 8. Clear Car Inside: 6' - 8" wide x 4' - 9" deep
 9. Cab Height: 8'-0" nominal

- 10. Hoistway Entrance Size: 3' - 6" wide x 7'-0" high
- 11. Door Type: Center Opening
- 12. Power Characteristics: 460 volts, 3 Phase, 60 Hz.
- 13. Seismic Requirements: Zone 1
- 14. Fixture & Button Style: Traditional Signal Fixtures with Microban® antimicrobial protection.
- 15. Special Operations: None

END OF SECTION