

## SECTION 01740

### WARRANTIES AND BONDS

#### **PART 1 GENERAL**

##### 1.01 SECTION INCLUDES

- A. Preparation and submittal.
- B. Time and schedule of submittals.

##### 1.02 RELATED SECTIONS

- A. Document: Notice Inviting Bids, Information for Bidders and Bid Bonds.
- B. Document: General Conditions: Performance Bond and Labor and Material Payment Bonds, Warranty and Correction of Work.
- C. Section 01770 - Contract Closeout: Contract closeout procedures.
- D. Individual Specifications Sections: Warranties required for specific products or Work.

##### 1.03 FORM OF SUBMITTALS

- A. Bind in commercial quality, 8½ 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.

##### 1.04 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 DISTRICT'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.

##### 1.05 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with DISTRICT'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

**GUARANTEE**

We hereby guarantee that the \_\_\_\_\_, which we have installed for \_\_\_\_\_

**COUNTY OF RIVERSIDE** at **ALTERNATE EMERGENCY OPERATIONS CENTER** has been performed in accordance with the requirements of the Contract Documents and that the work as installed will fulfill the requirements of the Contract Documents.

The undersigned agrees to repair or replace any or all of such work that may prove to be defective in workmanship or material together with any other adjacent work which may be displaced in connection with such replacement within a minimum period of **ONE (1) YEAR** from the date of acceptance of the above-mentioned project by \_\_\_\_\_ **COUNTY OF RIVERSIDE**, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of the undersigned's failure to comply with the above mentioned conditions within a reasonable period of time, as determined by the District, but not later than ten (10) working days after being notified in writing by the District, the undersigned authorizes the District to proceed to have said defects repaired and made good at the expense of the undersigned, which will pay the costs and charges therefore upon demand.

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
SIGNED

\_\_\_\_\_  
TYPED OR PRINTED NAME

Representatives to be contacted for service subject to terms of contract.

NAME \_\_\_\_\_

ADDRESS

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PHONE #

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**CONTRACTOR'S CERTIFICATE  
REGARDING ASBESTOS MATERIAL**

This form is to be submitted at the time final billing is provided.

"I certify that all the materials and supplies installed under this

\_\_\_\_\_  
(Name of Contract)

contract are free of asbestos-containing materials."

\_\_\_\_\_  
Date

\_\_\_\_\_  
Official Name of CONTRACTOR

\_\_\_\_\_  
By

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

## SECTION 01770

### CONTRACT CLOSEOUT

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Closeout procedures.
- B. Adjusting.
- C. Project record documents.
- D. Operation and maintenance data.
- E. Warranties and Guarantees.
- F. Spare parts and maintenance materials.
- G. Instructions to DISTRICT'S personnel.

##### 1.02 CLOSEOUT PROCEDURES

###### A. Partial Occupancy and Substantial Completion:

- 1. Conform to Part 1, Title 24, Section 4-336 CCR, Requirements for Verified Reports and Closeout Procedures.
- 2. In conjunction with the Project Inspector, prepare a list of items to be completed or corrected. List may be developed by areas, when approved by the ARCHITECT.
- 3. Within a reasonable time after receipt of the list, the ARCHITECT will inspect to determine status of completion.
- 4. Should the ARCHITECT determine that Work is not substantially complete:
  - a. The ARCHITECT will promptly notify the CONTRACTOR in writing, giving the reasons for his determination.
  - b. CONTRACTOR shall remedy the deficiencies and notify the ARCHITECT when Work is ready for re-inspection.
  - c. The ARCHITECT will re-inspect the Work.
- 5. When the ARCHITECT concurs that work is substantially complete:
  - a. The ARCHITECT will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the CONTRACTOR'S list of items to be completed or corrected as verified by the ARCHITECT.
  - b. The ARCHITECT will submit the Certificate to the DISTRICT and to the CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.

###### B. Final Completion:

- 1. Prepare and submit a notice that Work is ready for final inspection and acceptance.
- 2. Verify the Work is complete.
- 3. Certify that:
  - a. Work has been inspected by all governing agencies and is in compliance with Contract Documents.

- b. Work has been inspected for compliance with the Contract Documents.
  - c. Work has been completed in accordance with the Contract Documents.
  - d. Equipment and systems have been tested as required and are operational.
  - e. Work is completed and ready for final inspection.
- 4. The ARCHITECT will make an inspection to verify status of completion.
  - 5. Should the ARCHITECT determine the Work is incomplete or defective:
    - a. The ARCHITECT will promptly notify the CONTRACTOR in writing, listing incomplete or defective work.
    - b. CONTRACTOR shall remedy the deficiencies promptly and notify the ARCHITECT when ready for re-inspection.
  - 6. When the ARCHITECT determines the Work is acceptable under the Contract Documents, he will request the CONTRACTOR to make closeout submittals.
- C. Closeout submittals include, but are not necessarily limited to:
- 1. Project Record Documents.
  - 2. Operation and maintenance data for items so listed in pertinent Sections of these Specifications and for other items when so approved by the ARCHITECT.
  - 3. Warranties and Guarantees.
  - 4. Keys and keying schedule.
  - 5. Spare parts, materials, extra stock to be turned over to the DISTRICT.
  - 6. Evidence of payment and release of liens, when requested by DISTRICT.
  - 7. List of subcontractors, service organizations and principal vendors, including names, addresses and telephone numbers, where they may be contacted for emergency service at all times, including nights, weekends and holidays.
- D. Final Payment:
- 1. Submit a Final Payment Request, showing all adjustments to the Contract Sum.
  - 2. Retention will be released no sooner than thirty-five (35) days and not later than sixty (60) days after Notice of Completion has been recorded with the County Recorder's Office.

1.03 NOT USED

1.04 ADJUSTING

Adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 PROJECT RECORD DOCUMENTS

- A. DISTRICT will provide one (1) set of blueline drawings and one (1) copy of the Project Manual for use during construction to record changes made during construction manually. CONTRACTORS installing underground utilities may have additional AutoCadd electronic as-built requirements as assigned in scope of work summaries.
- B. Record in concise and neat manner and on a weekly basis all actual revisions to the work:
  - 1. Changes made on the Drawings, including Clarification Drawings.
  - 2. Changes made to the Specifications.
  - 3. Changes made by Addenda.
  - 4. Changes made by Instruction Bulletins.

5. Change Orders or other authorized Modifications to the Contract.
  6. Revisions made to shop drawings, product data and samples.
- C. Store Record Documents separate from documents used for construction. Replace soiled or illegible documents.
  - D. Record information concurrent with construction progress.
  - E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
    1. Manufacturer's name, trade name, product model and number and supplier.
    2. Authorized product substitutions or alternates utilized.
    3. Changes made by Addenda and Modifications.
  - F. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
    1. Measured depths of foundations in relation to finish first floor datum.
    2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
    3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work. Identify ducts, dampers, valves, access doors and control equipment wiring.
    4. Field changes of dimension and detail.
    5. Details not on original Drawings.
    6. Refer to Scope Summaries for electronic as-built requirements.
  - G. Obtain Inspector's signed certification that Record Documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.
  - H. Submit Inspector's certified documents to ARCHITECT with claim for final Application of Payment. Fully completed record drawings are a prerequisite to final payment.
  - I. The DISTRICT, at his option, may require the preparation of a final reproducible "RECORD SET" of drawings that incorporate all changes made during the construction process to include incorporation of all change orders, addenda, field orders and "As Installed" conditions noted on the CONTRACTOR prepared record documents. The preparation and printing cost of the "RECORD SET" is not a part of the contract.

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit three (3) sets prior to final inspection, bound in 8½ x 11 inch text pages, in binders with durable covers, tabbed by specification section and/or other organizing heading.
- B. Deliver to CONSTRUCTION MANAGER'S or LEASE LEASE-BACK ENTITY'S home office, itemized and inventoried on transmittal.

1.07 WARRANTIES AND GUARANTEES

- A. Submit three (3) wet-signed originals separate from Operation and Maintenance data.
- B. Manufacturer's warranties and guarantees notwithstanding, warrant entire Work against defects in materials and workmanship for twelve (12) months from date of Substantial Completion. Warranties and guarantees between CONTRACTOR and manufacturers and CONTRACTOR and suppliers shall not affect warranties or guarantees between CONTRACTOR and DISTRICT.



- C. Execute and assemble documents from subcontractors, suppliers and manufacturers.
- D. Submit to CONSTRUCTION MANAGER or LEASE LEASE-BACK ENTITY prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

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 CONSTRUCTION MANAGER'S or LEASE LEASE-BACK ENTITY'S home office, inventoried and transmitted similar to Operation and Maintenance manuals.

1.09 UNDERGROUND WET UTILITY VIDEO

- A. Upon completion of the storm drain system, the Plumbing CONTRACTOR shall fully flush the storm drain system and confirm proper functionality. Additionally, the CONTRACTOR shall provide all services necessary to electronically view and record (video) the improvements to the storm drain system. The IOR shall witness the review and recording process. The CONTRACTOR shall turn-over two (2) copies of the documented review (video tape, DVD - media of the DISTRICT'S choice) of the storm drain system at the completion of the project.
- B. Upon completion of the sewer system, the Plumbing CONTRACTOR shall fully flush the sewer system and confirm proper functionality. Additionally, the CONTRACTOR shall provide all services necessary to electronically view and record (video) the improvements to the sewer system at all interior clean outs and main lines and all exterior building P.O.C./cleanout out to the public system P.O.C.. The IOR shall witness the review and recording process. The CONTRACTOR shall turn-over two (2) copies of the documented review (video tape, DVD - media of the DISTRICT'S choice) of the sewer system at the completion of the project.

1.10 INSTRUCTIONS TO DISTRICT'S PERSONNEL

- A. Instruct the DISTRICT'S personnel in proper operation and maintenance of all systems, equipment and similar items, which were provided as part of the work. Provide maintenance and inspection schedules that conform to manufacturer's recommendations.
- B. CONTRACTOR shall provide a schedule to the DISTRICT for approval for each of the instruction periods required.
  - 1. Organize the instruction sessions into group sizes and schedule the elapsed time for instruction in a manner to provide complete coverage of the subject matter. Video each session and provide DISTRICT with two (2) copies on DVD.
- C. Instruction sessions will be held in a DISTRICT designated area on the project site and at DISTRICT'S convenience. Amount of time required for each session shall be as specified in individual sections.
- D. Instructors shall be qualified by the product manufacturer in the subject matter presented at each session.
  - 1. Submit names of instructors and qualifications to the ARCHITECT and DISTRICT for approval thirty (30) days prior to each scheduled session.
  - 2. Substitution of instructors will not be permitted without prior approval of ARCHITECT or DISTRICT.

**PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

NOT USED

**\*\*\*END OF SECTION\*\*\***

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## SECTION 02070

### SELECTIVE DEMOLITION AND RECONSTRUCTION

#### **PART 1 -- GENERAL**

##### 1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Requirements apply to this section.

##### 1.02 SCOPE OF WORK

###### A. Work included:

1. Carefully demolish and remove from the site those items scheduled to be so demolished and removed. Furnish materials and perform labor required to execute this work as required by the Drawings and/or as specified and as necessary to complete the Contract, including, but not limited to, these major items:
  - a. Protection of existing work to remain.
  - b. Barricades, lights, signs and safety precautions required by governing codes.
  - c. Removal and disposition of all material resulting from this work, except materials to be stored for Owner.
  - d. Patching as necessary to match existing.
  - e. Saw-cutting existing concrete and asphalt concrete.
  - f. Cleaning existing items to remain.
  - g. Relocation of existing items as necessary to provide for new construction and as required by the Drawings.
  - h. Removal and/or relocation of utility lines (water, electric, sewer) as required by the Drawings, and such lines not shown but encountered in the course of the work.
  - i. Removal and/or relocation of existing irrigation lines.

###### B. Related scope: All new work

##### 1.03 GENERAL REQUIREMENTS

- A. Codes: Perform all work in accordance with the Codes listed in the Contract Documents and as required by local governing authority.
- B. All bidders submitting bids for this work shall first examine the site and all conditions and limitations thereon and thereabouts. Bid shall take into account all such conditions and limitations, whether or not the same are specifically mentioned in any of the contract documents and every bid shall be construed as including whatever sums are needed to complete the work in every part as shown, described, or reasonably required or implied, and attain the completed conditions contemplated by the Contract. The demolition drawings, including demolition work shown on construction drawings, shall be considered as a guide only. The exact extent of the demolition and reconstruction work shall be determined by a site visit and investigation.
- C. Partial removal: Items scheduled to be removed and of salvageable value to Contractor, excluding those items to be retained by the Owners, may be removed from the structure as work progresses. Salvaged items must be transported from site as they are removed.

Storage or sale of removed items on site will not be permitted.

- D. Noise control: Carry on all work in a manner which will produce the least amount of noise. Instruct all workmen in noise control procedures.
- E. Items of existing work indicated to remain upon completion of the Contract, but which require removal to complete the work, shall be carefully removed and replaced upon completion. The replaced work shall match its condition at the start of the work.

1.04 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

**PART 2 -- PRODUCTS**

Provide as necessary for proper completion of this Work.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 GENERAL PROVISIONS

- A. By careful study of the Contract Documents, determine the location and extent of selective demolition to be performed.
- B. In company with the Architect and Owner, after receiving Notice to Proceed, visit the site and verify the extent and location of selective demolition required.
  - 1. Carefully identify limits of selective demolition.
  - 2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
- C. Take into consideration as necessary work, all obvious existing conditions and installations on the site as though they were completely shown or described. Accept the site of the work as it exists and clear obstructions to the work shown.
- D. Examine the site and all conditions and limitations thereon and thereabouts. Take into account all such existing conditions and limitations whether or not the same are specifically shown or mentioned in any of the Contract Documents and include whatever is needed to complete the work in every part as shown, described or reasonably required or implied to attain the completed condition contemplated by the Contract.
- E. Prepare and follow an organized plan for demolition and removal of items.

1. Shut off, cap, and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction. Review plans, and confer with the Architect, to determine which lines are to be abandoned and which are to be kept active.
  2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid, and ready to receive new materials specified in other Sections of these Specifications.
  3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.
- F. Demolished material shall be considered to property of the Contractor and shall be completely removed from the job site. Do not store or permit debris to accumulate on the site. Burning of removed materials from demolished operations will not be permitted on site.

### 3.03 POLLUTION CONTROLS

- A. Use temporary enclosures and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

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

- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by Architect or governing authorities. Return adjacent areas to condition existing prior to start of work.

### 3.04 PROTECTION

- A. Site security: Erect wire or solid wood fences, barricades, warning lights and signs as required by the governing building code, to protect all manner of person from injury, to prevent trespassing, and to prevent theft or damage to the work.
- B. Protection of work to remain: Use stakes, barricades, and such other means of protection as required to prevent damage to existing work and equipment to remain.
- C. Protect all landscaping scheduled to remain.
- D. Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.
1. Erect temporary covered passageways as required by authorities having jurisdiction.
  2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of building structure to remain.

### 3.05 TRAFFIC

- A. Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- B. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

### 3.06 UTILITY SERVICES

- A. Maintain existing utilities, keep in service, and protect against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

3.07 REPLACEMENTS

- A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the acceptance of the Architect and at no additional cost to the Owner.
- B. Patch and fill holes caused by removal of piping and conduit in concrete slabs, and concrete walls with 3,000 psi concrete; level flush with adjacent surfaces.

3.08 ASPHALT CONCRETE PAVEMENT

All asphalt concrete pavement damaged, cut, trenched, etc. and any base material under the pavement shall be replaced and/or repaired using same specifications as existing pavement.

3.09 REMOVED MATERIALS TO BE SALVAGED OR REUSED

- A. Materials to be salvaged will be noted as such on the Construction Drawings. Existing Vertical blinds shall be included in salvage. Where room sizes match blind sizes, Contractor to include reinstallation of blinds as directed by Owner. Blinds shall be cleaned prior to reinstallation.
- B. Exercise extreme care when removing materials to be salvaged or reused. Use only mechanics skilled in the appropriate crafts.
- C. Store and protect salvaged materials until needed to be re-installed on the project, or deliver to Owner in good condition.

3.010 DEMOLITION

- A. Asphalt Concrete: Remove existing asphalt concrete and base material scheduled to be removed and prepare surface in accordance with Section 02510. All edges shall be saw-cut in straight and true lines.
- B. Concrete: Exercise due caution in cutting and/or patching concrete so as not to damage or deface that portion of the existing structure which is to remain. Should any such impairment occur, immediately clean or restore to original condition at no cost to Owner.

3.011 RECONSTRUCTION - GENERAL

- A. By careful study of the Contract Documents, determine the location and extent of reconstruction to be performed.
- B. In company with the Architect, visit the site and verify the extent and location of reconstruction required.
- C. Inspect existing surfaces to determine required surface preparation procedures.
- D. Plumbing and Electrical: In any case where a new line may tie into and extend existing line within the limits of the reconstruction Work, Contractor shall examine the entire existing line and determine whether the new Work will be adversely affected by it, and notify Architect of any such defect before tying in.

3.012 IN ALL RECONSTRUCTION WORK

Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

**\*\*\*END OF SECTION\*\*\***

## SECTION 02110

### CLEARING

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

##### 1.02 SCOPE OF WORK

Work included: The site shall be cleared and grubbed in preparation for the required Work of this Contract, as specified herein.

##### 1.03 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

##### 1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

#### **PART 2 -- PRODUCTS**

##### 2.01 MATERIALS

Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the acceptance of the Architect.

#### **PART 3 -- EXECUTION**

##### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

##### 3.02 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
- C. Protection of persons and property:



1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
  2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
  3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.03 CLEARING

Strip the site of roots, shrubs, grass, grass roots, or any other organic material. Remove roots of shrubs to depth of 24 inches and roots of trees completely. Contractor shall visit the site prior to Bid to ascertain extent of existing to be removed.

3.04 DISPOSAL

General:

1. Remove brush, grass, roots, trash, and other material from clearing operations.
2. Dispose away from the site in a legal manner - consider green recycling facilities in the area.
3. Do not store or permit debris to accumulate on the job site.

3.05 UTILITIES

- A. Coordinate with utility companies and agencies as required.
- B. Where utility cutting, capping, or plugging is required, perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

**\*\*\*END OF SECTION\*\*\***

## SECTION 02200

### EARTHWORK

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

The Work of this Section includes all earthwork required for construction of the Work. Earthwork shall include, but not be limited to the loosening, removing, loading, transporting, depositing and compacting in its final location of all materials wet and dry, as required for the purposes of completing the work specified in the Contract Documents which shall include, but not be limited to: the sawcutting and removal of A.C. pavement, P.C.C. concrete and underlying material to a subbase design grade indicated on the Plans, the installation of subbase material to a subbase grade beneath A.C. pavement and concrete infrastructure, the excavation of pipeline trenches, the installation of backfill material within pipeline trenches, excavations for above-grade and below-grade structures, backfill requirements for material to be placed beneath above-grade and below-grade structures, backfill requirements for the areas surrounding above-grade and below-grade structures, backfilling of manholes and catch basins, construction of earth embankments, backfilling of depressed areas, abandoned ponds or depressed areas resultant from demolition, the disposal of excess excavated materials, borrow of materials to make up deficiencies for fills; and all other incidental earthwork, all in accordance with the requirements of the Contract Documents.

Principal work items included in this Section are:

- A. Site preparation, clearing and grubbing.
- B. Preparation of fill areas.
- C. Excavation and controlled fill construction.
- D. Structural excavation and backfills.
- E. Disposal of surplus and/or unsuitable materials.
- F. Dust control and drainage control.
- G. Grading
- H. Clean-up.

##### 1.03 REFERENCE STANDARDS

ASTM C 131	Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 75	Practice for Sampling Aggregates
ASTM D 422	Method for Particle-Size Analysis of Soils
ASTM D 698	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49-kg) Rammer and 12-in (304.8-mm) Drop
ASTM D 1556	Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	Test Method for Moisture-Density Relations of Soils Using Rammer and Drop
ASTM D 1682	Test method for Breaking Load and Elongation of Textile Fabrics

ASTM D 2419	Test method for Sand Equivalent Values of Soil and Fine Aggregate
ASTM D 2487	Classification of Soils for Engineering Purposes
ASTM D 2922	Test Method for Density of Soil in Places by Nuclear Methods (Shallow Depth)
ASTM D 3017	Test method for Water Content of Soil and Rock in Place by Nuclear Methods
ASTM D 3776	Test Method for Mass Per Unit Area (Weight) of Woven Fabric
ASTM D 4253	Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Plate
ASTM D 4254	Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4751	Test Method for Determining the Apparent Opening Size of a Geotextile
CAL-OSHA	Title 8 General Industry Safety Orders

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 DEFINITIONS

- A. Site: The property owned by the County of Riverside.
- B. Controlled Fill: Compacted suitable fill material in all areas of the site requiring filling to grade as shown on the Plans.
- C. Structural Fill: Compacted suitable fill material which will support a structure or some part of a structure. This includes support material for P.C.C. structures and pads
- D. Structural Backfill: Compacted suitable material placed between the wall of a structure and construction excavation slope up to finished grade.
- E. Suitable Material: As specified herein shall be any material imported or excavated from the cut areas that is, in the opinion of the Engineer, suitable for use in constructing fills.
- F. Waste Excavation: Also Surplus Material. Material from project excavations which is not suitable for use in backfill or compacted fills or is in excess of that required to be used for backfill or to construct fills.
- G. Pipe Zone Backfill: Material suitable for placement below or surrounding the pipe to a given vertical distance above the pipe as required by the pipe section.
- H. Pipe Trench Backfill: Material suitable for placement from the pipe zone to finish grade or to pavement subbase material.

1.07 SITE INVESTIGATION

- A. Soil Investigation Report: A Geotechnical Report has been prepared for this project and is available for review at the Construction Manager's office. The Soils Report is not a part of the Contract Documents and is for information only.
- B. Contractor's Responsibility: The Contractor shall carefully examine the site and make all inspections necessary in order to determine the full extent of the work required to make the

completed Work conform to the Plans and Specifications. The Contractor shall satisfy himself/herself as to the nature and location of the Work, conditions, the conditions of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the Work. The Contractor shall satisfy himself/herself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered. The Contractor shall review water table conditions. Any inaccuracies or discrepancies between the actual field conditions and the Plans, or between the Plans and Specifications must be brought to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

- C. Existing Elevations: All existing elevations illustrated on the Plans are approximate. The Contractor shall recognize and acknowledge the condition that the bid lump sum price shall include all earthwork activities irrespective of the possible localized difference in contour elevations and actual ground; and that there will be no additional compensation from the Owner for earthwork changes, engineering, or field staking in this regard.

1.08 SAFETY

The Contractor shall familiarize himself/herself with, and shall at all times conform to, the regulations of the "OSHA General Industry Occupational Safety and Health Standards", and "OSHA Safety and Health Regulations for Construction Safety Orders" and "Trench Construction Safety Orders" of the State of California, Department of Industrial Relations, Division of Occupational Health and Safety. A copy of these documents shall be kept on the job site.

1.09 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

The Contractor shall comply with regulations in force at all times to prevent pollution of air and water. The Contractor shall be responsible for the construction of Project Environmental Control facilities in accordance with Section 01560 of Division 1, as applicable.

1.10 GEOTECHNICAL TESTING

*The County of Riverside shall provide the services of a qualified Geotechnical Consultant to perform the required earthwork geotechnical testing specified within the contents of the Plans and Specifications. The cost for the Geotechnical Testing shall be borne by the County of Riverside.* A copy of all tests shall be forwarded to the Engineer within four (4) days after the testing is complete. Geotechnical Earthwork Testing shall include in-situ native soil compaction testing, moisture-density soils testing, compaction testing, gradation testing, sand equivalent testing and similar testing. The Contractor shall bear the cost of retest and re-inspection of re-worked material due to faulty work.

1.11 STANDARDS FOR SOIL CLASSIFICATION, PROPERTIES AND TESTS

A. Earthwork and Embankment:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.

B. Backfill for Trench:

1. Classification - ASTM D 2487.
2. Compaction - Modified Proctor ASTM D 1557-91.
3. Field Density Test - ASTM 1556-82; D 2937-83, D 2922-81 (as approved by Engineer).

C. Structural Fill and Backfill:

1. Classification - ASTM D 2487.
2. Attenberg Limits - PlastiOwner Index and Liquid Limit ASTM D 4318.

3. Compaction - Modified Proctor ASTM D 1557-91.
4. Physical Properties - ASTM D 854, D 2216.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

D. Controlled Fills:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.
4. CBR - ASTM D 1883 (R-Value - ASTM 2844).
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

E. Earth Embankments and Berms:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91
4. CBR - ASTM D 1883.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

F. Borrow:

1. Classification - ASTM D 2487.
2. Other properties - as determined by requirements at point of use.

G. Pipe Trenches:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.
4. CBR - ASTM D 1883.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

1.12 COMPACTION

The maximum dry density, optimum moisture content and field density of each soil type used in the controlled compacted fill shall be determined as stated in Section 1.09 above.

1.13 INSPECTION

Observation and compaction tests shall be obtained by the Geotechnical Consultant engaged by the County of Riverside during the filling and compacting operations.

The Geotechnical Consultant shall be required to be present at the site on a full-time basis for several work activities and conduct intermittent testing for other work activities. The following chart indicates the earthwork items which will require full time or intermittent geotechnical testing.

ITEM

GEOTECHNICAL

<u>NO.</u>	<u>ITEM</u>	<u>TESTING</u>
1.	Excavation and scarification process	Full-time Inspection

<u>ITEM NO.</u>	<u>ITEM</u>	<u>GEOTECHNICAL TESTING</u>
2.	Backfill for Water Pipe, Storm Drainage Pipe, Sanitary Sewer Pipe and Irrigation Pipe Trenches. The Specification requires that the backfill be compacted in lifts. Additional lifts shall not be allowed to be placed until previous lifts have been satisfactorily tested for compaction.	Intermittent Testing
3.	Backfill for Electrical Conduit Trenches. The specification requires that the backfill be compacted in lifts. Additional lifts shall not be allowed to be placed until previous lifts have been satisfactorily tested for compaction. This requirement shall be strictly enforced and the Contractor shall be required to remove all backfill from the electrical conduit trench if this specification is violation.	Intermittent Testing
4.	Over excavation and recompaction of subgrade material	Intermittent Testing
5.	Installation of Class 2 Base for Site Grading.	Intermittent Testing
6.	Installation of Granular Sand for P.C.C. Infrastructure Subbase Material	Intermittent Testing
7.	Installation of Granular Sand for Water Pipelines, Stormwater Drainage Pipelines and Sanitary Sewer pipelines.	Intermittent Testing
8.	Existing Retention Basin Preparation	Intermittent Testing
9.	Building Pad Preparation	Intermittent Testing

1.14 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

- A. Reports:  
None Required.
- B. As-Builts:  
Comply with the requirements of Section 01770 – Contract Closeout.
- C. Operation and Maintenance Data:  
None required.
- D. Extra Materials:  
None required.
- E. Extended Warranty:  
Comply with the requirements of General Condition Article 3.5 and Section 01740.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

- A. Engineered Fill Material: Materials for engineered fill shall consist of any material imported or excavated from the *cut areas* that, in the opinion of the Engineer, is appropriate for use in constructing fills. The on-site soils are suitable for use as compacted fill. Native and imported materials should be placed in lifts no greater than 8 inches in loose thickness, uniformly moisture conditioned to between optimum moisture and 4% over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density, except in the building pad when it shall be at least 95%.

Imported fill soils should consist of non-expansive (Expansion Index less than 10) granular soils that meet the USCS classifications of SM, SP-SM, with a maximum rock size of 3 inches, and 5 to 35% passing the No. 200 sieve. The geotechnical engineer should approve the fill soils prior to importing.

In areas other than the building pad which are to receive concrete slabs and asphalt concrete pavement, the ground surface should be over-excavated to a depth of 12 inches, uniformly moisture conditioned to  $\pm 2\%$  over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

Trench Backfill: On-site soil free of debris, vegetation, and other deleterious matter may be suitable for use as utility trench backfill. Backfill within roadways should be placed in layers not more than 6 inches in thickness, uniformly moisture conditioned to between optimum moisture and 4% over optimum moisture, and mechanically compacted to a minimum of 90% of the ASTM D1557 maximum dry density except for the top 12 inches of the trench which shall be compacted to at least 95%. Trench backfill should only be placed and compacted after encapsulating buried pipes with suitable bedding and pipe envelope material.

Representative samples of material to be used for fill shall be tested in the laboratory by the Geotechnical Engineer in order to determine the maximum density, optimum moisture content, sand equivalent and classification of the soil. In addition, the Geotechnical Engineer shall determine the approximate bearing value of a recompacted saturated sample by direct shear tests or other tests applicable to the particular soil.

During grading operations, soil types other than those analyzed in the report of the soil investigation may be encountered by the Contractor. The Geotechnical Engineer shall be consulted to determine the suitability of these soils. The Contractor shall bear the expenses of the Geotechnical investigation.

- B. Structural Fill Material: Materials shall consist of crushed rocks, Class 2 Base, granular sand, decomposed granite (crusher fines) or fine gravel either imported or manufactured from excavated onsite rocky material.

The crushed aggregate, granular sand, decomposed granite (crusher fines) or fine gravel shall be uniformly graded. The following gradations shall apply:

1. Granular Sand:

Clean granular sand free of clay, shale and deleterious material. Sand shall be compacted to 95 percent of maximum density at optimum water content per ASTM D 1557 unless otherwise noted on the Plans. The material shall conform to a sand equivalent of 30 or greater. The maximum amount of material passing the Number 200 sieve shall be 5 percent. The sand shall conform to the following gradation percentages:

<u>SIEVE SIZE</u>	<u>GRANULAR SAND</u> <u>% PASSING</u>
3/8"	100
No. 4	98-90
No. 8	90-75
No. 10	75-60
No. 16	60-50
No. 30	50-38
No. 40	38-29
No. 50	29-19
No. 100	19-7
No. 200	5-0

The Contractor shall supply a 5-gallon sample of sand material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The gradation, sand equivalent and maximum density of the sand material shall be determined. The test results shall be forwarded to the Engineer. The cost of testing shall be incurred by the Contractor. The gradation of the granular sand shall be determined and the test results forwarded to the Engineer prior to the delivery of the granular sand material to the Site. Prior to the placement of sand the native subbase grade shall be checked and approved by the Engineer.

Crusher fines shall be allowed to be utilized in lieu of sand if approved by the Engineer.

2. Crusher Fines:

Crusher fines shall consist of decomposed granite indigenous to the Imperial Valley. Crusher fines utilized for this project shall conform to the following gradation requirements:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
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5/8"	100
No. 4	80-100
No. 8	50-85
No. 30	30-50
No. 200	4-15

The sand equivalent shall be 20 or greater.

The Contractor shall supply a five-gallon sample of crusher fines material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The Gradation and Maximum Density of the crusher fines material shall be determined. The test results shall be forwarded to the Engineer for approval prior to the delivery of the material to the Site. The cost of the testing shall be incurred by the Contractor.

3. Fine Gravel:

Clean fine gravel free of clay, shale and deleterious material. Fine gravel shall be compacted with a plate compactor with one pass in maximum 1 foot lifts. Additional lifts shall not be added until previous lifts shall have been passed over by the plate compactor. The maximum amount of material passing the 1/4" Sieve shall be 2 percent. The fine gravel shall conform to the following gradation percentages:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
3/8"	100
1/4"	0-2

The Contractor shall supply a five-gallon sample of fine gravel material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The Gradation and Maximum Density of the fine gravel material shall be determined. The test results shall be forwarded to the Engineer for approval prior to the delivery of the material to the Site. The cost of the testing shall be incurred by the Contractor.

4. Class 2 Base:

The Class 2 Base material shall conform to Caltrans Section 26, Latest Edition, for 25mm maximum base material. The gradation requirements are as follows:

<u>SIEVE SIZE</u>	<u>CLASS 2 BASE</u> <u>% PASSING</u>
1"	100
3/4"	87-100
No. 4	30-65

No. 30

5-35

No. 200

0-12

The sand equivalent shall be 25 or greater. An angular aggregate is to be used. Class 2 Base material shall be compacted to 95 percent of maximum density according to ASTM D 1557, unless otherwise noted on the Plans or Details. The tolerance for the Class 2 Base between design subgrade elevation and actual subgrade elevation as constructed in the field shall be plus or minus 0.02 feet as referenced from the design subgrade. Prior to the placement of Class 2 Base, the native subbase grade shall be checked and approved by the Engineer. The native subbase grade shall be within plus or minus 0.05 feet of native subbase design grade prior to the placement of Class 2 Base.

The Contractor shall supply a 5-gallon sample of the Class 2 Base to the material testing laboratory within four (4) days of the Notice to Proceed. The material shall be delivered to the testing laboratory to determine the maximum density, gradation, R-value, sand equivalent and durability index of the Class 2 Base. A copy of the test results shall be forwarded to the Engineer by the Geotechnical Consultant for review. The gradation of the Class 2 Base shall be determined and the test results forwarded to the Engineer for approval prior to the delivery of the Class 2 Base material to the Site. *Class 2 Base utilizing recycled materials shall not be allowed.*

- C. Structural Backfill Material: Structural Backfill Material shall consist of the same material listed with the Structural Fill Material item above.

### PART 3 – EXECUTION

#### 3.01 GENERAL

The Work performed under this Specification shall be constructed to the lines, grades, elevations, slopes and cross-sections indicated on the Plans, specified herein, and/or directed by the Owner. Slopes, graded surfaces, and drainage features shall present a neat uniform appearance upon completion of the Work.

It shall be the Contractor's responsibility (1) to maintain adequate safety measures and working conditions; and (2) to take all measures necessary during the performance of the Work to protect the entire project area and adjacent properties which would be affected by this Work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the Owner. It shall be the Contractor's responsibility to maintain completed areas until the entire project area is in satisfactory compliance with the job specification.

Utility lines and structures indicated on the Plans which are to remain in service shall be protected by the Contractor from any damage as a result of his/her operation. Where utility lines or structures not shown on the Plans are encountered, the Contractor shall report them to the Owner before proceeding with the Work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by his/her operations.

#### 3.02 REMOVALS, CLEARING AND GRUBBING

- A. Clearing: Clearing consists of the complete removal of objectionable materials and obstructions above and below the ground surface including tree stumps, brush, grass, vegetative matter and other objectionable materials within the project limits. All brush and organic material shall be removed before placing any earth fills. It shall be the Contractor's responsibility to save and protect all trees that lie outside the construction area.
- B. Grubbing: Grubbing consists of the complete removal of stumps, including tap roots or lateral roots 1-1/2 inches or more in diameter, and the removal of brush, grass or weeds to depths below the natural ground as specified herein. Stumps shall be grubbed to a depth of 3 feet

and grass or weeds shall be grubbed to a depth of 6 inches below the natural ground surface, or to the depths as determined in the field by the Engineer at the time of construction.

- C. Protection: Existing items not designated to be demolished or removed shall be protected from damage. Any such item damaged by the Contractor shall be restored or replaced immediately at the Contractor's expense.
- D. Debris and Waste Material: All debris and waste material resulting from demolition, clearing and grubbing shall be removed from the site and disposed of by the Contractor.

### 3.03 DUST CONTROL

The Contractor shall take all steps possible to prevent and reduce dust arising from the construction activity. Section 01560 Project Environmental Controls elaborates on dust control requirements.

### 3.04 CARE OF DRAINAGE WATER

Contractor shall take care of drainage water from the construction operations, and of stormwater and/or wastewater reaching the construction area from any source, so that damage is not incurred to the excavation, pipe or structures. The Contractor shall be responsible for any damages to persons or property on or off the Site due to such drainage water or to the interruption or diversion of such stormwater or wastewater on account of his/her operation.

Such grading shall be accomplished as may be necessary to prevent surface water from flowing into excavations, and any water accumulating therein shall be removed by pumping or by other reviewed methods.

Protection of the site during construction shall be the responsibility of the Contractor. Completion of a portion of the project shall not preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete.

### 3.05 EXCAVATION

- A. General: The Contractor shall perform all excavation necessary or required as illustrated on the Plans. The excavation shall include the removal and disposal of all earth materials of whatever nature encountered, which shall include both rock excavation and common excavation when both are present, and shall include the furnishing, placing and maintaining of shoring and bracing necessary to safely support the sides of the excavations. The Work shall also include all pumping, ditching and other required methods for the removal or exclusion of water. See Division 2 Section 02150 Sheeting, Shoring and Bracing.
- B. Excavation for Structures: Structure excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the Work. The removal of such materials shall conform to the lines and grades shown on the Plans and/or herein specified. Temporary structure excavations shall at all times conform to the Requirements of the State of California, Division of Occupational Health and Safety, and pertinent requirements contained in referenced Geotechnical Investigation Report and Specification Section 02150 - Sheeting, Shoring and Bracing.

All trench excavations should conform to Cal/OSHA requirements for Type C soil. The contractor is solely responsible for the safety of workers entering trenches. Temporary excavations with depths of 4 feet or less may be cut nearly vertical for short duration. Temporary slopes should be no steeper than 1.5H:1V. Sandy soil slopes should be kept moist, but not saturated, to reduce the potential of raveling or sloughing.

Trench excavations deeper than 4 feet will require shoring or slope inclinations in conformance to Cal/OSHA regulations for Type C soil. Surcharge loads of stockpiled soil or construction materials should be set back from the top of the slope a minimum distance equal to the height of the slope. All permanent slopes should not be steeper than 3:1 to reduce

wind and rain erosion. Protected slopes with ground cover may be as steep as 2:1. However, maintenance with motorized equipment may not be possible at this inclination.

**Existing Retention Basin Preparation:** Loose soils at the bottom of the retention basin should be removed. The exposed natural sub-grade should be scarified to a depth of 8 inches, uniformly moisture conditioned to  $\pm 2\%$  over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density. Fill should be placed and compacted on benches cut into the side slopes of the basin.

**Building Pad Preparation:** The existing surface soils within the building pad area, outside the top of the basin side slopes, should be removed to 4 feet below the lowest foundation grade or 5 feet below the existing grade (whichever is deeper), extending five feet beyond all exterior wall/column lines. The exposed sub-grade should be scarified to a depth of 8 inches, uniformly moisture conditioned to  $\pm 2\%$  over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

Loose soils existing below depths of 5 feet, such as those found to a depth of 10 feet within the south-east corner of the proposed building pad area (refer to soil boring B-4 location of the Geotechnical Investigation Report), will require removal and replacement with compacted fill. After the over-excavation of the loose soils, a minimum related compaction of 85% of the exposed soils in the building limits and five feet laterally beyond, should be present prior to placement of engineered fill. If 85% relative compaction is not encountered, then additional removals will be required until 85% relative compaction is attained. After verification of 85% relative compaction of the exposed sub-grade soils, the engineered building pad should be constructed in accordance with above paragraph.

**Moisture Control and Drainage:** The moisture condition of the building pad should be maintained during trenching and utility installation until concrete is placed or should be rewetted before initiating delayed construction. If soil drying is noted, a 2 to 3 inch depth of water may be used in the bottom of footings to restore footing subgrade moisture and reduce potential edge left.

**Auxiliary Structures Foundation Preparation:** Auxiliary structures such as free standing or retaining walls should have the existing soil beneath the structure foundation prepared in the manner recommended for the building pad except the preparation needed only to extend 3 feet below and beyond the footing.

Contingent upon locations, all surfaces to receive compacted fill shall be scarified, brought to near optimum moisture content and compacted to required percentage of relative compaction as specified herein unless otherwise indicated on the Plans.

Rough grade excavations for structures and footings will be inspected by the Geotechnical Engineer to verify that the excavations extend into satisfactory soils and are free of loose and disturbed materials.

### 3.06 CONTROLLED FILL

- A. **General:** Controlled fill shall consist of native material, granular sand, Class 2 Base, crusher fines or other material as indicated on the Plans. The subbase grade shall be excavated to within plus or minus 0.05 feet of design grade prior to the placement of controlled fill. The design subbase grade shall be field verified and approved by the Engineer prior to the placement of the controlled fill material. The Engineer shall determine the number and location of points to check for the subbase grade elevation compliance. Prior to the Engineer's inspection of the subbase grade, the Contractor shall establish bluetop stakes on a 20-foot by 20-foot grid across the area controlled fill is to be placed.

If the controlled fill consists of native material it shall be placed in maximum 8-inch lifts and compacted to 90 percent of maximum density (except in the building pad when it shall be at least 95%) at optimum water content per ASTM D 1557 unless otherwise required by the Geotechnical Report. Additional native soil lifts shall not be placed until previous lifts have

attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

Granular sand, Class 2 Base and crusher fine controlled fill material shall be placed in maximum 8-inch lifts and compacted to 95 percent of maximum density at optimum water content per ASTM D 1557. Additional granular sand, Class 2 Base or crusher fine lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

- B. Preparing Areas To Be Filled: All vegetation and objectionable material shall be removed by the Contractor from the surface upon which the fill is to be placed and any loose and porous soils shall be removed or compacted to a depth specified by the Geotechnical Engineer. The surface shall then be plowed or scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches shall be excavated into the adjacent slope area. Keying and benching shall be sufficient to provide at least 6-foot wide benches and a minimum of 4 feet vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill shall be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Engineer. Material generated by the benching operation shall be moved sufficiently away from the bench area to allow for the review of the horizontal bench prior to placement of fill.

After the foundation for the fill has been cleared, plowed or scarified, it shall be disced or bladed by the Contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted as specified.

- C. Placing, Spreading and Compacting Fill Material: The fill material shall be placed by the Contractor in thin layers that when compacted shall not exceed 8 inches for granular sand, Class 2 Base, crusher fines and native material. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Geotechnical Engineer, water shall be added by the Contractor until the moisture content is increased or decreased as required for the specified compaction.

When the moisture content of the fill material is above that required by the Geotechnical Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density. Compaction shall be accomplished by sheepfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet (5'). If the desired compaction is not achieved, the existing slope shall be overexcavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It

shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent watercourses.

3.07 STRUCTURE FILL AND STRUCTURE BACKFILL MATERIAL

- A. Placement of Structure Backfill: Before beginning backfilling, all foreign material, including water, shall be removed from the space to be backfilled and the area to be backfilled shall be inspected and approved by the Geotechnical Engineer. Sloping sides of the excavated space shall be stepped to prevent wedging action of the backfill against the structure. No backfill shall be placed around or upon any structure until it is proven that the concrete has attained satisfactory strength in accordance with the Division 3 of Technical Specifications and that the structure as a whole is adequate to receive backfill. The compressive strength shall be determined by tests on representative cylinders cured under conditions similar to those prevailing at the site.
- B. General: Structure fill and structure backfill shall consist of granular sand, Class 2 Base, crusher fines or other material as indicated on the Plans. The subbase grade shall be excavated to within plus or minus 0.05 feet of design grade prior to the placement of structure fill and structure backfill. The design subbase grade shall be field verified and approved by the Engineer prior to the placement of the structure fill or structure backfill material. The Engineer shall determine the number and location of points to check for the subbase grade elevation compliance. Prior to the Engineer's inspection of the subbase grade the Contractor shall establish bluetop stakes on a 20-foot by 20-foot grid across the area which structure backfill is to be placed.

Granular sand, Class 2 Base and crusher fine structure fill and structure backfill material shall be placed in maximum 8-inch lifts and compacted to 95 percent of maximum density at optimum water content per ASTM D 1557. Additional granular sand, Class 2 Base or crusher fine lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

- C. Placing, Spreading and Compacting Fill Material: The structural fill and structural backfill material shall be placed by the Contractor in thin layers that when compacted shall not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Geotechnical Engineer, water shall be added by the Contractor until the moisture content is as required for the specified compaction.

When the moisture content of the fill material is above that required by the Geotechnical Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density. Compaction shall be accomplished by sheepfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet (5'). If the desired compaction is not achieved, the existing slope shall be overexcavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent watercourses.

3.08 ESTABLISHMENT OF SUBBASE GRADE, SUBGRADE OR FINISH GRADE

Finish Grade is defined as the finish surface grade. For instance, the top of an A.C. or P.C.C. paved surface is referred to as finish grade.

Subgrade is defined as the grade of the material beneath the finish surface. For instance, the top of Class 2 Base grade beneath an A.C. or P.C.C. paved surface is referred to as subgrade.

Subbase is defined as the grade of the material beneath the base material. For instance, the top of native material beneath the Class 2 Base subgrade material of an A.C. or P.C.C. paved roadway is the subbase grade.

Finish grade surfaces are to be graded to within plus or minus 0.02 feet from design grade as illustrated on the Grading Plans. The Contractor shall place bluetop stakes on a 20-foot x 20-foot grid across the top of the finish grade surface during final grading. A bluetop stake is defined as a stake placed at the finish grade elevation within the tolerance of plus or minus 0.02 feet of finish grade. The Engineer shall obtain elevations across finish grade surfaces at locations determined by the Engineer prior to accepting and approving the finish grade surfaces. The Contractor shall rework areas not conforming to the finish surface grade tolerance as required. Work items to occur after the establishment of finish grade shall not occur until the Engineer has approved the finish grade.

Subgrade surfaces are to be graded to within plus or minus 0.02 feet from design grade as illustrated on the Grading Plans. Bluetop stakes shall be placed on a 20-foot x 20-foot grid pattern across rectangular or square facilities such as parking lots and access roads. The Engineer shall obtain elevations across the subgrade surfaces at locations determined by the Engineer prior to accepting and approving the subgrade surfaces. The Contractor shall rework areas not conforming to the subgrade tolerance as required. Work items to occur after the establishment of subgrade shall not occur until the Engineer has approved the finish subgrade.

Subbase surfaces are to be graded to within plus or minus 0.05 feet of subbase design grade as illustrated on the Grading Plans. Bluetop stakes shall be placed on a 20-foot x 20-foot grid pattern across rectangular or square facilities such as parking lots, access roads, sludge beds, structures, building pads, etc. The Engineer shall obtain elevations across the subbase surfaces at locations determined by the Engineer prior to accepting and approving the subbase surfaces. The Contractor shall rework areas not conforming to the subbase design grade tolerance as required. Work items to occur after the establishment of subbase grade shall not occur until the Engineer has approved the subbase grade.

3.09 COMPACTION TEST SCHEDULE

The following compaction test(s) shall apply to this project:

ITEM

NO.

ITEM

1. Excavation and scarification process

2. Backfill for Water Pipe, Storm Drainage Pipe, Sanitary Sewer Pipe and Irrigation Pipe Trenches. The Specification

requires that the backfill be compacted in lifts. Additional lifts shall not be allowed to be placed until previous lifts have been satisfactorily tested for compaction.

3. Backfill for Electrical Conduit Trenches. The specification requires that the backfill be compacted in lifts. Additional lifts shall not be allowed to be placed until previous lifts have been satisfactorily tested for compaction. This requirement shall be strictly enforced and the Contractor shall be required to remove all backfill from the electrical conduit trench if this specification is violation.
4. Over excavation and Recomaction of Subgrade Material
5. Installation of Class 2 Base for Site Grading.
6. Installation of Granular Sand for P.C.C. Infrastructure Subbase Material
7. Installation of Granular Sand for Water Pipelines, and Stormwater Drainage Pipelines and Sanitary Sewer pipelines.
8. Existing Retention Basin Preparation
9. Building Pad Preparation

### 3.10 CLEAN-UP

Upon completion of Work in this Section, all rubbish and debris shall be removed from the site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a clean, neat and acceptable condition.

**\*\*\*END OF SECTION\*\*\***



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**SECTION 02220**  
**EXCAVATING, BACKFILLING AND COMPACTING**

**PART 1 -- GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

Work included: Excavate for foundations, backfill and compact as necessary as shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the Geotechnical Engineer of Record engaged by the Owner.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Submit proposed Products to Architect.

**PART 2 -- PRODUCTS**

2.01 SOILS MATERIALS: FILL AND BACKFILL

- A. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps larger than 2" in their greatest dimension, and equal to the on-site material.
- B. Fill material is subject to the acceptance of the Geotechnical Engineer of Record, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter.
- C. Imported materials shall be tested and accepted by the Geotechnical Engineer of Record before being brought to the site.
- D. Cohesion-less material used for structural backfill: Provide sand free from organic material and other foreign matter, and as accepted by the Geotechnical Engineer of Record.
- E. Provide granular base under building slabs. Fine aggregate shall comply with requirements of Section 03300 of these Specifications.

2.02 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

## **PART 3 -- EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.
- E. If the Contractor encounters conditions at the site that (a) are materially different from those indicated in the contract plans or in specifications, or (b) could not have been reasonably anticipated as inherent in the work of the character provided in the contract, the Contractor shall immediately notify the Owner verbally and in writing within 24 hours. This notification shall be a condition precedent before any negotiations for "changed or differing site conditions" can proceed. If the Owner determines that conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, then negotiations shall commence between Owner and Contractor to provide equitable adjustment to Owner or Contractor resulting therefrom.

### **3.02 PROCEDURES**

- A. Utilities:
  - 1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
  - 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
  - 3. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Architect and secure his instructions.
  - 4. Do not proceed with permanent relocation of utilities until written instructions are received from the Architect.
- B. Protection of persons and property:
  - 1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or within public access.
  - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
  - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
- C. De-watering:
  - 1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
  - 2. Keep excavations and site construction area free from water.
- D. Use means necessary to prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to adjacent areas at all times.

3.03 EXCAVATING

- A. Perform excavating of every type of material encountered within the limits of the Work to the dimensions and elevations indicated and specified herein.
- B. Excavated materials: Transport to, and place in, fill or embankment areas within the limits of the Work; dispose of such excess material away from the site in a location arranged and paid for by the Contractor.
- C. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.
- D. Unauthorized excavation:
  - 1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Architect or the Soils Engineer.
  - 2. Under footings, foundations, or retaining walls:
    - a. Sub-excavate and re-compact earth materials in the affected area as directed by the Soils Engineer.
    - b. When acceptable to the Soils Engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
  - 3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Soils Engineer.
- E. Stability of excavations:
  - 1. Slope sides of excavations to 1:1 or flatter, unless otherwise directed by the Soils Engineer.
  - 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
  - 3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- F. Shoring and bracing:
  - 1. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
  - 2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
  - 3. Carry shoring and bracing down as excavation progresses.
- G. Excavating for structures:
  - 1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft.
  - 2. Where concrete is anticipated to be placed directly against earth surfaces, widen excavations by one inch at each contact surface beyond that specified on the plans.
  - 3. In excavating for footings and foundations, take care to create accurate and straight planes and shapes.
    - a. Excavate by hand tools to final grade where necessary.
    - b. Trim bottoms to required lines and grades to leave solid base to receive concrete.

H. Excavating for pavements:

1. Cut surface under pavements to comply with cross-sections, elevations, and grades.

3.04 FILLING AND BACKFILLING

A. General:

1. For each classification listed below, place acceptable soil material in layers to required subgrade elevations.
2. In excavations, use satisfactory excavated or borrowed material.
3. Under asphalt pavements, use sub-base materials.

B. Placing and compacting:

1. Place backfill and fill materials in layers not more than 8" in loose depth.
2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
3. Compact each layer to required percentage of maximum density for area.
4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

C. Backfill excavations as promptly as progress of the Work permits but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing and waterproofing.
2. Inspecting, testing, approving, and recording locations of underground utilities.
3. Removing concrete formwork.
4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removing trash and debris.
6. Placement of horizontal bracing on horizontally supported walls.

3.05 COMPACTING

A. Control soil compaction for any areas disturbed during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557. Soils Engineer's recommendations found in the Soils Report will take precedence.

B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the Soils Engineer.

1. Structures: Compact each layer of fill and material or backfill material at 90% of maximum density.
2. Lawn and unpaved areas:
3. Compact the top 8" of subgrade and each layer of fill material or backfill material at 90% of maximum density.
4. Compact the upper 12" of filled areas, or natural soils exposed by excavating, at 85% of maximum density.

5. Paving: Compact each layer of fill material or backfill material at 95% of maximum density.

C. Moisture control:

1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the Soils Engineer.

3.06 GRADING

A. General:

1. Smooth the finished surfaces within specified tolerance.
2. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.

B. Grading outside building lines:

1. Grade areas adjacent to buildings to achieve drainage away from the structures, and to prevent ponding.
2. Finish the surfaces to be free from irregular surface changes, and:
  - a. Shape the surface of areas scheduled to be under walks to lines, grade, and cross-section, with finished surface not more than 0.10 ft. above or below the required subgrade elevation.
  - b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross-section, with finished surface not more than 0.05 ft. above or below the required subgrade elevation.

3.07 MAINTENANCE

A. Protection of existing graded areas:

1. Protect existing graded areas from traffic and erosion, and keep free from trash and weeds;
2. Repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances.

- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

**\*\*\*END OF SECTION\*\*\***

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**SECTION 02510**  
**ASPHALT CONCRETE PAVING**

**PART 1 – GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SCOPE OF WORK

Requirements specified in the Specifications form a part of this Section. Provide labor, equipment, tools and materials to accomplish asphalt concrete paving as indicated on the Plans and/or on the Proposal forms.

1.03 PAVEMENT REMOVAL AND REPLACEMENT

A. General: Pavement removal and replacement for all public roads, including aggregate base and temporary paving where required, shall comply with all requirements of the agency issuing the Encroachment Permit. In roads established under formation of a special road district, the specifications of the Encroachment Permit shall apply. Any private roads and streets, including driveways in which the surface is removed or damaged, shall be restored to the original grade and crown by the Contractor in accordance with the paving requirements described herein. Removed or damaged sections shall be restored with the type of improvements (or better) conforming to that which existed at the time the Contractor entered upon the work.

It shall be the responsibility of the bidder to satisfy himself as to the existing pavement sections prior to submitting his bid.

B. Pavement Cutting: Pavement shall be cut to a straight edge parallel to the pipe alignment, curb and gutter, barrier curb, pavement edge, etc., prior to excavation. Method of pavement cutting shall be sawcutting for the full depth of the pavement. Under no circumstances shall excavation be started prior to sawcutting of the pavement. If the adjacent pavement is disturbed during the Contractor's operation, the pavement shall be recut on straight lines to remove the damaged pavement before resurfacing. Portland cement concrete pavement and sidewalk shall also be saw cut full depth as required.

C. Asphalt Concrete Pipe Trench Pavement: Where required by the agency issuing the Encroachment Permit or other agency having jurisdiction, and where specified in the Contract Documents, an asphalt concrete cap shall be placed in the area of the pipe trench or pipe excavation area. The installation of the asphalt concrete pavement shall be in accordance with the specifications and policies of the agency having jurisdiction. In the event the agency requirements conflict with the Plan requirements, the most stringent will apply.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the bid Package Section 00003.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 TEMPORARY PAVEMENT

Install temporary pavement in accordance with the requirements of the agency issuing the Encroachment Permit. Steel plates may be allowed to cover excavation areas within road right of ways as approved by the governing agency and Engineer.



1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

None required.

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

Comply with the requirements of General Condition Article 3.5 and Section 01740.

## **PART 2 – PRODUCTS**

### 2.01 ASPHALT CONCRETE PAVING

A. MIX: Caltrans, Type A, ¾ inch aggregate gradation except for parking lot areas. Parking Lot areas shall use Caltrans Type A ½ inch aggregate gradation.

B. THICKNESS: 3" min.; or greater as specified on the Plans.

C. AGGREGATE SIZE: ¾" (1/2 inch aggregate gradation for parking areas) per Caltrans Section 39.

D. ASPHALT CONTENT: 4% to 8% by weight per the A.C. Mix Design.

E. PRIME COAT: Per Caltrans Section 39-4.02.

### 2.02 ASPHALT CONCRETE CAP

A. MIX: Caltrans, Type A, ¾ inch aggregate gradation except for parking lot areas. Parking Lot areas shall use Caltrans Type A ½ inch aggregate gradation.

B. THICKNESS: 3" or greater as specified on the Plans.

C. AGGREGATE SIZE: ¾" aggregate gradation maximum, fine (1/2 inch aggregate gradation for parking area).

### 2.03 FOG SEAL

A. SPECIFICATION: Caltrans Section 37.

B. MATERIAL: Slow setting, mixing type asphaltic emulsion per Caltrans Section 94-1.01B.

### 2.04 ASPHALT CONCRETE BERMS (Not Applicable)

## **PART 3 – EXECUTION**

### 3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Verify that specified items may be installed in accordance with the approved design.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 ASPHALT CONCRETE PAVING

- A. Asphalt Concrete shall be applied with a vibratory machine. The grade of all asphalt bitumen shall be PG 70-10. The minimum bitumen shall be in accordance with the approved mix design. The Asphalt Concrete shall be compacted to 95 percent of maximum density per ASTM D-1559. The temperature of the asphalt when delivered to the application site shall range between 285° F and 359° F. The finished surface shall be within ± 0.02 feet of finish design grade with maximum high and low variance occurring in a maximum of 10 horizontal feet.
- B. Rollers of the vibratory, steel wheel or pneumatic-tired type may be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the bituminous mixture. The number, type and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment which causes excessive crushing of the aggregate shall not be permitted.
- C. After spreading, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor.
- D. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture. Any displacement occurring as a result of reversing the direction of the roller or from any other cause shall be corrected at once.
- E. Rolling shall continue until the roller marks are eliminated, the surface is of uniform texture and true to grade and cross-section and the required field density is obtained.
- F. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened, but excessive water will not be permitted.
- G. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers.
- H. Any mixtures that become loose and broken, mixed with dirt, or in any way defective, shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense.
- I. The Contractor shall pay for all costs associated with the preparation of the Marshall Mix Design, compaction tests and extraction/gradation tests required for this project. The Contractor shall incur all costs relative to the preparation of the Marshall Mix Design. The density testing relative for this project is to be performed by the Owners Material Testing Consultant.
- J. A sample of the bituminous mix shall be obtained each morning pavement operations are occurring. The sample shall be obtained by the material testing consultant. The maximum density of the sample shall be determined. The results of the test shall be used to base the field density tests against. An extraction from the sample shall be taken to determine the percentage of bitumen in the mix. The gradation of the sample shall also be obtained. Density tests shall be taken during the rolling operation. The pavement shall continue to be rolled until the desired density is obtained. The costs associated with the testing shall be borne by the Contractor. The Contractor shall provide two (2) sets of test reports to the Engineer. A field technician provided by the material testing consultant shall be made available during the asphalt placement to continuously monitor the density of the asphalt if so required by the Engineer.
1. Application: Mixing transporting and placing of asphalt concrete shall be in accordance with all applicable provisions of Caltrans Section 39. Asphalt concrete shall not be placed when the atmospheric temperature is below 60°F, or during unsuitable weather.

2. Repairs: Deficient paving and/or low areas with inadequate drainage and damaged paving due to subgrade failure, inadequate trench compaction, etc., shall be repaired by the Contractor at no additional cost to the Owner.

### 3.03 ASSOCIATED PAVING RELATED WORK

- A. Manhole Covers: Adjust sewer and storm drain manhole covers three (3) inches below the finish design pavement surface prior to the installation of A.C. pavement. Raise the manhole covers to finish pavement grade after paving operations are completed. Place a one (1) foot wide, one (1) foot deep 4,000 PSI concrete ring concentric around the manhole level with the finish pavement surface.
- B. Valve Covers: Adjust water valve risers and covers three (3) inches below the finish design pavement surface prior to the installation of A.C. pavement. Raise the valve risers and covers to finish pavement grade after paving operations are completed. Place an eight (8) inch wide, eight (8) inch deep 4,000 PSI concrete ring concentric around the water valve riser and cover level with the finish pavement surface.
- C. Striping: Replace the traffic striping and pavement markers over the areas receiving the overlay.
- D. Traffic Signs: Replace traffic signs temporarily removed during the construction work.
- E. Payment: Payment for all associated paving related work as described herein shall be included in the appropriate bid item(s) indicated on the Proposal forms and no additional compensation shall be made therefore.

### 3.04 FOG SEAL

- A. Application: Apply fog seal at a rate of 0.06 to 0.10 gallons per square yard of surface area.
- B. Fog Seal Schedule: Apply fog seal not less than fourteen (14) days following placement of asphalt concrete surfacing.

### 3.05 PAVING SCHEDULE

Unless otherwise approved by the Engineer, all permanent paving shall commence only after construction of all other contract work is completed.

### 3.06 APPLICATION OF SEAL COAT

- A. Prepare the surfaces, mix the seal coat material, and apply in accordance with Standard Specification, Section 302-4.
- B. Apply one coat of the specified sealer.
- C. Achieve a finished surface seal which, when dry and thoroughly set, is smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges and other surface irregularities.

**\*\*\*END OF SECTION\*\*\***

**SECTION 02550**  
**SITE CONCRETE WORK**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

**1.02 SCOPE OF WORK**

Complete site concrete work as shown on drawings and specified herein.

1. Final Subgrade Preparation
2. Forms for this Work
3. Placing Concrete
4. Concrete Finishing
5. Concrete Curing
6. Reinforcement

**1.03 QUALITY ASSURANCE**

**A. Reference Standards:**

1. CBC: All work shall conform to the requirements of the current edition.
2. County of Riverside.
3. City of Indio.

**B. Tests and Inspection:**

1. Tests shall be performed as required by the Inspector.
2. Contractor shall notify testing laboratory a minimum of forty-eight (48) hours before pouring of concrete.
3. A minimum of three (3) test cylinders will be taken by molded cylinder method for each fifty (50) yards of each grade of structural concrete. A minimum of one set of cylinders shall be taken for each day placement of each grade.

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.05 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Contractor shall submit all necessary Product Data and a complete list of material sources for all products to be incorporated into the project for review and approval of the Architect. The Performance of all Mix Designs shall be established either by stamped by an individual licensed to specify concrete mix designs engaged by Concrete Supplier or by break test data from at least 30 different projects for each mix design.

**1.06 CLOSEOUT**

Upon completion of work of this Section, the Contractor shall remove all equipment, excess material, and waste products from the site.

**PART 2 – PRODUCTS**

**2.01 MANUFACTURER**

Materials used in concrete work shall be all new from domestic sources approved by the Architect.

**2.02 MATERIALS**

A. Cement: Shall be a standard brand of domestic Portland cement conforming to "Standard Specifications for Portland Cement", ASTM Des. C-150 Type I or II.

B. Concrete Aggregates: Shall conform to ASTM Des. C-33 and UBC Standard No. 26-2 for stone weight concrete and in addition shall comply with the following:

1. Aggregates shall be from approved local pits and shall not contain opaline, feldspar, siliceous magnesium limestone, or other deleterious substances. No pumice aggregate will be allowed. If aggregate is from pits having a high alkali content, cement shall be "low alkali" with a maximum of 0.6% free alkali as determined by standard tests in ASTM C-114.
2. Concrete aggregates for stone concrete shall conform to UBC Standards, except as modified by this section. Any suitable individual grading of coarse aggregates may be used, provided the "grading of combined aggregates" shown below are obtained. Both the coarse and fine aggregate shall be tested by the use of a solution of sodium or magnesium sulfate, or both, whenever in the judgment of the Architect or Structural Engineer or the Building Department, such tests are necessary to determine the quality of the materials. Such tests shall be performed in accordance with the standard method of tests for "Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate", ASTM C88. The loss shall not exceed six percent for either fine or coarse aggregate. Aggregate failing to comply with this requirement may be used in the work provided it contains less than 2 percent of shale and other deleterious particles and shows a loss in the soundness test of not more than ten (10) percent when tested in the sodium sulphate solution.
3. Grading of Combined Aggregate:

<u>SAME NUMBER AS ONE &amp; ONE HALF</u>	<u>ONE INCH</u>	<u>THREE-FOURTHS</u>	
<u>SIZE IN INCHES</u>	<u>INCH MAXIMUM</u>	<u>MAXIMUM</u>	<u>INCH MAXIMUM</u>
Passing a 2 inch	--	--	--
Passing a 1-1/2"	95 - 100	--	--
Passing a 1"		75 - 90	90 - 100
Passing a 3/4"	55 - 77	70 - 90	90 - 100
Passing a 3/8"	40 - 35	45 - 65	60 - 80
Passing a No. 4	30 - 40	31 - 47	40 - 60
Passing a No. 8	22 - 35	23 - 40	30 - 45
Passing a No. 16	16 - 30	17 - 35	20 - 35
Passing a No. 30	10 - 20	10 - 23	13 - 23
Passing a No. 50	2 - 8	2 - 10	5 - 15
Passing a No. 100	0 - 3	0 - 3	0 - 5

4. Coarse Aggregate: Shall be clean, hard, fine-grained, sound washed gravel, or crushed stone, containing not more than 2% by weight of flat, thin elongated, friable, or laminated pieces. Maximum sizes of gradations for concrete work shall be 3/4"

and 1-1/2" for locations as hereinafter designated. The nominal maximum size of the aggregate shall not be larger than one-fifth of the narrowest dimensions between sides of forms, one-third of the depth slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars.

- C. Water: For all concrete and cement work shall be clean, free from strong acids, alkali, oil, or organic materials and shall be supplied by Contractor from domestic source.
- D. Form Coatings: Standard product resin type sealer, free of oil, grease, wax or any other substance deleterious to materials applied to concrete, delivered in unopened labeled containers. Do not use form oil or any oil-bearing material.
- E. Forms: Conform to shape, lines and dimensions of the members as shown on the plans. Properly brace or tie together to maintain position and shape. Make forms sufficiently tight to prevent leakage of mortar. Lumber shall be Construction grade Douglas Fir conforming to WCLA Grading Rules 16, as revised.
- F. Other Admixtures:
  - 1. For workability, an admixture may be added in accordance with manufacturer's recommendations. Obtain approval of material prior to use. Approval will be based on the following requirements:
    - a. Reduction of mixing water by at least ten (10) percent.
    - b. Reduction of segregation and bleeding.
    - c. Increasing of placability and viscosity of concrete.
    - d. No reduction in strength for any proportion of water/cement ration.
  - 2. Add air-entrainment material to concrete mix at the rate of 4-6% per cubic yard of concrete.

## 2.03 CONCRETE

- A. Transmit-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in ASTM C94 and, in addition, shall in no case be mixed for a period of less than ten (10) minutes at a peripheral drum speed of approximately 200 feet per minute, and mixing shall be continued until discharge is completed. At least 3 minutes of the mixing period shall be at the job site. Concrete shall be rejected if not placed in final position within one (1) to one and a half (1-1/2) hours after water is first added to the batch. The concrete at the time of placing shall be in such condition that it can be properly placed.
- B. Site-mixed Concrete: Conform to "Arbitrary Mix" in California Building Code.
- C. All concrete shall be six (6) sack mix concrete having a twenty-eight (28) day strength of not less than two thousand (3000) PSI or as noted on the plans and details.
- D. Curing Materials:
  - 1. Liquid curing compound: Thompson's approved standard product fugitive resin type, or equal conforming to ASTM C309, free of wax or oil, compatible with subsequently applied finishes or coverings, not deleterious to bond of cementitious materials to concrete. Deliver in unopened, labeled containers.
  - 2. Concrete Curing Paper: Sisalkraft, non-staining reinforced type, or equal conforming to ASTM C171.
- E. Expansion Joint Material: "Fleximastic" or other approved hot-pour rubber type conforming to ASTM D1190.
- F. Concrete Finish: Medium Salt Finish and/or broom finish as called out on the Drawings.

- G. Patching Mortar: One part Portland cement or equal (part white and part gray adjusted to match color of paving being patched) and two and one-half (2-1/2) parts sand with the least water required to produce a workable mass. Rework this mortar until it is the stiffest consistency that will permit placing.
- H. Reinforcing fibers: Shall be polypropylene, collated, fibrillated fibers from Fibermesh Company (615) 892-7243, or approved equal. Follow NER 284 and manufacturers requirements for installation. Only fibers designed and manufactured specifically for use in concrete and so certified shall be acceptable.

### **PART 3 -- EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

#### **3.02 SUBGRADE PREPARATION**

- A. Construct the subgrade true to grade and detail as shown on the plans.
- B. Contractor shall verify the acceptability of the work of other sections to be concealed by concrete work prior to commencing concrete placement.
- C. Preparation Before Placing: Water shall be removed from excavation before concrete is deposited. Any flow of water shall be diverted without washing over freshly deposited concrete. Hardened concrete, debris and foreign materials shall be removed from interior of forms and from inner surfaces of mixing and conveying equipment. Reinforcement shall be secured in position, inspected and approved before pouring of concrete. Wheeled concrete-handling equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement. Sub-grade for paving over native earth or fill shall be finished to exact location and section of bottom of slab and shall be maintained in a smooth, compacted condition, until concrete is placed. Sub-grade shall be thoroughly moistened but not muddy at time concrete is deposited.
- D. Subgrade to 95% maximum density at optimum moisture content.
- E. Prior to pouring concrete, call Contractor's Soil Engineer for approval of subgrade compaction and moisture content. Give Soil Engineer minimum 24 hours notice prior to inspection time. Soil Engineer's fee will be paid by Contractor.

#### **3.03 FORMING**

- A. Set forms with upper edges true to line and grade. Remove side forms not sooner than twelve (12) hours after finishing has been completed.
- B. Form curves so that there are no abrupt offsets or jogs at points of tangency. Secure approval of form alignment both horizontally and vertically prior to pouring and make necessary adjustments to conform to plans and details as directed.
- C. Where forms adjoin existing concrete, the transition shall be smooth and even in both alignment and in horizontal plane.
- D. Forming shall not be secured to surface which will remain exposed, with powder shot studs or any other manner which will damage finish.

- E. Rigidly construct and shore to prevent mortar leakage, sagging, displacement, or bulging between supports. Use clean, sound approved form material, coated with specified materials only, not oil. Provide backing on all plywood joints.
1. Form Ties: Bolts or rods with internal ties and spreaders; designed so that no permanent metal is within one (1) inch of exterior surface or one-half (1/2) inch of interior surface.
  2. Wood: Leave no wood in forms except as indicated nailing blocks and inserts.
  3. Shores: Of substantial construction to prevent deflection under imposed loads, double-wedged with large bearing blocks, kept tight during concrete placing, or with approved jacks.
- F. Embedded Items: Install work built into concrete such as sleeves, anchor bolts, wood nailers, reglets, frames and sleeves for piping, conduit and fittings. Provide facilities and supervision required for installation of inserts specified under other sections and perform cutting and reinforcing of forms required to accommodate them. Do not place any concrete until all inserted items are installed in their proper locations, secured against displacement, cleaned, inspected and approved. Set such items according to approved shop drawings and setting plans. Furnish ties and supports necessary to keep embedded items in place when concrete is placed.

### 3.04 CONCRETE INSTALLATION

- A. Construct concrete work to conform to plans and details.
- B. Weather: Do not place concrete during rain unless approved measures are taken to prevent damage to concrete. Cure concrete placed during periods of dry winds, low humidity, high temperatures and other conditions causing rapid drying, initially with a fine fog maintained until final curing operations are begun.
- C. Slump: Conform to ASTM C143. Not over five (5) inches for slabs on grade and not over four (4) inches for walls and footings.
- D. Mix for footings shall be Class B concrete.
- E. Transit Mix:
1. Transit mixed concrete shall conform to ASTM C-94 and UBC Standards. Transit mixers shall be equipped with automatic devices for recording number of revolutions of drum.
  2. Admixture: Shall comply with UBC Standards and shall be installed in accordance with manufacturer's recommendations.
  3. Transit mix concrete shall comply with UBC Standards and not be delivered to work with total specified amount of water incorporated therein. Withhold two and a half (2-1/2) gallons of water per cubic yard which may be incorporated in mix before concrete is discharged from mixer truck. Adding of any water shall be under direct inspection of Architect. Each mixer truck shall arrive at job site with its water container full.

### 3.05 PLACING FORMED CONCRETE

- A. Notify Architect not less than 48 hours before starting any concrete placing. No concrete shall be poured until reinforcing steel and forms have been approved by the Structural Engineer or Architect or by jurisdictional Inspector.
- B. Cleaning of Forms: Before placing of any concrete, thoroughly clean all forms, wash out with water, and make tight.
- C. Concrete: Deliver to point of placing so as not to fall vertically more than six (6) feet, and deposit so that surface is kept horizontal and level, a minimum amount being allowed to flow



from one portion to another. Deposit concrete in forms as nearly as possible in its final location. Under no circumstances deposit concrete which has partially hardened.

- D. **Vibration and Tamping:** As concrete is placed in forms, work concrete around reinforcing steel, built-in items and into corners and angles. Provide mechanical vibrators operated by experienced men for agitating concrete in forms and vibrate thoroughly within five (5) minutes after layer is placed. Vibration shall be carried well into previous layer. Supplement vibration by suitable methods to eliminate voids along forms for full depth of layer as directed. Do not use vibrators to work concrete along the forms. Keep at least one spare vibrator on the job at all times while concrete is being placed. Comply with ACI 309 (609.60), Consolidating of Concrete.
- E. **Stoppage:** Upon completion of pour and after concrete has partially hardened, wash scum or laitance off surface with stiff brush and stream of water. When work is resumed, brush clean with wire brushes or as specified, then place fresh concrete. A chemical retarding agent may be used on joint surfaces to expose the aggregate. Remove retarded mortar within 24 hours after placing and wash surface to produce a rough, exposed aggregate bonding surface.

### 3.06 FLATWORK

- A. Set forms as shown on plans.
- B. Deposit concrete evenly, consolidate with mechanical vibrators, particularly at side forms and strike off to indicated elevations and contours. Depress slabs for applied finishes as required. Maintain full indicated thickness of slab over all parts of cambered supports.
- C. Screed concrete to elevations and contour indicated or required for the work. Compact concrete with grid tamper to eliminate voids and pockets and to produce a uniformly dense slab.
- D. Where rough slabs are left to receive deferred finishes, provide protection against contamination from time of placing mechanically, leaving a clean surface.
- E. **Expansion Joints:**
  - 1. **Building/Paving:** Three-fourths (3/4) inch expansion joints with one-half (1/2) inch deep poly-sealant caulk water seal. Install typically where concrete paving meets the building shell and columns.
  - 2. **Sidewalks:** Expansion joints shall be provided in all sidewalks at twenty (20) feet o.c. Joints shall be filled with one-half (1/2) inch asphalt impregnated felt.
  - 3. All exterior flat work shall be marked off as indicated on the Drawings. Make markings with an approved "V" shaped tool, straight, even, properly spaced and uniformly deep matching contraction joints.
- F. **Contraction Joints:** Locate where indicated on plans, to full depth and slightly below finish surface. Make joints as detailed extending entirely through slab, using material conforming to ASTM D1751. Contraction joints for walks and paving unless otherwise indicated shall be tooled one-fifth (1/5) the depth of the slab and one-eighth (1/8) inch wide. Joints shall be five (5) feet on center unless otherwise indicated on the plans.
- G. Test surface as work progresses and eliminate high or low spots. Smooth gradient transitions are required.
- H. **Tolerances:** Cement finish shall be true in line, plane and elevations as shown. Finished concrete slab surfaces shall not deviate from a flat plane more than one-eighth (1/8) inch when tested with a ten (10) foot straight edge held in any direction. Furnish and maintain in good condition a ten (10) foot straight edge for use by the Architect.
- I. **Defective Finish:** Any slab showing a greater variation than the specified one-eighth (1/8) inch, showing voids or separation of the aggregates, or showing a texture in variance to the

plans shall be deemed defective and the entire slab shall be removed and replaced with acceptable concrete at the Subcontractor's expense.

### 3.07 SURFACE FINISHES

- A. Finish all surfaces to present a uniform appearance throughout the area involved, and throughout adjacent areas with the same treatment. Locations of required finish shall be as indicated on plans. Provide two (2) samples of each finish. The approved samples shall act as examples for all concrete work.
- B. Formed surfaces shall be free of flaws, cracks, rock pockets, voids or spalls and be true to line and detail.
- C. Ensure exposed to view finish surfaces of concrete are uniform in color and texture.
- D. Where finishing occurs adjacent to finished metal or other finished surfaces, particularly where serrated or indented, remove all traces of cement film before it hardens. This applies particularly to stair nosings and similar items.
- E. Broomed: After floating, draw broom across the surface at right angle to flow of traffic producing a uniform non-skid surface. For light broom finish, use a fiber broom, leaving depressions approximately one-sixteenth (1/16) inch deep. Use liquid curing membrane.
- F. Medium Salt Finish: After floating, finish with steel trowel. Add salt in density approved in sample. Wash clean after concrete set. Protect landscape areas from salt.
- G. Steel Trowel with "Sack" Finish: Shiner band at joints and paving edges shall be steel troweled. Do not burnish smooth. Sack finish to provide a smooth but skid-proof surface. Use liquid curing membrane.

### 3.08 CURING

- A. Commence curing as soon as feasible after finishing without marring surfaces, and in any case on same day.
- B. Paper Curing: Except as otherwise specified, use concrete curing paper only, joints sealed with pressure-sensitive tape; immediately repair any tears during curing period. Verify that surfaces remain damp for full curing period; if necessary, lift paper and wet surfaces with clean water, and replace paper.
- C. Liquid Curing Compound: Do not apply on any surface to receive retardant, mortar, or any other material adhered by bond, except as otherwise specified. Carefully mask and protect adjoining surfaces where compound is used.
- D. Fugitive Dye Type: Subject to approval, may be used where no other finish or material is to be applied, ASTM C309, clear, Type 1.
- E. Curing Period and Protection: Maintain curing mediums in proper sealed condition for minimum of ten days after application. Keep traffic on curing surfaces to minimum possible, and completely off liquid compound cured surfaces. Immediately restore any damaged or defective curing media.
- F. Curing Formed Concrete: Keep forms containing concrete thoroughly wet, including tops and exposed portions of concrete, for not less than fourteen (14) days from time of placing concrete. Continuously wet concrete between hours of 8:00 a.m. and sunset each day, including Saturdays, Sundays and holidays, for first ten (10) days, and not less than three (3) times daily for remaining four (4) days. Polyethylene film or equal may be used as approved.

### 3.09 DEFECTIVE CONCRETE

- A. If any concrete work is not formed as indicated, or is not true to intended alignment, or is not plumb or level; or has voids, honeycombs, or has been cut or resurfaced; or has voids or honeycombs that have been filled, unless under the direction of Architect or has any sawdust, shavings, wood or debris embedded in it; or does not fully conform to provisions of

contract; then such concrete work shall be deemed to be defective materials and/or faulty workmanship and Contractor shall remove same from site in accordance with contract.

- B. Defective concrete will be cut out by Contractor. Patch and fill surfaces which are to remain exposed and indicated to be smooth so as to match adjoining areas.
- C. Fill rock pockets, "honeycombs" and holes resulting from the removal of nails, ties and spreaders and like items with mortar formed of cement and fine aggregate in the proportion used in concrete mix, and non-shrink grout material in quantity as recommended by the manufacturer, using a pressure gun. Chip away defective areas to solid concrete, forming perpendicular or slightly undercut edges. Drench area of patch and surrounding area with water. Brush a thin coat of cement grout onto base and edges of patch area. Pack full with mortar. Match surrounding concrete surfaces in color and texture using part white Portland cement where necessary. Remove fins and irregularities in exposed concrete; patching must match adjoining surface and approved sample.

**\*\*\*END OF SECTION\*\*\***

**SECTION 02763**  
**PAINTED TRAFFIC LINES AND MARKINGS**

**PART 1 – GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SUMMARY

Section includes Painted traffic striping and symbols on pavements and curbs.

1.03 REGULATORY REQUIREMENTS

Provide pavement markings meeting the accessibility requirements of the 2010 California Building Code (CBC).

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.11 of the General Conditions.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 PRODUCT HANDLING

- A. Comply with the requirements of Section 01620.
- B. Deliver paints and paint materials in original sealed containers that plainly show the designated name, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer. Provide storage facilities at the project site for maintaining materials at temperatures recommended by the manufacturer.

1.07 ENVIRONMENTAL CONDITIONS

Do not apply paint when either air or pavement temperature is below 50 degrees F or above 95 degrees F; or when rain, fog, condensation, or temperatures below 50 degrees F are anticipated during the drying period.

1.08 CLOSE-OUT

- A. Reports:  
None required.
- B. As-Builts:  
None required.
- C. Operation and Maintenance Data:  
None required.
- D. Extra Materials:  
None required.
- E. Extended Warranty:  
Comply with the requirements of the General Condition Article 3.5 and Section 01740.

**PART 2 – PRODUCTS**

2.01 MATERIALS

- A. Pavement Marking Paint: Vinyl acrylic type for use on asphaltic concrete and portland cement concrete, colors as indicated, specified herein, or required by CBC Title 24 Part 2.

- B. Acceptable products or equal: Frazee Paint Company; 502 Vinyl Traffic Paint Dunn-Edwards Corp.; Traffic Paint W-801

### **PART 3 – EXECUTION**

#### **3.01 INSPECTION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

#### **3.02 PREPARATION**

- A. Immediately before applying the paint, thoroughly clean the pavement surface of dust, dirt, sand, scale, water, oil, grease or other objectionable matter. Do not use solvent material that will damage pavements as cleaning agents. Immediately before painting, give pavement surfaces a final cleaning by means of a power broom and a power blower using compressed air following the brooming.
- B. Provide warning devices required to protect the painting operations and the finished work.

#### **3.03 APPLICATION**

- A. Do not apply pavement markings until after sealer has been applied as specified in Section 02743. Apply the paint only when the pavement is dry and clean. Under inclement weather conditions, or when temperature is below 50 degrees F, painting will not be permitted.
- B. Equipment: Apply the traffic and parking striping [ and game markings ] with a traffic stripe painting machine with a compressor capacity of at least 105 cubic feet and capable of operating at an air pressure of 125 psi. Mechanically agitate paint while the machine is in operation. Equip the striping machine with a pointer so designed that the machine will hold exactly to the alignment. Equip the propelling vehicle with a speedometer or tachometer, and with a suitable device for determining the quantity of paint in the container. Thoroughly clean the paint container and spray nozzles on the machine before starting each day's work.
  - 1. Equipment used for applying reflectorized striping shall be equipped with a bead dispenser capable of applying the beads at the specified rate.
  - 2. Where the configuration or location of a traffic stripe is such that a striping machine is not suitable, use hand spraying equipment and stencils or templates.
  - 3. Apply paint for word markings, letters, numerals, and symbols using hand spraying equipment and stencils or templates.
- C. Application: Immediately following the preparation of the pavement surface, apply the striping at the rate of 100 to 110 square feet per gallon of paint. Apply lines 4 inches wide unless otherwise indicated. Apply the stripe of the indicated or specified width, with clean true edges and without sharp breaks. Repaint, to the applicable specifications, portions of the stripe damaged by any type of traffic within 24 hours after the stripe has been applied.
  - 1. Provide International Symbol of Accessibility for each parking stall for the disabled at location indicated. Symbol shall be 36 inches square, white on standard blue background and shall conform to CBC Title 24 Part 2, Chapter 11; and ADA Accessibility Guidelines for Buildings and Facilities.
  - 2. Tactile warning lines shall be in conformance with CBC Section 1133B.8.3 and 1133B.8.4.

- D. Tolerances: Apply striping within a tolerance of 1/2 inch in 50 feet. Apply markings and stripings to the widths indicated within a tolerance of 1/4 inch on straight sections and 1/2 inch on curved sections.
- E. At completion touch up stripes and markings which are not clear and distinct or which are not uniform in color.

**\*\*\*END OF SECTION\*\*\***

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## SECTION 02781

### DETECTABLE WARNING SURFACE: PRECAST TACTILE PAVER TILES

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SUMMARY

- A. Perform all work required to complete, as indicated by the Contract Documents and furnish all supplementary items necessary for the proper installation of Precast Concrete Pavers.
- B. System shall consist of precast concrete pavers installed on Latex thinset mortar setting bed.
- C. The paver installation shall be absolutely rigid and even large slabs when subjected to vehicular traffic, shall not be displaced.

##### 1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM C 33: Specification for Concrete Aggregates
  - 2. ASTM C 150: Specification for Portland Cement
  - 3. ASTM C 67: Method of Sampling and Testing Brick and Structural Clay Tile
  - 4. ASTM C 140: Specification for concrete
- B. T.C.A. Tile Council of America
  - 1. Installation Method Cement Mortar Bonded F102 - 95.
- C. A.N.S.I. American National Standards Institute
  - 1. A-118.4 Latex Portland Cement Mortar
  - 2. A-118.6 Grout – Latex

##### 1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. All products covered under this Section shall be produced by a single manufacturer unless otherwise specified.
  - 2. Manufacturer shall submit evidence of having not less than ten (10) years successful production of this product.
  - 3. The paver manufacturer shall demonstrate, either by proven field performance of the laboratory freeze-thaw test that the paving units have adequate durability if they are to be subjected to a freeze-thaw environment.
    - a. Satisfactory field performance is indicated when units similar in composition and made with the same manufacturing process as those to be supplied to the purchaser, do not exhibit objectionable deterioration after at least 3 years.
    - b. The units used as the basis for proven field performance shall have been exposed to the same general type of environment, temperature range and traffic volume as is contemplated for the units supplied to the purchaser.



B. Subcontractor Qualifications:

Subcontractor shall submit evidence of skill and not less than five (5) years specialized experience with this product.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Manufacturer's Literature: Materials descriptive literature, installation instructions and paver color selection chart.

1. Test Reports: Three (3) copies, showing compliance with specified ASTM requirements

2. Quality Assurance Qualifications – see Item 1.04.

3. Shop drawings:

a. Layout drawings of each paved area showing the pattern of pavers, indicate pavers requiring cutting, indicate setting bed methods in each area, drainage patterns and drains. Include details of setting beds, noting all materials and their thickness, show details at curbs and vertical surfaces.

b. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation

4. Samples: Three (3) sample pavers of each manufacturer, type, size and color selected or specified.

1.07 PROJECT/SITE CONDITION

A. Environmental Requirements: Do no work during freezing weather or on wet or frozen sub-base.

B. Mock-up Installation

1. Prior to the start of precast concrete paver work construct mock-ups of each type of paver size and pattern area including precast curb for the Owner and Architect to review. The mock-ups will be at the project site at a location mutually agreed to by the Owner and Contractor.

2. Construct the two (2) mock-up installations a minimum 8 foot x 8 foot area of typical precast concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.

3. After review of the mock-ups, they should be retained and used as a standard of quality for the precast concrete paver work. At completion of the work remove the mock-up installations and related materials from the project site. If the mock-ups are incorporated in the actual construction, record their actual locations and sizes on the actual built record drawings for the project.

1.08 SEQUENCING AND SCHEDULING

Coordinate sequencing and scheduling of work with other supporting, adjacent, contiguous or otherwise related material trades.

1.09 PRODUCT HANDLING

Adhere to requirements of Section 01620.

1.10 CLOSE-OUT

A. Reports:

None required.

B. As-Builts:

None required.

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

**PART 2 – PRODUCTS**

2.01 MATERIALS

A. System Source: Wausau Tile, Wausau WI, 1-800-388-8728

B. System Name: Thinset Mortar Method - Pedestrian Installation

C. Precast Concrete Pavers

1. Name: Detectable Warning Pavers

2. Size: As shown on the drawings

3. Texture: ADA-2 Truncated Dome

4. Finish and Color: To be picked from Standard color and finish.

5. Reference Standard:

a. Cementitious Materials: Materials shall conform to the following applicable ASTM Specifications

1) Portland Cement: ASTM C 150 for Portland Cement

b. Aggregates shall conform to these ASTM specifications, except that grading requirements shall not necessarily apply:

1) Normal Weight: ASTM C 33 for Concrete Aggregates

c. Other constituents: Coloring pigments, integral water repellents, etc., shall be previously established as suitable for use in concrete and either shall conform to ASTM Standards where applicable, or shall be shown by test or experience not to be detrimental to the durability of the concrete.

6. Performance Requirements:

a. Compressive Strength: At the time of delivery to the work site, the average compressive strength shall not be less than 7,000 psi with no individual unit less than 6,500 psi per ASTM C 140.

b. Absorption: The average shall not be greater than 5% per ASTM C140.

c. Flexural Strength: Not less than 600 psi per ASTM 293.

- d. Load carrying capacity: Paver units shall have a tested center load capacity of 1,750 lbs.
- e. Latex Mortar Mix: A.N.S.I A-118.4
- f. Water: Clean and free of deleterious acids, alkalies or organic materials
- g. Grout: A.N.S.I. A-118.6, Grout – Latex
- h. Sealant: As specified in Section 07920 -0 Sealants and Caulking
- i. Back-up: As specified in Section 07920 - Sealants and Caulking
- j. Bond Breaker: As specified in Section 07920 - Sealants and Caulking

2.02 MIXING

- A. Latex Portland Cement Mortar setting bed: As recommended by the manufacturer.
- B. Grouting Mix: Latex as recommended by manufacturer. Color as selected.
- C. Rework mixes from time to time to maintain proper consistency, as recommended by manufacturer but do not add ingredients. Discard mortar that has reached its initial set.

**PART 3 – EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 INSPECTION

- A. Examine all surfaces to receive the parts of the work specified herein. Concrete slab shall not exceed 1/8" in 10'-0" from required plane. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of precast concrete pavers and associated construction constitutes acceptance of the adjacent and underlying construction.
- B. Installation of Mortar bed as per TCA F102 - 95. All materials used follows instructions of manufacturer for use in mortar method.
- C. Install precast concrete pavers
- D. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Latex or acrylic additives of the same manufacturer as the grout.
- E. All control and expansion joints to be installed as per TCA EJ 171-94. All joint materials said to follow manufacturer's directions and instructions.
- F. Field cut precast pavers in accordance with manufacturer's recommendations for methods, equipment and precautions.

3.03 CLEANING AND PROTECTION

- A. Remove and replace pavers that are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

- B. Cleaning: Remove mortar stains and all other types of soiling from exposed paver surfaces, wash and scrub clean.
- C. Provide final protection and maintain conditions in a manner acceptable to installer, which ensures paver work being without damage or deterioration at time of substantial completion.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 02835**  
**CHAIN LINK FENCES & GATES**

**PART 1 -- GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SUMMARY

Provide chain link fence system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.03 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.04 SUBSTITUTIONS

Substitutions will be considered per General Conditions Article 3.11.4 and Section 01630.

1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data: submit:

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 in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures for the Work.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

1.07 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740

## PART 2 -- PRODUCTS

### 2.01 DIMENSIONAL DATA

General:

- A. Pipe sizes indicated are commercial pipe sizes.
- B. Tube sizes indicated are nominal outside dimensions.
- C. H-section sizes indicated are normal flange dimensions.
- D. Roll-formed section sizes indicated are the nominal outside dimensions.

### 2.02 GALVANIZING

On steel framework and appurtenances, provide galvanized finish with not less than the following weight of zinc per square feet.

- A. Pipe: 1.8 oz., complying with ASTM A120.
- B. H-sections and square tubing: 2 oz., complying with ASTM A123.
- C. Hardware and accessories: Comply with Table 1 of ASTM A153.
- D. Fabric: 2.0 oz., complying with Class II of ASTM A121.

### 2.03 FABRIC

- A. Provide number 9 gage or 0.148" wires in 2" mesh, with top and bottom knuckled salvages.
- B. Provide fabric in one-piece widths.

### 2.04 POSTS, RAILS, AND ASSOCIATED ITEMS

- A. End, corner, slope, and pull posts: Provide at least the following minimum sizes and weights:

<u>Material and dimensions</u>	<u>Lbs. per Lin. Ft.</u>
Pipe, 2.875" outside dimension	5.79

- B. Line posts: Provide minimum sizes and weights as follows:

<u>Material and dimensions</u>	<u>Lbs. per Lin. Ft.</u>
Pipe, 2.875" outside dimension	3.65

- C. Top rails:

1. Use 1.660" outside diameter pipe weighing 1.80 lbs. per linear foot, or
2. Use 1.625" x 1.25" roll-formed sections weighing 1.35 lbs. per linear foot.
3. Provide in manufacturer's longest lengths, with expansion type couplings approximately 6" long for each joint.
4. Provide means for attaching top rail securely to each gate, corner, pull, slope and end post.

- D. Post brace assemblies:

1. Provide at end and gate posts, and at both sides of corner, slope, and pull posts, with the horizontal brace located at mid-height of the fabric.
2. Use 1.660" outside diameter pipe weighing 1.80 lbs. per linear foot for horizontal brace.
3. Use 3/8" diameter rod with turnbuckle for diagonal truss.

- E. Tension wire: Provide number 7 gage galvanized coiled spring wire at bottom of fabric.

F. Post tops:

1. Provide single piece steel, wrought iron, or malleable iron, designed as weather-tight closure cap.
2. Provide one cap for each post.
3. Provide caps with openings to permit through passage of top rail.

G. Stretcher bars:

1. Provide one-piece lengths equal to full height of fabric, with a minimum cross-section of 3/16" x 3/4".
2. Provide one stretcher bar for each gate and end post, and two for each corner, slope, and pull post, except where fabric is woven integrally into the post.

H. Stretcher bar bonds:

1. Provide steel, wrought iron, or malleable iron, spaced not over 15" on centers, to secure stretcher bars to end, corner, pull, slope, and gate posts.
2. Bands may be used also with special fittings for securing rails to end, corner, pull, slope, and gate posts.

2.05 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Wire ties:

1. For tying fabric to line posts, use number 9 gage wire ties spaced 12" on centers.
2. For tying fabric to rails and braces, use number 9 gage wire spaced 24" on centers.
3. For tying fabric to tension wire, use number 11 gage hog rings spaced 24" on centers.
4. Manufacturer's standard wire ties will be acceptable if of equal strength and durability.

B. Concrete: Comply with provisions of Section 03300 for concrete.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. General: Install posts at a maximum spacing of 10 feet on centers.
- B. Excavating: Drill holes for post footings in concrete slab and fence post grade beam.
- C. Setting posts:
  1. Remove loose and foreign materials from sides and bottoms of holes, and moisten soil prior to placing concrete.
  2. Center and align posts in hole.



3. Place concrete around posts in a continuous pour, and vibrate or tamp for consolidation.
4. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
5. Extend footings for gate posts to the underside of bottom hinge.
6. Set keeps, stops, sleeves, and other accessories into concrete as required.
7. Keep exposed concrete surfaces moist for at least seven days after placement, or cure with membrane curing material or other curing method accepted by the Architect.
8. Grout-in those posts which are set into sleeved holes, concrete constructions, or rock excavations, using non-shrink portland cement grout or other grouting material accepted by the Architect.

D. Concrete strength:

1. Allow concrete to attain at least 75% of its minimum 28-day strength before rails, tension wires, and/or fabric is installed.
2. Do not, in any case, install such items in less than seven days after placement of concrete.
3. Do not stretch and tension fabric and wire, and do not hang gates, until concrete has attained its full design strength.

E. Rails and bracing:

1. Install fence with a top rail and bottom tension wire.
2. Install top rails continuously through post caps or extension arms, bending to radius for curved runs.
3. Provide expansion couplings as recommended by the fencing manufacturer.
4. Provide bracing to the midpoint of the nearest line post or posts at all end, corner, slope, pull, and gate posts.
5. Install tension wires parallel to the line of fabric by weaving through the fabric, and tying each post with not less than number 6 gage galvanized wire, or by securing the wire to the fabric.

F. Installing fabric:

1. Leave approximately 1" between finish concrete surface and bottom salvage.
2. Excavate high points in the ground to clear the bottom of the fence.
3. Place and compact fill to within 1" of the bottom of the fabric in depressions.
4. Pull fabric taut and tie to posts, rails, and tension wires.
5. Install fabric on outward side facing side of fence, and anchor to framework so that the fabric remains in tension after pulling force is removed.
6. Install stretcher bars by threading through or clamping to fabric on 4" centers, and secure to posts with bands spaced 15" on centers.

G. Miscellaneous:

1. Use U-shaped tie wires, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns.
2. Bend ends of wire to minimize hazards to persons and clothing.

3. Fasteners:

- a. Install nuts for tension band and hardware bolts on side of fence opposite fabric side.
- b. Peen the ends of bolts to prevent removal of nuts.
- c. Repair coatings damaged in the shop or field erection, using a hot-applied repair compound applied in accordance with its manufacturer's recommendations as accepted by the Architect.

**\*\*\*END OF SECTION\*\*\***

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**SECTION 02940**  
**AUTOMATIC IRRIGATION SYSTEM**

**PART 1 -- GENERAL**

1.01 **GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 **SCOPE OF WORK**

The Contractor shall provide all labor, materials, transportation and services necessary to furnish and install a complete irrigation system as shown on the drawings and specified herein.

1.03 **QUALITY ASSURANCE**

Conformance: All irrigation work shall conform to applicable local, county and/or state codes, regulations and rules.

1.04 **SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 **SUBMITTALS**

Provide in accordance with Article 3.11 of the General Conditions.

1.06 **INSURANCE**

The Contractor shall carry all workmen's compensation, public liability and property damage insurance as required by all applicable codes, regulations and by the Owner.

1.07 **SITE VERIFICATION**

- A. Field Measurement: Prior to commencement of work, the Contractor shall verify, at the site, all conditions and dimensions shown on the plans necessary to achieve the intended design of the irrigation system. Any discrepancies shall be immediately reported to the Architect.
- B. Liable for Encroachment: The Contractor shall be responsible and liable for any encroachment into adjacent property, rights-of-way, easements, set-backs or any other legal property restrictions either marked or unmarked.
- C. Point of Connection Verification: The Contractor shall verify the static pressure, meter size and size of service to meter (P.O.C.) at each point of connection.
- D. Field Staking: Prior to installation, the Contractor shall locate, by stakes or other means, all pressure supply lines, control equipment, ground cover delineations and heads for approval by the Architect.

1.08 **COORDINATION OF ACTIVITIES**

The Contractor shall be responsible for coordination of his activities with all other trades.

1.09 **INTENDED DESIGN COVERAGE**

The Contractor shall be responsible for completion, modification or revisions of the systems as necessary to maintain the consistent coverage design of Contract Documents. Any deviation from the Contract Documents shall have the prior written approval of the Owner and Architect.

1.010 **NOTIFICATION OF DISCREPANCIES**

- A. Any discrepancies between the field conditions and the Contract Documents and/or the design intent affecting the successful completion and cost of the project shall be reported to the Architect immediately. All work related to the problem area shall cease until the

discrepancies have been resolved by the Owner and Architect in writing. Any continuation of work is at the Contractor's risk and expense.

- B. The irrigation plans, including piping and equipment locations, are drawn schematically. The Contractor shall make minor adjustments to the system, as required, to avoid physical elements and conform to the site conditions. In all cases, the Contractor shall insure that there are no conflicts between the irrigation system, planting and construction elements, and existing utilities.

1.011 ELECTRICAL CONNECTION

The Contractor shall be responsible for the final electrical connection from power source to controllers as indicated on the plans, where applicable.

1.012 LIABLE FOR DAMAGE

- A. The Contractor shall be liable for damage to all utilities, construction, irrigation and planting elements, new, marked or unmarked, and shall replace or repair damage to its original condition in a manner acceptable to the Owner.
- B. The Contractor shall be responsible and liable for any loss to his equipment, parts and materials on this project until completion and acceptance of the job in writing from the Owner.

1.013 AS-BUILTS

The Contractor shall provide and keep up to date a complete "As-Built" record set of prints which shall be corrected daily and show every change from the original drawings. Before the time of the final inspection, the Contractor shall transfer all information from the "As-Built" set, and field staking of all equipment located on the mainline and control wire location, to a reproducible drawing or drawings. All work shall be neat and legible. Contractor shall certify reproducibles as to accuracy and completeness.

1.014 WRITTEN GUARANTEE

- A. The Contractor shall guarantee all irrigation material and workmanship for a period of one year following the date of final acceptance of the project. The Contractor shall provide a written guarantee on his letterhead at the time of the final inspection.
- B. The Contractor shall provide a written certification that the irrigation system is installed free from defects in materials and workmanship and in full compliance with the drawings and specifications. This shall be on the Contractor's letterhead with his Irrigation and California C-27 Contractor's License number.

1.015 TURNOVER ITEMS

The Contractor shall supply to the Owner, as part of this contract, the following items prior to the time of the final inspection:

1. A reproducible set of "As-Built" drawings as per note above.
2. The original of the guarantee letter.
3. The original of the certification letter.
4. Two keys for each automatic controller.
5. Two sets of any special equipment required for operating, adjusting, assembling and removing each type of equipment supplied on this project as requested by the Owner.

1.016 OWNER'S IRRIGATION WORK RESPONSIBILITIES

- A. Construction Responsibilities: The Owner will be responsible for all aspects of construction including all irrigation inspections. All field meetings shall be initiated by the Contractor and coordinated through the Architect for the Owner. The Landscape Architect shall be in a

support observation role to the Architect and Owner, providing interpretive advice only in accordance with the observation schedule, as noted.

- B. Determining Legal and Physical Elements: The Owner shall be responsible for determining property lines, rights-of-way, tract boundaries, grades, easements, utility locations (above and below grade) and any other legal or physical elements as required for the successful completion of the work. Contractor shall not be permitted to proceed with any work without determination of the above facts.
- C. Site Discrepancies: All discrepancies in site conditions, drawings or specifications shall be immediately brought to the attention of the Architect. It is the Architect's responsibility to consult the Owner and Landscape Architect prior to any further work in that area. Any unreported discrepancy and continued work without written authorization from the Owner and Architect shall be at the Contractor's risk and expense.
- D. Contract Fulfillment: the Architect and Owner shall decide all questions relating to interpretation of the drawings and specifications, quality of work and acceptable fulfillment of intent of the Contract Document concurrently.

#### 1.017 FIELD OBSERVATION SCHEDULE

- A. Field Observation Coordination: The following observations shall be initiated by the Contractor and coordinated through the Architect. The Contractor shall notify the Architect and Owner not less than forty-eight (48) hours in advance of any requested observation. Continued work without observation at these phases of work is at the Contractor's risk, with any required change or modification at the Contractor's expense. The Architect or Owner shall inform the Landscape Architect as to the purpose and time of the observation forty-eight (48) hours in advance.
- B. Contractor Orientation/Preconstruction Meeting: This meeting shall be conducted to discuss the plans and specifications, possible discrepancies, site conditions and other aspects of the project irrigation work such as scheduling and requirements for starting work. Prior to the meeting, Contractor shall thoroughly acquaint himself with site conditions and the plans, details and specifications.

#### 1.018 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

- A. The entire sprinkler irrigation system shall be under full automatic operation for a period of seven (7) days prior to the start of any planting.
- B. All irrigation lines, valves and wiring runs shown on plans in the street, paved areas and under hardscaping are schematic. Install these lines, valves and wiring runs in planting areas except where it is obvious that they must cross that paved area to get from one planting area to another or unless noted otherwise.

## **PART 2 -- PRODUCTS**

#### 2.01 SPECIFIED EQUIPMENT

- A. All equipment shall be as listed in the legend and installed as per details and specifications, or manufacturer's recommendation. Owner and Architect shall approve any substitutions in writing. Any unapproved equipment shall be replaced at Contractor's expense.
- B. Approval of any item or alternate item indicates only that it apparently meets the requirements of the drawings on the basis of the information submitted, and does not relieve the Contractor of any responsibility for the equipment's successful operation.
- C. Contractor's Guarantee: Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties will only supplement the guarantee.

#### 2.02 PIPING

- A. Mainline Pipe: Pressure mainline pipe sized two inches (2") and larger shall be PVC Class 315. Pressure mainline pipe 1-1/2" and smaller shall be PVC Schedule 40. Both shall be buried a minimum of 18" and have solvent welded joints made from NSF approved Type I, Grade I PVC compound conforming to ASTM resin specification 1785.
- B. Solvent Welds: PVC solvent weld fittings shall be Schedule 40 1-2, II-K NSF approved, conforming to ASTM test procedure D2466.
- C. Lateral Line Pipe: Non-pressure buried lateral line pipe shall be PVC Class 200, buried a minimum of 12" with solvent weld joints made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specifications D1784.
- D. Steel Pipe: Galvanized steel pipe shall be ASA Schedule 40 mild steel screwed pipe with medium galvanized screwed beaded malleable iron fittings.
- E. Steel Pipe Below Grade: All galvanized pipe and fittings installed below grade shall be coated with two (2) coats of Koppers #50 Bitumastic.
- F. Pipe Joints: All connections to be sealed with "Led-Lube" or equal for galvanized joints and "Rector Seal No. 5" or equal for PVC joints.

### 2.03 CONTROLS

- A. Control Wire: Connections between the automatic controllers and the electric control valves shall be made with direct burial copper wire AWG-UF 600 volt UL approved. Minimum size is #14 AWG buried 18" below grade. Use different color pilot wire for each controller. Common wires shall be white with a different color striper for each automatic controller.
- B. Wire Trench: Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. Where more than one (1) wire is placed in a trench, the wires shall be taped together at intervals not exceeding ten (10) feet.
- C. Expansion Curl: An expansion curl should be provided within three (3) feet of each wire connection and at least every one hundred (100) feet of wire length.
- D. Wire Splices: All splices shall be made with Scotch-Lok #3577 connector sealing packs, pen-tite wire connector, or approved equal. Use one splice per connector sealing pack.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

### 3.02 IRRIGATION MAINLINE AND EQUIPMENT LAYOUT

This observation shall be performed by the Architect following staking of all pressure mainline and control equipment, verification of all site conditions and prior to any trenching. Any discrepancies not previously noted shall be corrected at this time to the satisfaction of the Owner and Architect at the Contractor's expense.

### 3.03 IRRIGATION MAINLINE AND PRESSURE TEST

This observation is for the purpose of reviewing all mainline layout for conformance to specifications and verifying the water tightness of pressure systems prior to backfilling trenches. Pressure tests must conform to manufacturer's specifications. All pressure lines shall be tested under a sustained hydrostatic pressure of 150 pounds per square inch for a period of not less than two (2) hours. This test shall be performed in the presence of the Owner's Inspector to

manufacturer's accepted testing procedure and approved in writing by the Contractor, prior to backfilling any trenches. Contractor shall furnish necessary force pump and all other necessary testing equipment.

3.04 PROGRESS INSPECTIONS

Periodic inspections shall be performed by Owner's Inspector during the layout of all lateral line systems, with trenches open to verify conformance to details, depth of pipe and equipment assemblies.

3.05 IRRIGATION COMPLETION/COVERAGE TEST

This observation is to ensure conformance of all irrigation equipment with irrigation contract documents and will consist of operation of each system to ensure intended coverage. The Contractor shall flush and adjust all heads for optimum performance and to prevent overspray onto walks, roadways and buildings, etc., prior to this observation. This may include changes in nozzle sizes and degree of arc to optimize operation.

3.06 INSTALLATION

- A. Trenches: Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade.
- B. Backfill: The trenches shall not be backfilled until all required tests are performed. Trenches shall be carefully backfilled with approved materials, free from clods of earth or stones two inches (2") or larger. Backfill shall be mechanically compacted to a dry density equal to adjacent undisturbed soil and shall conform to adjacent surface grades without irregularities.
- C. Streets: Where any cutting or breaking of concrete or other paving surface is necessary, it shall be done and replaced to match existing to the Owner's Inspector satisfaction, by the Contractor, as part of the contract cost.
- D. Pipe Cover: All wire, pressure and non-pressure pipe installed under asphaltic concrete paving shall be installed in Class 315 sleeves, twenty-four inches (24") below road bed and backfilled per structural soils report specifications.
- E. Pipe Clearance: All lines shall have a minimum clearance of six inches (6") from each other. Parallel lines shall not be installed directly over one another.
- F. Control Valves: Install each control valve in a separate locking valve box with a minimum of twelve inches (12") between valves, and a minimum of six inches (6") from any walk or structure.
- G. Head Installation: Irrigation heads shall be installed only after the system has been flushed to the complete satisfaction of the Owner's Inspector. All sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the plans.
- H. All galvanized pipe on grade shall be secured to slope surfaces at ten feet on center (10' o.c.) and to flat areas at twenty feet on center (20' o.c.) maximum with #4 x 24" rebar with "J" hooked radius at one end to hold pipe securely in place.

\*\*\*END OF SECTION\*\*\*



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**SECTION 02950**  
**LANDSCAPE & PLANTING**

**PART 1 -- GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

The Contractor shall provide all labor, materials, transportation and services necessary to furnish and install the Landscape Materials as shown on the drawings and specified herein. Items may include, but are not limited to:

- A. Finish grading and shaping of surfaces to receive planting.
- B. Soil conditioners for planting areas and backfill mix for trees and shrubs.
- C. Crushed rock ground cover.
- D. All plant materials.
- E. Staking and guying.
- F. Turf seeding and sodding.
- G. Pruning of trees and shrubs.
- H. Maintenance of all planting.
- I. Guarantee.

1.03 OBSERVATIONS

- A. The Landscape Architect will make the observations. Contractor shall be on the site when observations are made. Request observation by telephone at least two working days in advance of date desired. If the work is not ready for observation when the Landscape Architect arrives, Contractor shall pay for the Landscape Architect's visit.
- B. Observation is required for the following:
  - 1. When grading and soil conditioning has been completed, prior to planting.
  - 2. When trees and shrubs have been spotted for planting, but before planting holes are excavated.
  - 3. When planting and all other specified work has been completed, prior to maintenance period.
  - 4. At end of 90-day maintenance period, if requested.

1.04 GUARANTEE

- A. All 15 gallon or smaller trees, shrubs and plant material shall be guaranteed for a period of 90 days; 24" box and larger trees shall be guaranteed for a period of one year. All palm trees, regardless of size, shall be guaranteed for one year. All guarantee periods commence from the time of final acceptance by the Owner at the successful completion of the maintenance period.
- B. Replace all dead plants and those not in vigorous conditions noted during the maintenance period, as soon as weather permits.
- C. Plants used for replacements shall be of same kind and size as originally planted. Plants shall be furnished, planted and fertilized as specified and guaranteed.

- D. Frost Damage: All plants specified are considered appropriate to the local climate, based on accepted industry standards. It is understood that frosts occur on occasion in this climate, and, as such, will be treated as a no-fault "act of God." If plant material has been delivered to the site, but not planted, the contractor will replace any dead or damaged plant material at no cost to the Owner. If plant material has been planted per these specifications prior to the frost, then the Owner shall be responsible for cost of replacement of frost damaged plant material.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

- A. Reports: None Required
- B. As-Builts: None Required
- C. Operation and Maintenance Data: Comply with the requirements of Section 01770 – Contract Closeout.
- D. Extra Materials: None Required
- E. Extended Warranty: None Required.

**PART 2 -- PRODUCTS**

2.01 MATERIALS

A. Topsoil:

- 1. Existing soil on the site shall be used as topsoil for planting purposes where possible, but shall be free of debris, oil, weeds or other foreign matter. Contaminated soil shall be removed and replaced with acceptable existing soil or imported soil.
- 2. Imported soil shall be sandy textured. Silt plus clay content of this soil shall not be greater than 15 percent by weight. The boron content of this soil shall not be greater than 1 part per million as measured on the saturation extract. The sodium absorption ration (SAR) shall not exceed 6.0 millimhos per centimeters at 25 degrees Celsius.

B. Fertilizers and Soil Conditioners:

- 1. Organic amendment shall be nitrolized-mineralized redwood sawdust (.5% actual nitrogen) or nitrolized-mineralized fir sawdust (.8% actual nitrogen) or nitrolized-mineralized fir bark (1% actual nitrogen). Amendment shall be fine textured, having actual minimum 80% passing #8 screen and minimum 95% passing #4 screen. The electrical conductivity (EC) should not exceed 3.0. Salinity shall not be higher than 3.5 millimhos per centimeter at 25 degrees C. as measured by saturation extract conductivity.
- 2. Commercial fertilizer shall have a minimum of 12 parts nitrogen, 9 parts phosphoric acid, and 8 parts potash. Deliver mixed fertilizer in standard bags, marked with weight, analysis and name of manufacturer. Keep fertilizer in dry storage.

C. Plant Materials:

- 1. All plant materials shall be healthy, well developed representations of their species or varieties, free from disfigurements, with well developed branch and root systems,

conforming to Federal, State and County laws, requiring inspection for plant diseases and insect infestation.

2. Inspection certificates required by law shall accompany each shipment, invoice or order for stock, and when plant material arrives at site, file certificate of inspection with Forest Service, or County Agricultural Department.
  3. Tag plant materials with name and size in accordance with standards of practice recommended by American Association of Nurserymen.
  4. Sizes of tree and shrub containers shall be as stated on the planting plan. Container stock shall grow in containers for at least 6 months, but not over 2 years. Samples shall be shown to prove that root-bound conditions do not exist. Container plants that have cracked or broken balls of earth when taken from containers, shall not be planted, except upon special approval.
  5. Do not prune, prior to delivery, except by special approval.
  6. Plants shall be subject to inspection for size, variety, condition, latent defects and injuries at place of growth and at the project site any time before or during progress of work. Remove rejected plants from the project site immediately and replace with acceptable material.
  7. Protect all plants from damage by sun, wind or rain at all times before planting.
  8. If proof is submitted that any plant specified is not obtainable, substitution will be permitted. A proposal will be considered for use of the nearest equivalent in size or variety with an equitable adjustment of contract price. All substitutions will be subject to Landscape Architect's approval.
  9. Plants shall be grown under climatic conditions comparable to those of the subject site, unless otherwise specifically approved by the Landscape Architect.
  10. Sod or seed shall be purchased from a reputable company and shall be first quality, fresh and clean. Sod or seed shall be in the proportions specified on plans.
- D. Tree ties shall be of heavy hose-like plastic ties.
- E. Tree stakes shall be 2" diameter x 10'-0" actual dimension for 5 and 15 gallon trees. Use Lodgepole Pine, or approved substituted, pointed at one end and stained over their entire length with green shingle stain. Stake only the plants that are indicated to be staked on Planting Plans. See details on drawings.
- F. Root Guards:
1. Provide "Deep Root" barrier planter, or equal, where indicated on plan, or as described in this Section. Available from Deep Root Corporation, 81 Langton Street, #4, San Francisco, California 94103 (714) 898-0563. Follow manufacturer's instructions for installation.
- G. Crushed Rock Ground Cover:
1. Provide crushed rock (gravel or "fines") where indicated, and as specified, on the drawings. Rock shall be installed per the thickness stated on the drawings: if no thickness is called out install a minimum of 1½" thick. Crushed rock shall be laid over visqueen or a geotextile fabric.

### **PART 3 -- EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.

- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Commence work within five days after notification by the Owner and conduct operations continually until completion, unless weather conditions are unfavorable.
- B. Site Clearance: Clean and remove weeds, grasses, roots and any minor accumulated debris and rubbish from planting areas before commencing work. Existence of major amounts of debris shall be called to the attention of the General Contractor for removal.
- C. Storage/Maintenance: Secure permission from the Owner to store plants on the project site. Ensure that they are protected from damage by sun, rain, wind and construction work. Plants stored on site must be watered and maintained so they remain in vigorous condition; damaged material must be replaced at no cost to the Owner.
- D. Finish Grading of Planting Areas: Grading shall be done as indicated on the Grading Plans and as follows:
  - 1. Do not work the soil when moisture content is so great that excessive compaction will occur; nor when content is so dry that dust will form or clods will readily break up.
  - 2. Remove and dispose of all soil in planting areas that contains any deleterious substance such as oil, plaster, concrete, gasoline, paint, solvents, etc., removing the soil to a minimum in the affected areas. The affected soil shall be replaced with native or imported soil, as required. The Subcontractor shall be responsible for any damage to installed plants caused by such substances.
  - 3. If an area to be landscaped is not acceptable to the Contractor, he shall notify the Landscape Architect in writing.
  - 4. Loosen all planting areas to a depth of 8" prior to the start of finish grading. Finish grades shall allow for addition of soil conditioners.
  - 5. Make minor grade adjustments as directed by the Landscape Architect.
  - 6. Warp grades so that water does not collect where designed drainage meets an obstruction.
  - 7. Use water trucks and sprinklers, as required, to control all airborne dust caused by grading operations.
  - 8. Finish grade all planting areas to a smooth and even condition, making certain that water does not pocket nor irregularities remain. Remove and dispose of all foreign materials, clods and rocks over 1-1/2" in diameter within 3 inches of surface. Provide a grade, after conditioning and planting, which is 1-1/2" below the tops of curbs and walks, sloping to drain to adjacent roadway, drain swale or catch basins.
- E. Soil Conditioning: (Applies to all irrigated areas.)
  - 1. Landscape architect will meet with landscape contractor prior to planting in order to discuss plant and tree locations. Landscape contractor must allow for field adjustments of all plant material.
  - 2. Soil samples (one per acre; minimum of one per site) should be sent to Soils and Plant Laboratory, Inc., 1594 North Main Street, Orange, California 92867, (714) 282-8777; or equal approved laboratory. Samples shall be reviewed for soil analysis and amendment recommendations. An analysis shall be submitted to the landscape architect and the Owner in writing. This analysis shall include a location map indicating where the soil samples were taken on the site. This procedure shall also

apply to water samples and water analysis should this be necessary. Water analysis shall be done if requested by the landscape architect or the Owner.

The landscape contractor shall provide a minimum of one percolation pit per acre to monitor how quickly the water will drain from tree and shrub pits. Landscape contractor will dig in locations directly by the landscape architect. The holes shall be 48" deep by 48" wide; the holes will then be saturated with water and filled with water. The holes will then be measured as to the number of inches they drain in one hour. If the drainage is less than 2" per hour, the contractor must notify the landscape architect in writing. The landscape architect will then provide site-specific drainage details that will assist in removing excess water from tree roots.

3. All planting areas with a grade of 3:1 or flatter shall be graded to finish grade allowing for amendments, then incorporate evenly into the top 4" to 6" the following for each 1,000 square feet of area, unless test results require a change; do not add amendments until landscape architect has reviewed test results:
  - a. 3 cubic yards of nitrolized shavings: (1) 200 pounds Gro-power Plus.
  - b. All rocks or unbroken soil clods over 1-1/2" diameter brought to the surface shall be removed from the site.
  - c. Soil deemed to have significant clay content (greater than 15% by weight) shall be amended accordingly prior to planting. (Specifics to be stated on a per project basis). **IT IS THE LANDSCAPE CONTRACTORS' RESPONSIBILITY TO DETERMINE CLAY CONTENT OF SOIL AND REPORT TO LANDSCAPE ARCHITECT.**

F. Planting Shall be Done as Follows:

1. Determine location of trees and shrubs by scaling from Planting Plans. All trees planted within 5' of paving, walls or buildings shall have root guards installed, per item F of Section 02950.2.01 of these specifications.
2. Locate containers per plan and obtain approval from the Landscape Architect before excavating pits.
3. Excavate pits per detail sheets.
4. If planting pits are cut with power auger, vertical sides of pit shall be additionally broken with balling bar or spade to interrupt continuous curve influence on root development.
5. Plant material shall be planted in such a manner, that after settling, the crown of the plant bears the same relation to finish grade that it did to the surface in the container.
6. Backfill tree and shrub pits with a prepared mix as follows: (Applies to non-native plant materials only. Native plants to be backfilled with native soil.) This mix may be modified after review of soil sample results.
  - a. 8 parts (by volume) native on-site soil parts (by volume) well composted material or equal.
  - b. 18 lbs of Gro-Power or equal per cubic yard of mix.
  - c. 10 lbs Gypsum per cubic yard of mix.
  - d. Provide Gro-Power Planting Tablets or equal per following schedule:

1 gallon	- 3 tablets
5 gallons	- 8 tablets
15 gallons	- 14 tablets

24" box - 14 tablets

30" box - 15 tablets

e. Larger per manufacturer's specifications

7. Form shallow basin around edge of plant pit.
8. Grade area around plants to finish grades and dispose of excess soil.
9. Stake or guy all new trees so indicated on plant material legend in accordance with details shown on the drawings.

G. Sodded Turf:

1. Irrigate areas to be sodded prior to installation of sod. Soil shall be damp to a depth of 2".
2. Lay sod within 2 days after its delivery. Do not leave in rolls in hot sun longer than necessary.
3. Unroll sod carefully and place in staggered pattern of strips. Use a piece of 2"x4" board to tamp each roll against the adjacent strips to eliminate joints and edges.
4. Trim sod to conform to lawn shapes designated on Planting Plans.
5. Irrigate thoroughly to provide good moisture penetration after sod is laid.
6. Roll all sod areas with a Ryan Manufacturing Company or equivalent sod roller no later than 2 days after installation. Sod shall be flush with the finish grade of existing sidewalks, curbs, etc. A second rolling will be necessary if the first does not meet with these specifications.
7. Do not lay border areas with less than full width sod nor 1/2 length sod. (Sod width - 12", length - 48")
8. Handle and lay sod in a high standard workmanship manner. Fit and join all ends, joints and cuts so there are no voids and the final appearance is one of a continuous lawn.
9. Sod area will not be acceptable until approved by the Landscape Architect.

H. Seeded Turf:

1. Grass seed shall be a mixture noted herein and evenly sown at the rate of 15 lbs per 1,000 square feet. Exercise care that seed is not distributed other than where it is specified, seed in non-designated areas, which germinates, shall be removed under this contract.
2. If seed is not applied by hydro seeding, lightly rake area after seed has been applied and mulch with 1 cubic yard of organic amendment distributed uniformly for each 1,500 square feet. Correct uneven coverage of mulch by means suitable to Landscape Architect.
3. Apply water by the site irrigation system. Keep areas moist, but not glistening wet, until the time for the first cutting of grass. Any areas where seeds fail to germinate and grow satisfactorily shall be immediately re-seeded. Dress areas of settlement or erosion with a mixture of 50% fine sand (free from foreign matter, grading not to exceed that of "nursery sand" as supplied by Consolidated Rock) and 50% organic amendment and reseed. Repeat this process until lawn areas are acceptable to the Landscape Architect.
4. Mow grass to 1-1/2" minimum when it reaches a 2" height. During the maintenance period, do not allow the grass to exceed 2-1/4" in height. Collect all grass clippings during mowing operations and remove from site.

5. Maintain lawn edges adjacent to walks and buildings in a neat condition until the acceptance of the work. If headerboard is not specified, all lawn shapes, as indicated on drawings, shall be achieved by shovel cutting after first moving of lawn.
6. Do not allow workmen to walk on lawn areas unnecessarily before, during or after seeding operations. Recultivate and reseed damaged or compacted lawn areas at the Contractor's expense.
7. Take sufficient measures to prevent damage to lawn resulting from pedestrian traffic. If any type of barrier is used, it shall meet with the approval of the Landscape Architect. All damage to the lawns must be repaired before acceptance will be given.
8. Acceptance of lawn areas will not be made until lawns have received their second mowing and all bare spots have been reseeded and germination has taken place on all reseeded areas. Be responsible for maintenance of lawns until acceptance; this maintenance being part of the installation contract, and bearing no relation to a "maintenance period."

I. Stolonized Turf:

1. Irrigate areas to be stolonized to a depth of 2" prior to applying stolons.
2. See plans for rate of broadcasting stolons.
3. If stolons are not applied by hydro seeding, apply 1 cubic yard of organic amendment distributed uniformly for each 1,500 square feet. Correct uneven coverage of mulch by means suitable to the Landscape Architect or Landscape Contractor.
4. Apply water by the site irrigation system. Keep areas moist, but not glistening wet, until the time for the first cutting of grass. Restolonate all areas where stolons fail to germinate and grow satisfactorily. Dress areas of settlement or erosion with a mixture of 50% fine sand (free from foreign matter, grading not to exceed that of "nursery sand" as supplied by Consolidated Rock) and 50% organic amendment and restolonate. Repeat until lawn areas are acceptable to the Landscape Architect or Landscape Contractor.

J. Crushed Rock:

1. Sterilize soil.
2. Wet and compact area, which is to receive rock to 90% compaction.
3. Spread, wet and roll crushed rock to specified thickness. If no thickness is specified provide 2" minimum thickness. Thickness of rock shall be uniform.

K. Pruning:

1. Prune minimum necessary to remove injured twigs and branches, deadwood and suckers.
2. Prune plants according to standard horticulture practice, by a qualified arborist. Cover all cuts over 1/2" in diameter with an application of "tree seal" or equal, colored to match trunk. Do not use lead base paints.

L. Clean-Up:

1. During the course of the work, remove surplus materials from the site and leave premises in a neat and clean condition.
2. Clean up and remove all remaining debris and surplus materials upon completion of work, leaving the premises neat and clean.
3. Remove all tags, labels, nursery stakes and ties from plants.

3.03 MAINTENANCE



- A. Continuously maintain all areas included in the contract during the progress of the work, the maintenance period and until final acceptance of the work.
- B. After all work indicated on the drawings or herein specified has been completed, observed and accepted by the Architect, maintain all planted areas for a period of 90 days.
- C. Tree and Shrub Care:
  1. Watering: Maintain a large enough water basin around plants so that water can be applied to establish moisture through the major root zone. When hand watering, use a water wand to break the water force.
  2. Pruning:
    - a. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which have vertical spacing of 18" to 48" and radial orientation so as not to overlay one another. Eliminate narrow v-shaped branch forks that lack strength; to reduce toppling and wind damage by thinning out crowns; to maintain growth within space limitations; to maintain a natural appearance; to balance crown with roots.
    - b. Under no circumstances will stripping of lower branches ("raising up") of young trees be permitted. Retain lower branches in a "tipped back" or pinched condition with as much foliage as possible to promote trunk growth (tapered trunk). Lower branches may be cut flush with the trunk only after the tree is able to stand erect without staking or other support.
    - c. Thin out and shape evergreen trees when necessary to prevent wind and storm damage. Perform primary pruning to deciduous trees during the dormant season. Prune damaged trees or those that constitute health or safety hazards at any time of the year, as required.
    - d. The objectives of shrub pruning are the same as for trees. Do not clip shrubs into balled or boxed forms unless such is required by the design and designated on the plant legend.
    - e. Make all pruning cuts of lateral branches or buds, flush with trunk. "Stubbing" will not be permitted.
  3. Staking and Guying: Remove stakes and guys as soon as they are no longer needed. Inspect stakes and guys to prevent girdling of trunks or branches, and to prevent rubbing that causes bark wounds.
  4. Weed Control:
    1. Keep basins and areas between plants free of weeds. Apply pre-emergent herbicides recommended by a licensed pest control advisor. Avoid frequent soil cultivation that destroys shallow roots.
    2. Maintain insect and disease control with approved materials.
  5. Fertilization: Make three applications of commercial fertilizer 16-6-8 at the rate of 10 lbs/1,000 square foot at the following periods:
    1. 30 calendar days after the maintenance period has begun.
    2. 60 calendar days after the maintenance period has begun.
    3. Just prior to the end of the 90-day maintenance period.
  6. Replacement of Plants: Remove dead and dying plants and replace with plants of an equal size, condition and variety of original planting plan, to be paid for by the Landscape Contractor.
  7. Groundcover Care:

1. Apply a pre-emergent, Surflan and Ronstar. Treat larger areas with Surflan at rate of 5-1/3 lbs per acre; apply Ronstar to smaller areas at rate of 200 lbs per acre.
  2. Remove trash weekly.
  3. Edge groundcover to keep in bounds and trim top growth as necessary to achieve an overall even appearance.
  4. Replace dead and missing plants at Contractor's expense.
  5. Exterminate gophers and moles, repair damage.
8. Lawn Care:
1. Mow all turf and lawn areas to a minimum height of 3/4" - 1" in warm weather and 1-1/2" during the cool season. Mow at least once every 7 days in spring and fall seasons and as needed at other seasons.
  2. Trim edges at least twice monthly or as needed for a neat appearance. Vacuum or blow clippings off walks.
  3. Water lawns at such frequency as weather conditions require, in order to replenish soil moisture below root zone. Always water at night. Normally, a total of 1-1/2" of water is needed weekly in hot weather.
  4. If needed, control broad leaf weeds with selective herbicides. In areas where Crabgrass has infested the lawn, apply pre-emergent herbicides as recommended by a licensed pest control advisor.
  5. Exterminate gophers and moles and repair damages.
  6. Overseed as necessary, depending on the season. See plant legend for overseeding requirements.
9. Clean-Up:
- a. Contractors shall remove all debris associated with his work from the project site on a daily basis. Contractor is responsible for providing proper debris receptacles, or disposing of debris off site.
  - b. All receptacles or off site disposal must conform to state and local codes. Contractor is responsible for identifying any waste associated with his work which may be deemed as being "hazardous" as defined by the EPA, and disposing of it per EPA regulations.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 02980**  
**90-DAY MAINTENANCE**

**PART 1 -- GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

**1.02 SCOPE OF WORK**

- A. These specifications establish the standard for the maintenance of the landscaping for the (90) ninety days following completion of landscape installation.
- B. The Contractor shall furnish all labor, equipment, materials, tools, services and special skills required to perform the landscape maintenance as set forth in these specifications and in keeping with the highest standard of quality and performance.
- C. Maintenance of these areas shall include maintenance of plant materials and irrigation system. Maintenance of plant materials shall include, but is not limited to, mowing, trimming and edging, pruning, fertilization, aeration, weed control, cultivation, pest control, tree surgery, thatching, plant replacement and clean-up of drainage system. It is the intent of these specifications to provide plant material maintenance methods to keep the site in a state of growth and repair. Irrigation maintenance shall include operation of system adjustment and all necessary repairs.
- D. Emergency Numbers: The Contractor shall provide, at all times throughout the duration of this contract, emergency telephone numbers which can be called for emergency conditions at any time that the Contractor's representatives are not immediately available at the job site. An alternative number shall be provided in case no answer is received at the first number. The emergency number shall be used to contact a responsible representative of the Contractor who can take the necessary action required to alleviate an emergency condition that threatens to cause damage to any property.
- E. Method of Payment: The Contractor shall present monthly invoices of one-third of the total amount of the 90-day contract. Payments will be made monthly and shall equal one-third of the total amount for a 90-day period, due within (30) thirty days from which service was performed.

**1.03 INSURANCE, LICENSES, PERMITS**

- A. The Landscape Maintenance Contractor shall possess all insurance, licenses and permits required to perform the landscape maintenance.
- B. Licensing Requirements: In accordance with Division II, Chapter 9 of the Business and Professions Code of the State of California, providing for the licensing of contractors, the Contractor shall possess a valid C-27 landscape maintenance license or Class A Contractor's license. In addition, the Contractor shall possess a valid chemical applicator's license to include pest control or must subcontract to a licensed contractor.
- C. Contract Termination: The Owner reserves the right to terminate the contract, without penalty, for cause immediately or without cause after (30) thirty days written notice thereof is delivered to Contractor, either personally or by mail addressed as shown on the contract documents. In the event of such termination, the bond shall remain in effect for six (6) months after the date of termination to provide surety that any remedial work required at the time of termination will be completed.

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports: None required

B. As-Builts: Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data: None required

D. Extra Materials: None required

E. Extended Warranty: Comply with the requirements of the General Condition Article 3.5 and Section 01740.

**PART 2 -- MATERIALS**

As required.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

A. Examine the areas and condition under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 ANNUAL COLOR/GROUNDCOVER AREAS

A Fertilization

1. Apply fertilizers as indicated in Section 02950.

Shrub and groundcover areas shall be tilled only prior to pre-emergent application but raked and edged weekly or bi-monthly, and all debris removed from the areas that day. Groundcover shall be kept neat in appearance and within the intended area of planting by edging and trimming.

Keep shrubs and groundcover neatly trimmed away from sprinkler heads to allow for their proper operation and normal spray pattern. Groundcovers and vines shall be trimmed back from shrubs, trees and private property fences, as necessary. Trim and edge to maintain sidewalks and curbs free of plant growth.

B Weed Control:

1. Weeds shall be controlled so as not to reach an objectionable height. Remove weeds by chemical or mechanical means on a monthly schedule. Weed infestations of the shrub and groundcover areas, if severe, may be controlled by a commercial herbicide by obtaining written permission from the Landscape Architect. Such permission shall depend on the Contractor submitting to the Landscape Architect the following information:
  2. The exact location(s) where the herbicide is to be used.
  3. Verification that the herbicide has no harmful effect on desirable plant materials.
  4. The herbicide will be applied at the manufacturer's instructions for application.

5. Bermuda grass infestations of the shrubs, groundcover and slope areas, if severe, should be sprayed out and "weedeaten".

C Watering:

1. A regular deep watering program shall be implemented to give the best results. The established groundcover shall not be kept wet but should dry out somewhat between waterings.

D Surface Drains:

1. The Contractor shall be responsible for periodic inspection and maintenance of surface drains located within the landscaped areas. These drains shall be checked to assure proper functioning. On a regular schedule, remove all debris and vegetation that may accumulate in these drains, including the portion under the sidewalk, to maintain the proper flow of water.

E Annual Color:

1. The Contractor shall be responsible for replacing annual color two (2) times during the year. Annual color will be replaced at the following times: 1st week in November and the 1st week in June (as weather permits).

3.03 ADDITIONAL WORK IN ALL AREAS

A. Tree Maintenance:

1. Trees shall be pruned to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, which have vertical spacing from 18" to 48" and radial orientation so as not to overlay one another, to eliminate diseased or damaged growth, to eliminate narrow V-shaped branch forks that lack strength, to reduce toppling and wind damage by thinning out crowns, to maintain a natural appearance, to balance with roots.
2. Tree maintenance should be done on a yearly or twice yearly basis, as needed, to maintain the trees in a healthy and vigorous growing condition. A qualified tree care professional should be contracted by the Owner to perform this service on all trees 15' or greater in height. Trees under 15' in height may be maintained by the general maintenance contractor following the methods outlined below. Trees are not to be pruned to maintain an artificial height of 15' or under when the natural growth characteristics would exceed a 15' height.
3. Under no circumstances will stripping of lower branches (raising up) of young trees be permitted. Lower branches shall be retained in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk). Lower branches can be cut flush with the trunk only after the tree is able to stand erect without staking or other support.
4. Evergreen trees shall be thinned out and shaped when necessary to prevent wind and storm damage. The primary pruning of deciduous trees shall be done during the dormant season. Damaged trees or those that constitute a safety hazard shall be pruned at any time of the year, as required.
5. All major pruning operations will not begin until reviewed with the Landscape Architect.
6. Pruning shall be done by those experienced and skilled in pruning techniques. All cuts shall be done using proper horticultural practices. Cuts made over 1-1/2" in diameter shall be treated with a sealer.
7. Prune trees to allow for necessary clearances for pedestrian and vehicle

circulation.

8. Ailing or stunted trees that fail to meet expected growth will receive additional treatments to correct any deficiencies.
9. Surface roots that become maintenance or appearance problems will be removed as required to prevent damage to adjacent areas, sidewalks and curbs.
10. Apply all required insecticides and fungicides to prevent or control plant diseases and pests.
11. Perform minor tree surgery, as required.
12. Tree stakes, ties and guys shall be checked at least monthly and corrected, as needed. Ties will be adjusted to prevent girdling. Remove stakes, ties and guys as soon as they are no longer needed. Replace broken stakes, as required.
13. To prevent the setting and eventual dropping of fruit, olive trees shall be sterilized every spring, just before flowers are at full bloom, then again 7 to 14 days later to get any late blooms. The product for this shall be "Olive Stop" or approved equal.
14. The Contractor shall be responsible for the spraying of all pine trees for spider mites four times a year. The product for this shall be Malathion followed up with a petroleum oil for overwintering adults and eggs.

**B. Shrub Maintenance:**

1. The objective of shrub pruning is the same as for trees.
2. Shrubs shall be pruned, as required, for safety, removal of broken or diseased branches and general containment or appearance.
3. Prune shrubs to retain as much of the natural informal appearance as possible, consistent with intended use. Shrubs shall not be clipped into balled or boxed forms unless such is required by the design.
4. All pruning cuts shall be made to lateral branches, buds or flush with the trunk. "Stubbing" will not be permitted.
5. Apply all insecticides or fungicides to control pests.

**C. Loss or Damage to Plant Material by Contractor:**

1. Shrubs, trees and plants damaged or killed due to the Contractor's operations, negligence or chemicals shall be replaced at no cost to the Owner.

**D. Disease and Harmful Insect Control:**

1. Monthly inspections shall be made for evidence of disease and/or harmful insects. If evidence of such is found, a report shall immediately be submitted to the Landscape Architect. The report shall include:
  2. Exact location(s) where disease and/or harmful insects are prevalent.
  3. Contractor's opinion of the type of disease and/or insect.
  4. Contractor's recommendations for control and elimination of disease and/or harmful insects.

**E. Pest Prevention and Control:**

1. The Contractor shall be responsible for detection, prevention, elimination and control of diseases, harmful insects and weeds in the turf, shrubs, trees and groundcover areas. The Contractor shall select and supply proper materials and licensed personnel and obtain necessary permits to comply with all city, county,

state and federal regulations or laws.

2. Contractor will assume responsibility and liability for the use of all chemical controls. Pests and diseases to include, but not limited to, all insects, mites and other harmful organisms.
3. Chemical controls to include necessary use of herbicides and plant growth regulators. Pests may be controlled by mechanical means, as well as chemicals.

F. Rodent Control:

1. The Contractor shall be required to hire, as subcontractor, a professional who is in business strictly for the purpose of controlling rodents. The Contractor shall be responsible for overseeing the subcontractor to assure the control of all rodents, as required in all landscaped areas.

G. Clean Up:

1. The Contractor shall be responsible for keeping the entire area, including hardscape areas, free of debris such as papers, bottles, cans, glass, dirt, etc. Debris shall be removed Monday, Wednesday and Friday each week. Contractor shall be responsible for trash removal from the sites.
2. Contractor shall remove all debris resulting from the maintenance operations and dispose of it off-site. All grass clippings deposited on roadways or walks shall be picked up after each mowing or trimming operation.
3. All debris resulting from any of the Contractor's operations shall be removed and disposed of legally at the Contractor's expense. No debris will be allowed to remain at the end of the workday.
4. All walkways will be kept clean and care shall be taken not to create unnecessary hazards to the walking surface.
5. Unless otherwise indicated or directed, the Contractor shall provide a general clean-up operation at least once a week for the purpose of picking up debris which may accumulate from use of the area, windblown debris, dropped twigs or branches, leaves or paper in the landscape area.

H. Irrigation System:

1. Operation:
  - a. The water schedule will be established and programmed by the Contractor's landscape maintenance supervisor. Application rates will be based on the amount the planting areas are capable of receiving without excessive runoff. The irrigation system's schedule shall be monitored and adjusted accordingly to maintain efficient use of water being applied.
  - b. In determining rates of application, soil type, topography and weather conditions will be taken into consideration. The project is equipped with an automatic system that provides for repeat cycles. Applying water over short periods of time will allow for proper infiltration and thereby minimize runoff.
  - c. Contractor shall turn off all controllers when it is unnecessary to irrigate due to adequate rainfall.
  - d. Sprinkler heads shall be kept clear of overgrowth that may obstruct maximum operation.
  - e. Contractor will avoid manual activation of automatic valves.



- f. Contractor will keep system in operation by valve or head adjustment to keep all systems operating at manufacturer's recommended operating pressures. This shall be accomplished by valve throttling and pressure gauge.
- g. Contractor will be responsible for hand watering any areas not provided with an irrigation system, or any area resulting from the physical breakdown of the irrigation system.

2. Maintenance:

- a. The Contractor shall be responsible for the cost of cleaning, repair, adjustment and replacement of sprinkler system components, with the exception of irrigation controllers and backflow protection devices.
- b. The Contractor shall be responsible for the cost of cleaning, repair, adjustment and replacement of all items listed in the foregoing paragraphs in addition to the following:
  - 1. Plastic Pipe
  - 2. Plastic Pipe Fittings
  - 3. Galvanized Steel Pipe
  - 4. Galvanized Steel Fittings
  - 5. Remote Control Valve Wiring
  - 6. Remote Control Valves
  - 7. Manual Control Valves
  - 8. Quick Coupler Valves
  - 9. Sprinkler Heads
  - 10. Valve Boxes
- c. Replacement of any item shall be with an item of identical design, unless otherwise specified in writing by the Landscape Architect.
  - 1. The following specifications are provided for replacement of plastic pipe, plastic pipe fittings, galvanized steel pipe and galvanized pipe fittings:
    - a. Plastic pipe shall be polyvinyl chloride (PVC) Schedule 40, Type 1, Grade 2 (PVC 1220).
    - b. Plastic pipe fittings and connections shall be PVC Schedule 40.
    - c. Galvanized steel pipe and galvanized steel pipe fittings shall be Schedule 40.
  - 2. The Contractor shall inspect and examine the sprinkler system while water is on twice per month.
  - 3. Any part of the system not functioning normally shall immediately be cleaned, adjusted, repaired or replaced.
  - 4. Contractor shall be responsible for adjusting height of sprinkler risers necessary to compensate for plant material growth.
  - 5. Automatic controllers will be kept locked at all times.

3.04 MISCELLANEOUS

- A. The Contractor shall furnish and pay all costs for the following material:
  - 1. Herbicides, pesticides and fungicides
  - 2. Sprinkler system parts
  - 3. Fertilizers
  - 4. Tree stakes and ties
  - 5. All tools and equipment to complete the work specified
  - 6. Plant materials damaged by the Contractor
  - 7. Annual color
  - 8. Overseeding
- B. Daily Inspection:
  - 1. The Contractor shall be responsible for notifying Owner upon discovery of damage to facilities (i.e. drinking fountains, lighting poles and fixtures, etc.), which could be a potential health and safety hazard or could be an inconvenience to the general public.
- C. Inspections will be made by Owner and the Contractor on a weekly basis and/or at the request of the Contractor. Once a month Owner, Landscape Architect and Contractor will meet. The purpose of the meeting will be to discuss specific project problems.

3.05 FERTILIZATION

- A. General
  - 1. Fertilizers shall be inorganic, dry, pelletized formation, as specified. Application shall be in accordance with indicated rates and times.
- B. Method of Application
  - 1. In making application of fertilizer granules, caution shall be taken to contain these materials in the planting areas. Avoid use of cyclone spreaders, which tend to throw material into paved areas, etc. Use gravity flow spreaders when possible to keep material contained in planting areas.
- C. Timing of Application
  - 1. When climatic factors may cause problems of general containment of fertilizer materials, adjustment of the fertilizer schedule may be necessary. Avoid application of fertilizers prior to forecasted rainy weather, etc., which might affect stability. After fertilizer application, monitor watering schedule to eliminate runoff of fertilizer materials in solution.
- D. Trees and Shrubs
  - 1. Agriform 21 grams plant tablets shall be applied to trees and shrubs that require supplemental feeding. Annual fall feeding shall be done in accordance with the rates indicated. Place tablets 6 to 8 inches deep.

PRODUCT ANALYSIS	TIME	RATE PER 1,000 S.F.
20-10-5	As required	1 gal plant - 1 tablet 5 gal plant - 2-3 tabs Mature trees - 1 tab per 1/2" of caliper

3.06 CLEAN UP

- A. Contractors shall remove all debris associated with his work from the project site on a daily basis. Contractor is responsible for providing proper debris receptacles, or disposing of debris off site.
- B. All receptacles or off-site disposal must conform to state and local codes. Contractor is responsible for identifying any waste associated with his work which may be deemed as being "hazardous" as defined by the EPA, and disposing of it per EPA regulations.

**\*\*\* END OF SECTION \*\*\***

**SECTION - 02981**

**STABILIZED DECOMPOSED GRANITE**

**PART 1 -- GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

**1.02 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.03 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Sieve analysis of aggregate for road and firelanes.
- C. Samples and or shop drawings for the following:
  - 1. Aggregate for strength and color – road and firelane
- D. Construction Samples:
  - 1. Construct mock-up panels or areas for each different type of paving system as specified herein to demonstrate ability to archive types of setting bed, joints, pattern, color and texture required herein.
  - 2. Stalok® Paving Material for aggregate road and firelane surfacing: Construct a 12'x24' sample of finished path as directed by the Owner's Representative on site.
  - 3. General:
    - a. Schedule mock-up construction so that mock-up can be accepted a minimum of 30 days prior to the application of paving surfaces represented by the mock-up.
    - b. Locate mock-up panel(s) in areas as directed by the Owner's Representative.
    - c. Continue to construct mock-ups until acceptable mock-up is produced (at no cost to the Owner). Acceptable mock-up shall be standard for texture, color and workmanship.
    - d. Use same setting bed and joint mixes used in accepted mock-up in final work unless otherwise directed by Owner's Representative.
    - e. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-ups.
    - f. Remove mock-up panel(s) from the site at completion of the project, unless otherwise instructed by Owner's Representative.

**1.03 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.

- B. Special Warranty: Submit a written warranty executed by the installer agreeing to repair or replace components of Stalok® Paving Material that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
  - 1. Premature wear and tear, provided the material is maintained in accordance with manufacturer's written maintenance instructions.
  - 2. Failure of system to meet performance requirements.
- C. Warranty Period: Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the time of one year from completion.
- D. Contractor shall provide, for a period of sixty days, unconditional maintenance and repairs as required.

## **PART 2 -- SUMMARY**

- A The work of this Section consists of all paving work and related items as indicated on the drawings and or as specified herein and includes, but is not limited to, the following items:
  - 1. Stalok® Paving Material aggregate road and firelane surfacing
- B Related Sections:
  - 1. Section 02100 – Site Preparation
  - 2. Section 02200 – Earthwork
  - 3. Section 02230 – Granular Materials
- C General Provisions
  - 1. All of the contract documents, including General and Supplementary Conditions and Division I General Requirements, apply to the work of this Section.
  - 2. Examine all drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.
  - 3. Coordinate work with that of all those affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

### **2.01 PERFORMANCE REQUIREMENTS**

The following standards and definitions are applicable to the work of this Section to the extent referenced herein:

- 1. Standard Specifications: Highway Department, Standard Specifications for Highways and Bridges, latest edition.
- 2. ASTM: American Society for Testing and Materials.
- 3. AASHTO: American Association of State Highway and Transportation Officials.

### **2.02 PROJECT/SITE CONDITIONS**

Field Measurements: Each bidder is required to visit the site of the work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.

- 1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.

2.03 QUALITY ASSURANCE

Installer Qualifications: Installer to provide evidence to indicate successful experience in installation of Stalok® Paving Material or approval by manufacturer.

**PART 3 -- PRODUCTS**

3.01 MANUFACTURERS

Stalok® Paving Material is provided by the following manufacturer:

1. Stabilizer Solutions, Inc. 33 South 28<sup>th</sup> St., Phoenix, AZ 85034; phone (602) 225-5900, (800) 336-2468; fax (602) 225-5902; website www.stabilizersolutions.com; email info@stabilizersolutions.com

3.02 MATERIALS

Aggregate Specifications

1. Crushed stone shall consist of inert materials that are hard, durable, with stone free from surface coatings and deleterious materials. Gradation requirements shall be as follows:

U.S. Sieve No.	Percent Passing by Weight
# 1/2"	98 – 100
# 3/8"	90 – 100
# 4	65 – 80
# 8	48 – 63
# 16	40 – 49
# 30	30 – 40
# 50	20 – 27
# 100	10 – 18
# 200	10 – 12

2. R-value minimum of 70 determined by ASTM D 2488 Methodology (R-value is a measure of wear resistance).
3. Sand equivalent – an engineering measurement of the proportion of sand to silt and clay, will stay at a range of 30-55. As determined by ASTM D 2419 methodology.
4. Dense graded crushed stone base shall be furnished and installed as required and specified under Section 02200, Earthwork and Section 02230 Granular Materials to a 6" compacted depth.

**PART 4 -- EXECUTION**

4.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

4.02 PREPARATION

- A. Make any corrections necessary to base furnished and installed under Section 02200 Earthwork and Section 02230 Granular Materials to bring gravel to the sections and elevations shown on the drawings.
- B. Pre-soak base material with water prior to installing Stalok® Paving Material as needed to compact base.

4.03 BLENDING

- A. Stalok® Paving Material is a solely owned patented process.
- B. Blending procedures are performed only by a licensed Stalok® Paving Material blender and can only be sold through licensed Stalok® Paving Material Dealers.

4.04 PLACEMENT/COMPACTION

Place Stalok® Paving Material at a 2" compacted depth. Using a Paver Box, Paver, Crawler Paver, Asphalt Paver, Drag Box Paver, Pavement Profiler, Slip Form Paver, Pav-Saver Place Spreader or Equal Compact Stalok® Paving Material.

- 1. Compaction can be achieved by a 5-ton double-drum roller
- 2. Compact material making 8 to 10 passes.
- 3. Use plate compactor on edges and hard to get areas.
- 4. Loose material shall not be present on final surface.

4.05 WATERING

Water the surface area with a light spray following compaction. Contractor shall take care as to not disturb the aggregate surface with the spray action.

4.06 INSPECTION

Finished surface shall be uniform and solid, with no evidence of chipping or cracking. Dried, compacted paving material shall be firm to full depth with no soft areas. Loose material shall not be presented on the surface and no ruts shall be present.

4.07 MAINTENANCE

Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed. Any plowing program required during winter months shall involve the use of a rubber baffle on the plow blade or wheels on the plow that lifts the blade 1/4" off the paving surface.

4.08 REPAIRS

- A. Excavate damaged area to the depth of the Stalok® Paving Material and square-off sidewalls.
- B. If area is dry, moisten damaged portion lightly and scarify.
- C. Apply lightly moistened pre-blended Stalok® Paving Material to excavated area to finish grade.
- D. Compact with an 8" to 10" hand tamp or 1000 lb. Roller.

\*\*\*END OF SECTION\*\*\*

## SECTION 03100

### CONCRETE FORMWORK AND ACCESORIES

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Design, furnish and install forms for concrete as indicated on drawings and specified here. Remove forms and shores at specified time. Clean up.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Rough Carpentry: Section 06100.
- B. Structural Steel: Section 05120.
- C. Metal Fabrications: Section 05500.
- D. Items relating solely to mechanical or electrical work are included under those Divisions, except as specifically indicated otherwise on Drawings.
- E. Reinforcing Steel: Section 03210.
- F. Cast-In-Place Concrete: Section 03300.

##### 1.04 QUALITY ASSURANCE

- A. General:
1. Conform to all requirements of ACI 347 and CBC Section 1906.1 and 1906.2.
  2. Concrete formwork shall be designed and constructed to safely support fluid concrete and superimposed construction loads without excessive deflection or concrete leakage. Provide bracing to maintain accurate alignment and to resist all anticipated lateral loads. Forms shall conform with drawings as to shape, line, and dimension. Design, engineering and construction of forms shall be Contractor's responsibility. Formwork for exposed concrete shall be constructed to tolerances indicated in ACI 303R.
  3. Cooperate and coordinate with other trades who furnish and/or install piping, conduit, reglets, anchors, inserts, sleeves, hangers, etc., as their work requires; including provisions for recesses and chases.
- B. Submittals: (Submit under provisions of Section 01330)
1. Product Data. Provide manufacturers data and installation instructions for the following:
    - a. Tie rods and spreaders.
    - b. Formwork for exposed concrete.
    - c. Form coatings and release agents.
- C. Standards and References: (Latest Edition unless otherwise noted)
1. 2010 California Building Code (CBC).
  2. "Recommended Practice for Concrete Formwork", ACI 347, American Concrete Institute, latest edition.
  3. Standard Grading and Dressing Rules #17, West Coast Lumber Inspection Bureau (For Douglas Fir Form Lumber).
  4. U.S. Product Standard PS 1-83 (For Plywood Form Lumber).



5. "Guide to Cast-In-Place Architectural Concrete Practice", ACI 303R, American Concrete Institute, latest edition.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

**PART 2 – PRODUCTS**

2.01 MATERIALS

- A. Form Material:
  1. Smooth Concrete exposed to view: 5/8 inch minimum APA Plyform or steel.
  2. Concrete concealed from view: 5/8 inch minimum APA Plyform, steel or clean and sound 1 x 8 Standard Grade Douglas Fir.
- B. Fiber Forms: Tubular column forms spirally constructed of laminated plies of fiber. Plies shall be laminated using a non-water sensitive adhesive and surface wax impregnated for moisture protection. Forms shall give a smooth and seamless appearance to the cast concrete. Provide reveals, as shown on the drawings, as supplied by the form manufacturer. Forms shall be as manufactured by Sonoco Products, plastic lined; Burke Smoothtube by Burke Co.; or approved equal.
- C. Form Clamps: Assembly to have cone washers, (1 inch break back) 3/8" inch center rod.
- D. Form Ties:
  1. Concrete exposed to view: Snap ties allowing full 1 inch break back.
  2. Concrete concealed from view: Snap ties or wire.
  3. Verify special spacing requirements with architectural drawings at exposed concrete.
- E. Spreaders: Metal (no wood).
- F. Form Coating: Non-grain and non-staining types of form coating that will not leave a residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.
  1. Form coating containing mineral oils or other non-drying materials will not be permitted for any concrete work.
- G. Joint Tape: No. 471 plastic film tape 3 inches wide, as manufactured by the Industrial Tape Division of 3M Company.
- H. Expansion Joint Filler (Preformed): 1/2 inch thick; Flexcell by Celotex Corporation, Elastic Fiber Expansion Joint by Phillip Carey Mfg. Co., or Sealtight Fiber Expansion Joint by W.R. Meadows, Inc.
- I. Extruded Polystyrene Foam: ASTM C578 type IV. Dow Chemical Corp. "Styrofoam", UC Industries "Foamular", or approved equal.

## **PART 3 – EXECUTION**

### **3.01 FORM CONSTRUCTION**

- A. Construct substantial forms to the shapes, lines, grades and elevations shown, sufficiently tight to prevent leakage of mortar, and tied, clamped and braced to prevent spreading, shifting or settling. Plywood joints shall be square and tight; plywood shall be arranged in such manner as to minimize number of joints and to provide a smooth, attractive finished concrete surface.
- B. Apply form coating to forms before reinforcing steel is in place.
- C. Sleeves, anchors and bolts, including those for angle frames, supports, ties and other materials in connection with concrete construction, shall be secured in position before the concrete is placed.
- D. Proper provisions shall be made for openings, blockouts, sleeves, offsets, sinkages, recesses and depressions required by other trades and suppliers prior to placing concrete.
  - 1. The Contractor shall also see that sleeves have been installed and other provisions have been made for the installation of mechanical, electrical and other equipment.
  - 2. Coordinate with all trades to insure proper placement of all items in forms and to provide proper blockouts wherever required.
- E. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, with no additional cost to the Owner.
- F. Form Not Required: Concrete footings may be poured directly against cut earth where feasible and when the Architect's approval has been obtained.
  - 1. See structural drawings for requirements for placing concrete footings directly against earth without forms.
- G. Use ¾ inch minimum wood chamfer strips typical at all exposed corners unless noted otherwise on drawings.

### **3.02 CLEANING OF FORMS**

- A. All dirt, chips, sawdust, rubbish, water, etc. shall be completely removed from form by water hosing and air pressure before any concrete is deposited therein. No wooden ties or blocking shall be left in concrete except where indicated for attachment of other work.
- B. Thoroughly clean and patch all holes in formwork and re-coat as required before reusing. Forms not suited to obtain concrete surfaces and tolerances in conformity with Contract requirements will be rejected by Architect.
  - 1. Reuse of forming materials shall be limited only as required to produce the finishes as specified, free from blemishes and other defects unless covered by other building materials in which case blemish free concrete is not required.

### **3.03 INSPECTION OF FORMS**

- A. Notify the Architect at least 48 hours in advance of the beginning of pouring operations and at the completion of formwork and location of all construction joints. An inspection of forms and joints will be made for approval of finished work and general layout only. The foregoing inspection shall in no way relieve the Contractor of responsibility of design and safety or formwork, bulkheads and shorings.

3.04 REMOVAL OF FORMS AND SHORING

- A. Do not remove forms until concrete has attained sufficient strength to support its weight and any construction loading. Concrete must be allowed to cure long enough to avoid damage during form removal. Contractor or his representative in charge of concrete construction shall be present during removal of forms and shores, and shall be personally responsible for safety of this operation at all times and under all conditions.
- B. As a minimum, formwork and shoring shall remain in place for the following periods:
  - 1. Concrete on grade: 24 hours
  - 2. Walls and Columns: 3 days
  - 3. Formwork may be removed and reshores installed before the times indicated above, provided the concrete has cured sufficiently to avoid damage when formwork is removed. Shores must be immediately replaced with reshores in a sequence designed to avoid inducing stress in the concrete member.

3.05 ADJUSTING AND CLEANING

- A. Upon completion of this Work, clean up and remove from Site all equipment and debris resulting from this work.
- B. Surfaces to be painted shall be smooth and free of substances such as dirt, wax, excessive latence, grease or materials that would prevent proper bonding of finishes.
  - 1. Removal of foregoing contaminants, and complete removal of parting and curing compounds affecting proper paint bond, shall be responsibility of this Section of Work. Sandblast cleaning shall not be employed without specific approval of Structural Engineer.

\*\*\* END OF SECTION \*\*\*

## SECTION 03210

### REINFORCING STEEL

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Unless noted otherwise, furnish and install reinforcing for all concrete, including dowels, chairs, spacers, bolsters, etc., necessary for supporting and fastening reinforcement in place as shown on the Drawings and specified herein.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Concrete Formwork: Section 03100.  
B. Cast-In-Place Concrete: Section 03300.

##### 1.04 QUALITY ASSURANCE

A. General:

1. Acceptable Manufacturers: Regularly engaged in the manufacture of steel bar and welded wire fabric reinforcing.
2. Installer Qualifications: Installation shall be done only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics working under an experienced supervisor.
3. Welding Qualifications: Welding procedures, welding operators and welders shall be qualified in accordance with AWS D1.4 - "Structural Welding Code Reinforcing Steel".
  - a. Welders whose work fails to pass inspection shall be re-qualified before performing further welding.
4. Reinforcement Work shall conform to ACI 301 and CBC Section 1907, as minimum standards.
5. Allowable Tolerances:
  - a. Fabrication:
    - 1) Sheared length: 1 inch.
    - 2) Depth of truss bars: Plus 0 minus 1/2-inch.
    - 3) Ties: Plus or minus 1/2-inch.
    - 4) All other bends: Plus or minus 1 inch.
  - b. Placement:
    - 1) Concrete cover to form surfaces: Plus or minus 1/4-inch.
    - 2) Minimum spacing between bars: Plus or minus 1/4-inch.
    - 3) Crosswise of members: Spaced evenly within 2 inches of stated separation.
    - 4) Lengthwise of members: Plus or minus 2 inches.
  - c. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 2 bar diameters.

B. Standards and References: (Latest Edition unless otherwise noted):

1. American Concrete Institute (ACI).
  - a. ACI 301 - "Specifications for Structural Concrete for Buildings".
  - b. ACI 315 - "Details and Detailing of Concrete Reinforcing".
  - c. ACI 318 - "Building Code Requirements for Reinforced Concrete"

2. American Society for Testing and Materials (ASTM).
    - a. ASTM A82 - "Cold Drawn Wire for Concrete Reinforcement".
    - b. ASTM A185 - "Welded Steel Wire Fabric for Concrete Reinforcement".
    - c. ASTM A615 - "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".
    - d. ASTM A706 - "Low Alloy Steel Deformed Bars for Concrete Reinforcement".
  3. Concrete Reinforcing Steel Institute (CRSI) - "Manual of Standard Practice".
  4. 2010 California Building Code (CBC),.
- C. Submittals: (Submit under provisions of Section 01330)
1. Shop Drawings: Prepare in accordance ACI 315. Indicate bending diagrams, assembly diagrams, splicing and laps of bars and shapes, dimensions and details of bar reinforcing and assemblies. Correctness of all reinforcing requirements and work is the responsibility of Contractor. Identify such shop drawings with reference thereon to sheet and detail numbers from Contract Drawings.
    - a. Do not use scaled dimensions from Contract Drawings in determining the lengths of reinforcing bars.
    - b. No reinforcing steel shall be fabricated without approved shop drawings.
    - c. Any deviations from the contract documents must be clearly indicated as a deviation on the shop drawings.
    - d. Areas of high congestion, including member joints and embed locations shall be fully detailed to verify clearances and assembly parameters and coordination with other trades.
  2. Certified mill test reports of supplied reinforcing indicating chemical and physical analysis. Tensile and bend tests shall be performed by the mill in accordance with ASTM A615.
  3. Product Data:
    - a. Manufacturer's specifications and installation instructions for splice devices.
    - b. Bar Supports.
  4. Certificates of Compliance with specified standards:
    - a. Reinforcing bars.
    - b. Welded wire fabric.
    - c. Welding electrodes.
  5. Samples: Only as requested by Architect.
- D. Tests and Inspections:
1. A testing program is required prior to start of construction. Testing program to be done in compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
  2. All reinforcing steel whose properties are not identifiable by mill test reports shall be tested in accordance with ASTM A615. One Series of tests for each missing report to be borne by the Contractor.
  3. When inspections are indicated for reinforcement placement on the Structural drawings, a special inspector shall be employed to inspect reinforcing placement per CBC Section 1704.
  4. When tests are indicated for reinforcing steel on the structural drawings, the reinforcing steel used shall be tested in accordance with ASTM A615. One tensile and one bend test for each 2-1/2 tons of steel or fraction thereof, shall be made.
  5. Inspect shop and field welding in accordance with AWS D1.4, including checking materials, equipment, procedure and welder qualification as well as the welds. Inspector will use non-destructive testing or any other aid to visual inspection that he deems necessary to assure himself of the adequacy of the weld.
  6. Tests and inspection shall be performed by Owners testing agency except when needed to justify rejected work, in which case the cost of retests and reinspection shall be borne by the Contractor.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.
- B. Handle and store materials to prevent contamination.
  - 1. Store reinforcement in a manner that will prevent excessive rusting or coating with grease, oil, dirt, and other objectionable materials. Storage shall be in separate piles or racks so as to avoid confusion or loss of identification after bundles are broken.
- C. Deliver and store welding electrodes in accordance with AWS D12.1.

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.07 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

**PART 2 – PRODUCTS**

2.01 MATERIALS

- A. Reinforcement Bars: ASTM A615, Grade 60 for all bars.
  - 1. Bar reinforcement to be welded shall meet chemical requirements of ASTM A706.
  - 2. Longitudinal reinforcement in column and beams of special moment-resisting frames shall meet the chemical requirements of ASTM A706.
- B. Stirrups and Ties: ASTM A615, Grade 60 for all bars.
- C. Steel Dowels: Same grade as bars to which dowels are connected.
- D. Welded wire Fabric: ASTM A185.
- E. Tie Wires: FS-QQ-W-461, annealed steel, black, 16 gauge minimum.
- F. Welding Electrodes: AWS D1.4, low hydrogen, E70XX series.
- G. Bar Supports:
  - 1. Typical, unless noted otherwise; CRSI Class 2 wire supports.
    - a. Do not use wood, brick or other objectionable materials.
    - b. Do not use galvanized supports.
  - 2. Supports placed against ground: Pre-cast concrete blocks not less than 4 inches square with embedded wire.
- H. Mechanical Couplers: Comply with ACI 318 section 12.14.3.

**PART 3 – EXECUTION**

### 3.01 FABRICATION

- A. Shop fabricate reinforcement to meet requirements of Drawings.
- B. Fabricate reinforcement in accordance with the requirements of ACI 315 where specific details are not shown or where Drawings and Specifications are not more demanding.
- C. Steel reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of bars for bending will not be permitted.
- D. Reinforcing shall not be field bent or straightened without structural engineer's review.
- E. Provide offsets in rebar (1:6 maximum) where required to maintain clearances.

### 3.02 CONDITION OF SURFACES

- A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions have been corrected.

### 3.03 GENERAL

- A. Concrete shown without reinforcing shall be reinforced as similar parts shown with reinforcing except where concrete is specifically noted to be unreinforced.

### 3.04 PLACEMENT

- A. All reinforcement shall be accurately set in place, lapped, spliced, spaced rigidly and securely held in place and tied with specified wire at all splices and crossing points. All wire tie ends shall point away from the form. Carefully locate all dowel steel to align with wall and column steel.
  - 1. Bars shall be in long lengths with laps and splices as shown. Offset laps in adjacent bars. Place steel with clearances and cover as shown. Bar laps shall be as indicated on the Drawings. Tie all laps and intersections with the specified wire.
  - 2. Maintain clear space between parallel bars not less than 1-1/2 times nominal diameter, but in no case shall clear space be less than 1-1/2 times maximum size concrete aggregate.
  - 3. Reinforcing dowels for slabs shall be placed as detailed. Sleeves may be used if reviewed by the Structural Engineer before installation. Install dowel through all construction and expansion joints for all slabs on grade.
- B. Bar Supports: Support and securely fasten bars with chairs, spacers and ties to prevent displacement by construction loads or placement of concrete beyond the tolerances specified. Conform to CRSI as a minimum standard.
- C. Steel Adjustment:
  - 1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
  - 2. Do not move bars beyond allowable without concurrence of Structural Engineer.
  - 3. Do not heat, bend, or cut bars without concurrence of Structural Engineer.
  - 4. Reinforcement shall not be bent after being embedded in hardened concrete.
- D. Splices:
  - 1. Splice reinforcing as shown.
  - 2. Lap Splices: Tie securely with wire to prevent displacement of splices during placement of

- concrete.
3. Splice Devices: Install in accordance with manufacturer's written instructions. Obtain Structural Engineer's review before using.
  4. Do not splice bars except at locations shown without concurrence of Structural Engineer.
    - a. Where splices in addition to those indicated are required, indicate location on shop drawings clearly and highlight "for Engineer's approval".
- E. Welding:
1. Welding is not permitted unless specifically detailed on Drawings or approved by Engineer.
  2. Employ shielding metal-arc method and meet requirements of AWS D1.4.
  3. Welding is not permitted on bars where the carbon equivalent is unknown or is determined to exceed 0.55.
  4. Welding shall not be done within two bar diameters of any bent portion of a bar which has been bent cold.
  5. Welding of crossing bars is not permitted.
- F. Welded Wire Fabric: Install in long lengths, lapping 24 inches at end splices and one mesh at side splices. Offset laps in adjacent widths. Place fabric in approximately the middle of the slab thickness unless shown otherwise on the Drawings by dimension. Wire tie lap joints at 12-inch centers. Use concrete blocks to support mesh in proper position.
- G. Reinforcement shall be free of mud, oil or other materials that may reduce bond at the time concrete is placed. Reinforcement with tightly adhered rust or mill scale will be accepted without cleaning provided that rusting has not reduced dimensions and weights below applicable standards. Remove loose rust.
- H. Protection against rust:
1. Where there is danger of rust staining adjacent surfaces, wrap reinforcement with impervious tape or otherwise prevent rust staining.
  2. Remove protective materials and clean reinforcement as required before proceeding with concrete placement.
- I. Drawing Notes: Refer to notes on Drawings for additional reinforcement requirements.
- J. Mechanical and Electrical Drawings: Refer to Mechanical and Electrical Drawings for formed concrete requiring reinforcing steel. All such steel shall be included under the work of this Section.

**\*\*\* END OF SECTION \*\*\***



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## SECTION 03320

### UNDERSLAB VAPOR BARRIER

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

- A. Division 0, Contract requirements and Division 1, General Conditions apply to this section.
- B. This Section describes the requirements for furnishing and installing moisture barrier and sand under concrete slabs-on-grade.
- C. Related Sections:
  - 1. Prepare subgrade according to Section 02200 and/or the Soils Report.
  - 2. Concrete is specified in Section 03300.

##### 1.02 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product Data: Include independent laboratory test results showing compliance with ASTM and ACI Standards. Include manufacturer's installation instructions for placement, seaming, and pipe boot installation.

##### 1.03 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to bidders of the Bid Package Section 00003.

##### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

Protect products against damage during field handling and installation.

#### **PART 2 -- PRODUCTS**

##### 2.01 MANUFACTURERS

- A. Stego Wrap Vapor Retarder by Stego Industries
- B. Vapor-Block by Raven Industries
- C. Architect approved equal

##### 2.02 MATERIALS

- A. Vapor Retarder must have the following qualities:
  - 1. 10 mil thickness minimum.
  - 2. Permeance of 0.01 UP perms as tested by ASTM E154.
  - 3. Puncture resistance of 2,600 grams per ASTM D1709, Method B.
  - 4. ASTM E 1745 Class A (Plastics) after conditioning testing.
- B. Vapor Retarder Tape:
  - 1. Water Vapor Transmission Rate :ASTM E 96, 0.3 perms or lower
  - 2. Minimum 8-mils thick
  - 3. Minimum 4 inches wide
  - 4. Manufactured from High Density Polyethylene
  - 5. Pressure Sensitive Adhesive
- C. Pipe Boots: Construct from vapor barrier sheeting material and pressure sensitive tape in accordance with manufacturer's instructions.

- D. Sand: Clean yard sand, free from excessive dirt, debris, organic matter, and fines smaller than No. 200 sieve size.

### **PART 3 -- EXECUTION**

#### **3.01 INSPECTION**

- A. Below grade and grading work and items penetrating moisture barrier shall be completed prior to start of installation.
- B. Examine the areas and conditions under which work of this Section will be performed.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

#### **3.02 INSTALLATION REQUIREMENTS**

- A. Vapor Barrier Sheeting:
  - 1. Install in accordance with manufacturer's instructions and ASTM E1643.
  - 2. Unroll with the longest dimension parallel with the direction of the pour.
  - 3. Lap vapor barrier over footings and seal to foundation walls.
  - 4. Overlap joints 6-inches and seal with pressure sensitive tape.
  - 5. Seal penetrations, including pipes, with pipe boot.
  - 6. Penetrations through vapor barrier sheeting except for reinforcing steel and permanent utilities are not permitted.
  - 7. Repair damaged areas by cutting patches of vapor barrier sheeting, overlapping damaged area 6-inches and taping all four sides with pressure sensitive tape.
- B. Sand Cushion:
  - 1. Provide 2-inch layer over moisture barrier, unless otherwise indicated.
  - 2. Spread over surfaces required and work to fill voids; leave in stable condition with finished surfaces reasonably uniform at established grade.

**\*\*\*END OF SECTION\*\*\***

## SECTION 03240

### SYNTHETIC FIBER REINFORCEMENT

#### PART 1 -- GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SECTION INCLUDES

A. Polypropylene fibers used as concrete secondary reinforcement.

##### 1.03 RELATED SECTIONS

A. Section 03210 - Reinforcing Steel.

B. Section 03300 - Cast-in-Place Concrete.

##### 1.04 REFERENCES

A. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.

B. ASTM C 1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.

C. Southwest Certification Services (SWCS), Omega Point Laboratories No. 8662-1.

D. UL Report File No. R8534-11.

##### 1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.06 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product Data: Submit manufacturer's product data, including application rate and mixing instructions.

C. Samples: Submit manufacturer's sample of synthetic fiber reinforcement.

D. Manufacturer's Certification:

1. Submit manufacturer's certification that synthetic fiber reinforcement complies with specified requirements.
2. Submit evidence of manufacturer's ISO 9001:2000 certification.
3. Submit evidence of satisfactory performance history of synthetic fiber reinforcement.

##### 1.07 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Synthetic fiber reinforcement manufactured in ISO 9001:2000 certified facility.

2. Minimum 10-year satisfactory performance history of specified synthetic fiber reinforcement.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver synthetic fiber reinforcement in manufacturer's original, unopened, undamaged containers and packaging, with labels clearly identifying product name, unique identification number, code approvals, directions for use, manufacturer, and weight of fibers.
- B. Storage:
  1. Store synthetic fiber reinforcement in clean, dry area indoors in accordance with manufacturer's instructions.
  2. Keep packaging sealed until ready for use.
- C. Handling: Protect synthetic fiber reinforcement during handling to prevent contamination.

### PART 2 -- PRODUCTS

#### 2.01 MANUFACTURER

- A. Basis of Design: Propex Operating Company, LLC, PO Box 22788, Chattanooga, Tennessee 37422. Toll Free (800) 621-1273. Website: [www.fibermesh.com](http://www.fibermesh.com)  
E-mail: [fibermesh@propexglobal.com](mailto:fibermesh@propexglobal.com).

#### 2.02 SYNTHETIC FIBER REINFORCEMENT

- A. Synthetic Fiber Reinforcement: Fibermesh 300.
  1. Material: 100 percent virgin homopolymer polypropylene multifilament fibers, containing no reprocessed olefin materials.
  2. Conformance: ASTM C 1116, Type III.
  3. Fire Classifications:
    - a. UL Report File No. R8534-11.
    - b. Southwest Certification Services (SWCS), Omega Point Laboratories No. 8662-1.
  4. Fiber Length: Graded and Single-cut lengths.
  5. Alkali Resistance: Alkali proof.
  6. Absorption: Nil.
  7. Specific Gravity: 0.91.
  8. Melt Point: 324 degrees F (162 degrees C).

### PART 3 -- EXECUTION

#### 3.01 MIXING

- A. Add synthetic fiber reinforcement to concrete mixture in accordance with manufacturer's instructions.
- B. Add synthetic fiber reinforcement into concrete mixer before, during, or after batching other concrete materials.
- C. Application Rate: Add synthetic fiber reinforcement at standard application rate of 1.5 pounds per cubic yard (0.90 kg/m<sup>3</sup>) of concrete.

D. Mix synthetic fiber reinforcement in concrete mixer in accordance with mixing time and speed of ASTM C 94 to ensure uniform distribution and random orientation of fibers throughout concrete.

E. Concrete shall be as specified in Section 03300.

3.02 PLACING AND FINISHING

A. Placing and finishing concrete shall be as specified in Section 03300.

**\*\*\*END OF SECTION\*\*\***

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## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Furnish, place and finish cast in place concrete and related work as indicated on the Drawings and specified here.
  - 1. Install miscellaneous metal and other items furnished by other trades to be installed in concrete work.
  - 2. Provide facilities for job curing of test cylinders and transporting to Testing Laboratory.
- B. Provide grouting of steel base plates as indicated on the Drawings and specified here.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Concrete Formwork: Section 03100.
- B. Reinforcing Steel: Section 03210.
- C. Structural Steel: Section 05120.
- D. Metal Fabrications: Section 05500.

##### 1.04 QUALITY ASSURANCE

- A. Standards and References: (Latest Edition unless otherwise noted)
  - 1. 2010 California Building Code (CBC),.
  - 2. AMERICAN CONCRETE INSTITUTE (ACI)
    - a. ACI 117 Standard Tolerances for Concrete Construction and Materials
    - b. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
    - c. ACI 211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete
    - d. ACI 301 Structural Concrete for Buildings
    - e. ACI 302 Guide for Concrete Floor and Slab Construction
    - f. ACI 305R Hot Weather Concreting
    - g. ACI 318 Building Code Requirements for Reinforced Concrete
    - h. ACI 360 Design of Slabs-On-Ground
  - 3. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
    - a. ASTM C 31 Making and Curing Concrete Test Specimens in the Field
    - b. ASTM C 33 Concrete Aggregates
    - c. ASTM C 39 Compressive Strength of Cylindrical Concrete Specimens
    - d. ASTM C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
    - e. ASTM C 94 Ready-Mixed Concrete
    - f. ASTM C 109 Test of Hydraulic Cement Concrete



- g. ASTM C 143 Slump of Hydraulic Cement Concrete
- h. ASTM C 150 Portland Cement
- i. ASTM C 172 Sampling Freshly Mixed Concrete by the Volumetric Method
- j. ASTM C 192 Making and Curing Concrete Test Specimens in the Laboratory
- k. ASTM C 260 Air-Entraining Admixtures for Concrete
- l. ASTM C 330 Lightweight Aggregates for Structural Concrete
- m. ASTM C 494 Chemical Admixtures for Concrete
- n. ASTM C 618 Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
- o. ASTM C685 Volumetric Batching and continuous mixing
- p. ASTM C1157 Hydraulic-Cement

B. Submittals: (Submit under provisions of Section 01330)

1. Concrete mix designs. See "Mix Design" below. Include results of test data used to establish proportions.
2. Certificates of Compliance from Manufacturer
  - a. Cement certificates
  - b. Aggregates
  - c. Admixtures.
3. Data regarding hardeners and sealers.
4. Grout samples for sanded surface textures and colors upon Architects request only.
5. Layout drawings for construction, control and expansion joints.
6. Transit-mix delivery slips:
  - a. Keep record at the job site showing time and place of each pour of concrete, together with transit-mix delivery slips certifying contents of the pour.
  - b. Make the record available to the Architect for his inspection upon request.
  - c. Upon completion of this portion of the work, deliver the record and the delivery slips to the Architect.
7. See Section 03210 for reinforcing steel submittals.

C. Tests and Inspections:

1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
2. The following tests shall be made by a recognized testing laboratory selected by the Owner and approved by the governing agency. All tests shall be in accordance with the previously mentioned standards and ACI 318 Section 5.6. A complete record of all tests and inspections shall be kept.
  - a. Compressive Strength: Make and cure in accordance with ASTM C-31. Test in accordance with ASTM C-39 and ACI 318 section 5.6.
    - 1) A record shall be made of time and of locations of concrete from which samples were taken.
    - 2) Four identical cylinders shall be taken from each pour of 150 cubic yards or 5000 square feet or part thereof, being placed each day per ACI 318 5.6.2.1. One cylinder shall be tested at age 7 days, and two at age 28 days unless otherwise specified. Preserve remaining cylinder for future use.
  - b. Drying Shrinkage: (applies to lightweight concrete only unless noted otherwise)
    - 1) A record shall be made of time cylinders and of locations of concrete from which samples were taken.
    - 2) Three identical 4" x 4" x 11" specimens shall be made from same concrete as used in structure. Percent of shrinkage shall be reported at 21 days after 7 day moist curing period. Average results of 3 specimens shall be used as the

accepted value. The value for laboratory cast specimens shall not exceed .075%. If field test specimens are used in lieu of laboratory specimens, a tolerance of +33% may be used.

- 3) Test specimens in accordance with ASTM C157.
- c. Concrete consistency (slump) shall be tested in accordance with ASTM C143.
3. Provide full time inspection during the taking of test specimens and during the placing of all concrete and embedded steel.
4. See Section 03 21 00 for reinforcing steel tests and inspections.
5. Provide concrete batch plant inspections per ASTM C685.

#### 1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

#### 1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

### **PART 2 – PRODUCTS**

#### 2.01 MATERIAL

- A. Portland Cement: ASTM C 150, Type II. One brand of cement shall be used throughout to maintain uniform color for all exposed concrete.
- B. Concrete Aggregate: Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as combination of sizes when two or more are used, shall conform to grading requirements of appropriate ASTM Standards and ACI 318.
  1. Concrete Aggregates for Standard Weight Concrete: ASTM C 33. Aggregate shall be crushed granite or Perkins type.
  2. Concrete Aggregates for Lightweight Concrete: ASTM C330 to produce concrete weighing no more than 115 pcf at 28 days. Aggregate shall be vacuum saturated expanded shale as produced through the rotary kiln method.
- C. Water: Clean and free from injurious amounts of oil, acids, alkali, organic matter and other deleterious substances; suitable for domestic consumption.
- D. Admixtures shall be subject to prior approval by the Architect, in accordance with ACI 318, Calcium Chloride is not permitted.
  1. Water Reducing
    - a. ASTM C494 Type A - for use in cool weather.
    - b. ASTM C494 Type D - for use in hot weather.
  2. Air Entraining
    - a. Conform to ASTM C 260
  3. Fly Ash
    - a. Conform to ASTM C 618
  4. Mid-Range Water-Reducers
    - a. Master Builders "Polyheed" or approved equal.
  5. Fly Ash Pozzolan
    - a. Conforming to ASTM A-618 Class F
- E. Slab on Grade Vapor Retarder
  1. Vapor Retarder must have the following qualities:

- a. 10 mil thickness minimum
- b. WVTR less than 0.008 as tested by ASTM E 96
- c. ASTM E 1745 Class A (Plastics)
- 2. Vapor Retarder Products
  - a. Stego Wrap Vapor Retarder by STEGO INDUSTRIES LLC.
  - b. W.R. Meadows Premoulded Membrane with Plasmatic Core.
  - c. Zero-Perm by Alumiseal.
- 3. Vapor Retarder Tape
  - a. Water Vapor Transmission Rate :ASTM E 96, 0.3 perms or lower
  - b. Minimum 8-mils thick
  - c. Minimum 4 inches wide
  - d. Manufactured from High Density Polyethylene
  - e. Pressure Sensitive Adhesive
- F. Sand: Clean, dry, well graded.
- G. Abrasive aggregate for non-slip finish: Fused aluminum oxide grits, graded 12/30. Use factory-graded rustproof and non-glazing material that is unaffected by freezing, moisture and cleaning materials.
  - 1. Products offered by manufacturers to comply with the above requirements include: A-H Alox; Anti-Hydro Waterproofing Co., Toxgrip; Toch Div. - Carboline, or approved equal.
- H. Expansion Joint Filler:
  - 1. Joint fill shall be a preformed non-extruded resilient filler, saturated with bituminous materials and conforming to ASTM D 1751. Products shall be equivalent to Burke "Fiber Expansion Joint", W.R. Meadows "Fibrated Expansion Joint Filler", or approved equal.
- I. Bonding Agent: Sonneborn "Sonobond"; the Euclid Chemical Company "Euco-Weld"; Larsen Products Corp., "Weld-Crete" or approved equivalent.
- J. Concrete Sealer: Cure and Seal, as manufactured by the Euclid Chemical Company "Aqua-Cure VOX", Sonneborn "Kure-N-Seal WB", Burke "Spartan-Cote", W.R. Meadows "Intex" or approved equal conforming to ASTM C-309, Type I, Class B requirements, and conforming to State of California Air Resources Board VOC Regulations.
- K. Concrete Hardener/Sealer: Clear, water soluble, sprayable in-organic silicate based hardener/sealer or acrylic co-polymer resin. Products shall be equal to Euclid Chemical Company "Eucosil", Burke "Spartan-Cote", Sonneborn "Sonosil", W.R. Meadows "Pena-Lith", or approved equal and must conform to State of California Air Resources Board VOC Regulations.
- L. Concrete Cure: Water based curing compound conforming to ASTM C-309, Type 1, Class A and B, and AASHTO Specification M-148; Type 1, Class A and B requirements, and State of California Air Resources Board VOC Regulations. Product shall be equivalent to Euclid Chemical Company "Kurez VOX", Burke "No. 1127" or "Aqua-Resin Cure", W.R. Meadows "1100 Clear", or approved equal.
- M. Non-Shrink Grout: See Section 2.02.A.4

## 2.02 CONCRETE

- A. Concrete Mixes:
  - 1. Type A Concrete:
    - Strength: 4000 lbs. per square inch at 28 days.
    - Maximum Aggregate Size: 1-1/2 inch.
    - Cement Content: As required by mix design (ACI 318 Section 5.2).

6.0 sacks per yard minimum.  
Maximum Water to Cement Ratio: 0.52  
Admixture: Water Reducing.  
Weight: 145 lbs. per cubic foot  
Use for unexposed foundation concrete except as otherwise specified. At Contractor's option, Type B concrete may be substituted for this.

2. Type B Concrete:  
Strength: 4000 lbs. per square inch at 28 days.  
Maximum Aggregate Size: 1 inch.  
Minimum Cement Content: As required by mix design. (ACI 318 Section 5.2).  
6.0 sacks per yard minimum.  
Maximum Water to Cement Ratio: 0.45  
Admixture: Water reducing.  
Weight: 145 lbs. per cubic foot  
Use for building slab on grade  
Maximum Fly Ash content as a percentage of total cementitious material: 15%
  3. Type C Concrete:  
Strength: 2500 lbs. per square inch at 28 days.  
Maximum Aggregate Size: 1 inch.  
Minimum Cement Content: As required by mix design (ACI 318 Section 5.2).  
6.0 sacks per cubic yard.  
Maximum Water to Cement Ratio: 0.60  
Admixture: Water reducing.  
Weight: 145 lbs. per cubic foot.  
Use for concrete sidewalks, mechanical and electrical pads, miscellaneous non-structural slabs on grade.
  4. Grout shall be non-shrink, non-metallic, flowable Type "713" or "928" by Master Builders.
    - a. Metallic grout equivalent to Master Builders "Embeco" may be used only where covered by earth, concrete, or masonry.
    - b. Acceptance by Architect required before using.
- B. Consistency of Concrete: Concrete slump, measured in accordance with ASTM C 143, shall fall within following limits.
1. For General concrete placement: 3 inch plus or minus 1 inch.
  2. Mixes employing the specified mid-range water reducer shall provide a measured slump not to exceed 7 inch  $\pm$ 1 inch after dosing, 2 inch  $\pm$ 1 inch before dosing.
  3. Concrete slump shall be taken at point of placement. Use water reducing admixtures as required to provide a workable consistency for pump mixers. Water shall not be added at the jobsite without written review by the structural engineer.
- C. Mix Design:
1. Initial mix design shall be prepared for all concrete in accordance with ACI 318 section 5.2. Mix proportions shall be determined in accordance with ACI 318 Section 5.3 or ACI 318 section 5.4. In the event that additional mix designs are required due to depletion of aggregate sources, aggregate not conforming to Specifications, or at request of Contractor, these mixes shall be prepared as above.
  2. Contractor shall notify the Testing Laboratory and Architect of intent to use concrete pumps to place concrete so that mix designs can be modified accordingly.
  3. Fly ash shall not exceed fifteen percent of the total cementitious material.
  4. Provide 3% air entrainment typical, 6% for mixes exposed to freeze-thaw cycles.
  5. Owner's testing laboratory shall review all mix design before submittal.

D. Mixing:

1. Equipment: All concrete shall be machine mixed. Provide adequate equipment and facilities for accurate measurement and control of materials.
2. Method of Mixing:
  - a. Transit Mixing: Comply with ASTM C 94. Ready mixed concrete shall be used throughout, except as specified below.
  - b. On-Site Mixing: Use only if method of storing material, mixing of material and type of mixing equipment is approved by Architect. Approval of site mixing does not relieve Contractor of any other requirements of Specifications.
  - c. Mixing shall be in accordance with ACI 318 5.8.
3. Mixing Time: After mix water has been added, concrete shall be mixed not less than 1-1/2 minutes nor more than 1-1/2 hours. Concrete shall be rejected if not deposited within the time specified.
4. Admixtures:
  - a. Air entraining and chemical admixtures shall be charged into mixer as a solution and shall be dispensed by an automatic dispenser or similar metering device. Powdered admixtures shall be weighed or measured by volume as recommended by manufacturer. Accuracy of measurement of any admixture shall be within plus or minus 3%.
  - b. Two or more admixtures may be used in same concrete, provided such admixtures are added separately during batching sequence, and provided further that admixtures used in that combination retain full efficiency and have no deleterious effect on concrete or on properties of each other.
  - c. All admixtures are to be approved by Structural Engineer prior to commencing this work.
5. Retempering:
  - a. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall be discarded, not retempered.
  - b. Indiscriminate addition of water to increase slump is prohibited.
  - c. When concrete arrives at project with slump below that suitable for placing, water may be added only if neither maximum permissible water-cement ratio nor maximum slump is exceeded. Water shall be incorporated by additional mixing equal to at least half of total mixing time required. Any addition of water above that permitted by limitation of water-cement ratio shall be accompanied by a quantity of cement sufficient to maintain proper water-cement ratio. Such additions shall only be used if approved by Architect. In any event, with or without addition of cement, not more than 2 gallons of water per cubic yard of concrete, over that specified in design mix, shall be added.
6. Cold Weather Batching: When temperature is below 40 degrees F or is likely to fall below 40 degrees F during 24 hour period after placing, provide adequate equipment for heating concrete materials. No frozen materials or materials containing ice shall be used. Temperatures of separate materials, including mixing water, when placed in mixer shall not exceed 100 degrees F. When placed in forms concrete shall have a temperature between 50 degrees F and 85 degrees F.
7. Hot Weather Batching: Concrete deposited in hot weather shall have a placing temperature below 85 degrees F. If necessary, ingredients shall be cooled to accomplish this.

2.03 FLOOR LEVELING AND FILL MATERIALS

- A. Epoxy Concrete Mortar: Floor leveling, non-shrink trowel applied epoxy concrete mortar; TPM 115 General Polymers Corp., A-H Emery Epoxy Topping #170 Anti-Hydro Corp., or approved equal, where areas to fill are less than 1/4 inch thick.

- B. Concrete Mortar: Floor leveling, patching and repair, non-shrink trowel applied concrete mortar; Master Builders EMBECO 411-A, Euclid EUCO, or approved equal, where areas of fill are greater than 1/4 inch thick.
- C. Cementitious Floor Leveling Material: Shall be self-leveling or trowelable with a minimum 28 day compressive strength of 3000 psi in accordance with ASTM C-109. Material shall be equal to Quickrete No. 1249, Ardex V-800/K-55, Mapei "Ultra/Flex" or approved equal.

### **PART 3 – EXECUTION**

#### **3.01 PLACEMENT**

- A. Before any concrete is placed, the following items of work shall have been completed in the area of placing.
  - 1. Forms shall have been erected, adequately braced, cleaned, sealed, lubricated if required, and bulkheaded where placing is to stop.
  - 2. Any wood forms other than plywood shall be thoroughly water soaked before placing any concrete. The wetting of forms shall be started at least 12 hours before concreting.
  - 3. Reinforcing steel shall have been placed, tied and supported.
  - 4. Embedded work of all trades shall be in place in the forms and adequately tied and braced.
  - 5. The entire place of deposit shall have been cleaned of wood chips, sawdust, dirt, debris, hardened concrete and other foreign matter. No wooden ties or blocking shall be left in the concrete except where indicated for attachment of other work.
  - 6. Reinforcing steel, at the time the concrete is placed around it, shall be cleaned of scale, mill scale or other contaminants that will destroy or reduce bond.
  - 7. Concrete surfaces to which fresh concrete is to be bonded shall be brush cleaned to remove all dust and foreign matter and to expose the aggregate, and then coated with the bonding adhesive herein specified.
  - 8. Prior to placing concrete for any slabs on grade, the moisture content of the subgrade below the slabs shall be adjusted to at least optimum moisture.
  - 9. No concrete shall be placed until formwork and reinforcement has been approved by Architect. Clean forms of all debris and remove standing water. Thoroughly clean reinforcement and all handling equipment for mixing and transporting concrete. Concrete shall not be placed against reinforcing steel that is hot to the touch. Notify Architect 48 hours in advance of concrete pour.
- B. Conveying: Handle concrete from mixer to place of final deposit by methods which will prevent separation or loss of ingredients. Deposit concrete in forms as nearly as practicable at its final position in a manner which will insure that required quality is obtained. Chutes shall slope not less than 4 inches and not more than 6 inches per foot of horizontal run.
- C. Depositing: Deposit concrete into forms in horizontal layers not exceeding 24 inches in thickness around building, proceeding along forms at a uniform rate and consolidating into previous pour. In no case shall concrete be poured into an accumulation of water ahead of pour, nor shall concrete be flowed along forms to its final place of deposit. Fresh concrete shall not be permitted to fall from a height greater than 6 feet without use of adjustable length pipes or, in narrow walls, of adjustable flexible hose sleeves. Concrete shall be scheduled so that placing is a continuous operation for the completion of each section between predetermined construction joints. If any concreting operation, once planned, cannot be carried on in a continuous operation, concreting shall stop at temporary bulkheads, located where resulting construction joints will least impair the strength of the structure. Location of construction joints shall be as shown on the drawings or as approved by Structural Engineer. The rate of rise in walls shall not be less than 2 feet per hour.
  - 1. Consolidation: Concrete shall be thoroughly compacted and worked to all points with solid continuous contact to forms and reinforcement to eliminate air pockets and honeycombing. Power vibrators of approved type shall be used immediately following pour. Spading by hand, hammering of forms or other combination of methods will be allowed only where permitted by Structural Engineer. In no case shall vibrators be placed

- against reinforcing steel or used for extensive shifting of deposited fresh concrete. Provide and maintain standby vibrators, ready for immediate use.
2. Hot Weather Concreting: Unless otherwise directed by the Architect, perform all work in accordance with ACI 305 when air temperature rises above 75 degrees F and the following:
    - a. Mixing Water: Keep water temperature as low as necessary to provide for the required concrete temperature at time of placing. Ice may be required to provide for the design temperature.  
Aggregate: Keep aggregate piles continuously moist by sprinkling with water.  
Temperature of Concrete: The temperature of the concrete mix at the time it is being placed in the forms shall not exceed 85 degrees F. The method employed to provide this temperature shall in no way alter or endanger the design mix or the design strength required.  
Dampen subgrade and formwork before placing concrete. Remove all excess water before placing concrete. Keep concrete continuously wet when air temperature exceeds 85 degrees F for a minimum of 48 hours after placing concrete. For slab on grade construction, see Section 3.1.E.  
Protection: Minimize evaporation from concrete in place by providing shade and windbreaks. Maintain such protection in place for 14 days minimum.
  3. Cold Weather Concreting: Follow recommended ACI 306 procedures when air temperature falls below 40 degrees F., as approved by Architect. Concrete placed in freezing temperatures shall have a temperature of not less than 50 degrees F. Maintain this temperature for at least 7 days. No chemicals or salts shall be used to prevent freezing and no accelerating agents shall be used without prior approval from Architect.
- D. Construction Joints: Install only as indicated and noted on Drawings. Joints not indicated on Drawings shall be so located, when approved, as to least impair strength of structure, and shall conform to typical details. Construction joints shall have level tops, vertical sides. Horizontal construction joints shall be thoroughly cleaned and roughened by removing entire surface film and exposing clean aggregate solidly embedded in mortar matrix. Joints between concrete and masonry shall be considered construction joints. Vertical construction joints need not be roughened. See Drawings for doweling and required keys.
1. Roughen construction joints by any of following methods:
    - a. By sandblasting joint.
    - b. By thoroughly washing joint, using a high pressure hose, after concrete has taken initial set. Washing shall be done not less than 2 hours nor more than 4 hours after concrete has been poured, depending upon setting time.
    - c. By chipping and wire brushing.
  2. All decisions pertaining to adequacy of construction joint surfaces and to compliance with requirements pertaining to construction joints shall be reviewed with the Structural Engineer.
  3. Just before starting new pour, horizontal and vertical joint surfaces shall be dampened (but not saturated).
  4. Before placing regular concrete mix, horizontal construction joint surfaces shall be covered with a layer of mortar composed of cement and fine aggregate of same proportions as that used in prescribed mix, but omitting coarse aggregate.
  5. For slabs, construction joints shall be in locations shown on plan. If not shown, locate at intervals not exceeding 150 feet in each direction. Refer to drawings for proper details for reinforcing at construction joints.
- E. Concrete Slabs on Grade:
1. Exterior and interior concrete slabs on grade shall be poured as required under this Section. Base shall be accurately leveled and compacted prior to placing of concrete.
  2. Typically, interior slabs on grade shall be poured over a minimum of four (4 inch) inches of compacted crushed rock, unless otherwise indicated, over a vapor retarder.
  3. Protect slab on grade subbase from moisture prior to placing concrete. Avoid wetting rock layer to allow adequate concrete curing and avoid future vapor transmission. If the subbase has been wet excessively, verify that water has been eliminated prior to placement of concrete.

4. Vapor Retarder installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
  - a. Unroll Vapor Retarder with the longest dimension parallel with the direction of the pour.
  - b. Lap Vapor Retarder over footings and seal to foundation walls.
  - c. Overlap joints 6 inches and seal with specified tape.
  - d. Seal all penetrations (including pipes) per manufacturer's instructions.
  - e. No penetration of the Vapor Retarder is allowed except for reinforcing steel and permanent utilities.
  - f. Repair damaged areas by cutting patches of Vapor Retarder, overlapping damaged area 6 inches and taping all four sides with tape.
  
- F. Control Jointing - Slabs on Grade:
  1. Joints shall be in locations indicated on Drawings, or as directed by Architect.
  2. Joints in interior slabs shall be made by one of following methods:
    - a. By use of construction joints laid out in checkerboard pattern; pour and allow alternate slabs to set; fill out balance of checkerboard pattern with second pour.
    - b. By use of dummy groove joints at least 1/4 depth of slab, and at least 1/8 inch wide. These joints may be sawcut as soon as wet concrete can support the weight of the equipment and operator. Delaying sawcutting past this point will make jointing ineffective.
  3. Control jointing in exterior paving slabs shall be laid out in a checkerboard pattern; pour as described above, but with joint edges tooled to provide a uniform joint at least 3/8 inch in depth.
  4. Slab reinforcing need not be terminated at control joints.
  5. Construction and expansion joints shall be counted as control joints.
  
- G. Expansion Joints :
  1. Unless otherwise indicated, use 3/8 inch thick expansion joint filler. See Section 2.1 H
  2. Joints in interior slabs on grade shall be only in locations indicated.
  3. Joints in exterior slabs on grade shall be installed at each side of structures, at curb transitions opposite apron joints, at ends of curb returns, at back of curb when adjacent to sidewalk, and at uniformly spaced intervals not exceeding 20 feet.
  4. Edges of concrete at joints shall be edger finished to approximately 3/8 inch radius.
  5. Interrupt reinforcing at all expansion joints.
  
- H. Score markings on exterior slabs on grade shall be located as indicated. Where not indicated, mark slabs into rectangles of not less than 12 square feet nor more than 20 square feet using a scoring tool which will leave edges of score markings rounded.

### 3.02 CURING AND PROTECTION

- A. Curing: Exposed surfaces of all concrete used in structure shall be maintained in a moist condition for at least 7 days after placing. The following final curing processes shall normally be considered to accomplish this. Concrete shall be maintained at not less than 50 degrees F nor more than 100 degrees F for a period of 72 hours after being deposited.
  1. Flatwork to be exposed, stained, or painted shall have curing process submitted and approved by the architect prior to construction.
  2. Initial Curing Process - Flat Work:
    - a. Mist Spraying: As soon as troweling of concrete surfaces is completed, exposed concrete shall be sprayed continuously with a special atomizer spray nozzle, capable of producing a fine mist. Spraying shall be done without any dripping of water from nozzle. Amount of spraying shall be such as to maintain surface of concrete moist without any water accumulating on surface. Maintain spraying for a minimum of 12 hours, or until such time as hereinafter described curing process is applied. Mist



spraying will not normally be required when the ambient air temperature is below 90 degrees F.

3. Final Curing Process - Flatwork: Except as noted, use any of following:
    - a. Water Curing: Concrete shall be kept wet by mechanical sprinklers or by any other approved method which will keep surfaces continuously wet.
    - b. Saturated Burlap Curing: Finished surfaces shall be covered with a minimum of two layers of heavy burlap which shall be kept saturated during the curing period.
    - c. Curing Compounds: Membrane curing compounds of chlorinated rubber or resin type conforming to ASTM C309 may be used only if specifically approved by Architect. Use of membrane curing compound will not be permitted on surfaces to be painted, or to receive ceramic tile, membrane water-proofing or hardeners and sealers. Membrane curing compound may be used in areas to receive resilient floor tile, provided it is wax-free, compatible with adhesive used and approved by adhesive manufacturer. Agitate curing compounds thoroughly by mechanical means continuously during use and spray or brush uniformly in accordance with manufacturer's recommendations. Apply immediately following final finishing operation. All curing compounds shall conform to State of California Air Resources Board VOC Regulations.
    - d. Waterproof paper conforming to ASTM C 171, or opaque polyethylene film, may be used. Concrete shall be covered immediately following final finishing operation. Anchor paper or film securely and seal all edges in such a manner as to prevent moisture escaping from concrete.
  4. Curing Process - Formed Surfaces: Forms heated by sun shall be kept moist during curing period. If forms are to be removed during curing period, curing as described for flatwork shall be commenced immediately.
- B. Refer to Drawings for areas of concrete slab not to receive curing compounds or hardening compounds. Where concrete floors are to receive heavy duty coatings, waterproof coatings and the like, verify with coating installer the type of finish required for specified coating.
- C. Protection: Contractor shall be responsible for protection of finished concrete against injury by rain, cold, vibration, animal tracks, marking by visitors, vandalism, etc.
- D. Provide additional curing agents or compounds, not necessarily listed herein, but as recommended and or required for use with shake type hardeners or other special coatings and coverings by their manufacturers for a complete and proper installation.

### 3.03 FINISHES

- A. Formed Surfaces:
1. Rough Form Finish: Surfaces shall be reasonably true to line and plane with no specified requirements for selected facing materials. Tie holes and defects shall be patched and fins exceeding 1/4 inch in height shall be rubbed down with wooden blocks. Fins and other rough spots at surfaces to receive membrane waterproofing shall be completely removed and the surfaces rubbed smooth. Otherwise, surfaces shall be left with the texture imparted by forms.
    - a. Rough finish shall be used for the following areas:
      - 1) Below grade and unexposed surfaces.
  - 2.. Smooth Plywood Form Finish: Finish shall be true to line and plane. Tie holes and defects shall have been patched and ground with surface fins removed. Arrangement of plywood sheets shall be orderly, symmetrical, as large as practical and free of torn grain or worn edges. Surface concrete shall be treated with 1 part muriatic acid, in three parts water solution, followed immediately by a thorough rinsing with clear water. Surfaces which are glazed, have efflorescence, or traces of form oil, curing compounds or parting compounds shall be cleaned or treated to match other formed surfaces, except as otherwise indicated or specified.

- a. Smooth Plywood Form Finish shall be used for the following areas:
    - 1) All surfaces above grade unless otherwise specified.
    - 2) At Contractor's option, may also be used in lieu of rough form finish.
  3. Smooth Plastic Liner Finish: Surface shall be smooth, concrete free of honeycombing, air pockets larger than 1/8 inch in diameter, and fins.
    - a. This finish shall be used only where indicated on the Drawings.
- B. Flatwork:
1. Unless otherwise indicated or specified, flatwork shall have an integral monolithic finish.
  2. Integral Monolithic Finish: Apply as soon as freshly poured concrete slabs will bear weight of workers. Pour slabs full thickness to finish floor elevations indicated. At proper time, tamp surface repeatedly with a wire mesh or grid tamper in a manner to force aggregate down below surface and to bring sufficient mortar to surface to provide for a smooth coating of cement mortar over entire surface. Allow surface mortar to partially set, then float with wooden floats and finish with one of following, as required.
    - a. Broom Finish: Steel trowel surface to a smooth dense surface free of lines, tool marks, cat faces and other imperfections. After troweling, and before final set, give surface a broom finish, brushing in direction noted on Drawings, or as directed. Broom finish shall be used typically on exterior flatwork except as otherwise indicated or specified and shall be "medium" texture as approved by Architect.
    - b. Smooth Steel Trowel Finish: Apply 2 steel trowelings to obtain hard, smooth surface. All lips, irregularities, uneven levels, etc. shall be worked out before last troweling. All interior flatwork shall have a smooth steel trowel finish unless specified otherwise.
  3. Tolerances:
    - a. For tolerances not indicated, refer to ACI 117.
    - b. Slabs on grade – Comply with  $F_F$  &  $F_L$  as specified by Architect, or at a minimum shall be sufficiently even to contact a 10' long straightedge with a tolerance of 1/8 inch.
    - c. Concrete over metal deck – Refer to Section 05 30 00 for minimum requirements, or at a minimum shall be sufficiently even to contact a 10' long straightedge with a tolerance of 1/8 inch.
    - d. Elevated slabs – Comply with Architectural requirements.
    - e. Finished surfaces of exterior integral finished flatwork shall not vary more than 1/4 inch from a 10' long straightedge, except at grade changes.
- C. Sacked Surfaces: Exposed surfaces that are unacceptable in appearance to the Architect shall be sacked.
1. Prepare concrete surfaces in accordance with the referenced standards. Remove any form release materials by stoning by hand, power grinding or other method approved by the Architect.
  2. Prepare concrete surfaces to receive sack finishing with a light sand blasting.
  3. For best results, grout application and rubbing should be performed when areas to be treated are shaded and during cool, damp weather. When work is to be performed in hot and dry weather, a fog spray should be available for continuous use.
  4. Prepare grout samples for matching of concrete surfaces for approval by the Architect. These shall be made in the following proportions of gray cement to white cement to sand: 1:1:2, 1:2:3, and 2:1:3, etc. until the correct matching color is obtained on the test areas. Sand should be fine enough to pass the Number 30 sieve. Mixes should be made to a good workable consistency in a clean container and the mix with the best color chosen, or modified if needed.
  5. Provide sufficient quantities of sand and cement from the same source for the complete work at the job site.
  6. Mixing and Application:
    - a. Mixing of grout on the job should be timed for it to be used up within 1 to 1-1/2 hours.
    - b. Let the grout stand 20 to 30 minutes after mixing, and then remixed before applying.

- c. Soak the concrete surface thoroughly with water at least 15 minutes before applying grout and again just before application so that the surface is adequately wet during the operation.
  - d. Apply grout with plasterer's trowel or sponge rubber float in sweeping strokes from the bottom up. Brush or spray gun applications may be used when approved by the Architect.
  - e. Work in freshly applied grout vigorously with a sponge rubber float, then let sit until some of its plasticity is gone but not until it loses its damp appearance. At this point it shall be rubbed with clean, dry burlap to remove the excess grout, leaving no visible film on the surface but filling all air holes.
  - f. Keep the surface wet for a day after grouting and sack rubbing are completed.
7. Alternate methods of application and materials shall be subject to the approval of the Architect.

### 3.04 PATCHING

#### A. Formed Surfaces:

1. Promptly upon removal of contact forms and after concrete surfaces have been inspected, form ties shall be removed and all necessary patching and pointing shall be expertly done.
2. Honeycombed areas shall be removed down to sound concrete, coated with a bonding grout or approved compound and patched using a low shrinkage high bond mortar. Patched areas shall be cured by being kept damp for at least 5 days.
3. Tie holes shall be cleaned, dampened and filled solid with patching mortar or cement plugs of an approved variety.

#### B. Slabs on Grade: After entire slab is finished, shrinkage cracks that may appear shall be patched as follows:

1. Where slab is not exposed or where appearance is not important, cracks larger than 1/32 inch wide shall be filled with cement grout and struck off level with surface.
2. Where slab is exposed and appearance is important, unsightly cracks shall be repaired in a manner satisfactory in appearance to Architect. If this cannot be accomplished, concrete shall be considered defective.

### 3.05 DEFECTIVE CONCRETE

#### A. Defective concrete shall mean any of the following:

1. Concrete not meeting 100 percent of the specified 28 day compressive strength.
2. Concrete exhibiting rock pockets, voids, spalls, streaks, cracks, exposed reinforcing to extent that strength, durability, or appearance is adversely affected.
3. Concrete significantly out of place, line, or level.
4. Concrete not containing the required embedded items.

#### B. Upon determination that concrete strength is defective:

1. Should cylinder tests fall below minimum strength specified, concrete mix for remainder of work shall be adjusted to produce required strength. Core samples shall be taken and tested from cast-in-place concrete where cylinders and samples indicate inferior concrete with less than minimum specified strength.
  - a. Cores of hardened concrete shall be taken and tested in accordance with ASTM C 42 and C 39. Number and location of such cores shall be subject to the approval of Architect.
  - b. Cost of core sampling and testing will be paid for by the Contractor.
  - c. "85 percent" reduction in ACI 318 5.6.5.4 will not justify low cylinder tests.

#### C. Upon determining that concrete surface is defective, Contractor may restore concrete to acceptable condition by cutting, chipping, pointing, patching, grinding, if this can be done without significantly altering strength of structure. Permission to patch defective areas will not

be considered a waiver of the right to require removal if patching does not, in the opinion of the Architect, satisfactorily restore quality and appearance.

- D. If core tests indicate that concrete is below the strength specified, or if patching does not restore concrete to specified quality and appearance, the concrete shall be deemed defective, and shall be removed and replaced without additional cost to the Owner.
- E. No repair work shall begin until procedure has been reviewed by the Architect and Structural Engineer.

### 3.06 SURFACE HARDENER AND SEALER

- A. Seal all interior exposed flatwork with clear sealer, except surfaces receiving ceramic tile, quarry tile, poured flooring or other special finishes specified, or as scheduled on the Drawings.
  - 1. Apply sealer in 2 or 3 coats, in accordance with manufacturer's directions, using the maximum quantity recommended.
    - a. Concrete floors must be thoroughly cured for a minimum of 30 days and completely dry before treatment.
    - b. Surfaces to be treated must be clean, free of membrane curing compounds, dust, oil, grease and other foreign matter.
    - c. Upon completion, concrete surfaces shall be clean and without discoloration or traces of excess hardener left on the surface.
- B. Apply sprayable hardener/sealer at locations as scheduled or as indicated on the Drawings. Apply in accordance with the manufacturer's favorably reviewed application instructions and recommendations.

### 3.07 GROUTING

- A. Prepare and place grout materials at locations as indicated on the Drawings in accordance with the manufacturer's recommendations and installation instructions.
- B. Pack grout materials solidly between bearing surfaces and bases or plates as indicated and to ensure no voids.

### 3.08 ADJUSTING AND CLEANING

- A. Remove all debris, excess materials, tools and equipment resulting from or used in this operation at completion of this work.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 03320**  
**CONCRETE SEALERS**

**PART 1 -- GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

**1.02 SCOPE OF WORK**

- A. Work included: Seal, harden or color concrete surfaces where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Concrete floor sealer/hardener/densifier shall react with concrete surfaces to produce a dense, hydrophobic, insoluble, moisture barrier to seal out contaminants, while hardening and densifying concrete surface.
- C. Related work:
  - 1. Documents affecting work of this Section included, but are not necessarily limited to, Special Conditions, and Sections in Division 1 of these Specifications.
  - 2. Section 03300: Cast-In-Place Concrete
  - 3. Section 03345: Concrete Finishing

**1.03 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use an applicator currently approved in writing by the manufacturer of the specified product.

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.05 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Sufficient technical data to prove compliance with the specified requirements.
  - 2. Evidence satisfactory to the Architect that the proposed applicator is currently approved by the manufacturer of the specified product.

**1.06 JOB CONDITIONS**

- A. Ensure concrete has been cured a minimum of 3-days, is free of curing compounds and other sealers, and is free of laitance, grease, oil, and contaminants.
- B. Protect adjacent surfaces/areas from damage due to over-spray

**1.07 EXTENDED WARRANTY**

Warranty sealed concrete floors to be free of dusting from abrasion for a period of 10-years from date of Substantial Completion. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

## **PART 2 -- PRODUCTS**

### **2.01 SEALER**

- A. Wherever the Drawing indicates concrete with sealer, the surface shall be treated with ready-to-apply clear sealing compound. Where a sealer is used in conjunction with a hardener with color, use only a product recommended by the manufacturer of the hardener as accepted by the Architect.
- B. Comply with ASTM C 309, Type I, Class B.
- C. Acceptable products:
  - 1. Curcrete Chemical Company Inc. (Springville, Utah) "Ashford Formula".
  - 2. "Industrial Concrete Sealer" by Burke Company, San Mateo, California, (213) 724-6690.
  - 3. "Sealtight Intex" by W.R. Meadows, Inc., Benica, California, (714) 759-5006.
  - 4. "Lithothane Concrete Sealer" by L.M. Scofield Company, Los Angeles, California, (213) 723-5285.

### **2.02 HARDENER**

- A. Wherever the Drawings indicate concrete with hardener, the surface shall be treated with a non-metallic dust-on floor hardener.
- B. Acceptable products:
  - 1. "Non-metallic Floor Hardener" by Burke Company.
  - 2. "Mastercron" by Master Builders, Inc., Anaheim, California, (714) 978-6961.
  - 3. "Lithochrome" by L.M. Scofield.

### **2.03 HARDENER WITH COLORS**

- A. Wherever the Drawings indicate colored concrete floor hardener, the surface shall be treated with a non-metallic dust-on hardener in colors selected by the Architect.
- B. Acceptable products:
  - 1. "Lithochrome Color Hardener" by L.M. Scofield Company.
  - 2. "Colorcron" by Master Builders, Inc.

## **PART 3 -- EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which the work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

### **3.02 APPLICATION OF SEALER**

A. Preparation:

1. On freshly finished concrete surfaces, no additional surface preparation is required.
2. On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the pores of the material to be treated.
3. On existing concrete, vertical surfaces, and masonry surfaces:
  - a. Sweep all areas to be treated, using a fine bristle broom, or hose off with water and let dry to remove all surface dust and dirt.
  - b. Free the surface from all contaminants which would inhibit penetration of the product into the pores of the material to be treated.
  - c. Remove all curing, sealing, and coating agents by use of chemical or mechanical means as necessary.
  - d. If acid is used to remove surface coatings, flush the surface with water sufficiently to remove all acid and acid residue.
4. When applying near windows, mask the glass.
5. Avoid contact with plant life, glass, aluminum, and other finished surfaces. Where contact occurs, immediately wipe a damp cloth or flush with water.
6. Avoid contact with asphaltic concrete.

B. Application:

1. On freshly finished surfaces, spray the product with a low pressure sprayer immediately following the finishing operation.
  - a. To assure proper curing, apply the product to the entire surface as soon as the surface is firm enough to walk on, and before checking and temperature cracking begins.
  - b. Keep the entire surface wet for 30 minutes by brooming excess product on to the dry spots, or by re-spraying the dry spots immediately.
  - c. As the product begins to dry into the surface and becomes slippery underfoot, lightly sprinkle the surface with water to aid penetration and to bring alkali to the surface.
  - d. As the product again begins to dry into the surface and become slippery underfoot, flush the surface with water and squeegee the surface totally dry, removing all excess product and alkali or other impurities brought to the surface.
2. On broom-finished surfaces, no flushing is required, but squeegee or broom the excess product from surface after 30 to 40 minutes.
3. On cured concrete surfaces, saturate the surface with the specified product.
  - a. If dry spots appear, broom excess material onto the dry spots or re-spray them immediately.
  - b. Keep the entire surface wet with the product for 30 minutes.
  - c. If, after 30 to 40 minutes, the majority of the product has not been absorbed into the surface, broom or squeegee the excess product from low spots and puddles so it will be absorbed into the surface, or remove such excess product from the surface.



- d. If, after 30 to 40 minutes, the majority of the product is still on the surface, wait until the surface becomes slippery underfoot and then flush the entire surface with clear water and squeegee completely dry. If no water is available, squeegee the excess product from the surface after 30 minutes so that the surface is completely dry.

### 3.03 APPLICATION OF HARDENER

Apply the hardener after the surface of the concrete has reached the stage where no excess moisture shows, but while still plastic.

1. Hardener shall be applied at the rate of 40 pounds per 100 square feet of surface for the initial application.
2. Hardener shall be evenly distributed and thoroughly floated into the surface mortar with a wood float. 20 pounds of additional hardener shall be applied over each uniform color and texture.
3. All hardener and/or colored concrete floors shall be cured and protected with concrete curing paper or plastic until just prior to final cleaning.
4. Before applying curing paper or plastic, interior floors treated with colored hardener shall be given a heavy protective coat of colored wax left unpolished, and then immediately covered with the paper. If wax is not applied within two (2) hours after final troweling, the concrete shall be sprayed with a fine water mist and kept continuously moist until wax is applied, unless spraying is not recommended by the manufacturer of the hardener.
5. Cleaning and finishing: After all other work including plastering and painting has been completed, the curing paper shall be removed and waxed floors cleaned of protective wax coating. Clean all floors to remove dirt, stains or blemishes, and repair and restore damaged floors to their original condition. The hardener manufacturer's recommendations, directions, and recommended materials and methods shall be used for the protective wax coating, cleaning and finishing work.

**\*\*\*END OF SECTION\*\*\***

**SECTION 03345**  
**CONCRETE FINISHING**

**PART 1 -- GENERAL**

1.01 **GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 **SCOPE OF WORK**

Work included: Provide finishes on cast-in-place concrete as called for on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.03 **QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Except as may be modified herein or otherwise directed by the Architect, comply with ACI 301, "Specifications for Structural Concrete for Buildings".

1.04 **SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 **SUBMITTALS**

- A. Submit in accordance with Article 3.11 of the General Conditions.
- B. Product data, submit:
  - 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. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.06 **PRODUCT HANDLING**

Comply with pertinent provisions of Division 1.

1.07 **CLOSE-OUT**: also comply with the requirements of Section 01770 – Contract Closeout.

- A. **Reports**:  
None required.
- B. **As-Builts**:  
Not required
- C. **Operation and Maintenance Data**:  
None required.
- D. **Extra Materials**:  
None required.
- E. **Extended Warranty**:

Comply with the requirements of General Condition Article 3.5 and Section 01740.

## **PART 2 -- PRODUCTS**

### **2.01 MATERIALS**

- A. General:
  - 1. Carefully study the Drawings and these Specifications, and determine the location, extent, and type of required concrete finishes.
  - 2. As required for the Work, provide the following materials, or equals accepted in advance by the Architect.
- B. Liquid bonding agent: "Weld-Crete," manufactured by the Larsen Products Corporation.
- C. Curing and protection paper:
  - 1. Comply with ASTM C171, Type 1, regular.
  - 2. Accepted products:
    - a) "Sisalkraft, Seekure 896";
    - b) Equal non-staining products faced with polyethylene film.
- D. Slip-resistant abrasive aggregate:
  - 1. Provide aluminum oxide grains, uniformly graded, screen size 12-13, 14-36 or 16-30.
  - 2. Acceptable product:
    - a) Emerchrome Floor Hardener by L.M. Scofield Company.
    - b) Frictex H by Sonneborn.
    - c) or approved equal.

### **2.02 OTHER MATERIALS**

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

## **PART 3 -- EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

### **3.02 FINISHING OF FORMED SURFACES**

- A. General:
  - 1. After removal of forms, give exposed concrete surfaces the finish specified below.
  - 2. Revise the finish as needed to secure the acceptance of the Architect.
- B. Rubbed finish:

1. Do not start cleaning operations until all contiguous surfaces to be cleaned are completed and accessible.
2. Do not permit cleaning as the work progresses.
3. Mix one part portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having the consistency of thick paint.
4. Substitute white portland cement for part of the gray portland cement as required to produce a color matching the color of surrounding concrete, as determined by a trial patch.
5. Wet the surface of the concrete sufficiently to prevent absorption of water from the grout, and apply the grout uniformly with brushes or spray gun.
6. Immediately after applying the grout, scrub the surface vigorously with a cork float or stone to coat the surface and fill all air bubbles and holes.
7. While the grout is still plastic, remove all excess grout by working the surfaces with a rubber float, sack, or other means.
8. After the surface whites from drying (above 30 minutes at normal temperatures), rub vigorously with clean burlap.
9. Keep the surface damp for at least 36 hours after final rubbing.

### 3.03 FINISHING SLABS

#### A. Definition of finishing tolerances:

1. "Class A": True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
2. "Class B": True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.

#### B. Scratched finish: For surfaces scheduled to receive bond-applied cementitious applications.

1. After the concrete has been placed, consolidated, struck off, and leveled to a Class B tolerance, roughen the surface with stiff brushes or rakes before the final set.

#### C. Floated finish: For surfaces intended to receive roofing.

1. After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further until ready for floating.
2. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
3. During or after the first floating, check the planeness of the surface with a ten foot straightedge applied at not less than two different angles.
4. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout.
5. Refloat the slab immediately to a uniform sandy texture.

#### D. Troweled finish:

- 1 Provide a floated finish as described above, followed by a power troweling and then a hand troweling which is relatively free from defects, but which still may show some trowel marks.
  - a. Monolithic Trowel Finish: For all floor surfaces not otherwise specified. Steel trowel and retrowel to smooth surface. After concrete has set

- enough to ring true, retrowel to a burnished impervious finish, free of trowel marks or other blemishes.
- b. Steel Float Finish: for all slabs to receive resilient tile, waterproof membrane, or carpeting. Same as monolithic finish except omit burnish retroweling.
  - c. Fine Swirl Finish (when shown on the Drawings): Prepare same as steel float finish. When ready, perform such finishing operations as necessary to produce Architect-selected fine textured, non-slip finish. Construct sample panel for Architect's acceptance prior to placement. Sample panel shall consist of tooled edges and have a tooled joint within field of panel.
2. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance, and in a plane of Class A tolerance.
- E. Broom finish: For slabs to receive thin set tiles, apply steel float finish followed by very fine broom finish. For surfaces to receive mortar setting beds and for exterior concrete driveway ramps, curbs and gutters, spandrels, etc.
1. Provide a finished surface uniform in texture and appearance, and in a plane of Class A tolerance. Roughen surface with coarse broom.
- F. Rock Salt finish: Exterior walkways and pavings except where non-slip finish is specified.
1. Provide a floated finish as described above.
  2. While the surface is still plastic, broadcast rock salt into the surface and embed uniformly into the surface by light tamping.
  3. Float the surface until it has been brought to a true plane with Class B tolerance.
  4. After the concrete has completely set, flood the surface with water to dissolve the rock salt, using a fine bristle brush as necessary to remove the salt.
  5. Provide a sample panel at the site of the proposed finish and receive the acceptance of the Architect of that finish prior to placing of the paving.
- G. Non-slip finish: For exterior platforms, steps, and landings; and Interior and exterior pedestrian ramps.
1. Provide a floated finish as described above.
  2. While the surface is still plastic, broadcast abrasive aggregate as specified in Paragraph 2.01.F above and work into the surface according to the manufacturer's recommendations.
  3. Complete finishing surface as described above for a troweled finish, and as recommended by the aggregate manufacturer.

### 3.04 CURING AND PROTECTION

- A. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
- B. Preservation of moisture:
1. Unless otherwise directed by the Architect, apply one of the following procedures to concrete not in contact with forms, immediately after completion of placement and finishing.
    - a. Ponding or continuous sprinkling;
    - b. Application of absorptive mats or fabric kept continuously wet;

- c. Application of sand kept continuously wet;
  - d. Continuous application of team (not exceeding 150° F) or mist spray;
  - e. Application of waterproof sheet materials specified in Part 2 of this Section;
  - f. Application of other moisture-retaining covering as accepted by the Architect.
  - g. Where forms are exposed to the sun, minimize moisture loss by keeping the forms wet until they can be removed safely.
2. Cure concrete by preserving moisture as specified above for at least ten days.
- C. Temperature, wind, and humidity:
- 1. Cold weather:
    - a) When the mean daily temperature outdoors is less than 40° F, maintain the temperature of the concrete between 50° F and 70° F for the required curing period.
    - b) When necessary, provide proper and adequate heating system capable of maintaining the required heat without injury due to concentration of heat.
    - c) Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
  - 2. Hot weather: When necessary, provide wind breaks, fog spraying, shading, sprinkling, ponding, or wet covering with a light colored material, applying as quickly as concrete hardening and finishing operations will allow.
  - 3. Rate of temperature change: Keep the temperature of the air immediately adjacent to the concrete during and immediately following the curing period as uniform as possible and not exceeding a change of 5° F in any one hour period, or 50° F in any 24 hour period.
- D. Protection from mechanical injury:
- During the curing period, protect the concrete from damaging mechanical disturbances such as heavy shock, load stresses, and excessive vibration.
- 1. Protect finished concrete surfaces from damage from construction equipment, materials, and methods, by application of curing procedures, and by rain and running water.
  - 2. Do not load self-supporting structures in such a way as to over stress the concrete.

**\*\*\*END OF SECTION\*\*\***

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## SECTION 05100

### SUPPORTING FROM STRUCTURE

#### PART 1 GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

###### A. Work Included:

1. This section provides guidelines and limitations for supporting all mechanical, electrical, plumbing or architectural items from the building structure, and for seismic bracing for all such items.
2. Design and install all support and bracing systems except as noted. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not overstress the building structure.

###### B. Work Not Included:

1. The Contractor is not required to design support and bracing for items for which the contract documents provide specific attachment, support, and bracing. Items specifically noted in the CBC as not requiring bracing may be exempt from seismic bracing if all conditions of attachment in the CBC are compliant. Seismic bracing is not typically required for the following items:
  - a. Gas piping less than 1 inch inside diameter.
  - b. Piping for boilers and mechanical equipment less than 1.25 inches inside diameter.
  - c. All other piping less than 2.5 inches inside diameter, unless racked together.
  - d. All piping and duct suspended by individual hangers 12 inches or less in length with flexible connections.
  - e. All rectangular air handling ducts less than 6 square feet in cross sectional area.
  - f. All round air handling ducts less than 28 inches in diameter.
  - g. All electrical conduits less than 2.5 inches inside diameter, unless racked together.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Structural Steel: Section 05120.
- B. Metal Fabrications: Section 05500.
- C. Information relating solely to mechanical or electrical work is included under those divisions, except as specifically indicated herein.

##### 1.04 QUALITY ASSURANCE

###### A. General:

1. Design and install all support systems to comply with the requirements of the 2010 California Building Code Chapter 16.
2. For seismic bracing design engage the services of a structural engineer licensed in California.
3. For guidelines regarding seismic bracing for mechanical, electrical and plumbing systems, refer to the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems". Where SMACNA guidelines deviate from CBC requirements, CBC requirements shall govern



- B. Standards and References: (Latest Edition unless specified otherwise)
1. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 apply to the work of this Section as if printed herein.
  2. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date of Notice to Proceed with the Work given.
- C. Submittals: (submit under provisions of Section 01330):
1. Submit shop drawings for all substructures and attachment methods.
  2. Submit proposed alternative methods of attachment for review by the Architect, prior to deviating from the requirements given below.
  3. For all seismic bracing systems, submit structural calculations and details prepared and signed by the Contractor's licensed engineer which include all resultant forces applied to the building structure. Do not overstress building structure. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

#### 1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

#### 1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

### **PART 2 – PRODUCTS**

#### 2.01 MATERIALS

- A. Furnish all substructures and fasteners required to comply with the limitations given below. Use materials as specified in the various sections and as appropriate to the use.
- B. All exterior materials: hot dipped galvanized or stainless steel.

### **PART 3 – EXECUTION**

#### 3.01 GUIDELINES AND LIMITATIONS

- A. The General Contractor shall coordinate the load requirements from all sub-contractors so that no combination of loads exceeds the limitations given below without written approval.
- B. Maximum Loading: Attach no loads greater than the following without specific approval of the Structural Engineer.
1. Metal deck without concrete fill - acoustical tile and gypsum board ceilings only; no piping, ducting or conduit. Maximum ceiling weight - 3.5 psf. Maximum wire hanger load = 60#.
  2. Metal deck with concrete fill - ceilings as indicated for metal deck without concrete fill above, plus electrical conduits, gas piping and ducting not exceeding 3.0 psf. Maximum point load from trapeze = 200 lbs. at 8'-0" cc each way. Mechanical units hung from concrete filled deck shall not exceed 500 lbs.
  3. Steel beams and girders: water and gas piping, electrical conduits, ducting and trapeze of same not to exceed 3.0 psf. Maximum load on a single span = 600#. Mechanical units hung from beams shall not exceed 1000# unless specifically indicated on structural plans.

4. Cast-In-Place concrete slabs - ceilings, piping, conduit and ducts shall not exceed 10 psf. Maximum hanger load 600#. Mechanical units hung from slabs shall not exceed 800#.
5. Wood sawn joists - loads from ceilings, piping, conduit and ducting shall not exceed 5.0 psf. Maximum concentrated load = 300 lbs. per joist.
6. Steel Joists - Loads from ceiling, piping, conduit and ducting shall not exceed 8 psf. Maximum concentrated load = 500 lbs. per joist.

3.02 SEISMIC BRACING

- A. In applying formulas from Chapter 16 of the 2010 CBC the value for  $I_p$  (importance factor) shall be assumed to be no less than 1.0. See structural drawings for other seismic factors.
- B. Design and install seismic bracing so as not to ground out vibration and sound isolation items.

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## SECTION 05120

### STRUCTURAL STEEL

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Furnish and install all structural steel as shown and specified including, but not necessarily limited to the following:
1. Prime coat painting and touch up.
  2. All cast-in-place anchor bolts, nuts, plates, etc.
  3. 10 gauge steel or 3/4 inch plywood templates for column anchor bolts.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Metal Fabrications: Section 05500.
- B. Cast-In-Place Concrete: Section 03300.

##### 1.04 QUALITY ASSURANCE

- A. General:
1. Comply with the referenced ASTM standards for materials.
  2. Perform all welding only with AWS certified welders.
  3. Verification of accuracy:
    - a. Engage and pay for a registered civil engineer or licensed land surveyor to check the alignment, plumbness, elevation, and overall accuracy of the erected framing at appropriate stages during construction and at completion of erection. Prior to erection, a survey shall be made of the as-built locations of all anchor rods and other embedded items associated with the attachment of structural steel. The party providing the survey shall submit written verification that the entire installation is in accordance with the contract documents and meets the allowable erection tolerances as set forth in the AISC "Code of Standard Practice for Steel Buildings and Bridges".
    - b. Columns shall be verified at each lift. Column shim details and procedures shall be submitted for review.
  4. Paint:
    - a. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use thinners approved by paint manufacturer, and use within recommend limits.
    - b. Coordination of Work: Review other Sections in which prime paints are to be provided to ensure compatibility of coatings system for various substrates. Upon request, furnish information or characteristics of finish materials to be used.
    - c. Requirements of Regulatory Agencies: Comply with applicable rules and regulations of governing agencies for air quality control.
- B. Except where other requirements are specified, comply with the following standards by American Institute of Steel Construction (AISC) and American Welding Association (AWS):
1. AISC 360-05 "Specification for Structural Steel Buildings".
  2. 2005 AISC "Code of Standard Practice for Steel Buildings and Bridges".
  3. AISC 341-05 "Seismic Provisions for Structural Steel Buildings"

4. AISC 358-05 "Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications"
  5. AISC "Specifications for Structural Joints Using A325 or A490 Bolts".
  6. 2005 AISC Section 10, Architecturally Exposed Structural Steel, Code of Standard Practice for Steel Buildings and Bridges
  7. AWS D1.1 "Structural Welding Code".
  8. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
  9. SSPC-Vis 1 Pictorial Surface Preparation Standards for Painting Steel Structures
  10. SSPC-SP2 Hand Tool Cleaning
  11. SSPC-SP3 Power Tool Cleaning
  12. SSPC-SP6 Commercial Blast Cleaning
  13. SSPC-PA2 Measurement of Dry Paint Thickness with Magnetic Gauges
  14. 2010 International Building Code (IBC).
- C. Submittals: (Submit under provisions of Section 01330)
1. Product Data: Include laboratory test reports and other data to show compliance with specifications (include specified standards). Include certified copies of mill reports covering chemical and physical properties of each type of structural steel.
  2. Shop Drawings:
    - a. Shop drawings shall include complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
    - b. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld.
    - c. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
    - d. Dimensions required to locate structural steel for manufactured items such as mechanical equipment, electrical equipment, dock levelers, etc., shall be coordinated and provided by the General Contractor. General Contractor shall also coordinate and provide dimensions to locate structural steel for window washing supports such as davits, tie-backs, etc.
  3. Procedures:
    - a. Provide weld procedures for both pre-qualified welds and special welds to be submitted to the Owner's Testing Laboratory and the Architect.
    - b. Provide installation procedure and inspection for direct tension indicator washers detailed in supplemental specifications provided by the manufacturer for approval.
    - c. Procedures shall be submitted for both shop and field welds.
- D. Tests and Inspections:
1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
  2. Testing Laboratory:
    - a. An inspection and testing laboratory will be selected by the Owner for testing and inspection as required by the Contract Documents. The selected laboratory shall conform to the requirements of ASTM E329 (Recommended Practice for Inspection and Testing Agencies used in Construction). Documentary evidence of such conformance shall be submitted to the Owner and the governing agency.
    - b. All materials, work, methods and equipment shall be subject to inspection at the mill, fabricating plant and at the building site. Material or workmanship not complying fully with the Contract Documents will not be accepted. The Contractor shall give the Testing Laboratory reasonable notice when ready for inspection and shall supply samples and test pieces and all facilities for inspection without extra charge. The

- Owner will assume the expense of making the tests and inspection except as otherwise specified in Division 1.
3. Cost of Testing and Inspection: Costs of testing and inspection of structural steel, except as specified hereunder and in Division 1, will be paid for by the Owner.
    - a. All transportation costs and per diem living costs for inspection at fabricators' plant further than 75 miles from the job site will be back-charged to the Contractor.
    - b. It is assumed that all fabrication will take place in one shop location only. All additional inspection costs will be back-charged to the Contractor.
    - c. All mill tests and costs of re-test of plain materials shall be at the expense of the Contractor.
    - d. Costs of tests required due to Contractor's failure to provide steel identifiable in accordance with the indicated ASTM designation shall be at the expense of the Contractor.
  4. Structural Steel Testing and Inspection:
    - a. Structural Steel: If structural steel tests are indicated as required on the structural drawings, one tension and one bend test shall be made for each size of structural shape, plate and for each tube and pipe size. Tests to be made in accordance with requirements of appropriate ASTM designations.
    - b. If structural steel tests are not indicated as required on the structural drawings, then for shapes, plates, bars, pipe and tubing, manufacturer's certified mill test reports and analysis for each heat will be acceptable for steel identifiable in accordance with indicated ASTM designation. Mill test reports shall indicate the physical and chemical properties of all structural steel used. Correlate individual heat numbers with each specified structural section.
    - c. Unidentifiable Steel:
      - 1) For  $F_y$  less than or equal to 36.0 ksi : Provide one tension and elongation test and one bend for each 5 tons or fraction thereof for each size.
      - 2) For  $F_y$  greater than 36.0 ksi : Provide one tension and elongation test and one bend or flattening for each piece.
    - d. Costs of retests and additional testing required by the use of unidentifiable steels shall be the Contractor's responsibility. Additional costs of testing incurred by the Owner shall be deducted from the Contract Final Payment.
  5. Expansion Anchors: Load test as indicated on drawings.
  6. Welding Inspection:
    - a. For Moment Resisting Frame Welding inspection and testing requirements, see specification Section 05 12 24 - Welding of Moment Resisting Frames.
    - b. If shop or field welding inspection is indicated on the structural drawings, all shop and field welded operations will be inspected by a qualified welding inspector employed by the Testing Laboratory. Such inspector will be a person trained and thoroughly experienced in inspection of welds. The inspector's ability to distinguish between sound and unsound welding will be reliably established
    - c. The welding inspector will make a systematic record of all welds. This record shall include:
      - 1) Identification marks of welders.
      - 2) List of defective welds.
      - 3) Manner of correction of defects.
    - d. The welding inspector will check the material, equipment and procedure, as well as the welds. He will also check the ability of the welder. He will furnish the Architect with a report, duly verified by him that the welding which is required to be inspected is proper, and has been done in conformity with the Contract Documents, and that he has used all means to determine the quality of the welds.
    - e. All full penetration groove welds will be subject to ultrasonic testing, as per AWS D1.1, Section 6 "Inspection, Part "C", Ultrasonic Testing of Groove Welds. All defective welds shall be repaired and retested with ultrasonic equipment at the Contractor's expense.

- f. Column Flanges: An area extending 6 inches above and below point where girder flanges are attached will be inspected. Column flange edges will be inspected visually, and entire area ultrasonically for lamination, plate discontinuities, and non-metallic inclusions.
  - g. All partial penetration groove welds shall be tested by ultrasonic testing.
  - h. When ultrasonic indications arising from the weld root be interpreted as either a weld defect or the backing strip itself, the Engineer will be notified. The Engineer may require the removal of backing strip. The backing strip will be removed at the expense of the Contractor, and if no root defect is visible the weld will be retested. If no defect is indicated on this retest, and no significant amount of base and weld metal have been removed, no further repair of welding is necessary. If a defect is indicated, it will be repaired and retested at Contractor's expense.
  - i. The ultrasonic instrumentation will be calibrated by the technician to evaluate the quality of the welds in accordance with AWS D1.1.
  - j. Other methods of inspection, for example, X-Ray, gamma ray, magnetic particle, or dye penetrant, may be used on welds if felt necessary by the inspection laboratory, and with the approval of the Engineer.
  - k. Base metal thicker than 1-1/2 inches, when subjected to through thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such weld before and after joint completion.
  - l. End-welded studs shall be sampled, tested, and inspected per the requirements of the Structural Welding Code - Steel D1.1 Chapter 7, published by the American Welding Society.
  - m. At the discretion of the owner's testing agency, the ultrasonic testing frequency may be reduced but may not be less than the following:
  - n. Initially, all welds requiring ultrasonic testing will be tested at the rate of 100 percent in order to establish the qualifications of each individual welder. If the reject rate is demonstrated to be less than 5 percent of the welds tested for each welder, then the frequency of testing for that welder may be reduced to 25 percent. If the reject rate increases to 5 percent or more, 100 percent testing will be re-established until the rate is reduced to less than 5 percent. The percentage of rejects will be calculated for each welder independently.
  - o. A sampling of a least 40 completed welds will be made for such reduction evaluation. Reject rate is defined as the number of welds containing rejectable defects divided by the number of welds completed. For evaluating the reject rate of continuous welds over 3' in length, each 12 linear inch increment of welds, 1 inch or less in thickness, will be considered as one weld. For evaluating the reject rate of continuous welds greater than 1 inch thickness, each 6 linear inches will be considered one weld.
7. High Strength Bolting Tests and Inspection:
- a. Furnish certified test reports for each lot of bolts in accordance with Section 9 of ASTM A325 and A490. Install bolts under the supervision of a qualified inspector in accordance with Section 9, Research Council "Specifications for Structural Joints using ASTM A325 or A490 Bolts".
  - b. If high strength bolting inspection is indicated or required on the structural drawings, the testing laboratory will visually inspect all high strength bolts.
  - c. While the work is in progress, the Inspector shall determine that the requirements of this Specification are met in the work. The Inspector shall observe the calibration procedures and shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is properly used to tighten all bolts.
    - 1) In addition to the requirement of the foregoing paragraph, for all connections specified to be slip critical (SC), the Inspector shall assure that the specified procedure was followed to achieve the pretension specified in the AISC. The pretension shall be verified by the inspector for these bolts.

- 2) Bolts in connections identified as not being slip-critical nor subject to direct tension need not be inspected for bolt tension other than to ensure that the piles of the connected elements have been brought into snug contact.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 PRODUCT HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
- B. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 SEQUENCING/SCHEDULING

- A. Cooperate and coordinate this work with other trades for anchor bolts, and other required inserts, templates, etc. Align this work prior to installation of other materials.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Structural Steel: Except where indicated on drawings.
  1. W shapes: ASTM A572-50 or ASTM A992-50 unless indicated otherwise on drawings.
  2. Channels and other rolled shapes: ASTM A36 unless indicated otherwise on drawings.
  3. Angles, plates and bars: ASTM A36 unless indicated otherwise on drawings.
- B. AISC group 4 and 5 shapes and plates greater than 2 inches thick: ASTM A36 and/or ASTM A572 Grade 50 with supplementary requirements S91 Fine Austenitic Grain Size and S5 Charpy V-Notch Impact Test. For location of Charpy V-Notch test, see ASTM A6 Supplementary Requirement S30. Charpy V-Notch test shall be per ASTM A673, frequency P and shall meet a minimum average value of 20 ft-lbs absorbed energy at 70° F.
- C. Cold-Formed Steel Tubing: ASTM A500, Grade B.
- D. Steel Pipe: ASTM A53, Type E or S, Grade B.
- E. Anchor Bolts: All anchor bolts cast in concrete or masonry shall be headed bolts with cut threads conforming to ASTM F1554 grade 36, 55 or 105 as indicated on drawings.
- F. Machine Bolts: ASTM A307.
- G. High Strength Bolts, Nuts and Washers: Install in accordance with requirements for A325 and A490 slip critical and snug tight conditions as indicated on drawings. Install high strength bolts with snug tight type connections with threads included in shear plane except as otherwise noted. Install hardened washers in conformance with AISC Specifications.



1. Bolt Specifications: Bolts shall conform to the requirements of the current edition of the Specifications of the American Society for Testing and Materials for High-Strength Bolts for Structural Steel Joints, ASTM A325, Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength, ASTM A490 as indicated on drawings.
  2. Bolt Geometry: Bolt dimensions shall conform to the current requirements of the American National Standards Institute for Heavy Hex Structural Bolts, ANSI Standard B18.2.1. The length of bolts shall be such that the end of the bolt will be flush with or outside the face of the nut when properly installed.
  3. Nut Specifications: Nuts shall conform to the current chemical and mechanical requirements of the American Society for Testing and Materials Standard Specification for Carbon and Alloy Steel Nuts, ASTM A563, Appendix Table X1.1. Provide grade A Heavy Hex nuts for grade 36 threaded rods. Use grade C, Heavy Hex nuts for grade 55 and 105 threaded rod.....
  4. Washers: Flat circular washers and square or rectangular beveled washers shall conform to the current requirements of the American Society for Testing and Materials Standard Specification for Hardened Steel Washers, ASTM F436.
  5. Tension Control Fastener System: Bolts shall conform to the requirements of the current edition of the Specifications of the American Society for Testing and Materials for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, ASTM F1852, providing equivalent properties to ASTM A325 or A490 as indicated on drawings.
- H. Headed Stud-Type Shear Connectors: ASTM A108 Grade 1015 or 1020 Cold-finished carbon steel with dimensions complying with AISC Specifications.
1. Tensile strength, 60,000 psi.
  2. Elongation in 2 inches, 20 percent
  3. Reduction of area, 50 percent.
- I. Provide hexagonal heads and nuts for all connections per ASTM A563, Appendix Table X1.1.
- J. Electrodes for Welding: Comply with AWS Code, E70 Series minimum. Fabricator to select proper electrodes according to weld procedures as submitted.
- K. Shop Primer:
1. Type A Material: Tnemec Company, Inc., 88HS
  2. Type B Material: Tnemec Company, Inc., 90-97 Tneme-Zinc.
  3. All paints shall meet the California Air Resources Board Standards.
  4. Finish paint Material (uno): Tnemec Company, Inc., Series 75- Endura-Shield. Color to be selected by owner.
- L. Powder Driven Fasteners: Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems.
- M. Expansion Bolts: Hilti Fastening Systems "Kwik-Bolt Concrete Expansion Anchors" to concrete; Ramset "Dynabolt Sleeve Anchors" to masonry or approved equal.

### **PART 3 – EXECUTION**

#### **3.01 FABRICATION**

- A. Shop Fabrication and Assembly: Fabricate and assembly structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated to provide the flattest floor possible. The contractor shall coordinate member tolerances with finishes.

Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

- B. Connections: Weld or bolt shop connections, as indicated. Bolt field connections, except where welded connections or other connections are indicated.
- C. Unless noted otherwise, make holes 1/16 inches larger than the nominal bolt diameter.
- D. Welding, Shop and Field: Weld by shielded arc method, submerged arc method, flux cored arc method, or other method approved by AWS. Perform welding in accordance with AWS Code. All welders, both manual and automatic, shall be certified in accordance with AWS "Standard Qualification Procedure" for the Work to be performed. See paragraph "welding" herein, for detailed requirements. If sizes of fillet welds are not shown on drawings, use AWS minimum weld size but not less than 3/16 inch fillet welds.
- E. Bolt Holes for Other Work: Provide holes required for securing other work to structural steel framing.

Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

Cut, drill, or punch holes perpendicular to metal surfaces and remove all burrs. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

- F. AISC Group 4 and 5 shapes and built up members shall meet the requirements for joints in AISC Sections J1.7, J1.8, J2.6 and M2.2.
- G. High Strength Bolts:
  - 1. Installation and Tightening:
    - a. Handling and Storage of Fasteners: Fasteners shall be protected from dirt and moisture at the job site. Only as many fasteners as are anticipated to be installed and tightened during a work shift shall be taken from protected storage. Fasteners not used shall be returned to protected storage at the end of the shift. Fasteners shall not be cleaned of lubricant that is present in as-delivered condition.
    - b. Tension Calibrator: A tension measuring device shall be required at all job sites where bolts in slip-critical joints are being installed and tightened. The tension measuring device shall be used to confirm: (1) the suitability to satisfy the requirements of AISC for the complete fastener assembly, including lubrication if required to be used in the work, (2) calibration of wrenches, if applicable, and (3) the understanding and proper use by the bolting crew of the method to be used. The frequency of confirmation testing, the number of tests to be performed and the test procedure shall be as specified in 1.d. below, as applicable. The accuracy of the tension measuring device shall be confirmed through calibration by an approved testing agency at least annually.
    - c. Joint Assembly and Tightening of Shear/Bearing Connections: Bolts in connections not within the slip-critical category shall be installed in properly aligned holes, but need only be tightened to the snug tight condition. The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. If a slotted hole occurs in an outer ply, a flat hardened washer or common plate washer shall be installed over the slot.

- d. Joint Assembly and Tightening of Connections Requiring Full Pre-tensioning. Slip-critical connections shall be installed in properly aligned holes and tightened by one of the following methods.
  - 1) Turn-of-nut Tightening: When turn-of-nut tightening is used, hardened washers are not required except as specified in the AISC. A representative sample of not less than three bolts and nuts of each diameter, length and grade to be used in the work shall be checked at the start of work in a device capable of indicating bolt tension. The test shall demonstrate that the method of estimating the snug-tight condition and controlling turns from snug tight to be used by the bolting crews develops a tension not less than five percent greater than the tension required for slip-critical connections.
  - 2) Installation of Alternate Design Bolts: A representative sample of not less than three bolts of each diameter, length and grade shall be checked at the job site in a device capable of indicating bolt tension. The test assembly shall include flat hardened washers, if required in the actual connection, arranged as in the actual connections to be tensioned. The calibration test shall demonstrate that each bolt develops a tension not less than five percent greater than the tension required by AISC. Manufacturer's installation procedure shall be followed for installation of bolts in the calibration device and in all connections. When alternate design features of the fasteners involve an irreversible mechanism such as yield or twist-off of an element, bolts shall be installed in all holes of the connection and initially brought to a snug tight condition. All fasteners shall then be tightened, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened fasteners prior to final twist-off or yielding of the control or indicator element of the individual fasteners. In some cases, proper tensioning of the bolts may require more than a single cycle of systematic tightening.
- e. Mark bolts that have been completely tightened with an identifying symbol.

### 3.02 WELDING

- A. General: Quality of materials and design and fabrication of all welded connections shall conform to AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Building," "AWS Code for Welding in Building Construction," and requirements of this section.

Location and type of all welds shall be as shown. Make no other welded splices, except those shown on drawings, without prior approval of the architect.

- B. Automatic Welding: Use electrode wire and flux for automatic and semi-automatic welding acceptable to Structural Engineer. All methods, sequences, qualification and procedures, including preheating, and post heating if necessary, shall be detailed in writing and submitted to the Structural Engineer for review.
- C. Qualification of Welders:
  - 1. Structural steel welding: Manual and automatic welds for structural steel construction shall be made only by operators who have been previously qualified by tests, as prescribed in AWS D1.1 to perform type of work required.
  - 2. Welders shall be checked by welding inspector. Those not doing satisfactory work may be removed, and may be required to pass qualification tests again. All qualification testing shall be at the Contractor's expense.
  - 3. Only welders whose weld procedures and pre-qualification by testing that have passed shall be considered qualified for such welds.

- D. Control cooling process after weld is completed by either step down post heat or thermal blankets as determined by procedures and prequalification.
- E. Box columns and built-up members shall have ultrasonic testing before and after welding.
- F. Flame cut surfaces shall be ground to remove contaminated steel layer to provide welds proper fusion without impurities.
- G. Preparation of surface: Surfaces to be welded shall be free of loose scale, slag, rust, grease, paint, and any other foreign material.
- H. Welding equipment: Welding equipment to be used in each case shall be acceptable to welding inspector. Use equipment with suitable devices to regulate speed, and manually adjust operating amperage and voltage. The amperage capacity shall be sufficient to overcome line drop, and to give adequate welding heat.
- I. Remove runoff tabs and grind surfaces smooth where the tabs would interfere with fireproofing and architectural finishes.
- J. End-welded studs:
  - 1. Automatic end-welded studs: Automatically end-weld in accordance with the manufacturer's recommendations in such a manner as to provide complete fusion between the end of the stud and the plates. There shall be no porosity or evidence of lack of fusion between the welded end of the stud and the plate. The stud shall decrease in length during welding approximately 1/8 inch for 5/8 inch, and 3/16 inch for 3/4 inch diameter. Stud sizes indicated on drawings represent the finish stud height.
  - 2. Fillet-end welded studs: Studs may be welded using prequalified FCAW, GMAW, or SMAW processes provided the requirements of the AWS D1.1 Chapter 7 Section 7.5.5 are met as well as any other pertinent requirements of D1.1.
- K. Provide mill camber as shown on the construction documents within AISC tolerance. Place mill tolerance upward for all beams specified no camber.

### 3.03 ERECTION

- A. Structural steel erection: Comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Building", latest edition.
- B. Erection Sequence: Erect steel in accordance with special erection sequences where special erection sequences are indicated on the contract documents.
- C. Before and during erection, keep all structural steel clean. Ship, handle and store steel in manner to avoid injury to members. Steel members showing evidence to rough handling or injury will be rejected.
- D. Mark each member with erection identification corresponding to mark shown on erection drawings. Carefully plan erection of structural steel so that no cutting and removal of material will be necessary. Do not torch burn in the field, unless specifically permitted by Engineer.
- E. Provide sufficient bracing, shoring and guys to effect safe and satisfactory erection. Provide bracing and shoring capable of holding steel work plumb and properly aligned while field connections are being made, and until lateral force resisting elements are deemed by Architect capable of bracing structure. Temporary bracing shall be adequate to resist lateral forces from wind or seismic prior to the completion of the lateral resisting system.

- F. Set bearing and base plates with extreme care. Bring level, to line and grade with leveling plates or by leveling nuts and bolts. Grout solid under plates with a flowable non-shrink grout per Section 03300 prior to applying vertical load.
- G. Field Assembly: Set structural framing accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces which will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

Shimming or other adjustments not indicated on drawings shall be approved by the Engineer prior to installation. Level and plumb individual members of the structure within specified AISC tolerances except as noted herein. Column shimming shall be 1/4 inch.

- H. All welds shall be full and clean, and conform to AISC and AWS specifications.
- I. Erection Tolerances: Individual pieces shall be erected so that the deviation from plumb, level and alignment shall not exceed 1 to 500 plus:
  - 1. The maximum displacement of the center line of columns adjacent to elevator shafts, from the established column line, shall not be more than 1 inch at any point.
  - 2. In order to provide a true, flat plane for the exterior elevations, install all steel framing at the exterior walls of the building, so that the center lines of such framing does not vary by more than 1 inch for the length of the building. Also install each vertical member on such grids so that its vertical center line does not vary by more than 1/2 inch from a vertical line for each story and 1 inch for its full height.
  - 3. All columns and beams shall adhere to Section M2.7 of the referenced "Specification for Structural Steel for Buildings" which states that completed members shall be free of twists, bends, and open joints. Take special care that column base plates are parallel and perpendicular to faces of columns and that bolt holes are accurately placed.
- J. Temporary Flooring:
  - 1. Provide planking and scaffolding necessary in connection with erection of structural steel, support of erection machinery, and construction materials. Temporary floors and use of steel shall be as required by applicable regulatory requirements.
  - 2. If steel decking is used as a working platform, it shall be temporarily tack-welded to supports to extent necessary for such use in accordance with applicable regulatory requirements. The concentrated loading from welding machines and other heavy machinery required for steel erection shall be distributed by planking or other approved means. Metal decking that becomes damaged as the result of being used as a working platform shall be replaced at no additional cost to the Owner.
- K. Tower Crane: The design for the support and bracing for a tower crane shall be the responsibility of the General Contractor. The design shall be prepared by a structural engineer licensed in the state of California. Drawings and calculations shall be stamped and signed by the structural engineer. Concentric, torsional, and/or eccentric loading to the main structure shall be resolved by the addition of structural steel for shear tabs, stiffeners, drag ties, bracing struts, etc., Such items shall be designed, detailed, furnished and installed by the contractor.

### 3.04 PAINTING AND CLEANING

- A. Prior to prime coat application, clean all loose rust, mill scale, oil, dirt, and all other materials from all steel to be left exposed. Use hand tool, power tool, sandblasting, chemical cleaning, and any other method necessary to provide a smooth, sound surface for painting.
- B. Shop prime all steel except the following:
  - 1. Steel encased in concrete.

2. Contact surfaces for slip-critical (sc) high strength bolts.
  3. Areas within 4 inches of field welds.
  4. Tops of members to receive metal decking.
  5. Steel to be fireproofed.
  6. Surfaces to be galvanized.
- C. Use the following Type A shop painting systems on all normal environment interior steelwork:
1. Surface Preparation: SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning. Where jobsite exposure is expected to exceed 6 months, SSPC-SP6 Commercial Blast Cleaning is required.
  2. Application: Follow coating manufacturer's printed directions.
  3. Material: Type A Tnemec Series 88HS Azeron Primer.
  4. Number of Coats: One
  5. Dry Film Thickness: 2.0 mils minimum.
  6. Volume Solids: 60.0 +/- 2.0% minimum
  7. Generic Description: Modified Alkyd.
- D. Use the following Type B shop painting systems on all exterior steelwork and interior steelwork subjected to wet conditions or fumes:
1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning
  2. Application: Follow coating manufacturer's printed directions.
  3. Material: Type B Tnemec 90-97 Tneme-Zinc primer
  4. Number of Coats: One
  5. Dry Film Thickness: 2.5 mils minimum.
  6. Volume Solids: 63% +/- 2%
  7. Generic Description: Organic Zinc-Rich Urethane
- E. Use the following finish painting systems on all exterior steelwork and interior steel work subjected to wet conditions or fumes:
1. Application: Follow coating manufacturer's printed directions. Apply over Type B primer system above.
  2. Material: Tnemec Series 75 Endura-Shield paint.
  3. Number of Coats: One
  4. Dry Film Thickness: 3 to 5 mils
  5. Volume Solids: 72% +/- 2%
  6. Generic Description: Aliphatic Polyurethane
- F. Apply two shop prime coats to areas which will be inaccessible after erection.
- G. Clean contact surfaces of high strength bolts of all burrs and material which might prevent solid seating of the parts. Steel to receive bolts shall be primer painted except beneath the contact area of slip-critical bolts.
- H. After erection, field touch up all welded areas, high strength bolts and damaged areas. For all steel to remain exposed, remove all blemishes, paint drips, and touch up prime coat.

### 3.05 HOISTING AND BRACING

- A. Provide all hoisting and erecting equipment and power.
- B. Provide and maintain any and all safety railings, toe boards, etc., required for the erection of steel framing and metal decking.
- C. Brace the erected frame in a manner which will assure safety and proper alignment to receive the metal decking and until the concrete slabs have been poured and have set.

- D. Erect building frame true and level. Erect columns in a manner to allow for movement due to welding shrinkage and thermal expansion and contraction of framing. Check plumbness after erection of each level. Maintain structural stability of frame during erection. Provide temporary bracing where necessary to maintain frame stability and to support required loads, including equipment and its operation.

**\*\*\* END OF SECTION \*\*\***

## SECTION 05500

### METAL FABRICATIONS

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Shop fabricated metal items and miscellaneous metal work.
- B. Refer to Schedule at end of this Section.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Structural Steel: Section 05120.

##### 1.04 QUALITY ASSURANCE

- A. Standards and References: (Latest Edition unless otherwise noted)
  - 1. 2010 California Building Code (CBC), with State of California Amendments
  - 2. American Society for Testing and Materials (ASTM) Specifications as listed in the Section.
- B. Submittals: (Submit under provisions of Section 01330)
  - 1. Shop Drawings: Submit shop drawings indicating profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevation, and details where applicable. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
  - 2. Manufacturer's descriptive data: Submit for manufacturer's items.

##### 1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to bidders of the Bid Package Section 00003.

##### 1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

##### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver all parts ready for erection; store in close proximity to final locations.

#### **PART 2 - PRODUCTS**

##### 2.01 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Steel Pipe: ASTM A53, Type E or S, Grade. B.
- D. Steel Bolts, Nuts, and Washers: ASTM A307.



- E. Welding Materials: AWS D1.1; type required for materials being welded.
- F. Galvanizing: Hot-dip process ASTM A123 typical and ASTM A153 for threaded fasteners performed after fabrication into largest practical section. Weight of coating not less than 2 oz. per sq. ft. of surface. Where damaged, repair surface with one coat of hot process galvanizing repair compound, "Galvalloy", Galweldalloy", or approved equal.
- G. Primer: Tnemec Company "Series V10 Red Primer", Sherwin-Williams "Kern Primer"; or approved equal.
- H. Dissimilar Materials: Separate dissimilar surfaces in contact with or in close proximity to non-compatible metals, concrete masonry, or plaster with neoprene gasket; or other approved means.
- I. Expansion Bolts: Hilti "Kwik Bolt TZ" Expansion Anchor Bolts, galvanized unless otherwise indicated.
- J. Non-shrink Grout: Master builders 928 or equal.

## 2.02 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to jobsite.
- D. Grind exposed welds flush and smooth adjacent finished surfaces. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints butt tight, flush and hairline.
- G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

## 2.03 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- C. Prime paint interior items with one coat unless scheduled to be galvanized.
- D. Galvanize exterior items and scheduled interior items to minimum 2.00 oz/sq ft zinc coating.

## **PART 3 - EXECUTION**

### 3.01 PREPARATION

- A. Obtain Architect's approval prior to site cutting or making adjustments not scheduled.
- B. Clean and strip primed steel items to bare metal where site welding is scheduled.

- C. Make provision for erection loads with temporary bracing. Keep work in alignment.
- D. Supply items required to be cast into concrete with setting templates, for installation under appropriate Sections.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Perform field welding in accordance with AWS D1.1.
- C. After installation, touch-up field welds, scratched or damaged surfaces with primer, except repair exposed galvanized work (not to be painted) with hot process field galvanizing, in accord with manufacturer's published directions.

3.03 SCHEDULE

- A. Provide and install items listed in Schedule and shown on Drawings with anchorage and attachment necessary for installation. The following Schedule lists principal items only. Refer to drawing details for items not specifically scheduled.
  - 1. Miscellaneous plates or angles not attached to structural steel; complete with anchorage for embedment.
  - 2. Exterior mounted ladders.
  - 3. Handrails and guardrails.
  - 4. Bollards.
  - 5. Gates for trash enclosure.

**\*\*\* END OF SECTION \*\*\***

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## SECTION 06100

### ROUGH CARPENTRY

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Provide all labor, materials, tools, facilities and equipment required for the fabrication and installation of rough carpentry and associated items (except that which is specified elsewhere) indicated on Drawings and necessary to complete the Work. Items include, but are not necessarily limited to, the following:
1. Blocking, backing, stripping, furring, and nailers.
  2. Rough hardware.
  3. Wood framing.
  4. Wood sheathing.
  5. Preservative treatment.
  6. Drilling, saw cuts, knock-outs and framing for ventilation.
  7. Wood sheathing backing at tile walls.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Concrete Formwork: Section 03100.
- B. Cast-in-Place Concrete: Section 03300.
- C. Structural Steel: Section 05120.
- D. Wood I-Joists: Section 06173.
- E. Glued Laminated Construction: Section 06180.
- F. Structural Composite Lumber: Section 06711.

##### 1.04 QUALITY ASSURANCE

- A. General:
1. Coordinate the work of all trades to ensure proper placement of all materials, anchors, etc., as well as providing for openings and anchors for the installation of surface mounted materials and equipment.
  2. Qualifications for Workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
  3. Rejection: In the acceptance or rejection of rough carpentry, no allowance will be made for lack of skill on the part of the workmen.
- B. Standards and References: (Latest Edition unless otherwise noted)
1. 2010 California Building Code (CBC).
  2. Lumber: West Coast Lumber Inspection Bureau (WCLIB); Standard Grading Rules for West Coast Lumber No. 17.

3. Lumber: Western Wood Products Association (WWPA); Western Lumber Grading Rules 05.
  4. Redwood: Redwood Inspection Service (RIS); Standard Specifications for Grades of California Redwood Lumber.
  5. Wood Sheathing: The Engineered Wood Association; Specifications and Grades.
    - a. Structural Plywood: United States Product Standard PS1, Group 1 Douglas Fir.
    - b. APA rated sheathing: United States Product Standard PS2.
  6. Wood Preservative: American Wood-Preservers' Association (AWPA):
    - a. U1, Use Category System: User Specification for Treated Wood.
    - b. M4, Standard for the Care of Preservative-Treated Wood Products.
  7. 2005 National Design Specification for Wood Construction (NDS).
- C. Submittals: (Submit under provisions of Section 01330)
1. Certification:
    - a. Preservative Treated Wood: Certification for waterborne preservative and that moisture content was reduced to 19 percent maximum, after treatment.
- D. Tests and Inspections:
1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
  2. If indicated on the Structural Drawings, load test expansion and epoxy anchors as indicated on the drawings.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protection:

1. After delivery, store all materials off the ground, covered, and in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather. Maintain wood at the maximum moisture levels indicated in Materials Section.
2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use. Do not allow installation of damaged or otherwise non-complying material.
3. Use all means necessary to protect the installed work and materials of all other trades.
4. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

**PART 2 – PRODUCTS**

2.01 MATERIALS

A. Sawn Lumber:

1. Lumber (Wood Framing): Meet requirements of following minimum grades. All grades to WCLIB Grading Rules No. 17. Species shall be Douglas Fir - Larch

<u>Item</u>	<u>Sizes</u>	<u>Grade</u>	<u>Maximum Moisture Content at Initial Use</u>	<u>Notes</u>
All Material	2x	No. 2	19%	Unless Noted Otherwise
All Material	3x,4x	No. 2	30%	Unless Noted Otherwise
All Material	6x	No. 1	30%	Unless Noted Otherwise
Decking	2x	Select Dex	19%	

2. "At initial use" shall be that point at which nails, screws, bolts, split rings, shear plates or other fasteners or the holes for said fasteners are placed in the wood.
3. All sawn lumber is assumed to be enclosed in the dry building envelope in the final service condition, unless noted otherwise, and free to dry to moisture content less than 19%.
4. The Contractor shall use whatever means necessary, including site drying to ensure that the moisture contents above are not exceeded.
5. All studs, plates, joists, rafters and beams 3x and thicker shall be free of heart center in accordance with the specified grading standards.

**B. Wood Sheathing:**

1. Roof and Wall Structural Sheathing: PS1 and PS2 APA rated sheathing with exterior glue. Thickness type and grade shall be as indicated on Drawings.
2. Where indicated on the Architectural Drawings as interior wall backing behind tile and in all toilet rooms behind sheet rock, to be C-C APA rated sheathing with exterior glue. Thickness shall be 5/8-inch at all locations.
3. Flooring: C-C APA Performance rated tongue and groove with exterior glue. Thickness type and grade shall be as indicated on the Drawings.

**C. Building Paper: Fed. Spec. UU-B-790a, Type I, Grade B (15 lb. min. unless noted elsewhere.).**

**D. Rough Hardware Fastenings and Connections: All types including bolts, lag screws, nails, spikes, screws, washers and other rough hardware, of kinds that may be purchased and that require no further fabrication, shall be furnished and installed for all finish and rough carpentry and shall conform to 2005 NDS Standards and dimensions. All hardware exposed to weather shall be hot-dipped galvanized per ASTM A123 Standards. All nails used into pressure treated lumber shall be hot-dipped galvanized per ASTM A123 or stainless steel.**

1. Common wire nails or spikes unless noted otherwise on the Drawings. Box nails and sinker nails are not permitted. Vinyl coating is permitted on nails when not exposed to weather.
2. Bolts: Bolt material shall conform to ASTM A307, Grade A. Bolt dimensions shall conform to ANSI/ASME B18.2.1 with hex head of sizes indicated.
3. Lag Screws: Lag screws shall conform to ASTM 307, Grade A. All lag screws shall have hex heads where exposed.
4. Washers: Standard flat washers shall conform to ANSI B18.22.1, Type A, Wide Pattern. Steel plate washers shall be Simpson BP or BPS or equivalent. Malleable iron washers shall be standard malleable iron washers.
5. Powder Driven Fasteners: Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems or equivalent. See Drawings for size, type and embedment.
6. Expansion Anchors: See Section 03300 for anchors to concrete and Section 04200 for anchors to masonry.

7. Adhesive Anchors: See Section 03300 for anchors to concrete and Section 04200 for anchors to masonry.
8. Fabricated Metal Timber Framing Connectors: Connectors shall be punched for nailing and bolting. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. All connectors must have specific ICC approval. Types as noted on Drawings are Simpson Strong-Tie. Hardware suppliers other than Simpson shall submit a comparative material list itemizing product designation, load rating and supported member size for review by the enforcement agency and the Structural Engineer.

## 2.02 FABRICATION

### A. Lumber:

1. All lumber shall be air or kiln-dried to the maximum moisture content indicated in Materials Section.
2. Furnish S4S unless otherwise noted.
3. Size to conform to rules of governing standard. Sizes shown are nominal unless otherwise noted.

### B. Wood Treatment:

1. Preservative Treatment: The treating process and results thereof shall conform to the appropriate AWWA Standards for exterior, above ground use (3B) and as indicated in CBC Section 2303.1.8.
2. After treatment and prior to shipping, air or kiln-dry lumber to maximum 19 percent moisture content.
3. All treated wood shall be identified with a label meeting the requirements of CBC Section 2303.1.8.1.
4. The amount of preservative to be injected into the wood shall be as required by the AWWA standard for each type of installation.
5. All wood in contact with concrete or masonry shall be preservative treated.
6. Cut surfaces and bored holes in pressure treated wood shall be protected in accordance with AWWA Standard M4.

- ### C. Fire Treatment: All fire-retardant-treated wood shall be identified with a label meeting the requirements of CBC Section 2303.2.1. The treating process and results thereof shall meet the requirements of CBC Section 2303.2. Moisture content of fire-retardant-treated wood shall meet CBC Section 2303.2.5. Treater shall submit design and fastener valves for treated wood to Structural Engineer for review. See Drawings for location of fire-retardant-treated wood.

## 2.03 SOURCE QUALITY CONTROL

### A. Grade Mark each piece of lumber. Marking must be done by recognized agency.

1. Douglas Fir shall bear WCLIB or WWPA grade stamp.
2. Pressure treated Douglas Fir shall bear AWWA Quality mark.

- ### B. Wood Sheathing: Each panel shall be legibly identified as to type, grade and specie by APA grade. If plies are spliced, the slope of the scarf shall not be steeper than 1:8. White pockets will not be permitted in face plies.

## **PART 3 – EXECUTION**

### 3.01 SURFACE CONDITIONS

#### A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly proceed.
  2. Verify that rough carpentry may be performed in strict accordance with the original design and all pertinent codes and regulations.
- B. Discrepancies: In the event of discrepancy, immediately notify Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 WORKMANSHIP

- A. General: All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.
- B. Selection of Lumber Pieces: Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function.
- C. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- D. Shimming: do not shim any framing component.
- E. Care shall be taken that notching and boring of members is in strict conformance with the Drawings and that there are no over-cuts.

3.03 FASTENING

- A. Nailing: Except as otherwise indicated on Drawings or specified, all nailing shall be as required by CBC Table 2304.9.1 - Fastening Schedule.
  1. Nails or Spikes shall be common wire unless noted otherwise. Penetration of nails or spikes shall be one-half the length of the nail or spike into the piece receiving the point. However, to connect pieces 2" in thickness, 16d nails shall be used unless noted otherwise.
    - a. Bore holes for nails wherever necessary to prevent splitting.
    - b. Use finish or casing for finish work.
    - c. Use of machine nailing is subject to a satisfactory installation of nails. Minimum edge distances shall be maintained. Nails installed through sheathing with nail guns shall not penetrate into the outer plies deeper than hand nailing. Submittal of guns and nails is required.
    - d. All nailing into Pressure-Treated lumber shall utilize hot-dipped zinc coated galvanized nails or stainless steel nails per CBC Section 2304.9.5.
- B. Bolts and Lag Screws: Bolts shall be sizes indicated on Drawings. Holes for bolts shall be 1/16-inch larger than the bolt diameter. Malleable, Steel plate or standard flat washers shall be used where heads or nuts would otherwise bear directly on wood surfaces. Malleable or plate washers shall be used on all anchor bolts. Cut washers are not permitted. Lag screws shall be screwed (not driven) into place. For the shank, holes shall be bored the same depth and diameter as shank. For threaded portion, holes shall be pre-drilled as follows:

Lag Screw Size	Thread Portion Pre-Drill
1/2" diameter	1/4" diameter
5/8" diameter	5/16" diameter
3/4" diameter	3/8" diameter
7/8" diameter	1/2" diameter



1" diameter	5/8" diameter
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Soap Lag screws prior to installation. Tighten all bolts and screws before closing in.

- C. Framing Devices: Install according to the manufacturer's instructions unless otherwise noted.

### 3.04 FRAMING AND ROUGH CARPENTRY

- A. Sills: Shall be in long lengths of sizes shown, fastened with anchor bolts as indicated, a minimum of two anchor bolts per piece. Place steel plate washers (but not standard flat or malleable iron washers) under nuts bearing on wood. Set sills level and true.
- B. Studs, Posts and Columns: Shall be full length. Corners shall be as detailed. Partitions or walls containing plumbing, heating or other piping shall be so formed as to give proper clearance for materials. Cut members as required to provide full bearing at ends. Connect to structure as indicated.
- C. Plates: Shall be full length of wall segment or 12-foot minimum and spliced as shown.
- D. Blocking: Blocking shall be same thickness and width of studs or joists unless shown otherwise. Blocking shall not be spaced over 8'-0" c.c. Install fire blocking in accordance with CBC. Horizontal fire blocking in walls shall be placed at floor lines and ceiling lines unless noted otherwise. Install blocking at all plywood joints where noted on the Drawings. Install wall width full height solid blocking at floor joists beneath all posts in walls. Blocking shall be installed around all wall, floor and roof penetrations.
- E. Joists and Beams: Shall be full span length and spliced over bearings unless shown otherwise. Install with crown side up. Beams or headers indicated to be built up of two or more joists shall be fabricated on the job using full length members. For two piece 2x members, stitch nail pieces together with 16d common nails spaced not over 12 inches c.c. and staggered. Clinch nails protruding through members. For three or more piece members, stitch bolt pieces together with ½" bolts spaced not over 12 inches c.c. and staggered.
1. Provide double joists and headers at all openings through roof unless otherwise shown on Drawings.
  2. Provide typical headers at all openings through walls where one or more studs are required to be cut. For penetration through walls narrower than stud spacing, provide solid blocking on all sides for fastening finish materials.
- F. Wood Sheathing: Install to pattern indicated and provide blocking at joints where noted on the Drawings. Center all joints over bearing supports. Nail to framing as indicated. Install wood sheathing with face plies perpendicular to joists or studs unless indicated otherwise. Wall wood sheathing shall continue uninterrupted by ceilings or soffit from floor to floor or floor to roof unless specifically detailed on the Structural Drawings.
- G. Wood Furring, Stripping: Install as shown or required to provide nailing materials or passage of pipes, conduits, etc., not otherwise accommodated including ceiling stripping for gypsum drywall construction.
- H. Bridging: Space not over 8'-0" c.c. for spans over 16'-0". Joists 8 inches or less in depth shall not require bridging unless specifically indicated.
- I. Solid Wood Backing: Solid wood backing shall be provided for all wall and ceiling finishes and for supporting of mounted items for all trades, including but not limited to metal toilet partitions, toilet room accessories, frames, cabinets, casework, mirrors, trim, applied wall finishes, athletic equipment, food service equipment, piping, conduit, ducts, etc. Contractor

shall coordinate placement of backing and supports with Subcontractor supplying mounted items.

- J. Building Paper: Install in all locations indicated except where included in other sections of the specifications.
- K. Cant Strips and Crickets: Shape to sizes shown. Rigidly fasten to construction. Form neat mitered corners.
- L. Wood Sheathing Backing: All toilet rooms, restrooms, single or joint occupancy shall have all walls backed with 5/8-inch thick wood sheathing with no surface voids. Install sheathing between the framing members and wallboard. The same wood sheathing shall also be provided and installed at all tile locations. At tile locations wood sheathing shall be installed between the framing members and the resin-cement backing board.

### 3.05 MISCELLANEOUS CARPENTRY WORK

- A. Install all items under other sections specified to be furnished and installed in other sections which relate to the rough carpentry work.
- B. Miscellaneous Carpentry Work not included under other sections but, indicated or required yet not specified elsewhere shall be furnished and installed hereunder, including appropriate fastening devices. Contractor shall provide miscellaneous carpentry work for all sections and divisions of work identified.
- C. Wood Curbs for Equipment: Construct all wood curbs for roof mounted equipment as detailed. Provide all miscellaneous blocking, bracing, supports, and other wood items as shown or required to complete the work.
- D. Plywood Backing for Electrical, telephone, and similar types of wall mounted equipment shall be provided hereunder where required. Plywood shall be 3/4-inch thick exterior A-C plywood with 'A' face exposed.
- E. Fire/Draft Stops: Construct fire and drafts stops in furred attic spaces where indicated or required by CBC code. Unless otherwise indicated on Drawings construct of not less than 5/8-inch Type 'X' gypsum wallboard or 1/2" wood sheathing, adequately supported by 2x4's at 24 inches c.c., braced diagonally to the roof structure. Draft stop and installation work shall conform to code requirements.
- F. Shoring and Bracing: Shore or brace for temporary support of all work as required during the construction period except any shoring and bracing specified and included under other sections of these specifications.
- G. Temporary Enclosures: Provide and maintain all barricades and enclosures required to protect the work in progress.
- H. Protect all work in progress and all work installed, as well as the work of all other trades. Any work damaged as a result of the work under this section shall be corrected to its original condition or replaced if directed by the Architect at no increase in cost to the Owner.
- J. Ventilation: Contractor shall include all labor and materials necessary to provide ventilation requirements of roof overhangs, eaves, attics, and all other components of the building required by codes to be ventilated. Work shall include removing knock-outs in wood I-joists for cross ventilation, drilling of blocking, wood sheathing, and other wooden components of the structure necessary to comply with requirements of the CBC for ventilation of buildings.

\*\*\*END OF SECTION\*\*\*

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## SECTION 06173

### WOOD I-JOISTS

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication, delivery and erection of all Wood I-joists.
  - 1. All Wood I-Joists, joist blocking, bridging, etc., for the installation of joists.
  - 2. Clips, angles, straps, hangers, etc., incidental to installation of joists.
  - 3. Nails, bolts, washers and other fasteners used for erecting and securing of Wood I-joists.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Structural Steel: Section 05120.
- B. Rough Carpentry: Section 06100.
- C. Glued Laminated Construction: Section 06180.
- D. Structural Composite Lumber: Section 06711.

##### 1.04 QUALITY ASSURANCE

- A. General Qualifications of Manufacturer: The fabricator shall have been engaged in the continuous manufacturing of Wood I-Joists for a minimum of five years.
- B. Standards and References: (Latest Edition unless specified otherwise)
  - 1. 2010 California Building Code (CBC).
  - 2. ASTM D5055, "Structural Capacities of Prefabricated Wood I-Joists".
- C. Submittals: (Submit under provisions of Section 01330).
  - 1. Where indicated on Drawings, show erection plans, sizes, types and location of wood I-joists. Drawings shall also indicate sizes and location of blocking, hangers, etc., with sufficient detailing to ensure correct installation.
  - 2. Substantiation of Load Capacity by one of the following methods:
    - a. Structural calculations proving capacity to carry the loads shown on the drawings. Calculations shall be signed by a Professional Engineer registered in the state in which the project is located.
    - b. Direct comparison of I-joists proposed and I-joists specified proving equal or better structural properties and direct comparison of hardware proposed and hardware specified proving equal or better capacities.
  - 3. ICC ES Report for supplied joist.
- D. Tests and Inspections:
  - 1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.

2. Manufacturing facility shall be approved by an independent inspection agency approved by the International Accreditation Service, Inc. (IAS).
3. All joists shall bear a stamp indicating the plant number, independent inspection agency, logo and ICC ES Report number.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 PRODUCT HANDLING

- A. If joists must be stored prior to erection, they shall be stored in a vertical position off the ground and covered and protected from weather.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Wood I-Joists: Wood I-joists as indicated on drawings are Red Built or I-level designations and are for reference to indicate required depth, spacing and capacity only. Wood I-joists shall have specific ICC approval, and may be used only if equivalent, in the Architect's opinion, to Wood I-joists specified. Structural capacities shall be evaluated by ASTM D-5055.
- B. Lumber:
  1. Wood Flanges: Laminated Veneer Lumber or Machine Stress Rated lumber. Species and thickness shall be such that the specified nailing capacity is not reduced.
  2. Wood Webs: U.S. Product Standard PS1 or PS2. Webs shall be constructed from Structural 1 plywood or OSB as indicated in manufacturer's ICC ES Report.
- C. Adhesive:
  1. According to manufacturers ICC ES Report.
- D. Types:
  1. Sizes, properties and additional information as shown on the Drawings.
- E. Accessories to be furnished and installed as indicated on the Drawings are as follows:
  1. Blocking, hangers, brackets, straps, ties, etc., shown on Drawings.
  2. Miscellaneous accessories incidental to erection and installation of joists.

2.02 FABRICATION

- A. Fabrication shall be in compliance with manufacturer's ICC ES Report.
  1. Fabrication shall be in accordance with best practices with adequate plant equipment and under supervision of properly qualified personnel.
  2. Moisture content of components at time of gluing shall comply with the manufacturer's ICC ES Report.

**PART 3 - EXECUTION**

3.01 INSPECTION

- A. Prior to installation of the work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of discrepancy, immediately notify Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 PROTECTION

- A. Protect work and materials of this Section during installation, and protect the installed work and materials of other trades.
- B. In the event of damage, make all repairs and replacement necessary to the approval of the Architect at no additional cost to the Owner.

3.03 HANDLING

- A. Use equipment and methods that avoid damages that may impair strength of wood I-joists. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

3.04 INSTALLATION

- A. Wood I-joists are to be erected and installed in accordance with the Drawings and manufacturer's recommendations. Comply with all manufacturer's recommendations concerning temporary construction loads.
- B. Erection bracing in addition to specified bridging is to be provided as detailed to keep the joist products straight and plumb as required and to assure adequate lateral support for the individual members and the entire system until the sheathing material has been applied.

3.05 CLEANUP

- A. Keep premises free from accumulated waste materials, rubbish and debris resulting from this Work. Upon completion, remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory items used in or resulting from said Work, and legally dispose of off the site.

**\*\*\* END OF SECTION \*\*\***

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## SECTION 06180

### GLUED LAMINATED CONSTRUCTION

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication and delivery to job site of all glued laminated wood members.

##### 1.03 RELATED WORK INCLUDED IN OTHER SECTIONS

- A. Rough Carpentry: Section 06100.  
B. Wood I-Joists: Section 06173.  
C. Structural Composite Lumber: Section 06711.

##### 1.04 QUALITY ASSURANCE

A. General:

1. Qualifications of Manufacturer: The fabricator shall have been engaged in the continuous manufacturing of glued laminated timbers for a minimum of at least two years and shall have the authority to use the AITC "Quality Inspected Stamp". Each timber member shall be stamped and placed in such a position not to be visible on finished erected members.

B. Submittals: (Submit under provisions of Section 01330):

1. Shop drawings showing full dimensions of each member and layout of entire structural system.  
2. Show large scale details of connections, connectors and other accessories.  
3. Indicate species and laminating combination, adhesive type, and other variables in required work.

C. Tests and Inspections:

1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.  
2. Each structural glued-laminated member shall be stamped with an identifying mark. Mark shall include all pertinent data, such as grade and species of lumber, type of glue, extremes of moisture content and other such information as may be required.  
3. Certificate of compliance with the above data.

D. Standards and References: (Latest Edition unless specified otherwise)

1. 2010 California Building Code (CBC).  
2. 2005 National Design Specification for Wood Construction (NDS).  
3. American Institute of Timber Construction, "Standard Specifications for Structural Glued Laminated Timber of Softwood Species, AITC 117."  
4. ANSI/AITC Standard A190.1  
5. ASTM D3737 "Design and Manufacture of Structural Glued Laminated Timber".



1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to site in manufacturer's protective wrappings with legends intact. Store on site secure from weather, soil and physical damage.
- B. Transport, handle and store in strict accordance with the manufacturer's recommendations. Use padded, non-marring slings.
- C. Architectural Appearance Grade members shall be shipped, handled and stored with complete weather and damage protection wrapping. Maintain wrappings in place until immediately prior to deck installation.
- D. Industrial Appearance Grade glued laminated timber members shall be wrapped in a water resistant covering during transit. Contractor shall be responsible for protection during hauling and unloading at job site.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Lumber:
  - 1. Lumber used for laminating structural members shall be well manufactured and shall conform to requirements of Standard Grading and Dressing Rules No. 17, West Coast Lumber Inspection Bureau. Such lumber shall be inspected, identified by individual piece, and certified as meeting requirements of said standard specifications by an approved lumber grading agency. It is assumed that each lamination is graded on basis of requirement for nominal size of individual lamination. When lumber is resawn, it shall be regraded on basis of new size.
- B. Type: Glued Laminated Timber Protected from Weather
  - 1. Species: Douglas Fir or Western Larch
  - 2. Stress Grade: AITC Combination 24F-V4 for simple beams, 24F-V8 for cantilever or continuous beams.
  - 3. Extreme fiber bending -  $F_b = 2400$  psi
  - 4. Adhesives: Wet use
  - 5. Appearance Grade: AITC Industrial for concealed uses, Architectural appearance at exposed uses.
  - 6. Preservative Treatment: Portions of beams exposed to weather shall be preservative treated.
  - 7.. Laminations: Provide outer tension laminations or proof load testing as required by ANSI/AITC A190.1.
  - 8. Sealing: Shop seal all surfaces with 2 coats of clear penetrating sealer.
- C. Type: Glued Laminated Timber Exposed to Weather
  - 1. Species: Alaskan Yellow Cedar
  - 2. Stress Grade: AITC Combination 20F-V12 for simple beams, 20F-V13 for cantilever or continuous beams.

3. Extreme fiber bending -  $F_b = 2000$  psi
4. Adhesives: Wet use
5. Appearance Grade: Architectural
6. Laminations: Provide outer tension laminations or proof load testing as required by ANSI/AITC A190.1.
7. Sealing: Shop seal all surfaces with 2 coats of clear penetrating sealer.

## 2.02 FABRICATION

- A. Fabrication shall be in compliance with the above standards and references.
  1. Fabrication shall be in accordance with best practices with adequate plant and equipment and under supervision of properly qualified personnel.
  2. Laminations shall be machine finished to a smooth surface, but not sanded, and to a uniform thickness with a maximum allowable variation of 1/64 inch. Warp, twist, or other characteristics which will prevent intimate contact of adjacent glued faces or interfere with uniform bending to a required curvature when under clamping pressure shall not be permitted. Surfaces to be glued shall be clean and free from oil, dust and other foreign material which would be detrimental to satisfactory gluing.
  3. Moisture content of lumber at time of gluing shall be not less than 7 percent nor more than 12 percent.
  4. Slips, misses, and wane are not permitted.
  5. Boring of holes in members shall be in strict conformance with the Drawings. Notching is prohibited except where specifically detailed.
  6. Field cuts and holes in preservative treated members shall be preservative treated and sealed.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Prior to installation of the work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of a discrepancy, immediately notify Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

### 3.02 PROTECTION

- A. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

### 3.03 HANDLING

- A. Use equipment and methods that avoid scarring corners and faces or otherwise injuring members. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

### 3.04 INSTALLATION

- A. Glued Laminated members are to be erected and installed in accordance with the Drawings and manufacturer's recommendations.

3.05 CLEANUP

- A. Keep premises free from accumulated waste materials, rubbish and debris resulting from this Work. Upon completion, remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory items used in or resulting from said Work, and legally dispose of off the site.

**\*\*\* END OF SECTION \*\*\***

**SECTION 06200**  
**FINISH CARPENTRY**

**PART 1 -- GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

Supply and install complete Finish Carpentry Work as shown on Drawings and as specified herein. Provide hardware and attachment accessories as required for a complete and proper installation.

1.03 MEASUREMENTS

Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

1.04 QUALITY CONTROL

Following standards apply to Work of this Section except where more stringent requirements are specified herein:

- A. Architectural Woodwork Institute "Quality Standards".
- B. Western Wood Products Association Manual.
- C. American Wood Preservers Association Specifications.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

- A. In accordance with Article 3.11 of the General Conditions.
- B. Submit shop drawings of millwork at full size or large scale showing sizes, materials, grain run, methods of construction, connection to adjacent members and installation. Indicate all backing members for installations and all hardware

**PART 2 -- PRODUCTS**

2.01 MATERIALS

- A. Douglas Fir: West Coast Lumber Inspection Bureau "Standard Grading and Dressing Rules" and Western Wood Products Association, graded "C" and better, flat grain grade marked by WCLIB or WWPA.
- B. Douglas Fir Plywood: U.S. Product Standard PS-1, American Plywood Association, grade trademarked "C-D", plugged, exterior glue, sanded.
- C. Blocking, Furring, etc.: Standard Grade Western White Pine, Construction grade Douglas Fir or other equally sound softwood, as graded by WCLIB or WWPA.
- D. Softwood Lumber: PS 20; custom grade in accordance with AWI maximum moisture content of 6%; of quality capable of transparent finish.
- E. Hardwood Lumber: FS MM-L-736; custom grade in accordance with AWI; maximum moisture content of 6% of quality capable of transparent finish.

## 2.02 ACCESSORIES

- A. Nails, bolts, nuts, washers, blind fasteners, lags and screws, size and type to suit application.
- B. Wood Filler: oil base, tinted to match surface finish color.
- C. Shelf Standards and Rests: Knape and Vogt #255 & #256 for recessed application. Provide two hold down clips for each shelf in the slot above
- D. Closet Hanger Bars and Supports: Knape and Vogt #770, #660, #734, #735, and #1195. Provide intermediate support of spans over 6'-0".

## 2.03 SHOP TREATMENT OF WOOD MATERIALS

- A. Shop pressure treat wood materials requiring UL fire rating or preservations.  
Provide UL approved identification on fire retardant treated material.
- B. Wood Preservative (PT type) Wolmanized, Pressure Treated Lumber, manufactured by Osmose Wood Products or approved equal.
- C. Fire Retardant (FR-S Type) chemically treated, and pressure impregnated, capable of providing a maximum rating of 25; manufactured by Demose Wood Products. Dricon FRT or approved equal.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.
- E. Verify that surfaces and openings are ready to receive work and field measurements are as shown on Shop Drawings and instructed by the fabricator.
- F. Verify that mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

### 3.02 PRIMING

Back paint all wood surfaces inaccessible and unexposed after installation before delivery with an approved linseed oil and aluminum primer.

- A. Prime coat all unfinished metal parts.
- B. Prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### 3.03 FINISH CARPENTRY INSTALLATION

- A. Use only hot dip galvanized or aluminum finish or casting nails. Set nails for putty stopping in surface members. Hammer marks not acceptable on any exposed finished surface and may be cause rejection of Work by Architect.
- B. Make all end splices exposed in finished members bevel splices and not square butted. Install members in as long lengths as possible.
- C. Install Work to details shown, plumb, level and to line and securely anchored per AWI custom quality standard. Make scribes where required accurate. Miter corners of trim.
- D. Provide and install other miscellaneous millwork items and related Work required to complete Work of this Section.

- E. Prepare all woodwork installed hereunder by cleaning and sanding as required to receive finishes specified in Section "Painting and Finishing".
- F. Install all doors and frames; finish hardware and bathroom accessories per manufacturer's recommendation.
- G. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth and site finish.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 06410**  
**W. I. C. CERTIFIED CABINET WORK**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

**1.02 SCOPE OF WORK**

Work Included:

- A. Provide factory-finished cabinets, and similar items where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. All cabinet work complete with all accessories, fittings and hardware.
- C. Preparations of cabinets to receive sinks, electric outlets, etc., as required and shown on the Drawings.
- D. Shelf brackets and shelves.
- E. Countertops.

**1.01 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. In addition to complying with all pertinent codes and regulations of governmental agencies having jurisdiction, comply with the following for the grade or grades specified:
- C. Identification of components:
  - 1. On a concealed but accessible surface of each item of the work of this Section, where accepted by the Architect, plainly stamp the identifying number or numbers shown on the Drawings for that item.
  - 2. On a concealed but accessible surface of each removable part of each item of the work of this Section, where accepted by the Architect, plainly stamp an identifying number or numbers for that item to aid in rapid and efficient identification and reinstallation of removable parts.

**1.02 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.03 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product data: submit:
  - 1. Materials list of proposed to be provided under this Section;
  - 2. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
    - a. Identify cabinets, fixtures, moldings, and other items in accordance with the system used on the Drawings;
    - b. Show overall dimensions, and call specific attention to all dimensions and conditions that vary from those shown on the Drawings.



3. Shop drawings shall indicate list of materials and hardware, sizes, sections, elevations, and details of construction and assembly as required by Section 1, Manual of Millwork "Millwork Shop Drawings Woodwork Institute of California, (Current Edition)."
4. The WIC Certified Compliance Grade Stamp shall be affixed to the casework shop drawings, certifying that the casework will be manufactured in accordance with WIC Premium Grade.

C. Samples:

1. Accompanying the Shop Drawings, submit samples of all items of finish hardware, metal work, trim, glasswork, plastic overlays, and similar items proposed to be provided under this Section.
2. After the Architect has selected general colors and types of finish, prepare and submit samples of the selected finishes on species of the actual cabinet and fixture material.
3. Revise and resubmit the samples as needed to secure the Architect's acceptance prior to fabrication of casework.

D. Certification:

1. The cabinetwork manufacturer shall certify on his letterhead that he holds a current license from the Woodwork Institute of California, to manufacture WIC cabinetwork. He shall list his license number and submit this certificate with his shop drawing submittal, to the Architect.
2. Before delivery to the job site, the fabricator shall issue a WIC Certified Compliance Certificate to the Architect, certifying that the Plastic Covered Casework products he will furnish for this project fully meet all requirements of "Premium Grade", as modified herein. Each unit of casework shall bear the WIC Certified Compliance Stamp indicating "Premium Grade" and all Countertop Work shall bear the "Custom Grade" stamp.

1.04 PRODUCT HANDLING

- A. Comply with the requirements of Section 01620.
- B. Comply with pertinent provisions of Division 1 and WIC Manual of Millwork, Technical Bulletin 419-R "Recommended Care and Storage of Architectural Millwork."
- C. Provide additional protection as needed to assure that the work of this Section remains undamaged during fabrication, installation, and the time between completion of installation and actual acceptance of the total Work.
- D. Do not deliver cabinets and fixture materials or products to the job site until concrete and plaster installations are completed and dry, not until the building interior has attained a relative humidity of 50% to 55% at 70 degrees F.

1.05 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Not required

C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

Comply with the requirements of General Condition Article 3.5 and Section 01740.

**PART 2 – PRODUCTS**

2.01 TYPE AND MANUFACTURE

Cabinets shall be manufactured in accordance with WIC Manual of Millwork, Section 15 - Premium Grade, modified as indicated on the drawings and herein specified. All units shall be factory built and factory finished. Provide Style A - frameless, Type I construction unless otherwise noted.

2.02 CASEWORK DEFINITIONS

A. Exposed Portions:

1. All surfaces visible when doors and drawers are closed.
2. Underside of bottoms of cabinets over 4'-0" above finished floor.
3. Cabinet tops under 6'-0" above finished floor.
4. Visible front edges of web frames, ends, divisions, tops, shelves, and hanging stiles.
5. Visible surfaces in open cabinets or behind glass.
6. Interior faces of hinged doors.

B. Semi-Exposed Portions:

1. Shelves, except in open cabinets.
2. Divisions, except in open cabinets.
3. Interior face of ends, backs, and bottoms, except in open cabinets.
4. Drawer sides, sub-fronts, backs, and bottoms.
5. The underside of bottoms of cabinets between 2'-6" and 4'-0" above the finished floor.
6. All rooms designated as storage, janitor, or utility.
7. Knee spaces.

C. Concealed Portions:

1. Toe space unless otherwise specified.
2. Sleepers.
3. Web frames, stretchers, and solid sub-tops.
4. Security panels.
5. Underside of bottoms of cabinets less than 2'-0" above the finished floor.
6. Flat tops of cabinets 6'-0" or more above the finished floor.
7. The three non-visible edges of adjustable shelves.
8. The faces of cabinet ends of adjoining units that butt together.

## 2.03 MATERIALS, FINISH AND CONSTRUCTION

### A. Exposed Portions:

1. Material for exposed portions shall be faced with decorative high pressure laminated plastic.
  - a. Plastic laminate shall be Standard Grade, satin finish, thermoplastic laminate surfacing, .050" thick, meeting the requirements of NEMA LD 3-85. Backing sheets shall be .020" thick conforming to the requirements of NEMA LD, latest edition. Use post-forming grade where required by the drawing details, minimum thickness .042" +/- .004".
  - b. Color and pattern as indicated on the Drawings.
  - c. If color and pattern is not indicated, then Architect will select as part of the review of Shop Drawings. In this case, acceptable manufacturers include Wilsonart, Laminart, Formica, and Nevamar. Architect reserves the right to select more than one color and pattern for use on any one cabinet.

### B. Semi-exposed Portions:

1. Material for semi-exposed portions, except interior faces of hinged doors, shall be high-pressure laminate cabinet liner meeting the requirements of NEMA LD-3-85.
2. The interior faces of hinged doors shall be faced with 0.032" minimum thickness high pressure laminated plastic conforming to NEMA LD-3.

### C. Concealed Portions:

1. Material for concealed portions may be sound, dry solid stock, plywood or particleboard, except where otherwise specified herein.

### D. Visible Edges:

1. All visible edges, exposed or semi-exposed, of ends, tops, bottoms, shelves, webs, stretchers, divisions, doors and drawer fronts shall be bound with butyl or tenite plastic T-molding secured by a 3/8" serrated leg glued in place with water-resistant glue or edged with .050" thick high pressure laminated plastic matching adjacent color.

E. Laminate Core Material shall be particleboard meeting the requirements of ANSI A 208.1-87, Table 1 - Grade 1-M-3.

F. Adhesive shall be Type II, water resistant.

## 2.04 DOORS

- A. All doors, including cabinet doors, shall be flush overlay type completely covering all cabinet face frames. Door cores shall be particleboard with 0.050" thick high-pressure laminated plastic on exposed face of door, net thickness to be 0.735". Edge bands shall be .050" thick high pressure laminated plastic matching adjacent surfaces or T-molding in color selected by the Architect. All exposed plastic shall be laminated to core by cold press only, in accordance with manufacturer's recommendations. Cabinet doors shall have 0.032" high-pressure laminated plastic on the inside face.
- B. Doors under 48" in height shall have a minimum of two hinges. Doors 48" to 84" high shall have a minimum of three hinges, and over 84" shall have a minimum of four hinges.

## 2.05 DRAWERS

- A. Drawer sides, backs, and sub-fronts shall be multiple dovetail or doweled construction and made of 0.50" minimum thickness hardwood or high-pressure laminate cabinet liner with particleboard core.

- B. Drawer bottoms shall be 1/4" enameled hardboard rabbeted into sides, front and back, and glued and blocked into rigid position. Drawers shall be supported upon metal side guides with nylon rollers. Provision shall be made to stop the drawer in both "in" and "out" positions without dependence on the drawer front. Metal drawer slides shall have a capacity of 75 pounds except that large drawers and file drawers shall be equipped with minimum 100-pound capacity full extension slides. Drawers shall operate smoothly without excessive play.
- C. Drawer fronts shall be flush overlay type completely covering all cabinet face frames. Cores shall be particleboard with 0.050" thick high pressure laminated plastic on exposed face of drawer front, net thickness to be 0.735". All exposed plastic shall be laminated to the core by cold press method only, in accordance with the manufacturer's recommendations. Backing sheet on the inside face shall be 0.032" minimum thickness. Edge bands shall be .050" thick high pressure laminated plastic adjacent surfaces or T-molding in color selected by the Architect. Maximum clearances of 3/32" shall be maintained between adjacent drawer fronts and doors. Secure drawer fronts to drawer with No. 8 x 1" screws.
- D. Provide security panels above locked drawers.

2.06 TOPS AND BOTTOMS

- A. Tops and bottoms shall be particleboard or plywood with 0.050" high pressure laminated plastic on exposed portions or cabinet liner on semi-exposed portions; net thickness shall be 0.735".
- B. Plywood bottoms of upper cabinets with spans 4'-0" or over in length between vertical members of the cabinet body shall be a minimum of 1" in thickness. Particleboard bottoms of upper cabinets with spans 3'-6" or over in length between vertical members of the cabinet body shall be a minimum of 1" in thickness.

2.07 ENDS AND DIVISIONS

- A. Cabinet ends and divisions shall be particleboard or plywood as detailed on the Drawings with 0.050" thick high pressure laminated plastic on exposed faces or high pressure laminate cabinet liner on semi-exposed portions; net thickness shall be 0.735". Visible edges shall be T-molding edge banding or .050" high pressure laminated plastic.
- B. Cabinet ends shall be lock-jointed, securely glued, and blind nailed or screwed to the tops, web frames, and bottoms at not to exceed 4" on center. Doweled construction is acceptable.

2.08 WEB FRAMES AND STRETCHERS

- A. Web frames and stretchers shall be a minimum of 0.735" in thickness and 2-1/2" in width, and shall be solid stock or plywood. A solid piece of plywood or particleboard a minimum of 0.735" in thickness, the full length and depth of the cabinet opening may be used in lieu of a web frame or stretchers.
- B. Web frames shall be furnished under countertops; or a continuous stretcher front and rear may be furnished in lieu of the frame, and shall be attached by means of a dado, tenon or metal angle bracket. A continuous stretcher at the front shall be furnished at the approximate mid-height of all drawer cabinets over 2'-6" in drawer opening height and shall be attached by means of a dado, tenon or metal angle bracket.

2.09 BACKS

- A. Semi-exposed backs shall be 1/4" thick plywood or tempered and sealed hardboard with high-pressure laminate cabinet liner. Exposed backs shall be 1/2" thick plywood with 0.050" high-pressure laminated plastic.
- B. Color shall match adjacent semi-exposed or exposed portions as applicable.
- C. Backs shall be securely nailed, doweled or dadoed to the case body, divisions, or fixed shelves.

## 2.010 SHELVES

- A. Shelves shall be plywood or particleboard with 0.050" thick high pressure laminated plastic when shelves are exposed and high-pressure laminate cabinet liner when shelves are semi-exposed. Minimum net thickness shall be 0.735". Exposed edges shall be bound with T-molding or 0.050" high pressure laminated plastic.
- B. Closet shelving and exposed shelving shall have 0.050" thick high pressure laminated applied to top and bottom surfaces with front edge bound in .050" thick high pressure laminated plastic or T-Molding.
- C. General shelving as in Janitor's closets and storage areas shall have .032" thick high-pressure cabinet liner applied to top and bottom surfaces and exposed edges.
- D. Adjustable shelves with unsupported spans in excess of 3'-6" between vertical members of the case body for plywood, and in excess of 3'-0" for particleboard, shall be a minimum of 1" in thickness; and shall be mounted on surface or recessed metal shelf standards with clips adjustable at 1/2" center.
- E. Fixed shelves with unsupported spans of 4'-0" or over between vertical members of the case body for plywood, and 3'-6" or over for particleboard, shall be a minimum of 1" in thickness; and shall be mounted on aluminum clips 1" x 1" x 1-1/2" at each corner.

## 2.011 CABINET BASES AND SLEEPERS

Cabinet bases may be constructed with either separate or integral bases. All bases and sleepers shall be 0.735" solid stock. Sleepers shall be provided at a maximum of 3'-0" on center.

## 2.012 ANCHOR STRIPS

- A. Anchor strips of solid stock or plywood shall be a minimum of 1/2" in thickness and a minimum of 2-1/2" in width, and shall be provided at the wall side of the cabinet back on both top and bottom of wall hung cabinets and at top only of base cabinets unless otherwise shown on the Drawings.
- B. Cabinets over 5'-0" in height shall have an intermediate anchor strip.

## 2.013 PLASTIC LAMINATE COUNTERTOPS

- A. Sink cabinet countertops of high-pressure laminated plastic shall be pressure bonded to waterproof 0.735" plywood as recommended by NEMA Standards. Plywood shall be faced with a close grain hardwood to minimize telegraphing of core. Countertops that do not join sink counters may be 0.735" plywood or 0.735" particleboard.
- B. Backsplash work, including end returns, shall be made with high pressure laminated plastic and self-edged in color and patterns selected by Architect. Plastic laminate shall be minimum 0.050" thick for flat surfaces and backsplash. In addition to top surfaces and edges, apply .05" plastic laminate to the underside of countertops exposed at exterior areas of casework.
- C. The underside of countertops with particleboard cores shall have a .020" thick backing sheet securely glued to the core with identical adhesive and under identical circumstances as the face sheet conforming to NEMA LD, latest edition.
- D. Adhesives used to secure plastic laminate to particleboard backing shall be ureaformaldehyde cold setting or phenol resin with a catalytic agent to be set under a pressure of 30 lbs. psi with cold press method.
- E. Back cut all joints to 89.75 degrees to insure flush fit at junction to top where plastic sheets meet joints. Joints shall be secured either by a series of 1/8" x 3/4" cold rolled steel strips 3" o.c. through entire joint or by wedge type fasteners. No joints shall be made through sink openings or other openings where water is to be used. Where no splash occurs, scribe back or edge of countertop to wall. Where backsplashes occur, they shall be square butt joined with the countertop.

- F. Accurately cut openings in countertops to receive sinks. Sinks shall be installed under Plumbing Section.
- G. Stainless steel "T" shaped "Clamp-down" type sink rings shall be furnished and installed under Plumbing Section. Contractor shall make necessary provisions for installation thereof and coordinate this part of work with others as required.

#### 2.014 HARDWARE

All hardware shall be jig fitted at the factory by trained craftsmen only. Provide U.S. 26D Dull Chrome finish - unless specified otherwise on the Drawings.

1. Hinges - National Lock #B 851 - 3 on doors over 42" high; 2 on doors under 42" high.
2. Pulls - National NA 928-26D extruded anodized clear aluminum (3-3/4" long by 1-1/4" high by 3/4" deep) or accepted equal.
3. Catches - Amerlock #T-9798-AW three-plate magnetic catch manufactured by Amerlock Corporation, or accepted equal.
4. Elbow Catches - Amerlock #3675 on companion doors where locks are specified.
5. Door Locks - National C8102.6 - master keyed to other casework.
6. Drawer Locks - National C8108 - master keyed to other casework.
7. Drawer Guides - Light & Medium Duty: Accuride 7434. Heavy Duty: Accuride 4034.
8. Shelf Standards - Knappe & Vogt #233 mounted with four Knappe & Vogt #237 clips for each shelf, or accepted equal.
9. Shelf Bracket - Simpson Strong-tie No. SBV or accepted equal.
10. Mirrors - 1/4" plate 10" x 12" silvered for unframed teachers wardrobe mirror, double strength B grade for doors.
11. Hang Rod at Wardrobes - 1-1/4" o.d. x .042 wall aluminum tubing, clear, anodized.
12. Hang Rod Flanges - Ronther Reiss #R44-55.
13. Television Swivel Base - Ball Son Co., #1005-00-00. Phone: (213) 589-5151.
14. Hang Rod and Hooks - 1" o.d. tubular steel hanger pole, chrome finish with hang rod flanges. Hooks to be Raymond Engineering, Inc., Model #924: black, double prong nylon.

#### 2.015 MISCELLANEOUS MATERIALS

Adhesives:

1. For woodwork and millwork, use water resistant and mold resistant adhesive complying with Fed Spec MM-A-125, type II.
2. For plastic laminates, use phenol, resorcinol, or melamine base, complying with Fed Spec MM-A-181, in type, grade and class best suited for the intended use.

#### 2.016 FABRICATION – GENERAL

- A. All units shall be completely fabricated and finished in the factory, except as otherwise specified or indicated for modified units. All doors and all hardware shall be jig fitted and ready for site installation.
- B. Joinery:
  1. All cabinet members shall be securely fastened together.
  2. All joints shall be securely glued.
  3. All exposed and semi-exposed joints shall be tight and true.

4. The use of finish nails is allowed only where they will not show through a plastic face.
  5. Construction joinery shall be dadoes, lock joints, rabbets or doweled joints.
- C. Edges of exposed portions:
1. Blind or stop dadoes are required. When lock joints are used they shall not run through the edge band.
- D. Scribe members:
1. Provide sufficient additional material to permit scribing to walls, floors, and related work.
  2. Provide adequate allowance for shrinkage occurring after installation.
- E. Framing and blocking:
1. Assemble with bolted and screwed connections only, securing to structural backing with cinch anchors, expansion screws, or toggle bolts as necessary.
- F. Cut and fit the work of this Section as necessary to receive, clear, engage or support other parts of the Work, and as needed for interface with electrical, plumbing, and other units.

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

#### **3.02 PREPARATION FOR INSTALLATION**

- 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. Make necessary measurements in the field to assure proper fit of shop fabricated items.
- C. Prior to start of installation, verify that the work of other trades is sufficiently complete to properly permit this installation to proceed.

#### **3.03 INSTALLATION**

- A. Install the work of this Section in accordance with the accepted Shop Drawings and Section 26, WIC "Manual of Millwork", using factory trained craftsmen.
  1. Scribe units to wall, floor, and other surfaces as appropriate, with not more than 1/32" clear between the cabinet or fixture and the abutting permanent surface, and with no change of clearance in excess of 0.01" in any 4".
  2. Set each unit square, level, plumb, and aligned within a tolerance of one on 1000 vertically and horizontally, and within 1/4' of the designated location for free-standing work.
- B. Coordinate the time and installation with availability of other trades to make required utility connections.
  1. Provide access panels as needed for connection and maintenance of utilities.

2. Prepare tops to receive sink frames, plumbing trim, electrical outlets, etc., provided under other Sections. Obtain necessary templates from related trades.
- C. Test each plumbing and electrical item through at least five operating cycles, and adjust as needed to achieve optimum operation.
- D. Upon completion of installation, thoroughly clean each item by use of only such cleaning materials as are recommended by the manufacturer of the item being cleaned.
- E. Touch-up scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.
- F. All casework shall be anchored to the building in conformance with requirements of the Office of the State Architect. Casework shall be anchored to walls to withstand a horizontal load in any direction equal to 50% of the weight of the casework and contents (a minimum of 50 pounds per square foot of horizontal projection per shelf).

**\*\*\* END OF SECTION \*\*\***



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**SECTION 06600**  
**PLASTIC SURFACING MATERIALS**

**PART 1 -- GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

**1.02 SCOPE OF WORK**

Provide factory-finished Surface Materials and similar items where shown on the drawings, as specified herein, and as needed for a complete and proper installation. Work may include, but is not limited to:

- A. Standard Decorative Laminates.
- B. Solid Surfacing.

**1.03 REFERENCES**

- A. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
- B. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- C. ISO 4586-2 - High Pressure Decorative Laminates; International Organization for Standardization.

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.05 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Samples:
  - 1. Selection Samples: Submit actual samples of surfacing materials to illustrate full range of colors, patterns, and finishes available.
  - 2. Verification Samples: Submit two samples, each 12 inches square, illustrating each selected surfacing material in specified color, pattern, and finish.
- C. Manufacturer's Instructions:
  - 1. Submit manufacturer's printed installation instructions for each product.
  - 2. Submit manufacturer's Safety Data Sheets (M.S.D.S.) for each adhesive.

**PART 2 -- PRODUCTS**

**2.01 MANUFACTURERS**

Acceptable Products: As indicated on the Drawings, or approved equal.

**2.02 STANDARD DECORATIVE LAMINATES**

- A. Acceptable Products: As indicated on the Drawings, or approved equal.
- B. Product Description: Decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.

C. Standard Decorative Laminate – General Purpose Type: having the following physical characteristics:

1. Sheet thickness: 0.048-inch (1.219 mm) plus/minus 0.005-inch (0.127 mm).
2. Exceeding performance requirements of NEMA LD 3-1995 Grade HGS.
3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 55; Smoke developed 30.
4. Patterns and Finishes: Selected from manufacturer's full range of available selections, as selected and approved by Architect.

## 2.03 SOLID SURFACING MATERIAL

A. Acceptable Product: As indicated on the Drawings, or approved equal.

B. Product Description: Homogenous sheet material composed of acrylic resins, fire-retardant filler materials, and coloring agents.

1. Nominal sheet thickness: 0.50 inch (13 mm).
2. Surface burning characteristics in accordance with ASTM E 84: Flame spread less than 25; Smoke developed less than 25.
3. Liquid Absorption, ISO 4586-2, for 1/2-inch material thickness: 0.4 percent after 2 hours boiling water.

C. Izod Impact, ASTM D 256, Method A: 0.2 foot pounds per inch.

1. Tensile Modulus, ASTM D 638 Nominal: 1.7 million pounds per square inch.
2. Thermal Expansion, ASTM D 696: 0.00019-inch per inch per degree F, maximum.
3. Hardness, ASTM D 2583, Barcol Impressor: 59.
4. Flexural Modulus, ASTM D 790: 1.6 million pounds per square inch.
5. Deflection Temperature under load, ASTM D 648: 90 degrees C.
6. Stain Resistance: ANSI Z124.6 modified, Method 3.4: No effect.
7. Boiling Water Resistance, NEMA LD 3-1995, Method 3.5: No effect.
8. High Temperature Resistance: NEMA LD 3-1995, Method 3.6: No effect.
9. Radiant Heat Resistance: NEMA LD 3-1995, Method 3.10: No effect.
10. Light Resistance: NEMA LD 3-1995, Method 3.3: No effect.
11. Ball Impact Resistance, NEMA LD 3-1995, Method 3.8, one half pound ball, unsupported: 125 inches.
12. Specific Gravity: 0.977 ounces per cubic inch (1.69 grams per cubic centimeter).
13. Approximate weight: 4.2 pounds per square foot (20.5 kg/square m).
14. Weatherability: ASTM D 2565: Pass.
15. Fungus Resistance, ASTM G 21: Pass.
16. Bacterial Resistance, ASTM G 22: Pass.
17. Pittsburgh Protocol Toxicity: 66.9 grams.
18. Patterns and Finishes: Selected from manufacturer's full range of available selections, selected and approved by Architect.
19. Impact Resistance NEMA LD3-1995 (1/2 lb. Ball) SSV bonded to substrate\*\*\* Method 3.08 modified. 125" (No Failure)
20. Tensile Toughness ASTM D 638. 21 (in. – lb./in. <sup>3</sup>)

21. Tensile Modulus ASTM D 638 Nominal.  $1.7 \times 10^{-5}$  lb./in.<sup>3</sup>
22. Density 1.60 gram/cm<sup>3</sup>
23. Approximate weight 4.2 lbs./ft<sup>2</sup>
24. Pittsburgh Protocol Toxicity = 30 grams range

### **PART 3 -- EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

#### **3.02 PREPARATION**

Surface preparation: Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer's printed installation instructions.

#### **3.03 APPLICATION**

Install materials in accordance with manufacturer's printed instructions.

**\*\*\* END OF SECTION \*\*\***

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## SECTION 06711

### STRUCTURAL COMPOSITE LUMBER

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication, delivery and erection of all Structural Composite Lumber (SCL).
  - 1. All blocking, bridging, etc., for the installation of members.
  - 2. Clips, angles, straps, hangers, etc., incidental to installation of members.
  - 3. Nails, bolts, washers and other fasteners used for erecting and securing members.

##### 1.03 RELATED WORK (See also Table of Contents)

- A. Rough Carpentry: Section 06100.
- B. Wood I-Joists: Section 06173.
- C. Glue-Laminated Construction: Section 06180.

##### 1.04 QUALITY ASSURANCE

- A. General Qualifications of Manufacturer: The fabricator shall have been engaged in the continuous manufacturing of SCL members for a minimum of five years.
- B. Standards and References: (Latest Edition unless specified otherwise)
  - 1. 2010 California Building Code (CBC)
- C. Submittals: (Submit under provisions of Section 01330).
  - 1. Show erection plans, sizes, types and location of SCL members. Drawings shall also indicate sizes and location of blocking, hangers, etc., with sufficient detailing to ensure correct installation.
  - 2. Product Data substantiating compliance with material properties shown on the Drawings.
- D. Tests and Inspections:
  - 1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2010 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
  - 2. Manufacturing facility shall be approved by an independent inspection agency approved by the International Accreditation Service, Inc. (IAS).
  - 3. All members shall bear a stamp indicating the grade, plant number, independent inspection agency, logo and ICC ES report number.

##### 1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.07 PRODUCT HANDLING

- A. If members must be stored prior to erection, they shall be stored in a vertical position off the ground, covered and protected from weather.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Structural Composite Lumber (SCL): SCL members shall be of the types and sizes indicated on Drawings and as specified here. Structural composite lumber shall have specific ICC approval, and shall meet all specified structural design properties. Proposed SCL members may be used only if equivalent, in the Architect's opinion, to the SCL specified.
- B. Lumber
1. Laminated Veneer Lumber (LVL): LVL shall be manufactured in accordance with the manufacturer's ICC-ES Report and have properties equal to or greater than as specified on the Drawings. Lumber species, thickness, etc. shall be such that the nailing capacity is equal to or better than that specified.
  2. Parallel Strand Lumber (PSL): PSL shall be manufactured in accordance with the manufacturer's ICC-ES Report and have properties equal to or greater than as specified on the Drawings. Lumber species, thickness, etc. shall be such that the nailing capacity is equal to or better than that specified.
  3. Laminated Strand Lumber (LSL): LSL shall be manufactured in accordance with the manufacturer's ICC-ES Report and have properties equal to or greater than as specified on the Drawings. Lumber species, thickness, etc. shall be such that the nailing capacity is equal to or better than that specified.
  4. Various SCL products shall only be used where specifically indicated on the Drawings. No substitutions shall be made without written approval.
- C. Adhesive:
1. According to manufacturers ICC ES Report.
- D. Types:
1. Sizes, properties and additional information as shown on the Drawings.
- E. Accessories to be furnished and installed as indicated on the Drawings are as follows:
1. Blocking, hangers, brackets, straps, ties, etc., shown on Drawings.
  2. Miscellaneous accessories incidental to erection and installation of members.

2.02 FABRICATION

- A. Fabrication shall be in compliance with manufacturer's ICC ES Report.
1. Fabrication shall be in accordance with best practices with adequate plant equipment and under supervision of properly qualified personnel.
  2. Moisture content of components at time of gluing shall comply with the manufacturer's ICC ES Report.

**PART 3 - EXECUTION**

3.01 INSPECTION

- A. Prior to installation of the work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of discrepancy, immediately notify Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 PROTECTION

- A. Protect work and materials of this Section during installation, and protect the installed work and materials of other trades.
- B. In the event of damage, make all repairs and replacement necessary to the approval of the Architect at no additional cost to the Owner.

3.03 HANDLING

- A. Use equipment and methods that avoid damages that may impair strength of SCL members. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

3.04 INSTALLATION

- A. SCL members are to be erected and installed in accordance with the Drawings and manufacturer's recommendations.

3.05 CLEANUP

- A. Keep premises free from accumulated waste materials, rubbish and debris resulting from this work. Upon completion, remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory items used in or resulting from said Work, and legally dispose of off the site.

**\*\*\* END OF SECTION \*\*\***



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**SECTION 07210**  
**THERMAL INSULATION**

**PART 1 – GENERAL**

1.01 **GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section

1.02 **SCOPE OF WORK**

A. Furnish and install Thermal Insulation indicated on the Drawings and as specified herein.

B. The principal items of work include:

1. Thermal Insulation within roof.
2. Thermal Insulation within exterior walls.
3. Thermal Insulation within interior walls.

1.03 **QUALITY ASSURANCE**

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.04 **SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 **SUBMITTALS**

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product data:

1. Materials list of items to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.06 **PRODUCT HANDLING**

Comply with the requirements of Section 01620.

1.07 **CLOSE-OUT**: also comply with the requirements of Section 01770 – Contract Closeout.

A. **Reports**:

Provide Certification per Item 1.03.B.

B. **As-Builts**:

Not required

C. **Operation and Maintenance Data**:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than FIVE (5) years from the date the Owner records Notice of Completion.

## **PART 2 – PRODUCTS**

### 2.01 MATERIALS

- A. Provide thermal insulation as indicated on Drawings.
- B. All insulation shall be inorganic glass fiber insulation. Insulation shall comply with ASTM Testing Standards. Fire Hazard Classification, Flame Spread Index, Smoke Developed Index, Combustibility, and Fire Endurance Ratings as required by Code.
- C. Insulation shall be as manufactured by Certainteed, Johns-Manville, Owens-Corning, or Architect approved equal.

## **PART 3 – EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

### 3.02 PREPARATION

- A. Verify adjacent materials are dry and ready to receive installation.
- B. Verify mechanical and electrical services within walls have been installed and tested.

### 3.03 INSPECTION

- A. Before any installation is started, determine that the other work is suitable to receive insulation.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- C. Remove or protect against projections in construction framing that may damage or prevent proper insulation.

### 3.04 INSTALLATION

- A. All work shall be performed by licensed applicators, shall comply with the recommendations of the manufacturer and the National Association of Insulation Manufacturers.

- B. Install insulation with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over and between framing numbers. Secure in place. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.
- C. Trim insulation neatly to fit spaces. Use batts free of damage. Install batt insulation, in wall spaces without gaps or voids.
- D. Install Insulation in all indicated walls from floor to underside of roof. Secure insulation with 19-gage wire or 1" wide, 20 gage steel strips. Architect shall approve all insulation details, including methods of fastening, before commencement of the work.

3.05 CLEAN UP AND DISPOSAL

At frequent intervals during and again upon completion of work, remove from building and working premises tools and equipment, surplus materials, all rubbish and debris of whatever nature not caused by other trades, and leave the work in a clean, orderly and acceptable condition approved by the Architect.

**\*\*\* END OF SECTION \*\*\***

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## SECTION 07500

### ADHERED FELTBACK PVC THERMOPLASTIC MEMBRANE ROOFING

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

A. Summary: Install an adhered Single Ply Thermoplastic (PVC) Roofing Membrane with flashings and other components to comprise a roofing system.

B. Related Work: The work includes but is not necessarily limited to the installation of:

1. Substrate Preparation
2. Wood Blocking
3. Separation Layers
4. Tapered Insulation
5. Roof Membrane
6. Fasteners
7. Adhesive for Flashings
8. Roof Membrane Flashings
9. Walkways
10. Metal Flashings
11. Sealants
12. Air Barrier
13. Perimeter Bar Securement

C. Upon successful completion of work the following warranties:

1. Manufacturer Warranty
2. Roofing Contractor Warranty

##### 1.03 QUALITY ASSURANCE

A. This roofing system shall be applied only by a Roofing Contractor authorized by the Manufacturer prior to bid ("Applicator"). The Roofing Contractor shall have at least five (5) years of experience as an applicator with the submitted manufacturer as certified by the manufacturer.

B. Upon completion of the installation and the delivery to the Manufacturer by the Applicator of a certification that all work has been done in strict accordance with the contract specifications and the Manufacturer's requirements, an inspection shall be made by a Technical Representative of the Manufacturer to review the installed roof system.

C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and the Manufacturer.

D. All work pertaining to the installation of the membrane and flashings shall only be completed by Applicator personnel trained and authorized by the Manufacturer in those procedures.

- E. Membrane to have no formulation changes in the last fifteen (15) years as certified by the manufacturer

1.04 SUBSTITUTIONS

- A. Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

- B. Include the following:

1. Copies of Specification including physical properties.
2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
3. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
4. Sample copy of Manufacturer's warranty including no exclusion for ponding water and no time limit shall be assigned to any such ponding water.
5. Sample copy of Applicator's warranty.
6. Dimensioned shop drawings which shall include:
  - a. Outline of roof with roof size and elevations shown.
  - b. Profile details of flashing methods for penetrations.
  - c. Technical acceptance from Manufacturer.
7. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or practices and requirements of this specification as stated in Section 2.01, C & D and Quality Assurance.
8. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
9. Letter from the proposed manufacturer confirming the number of years it has DIRECTLY manufactured the proposed roof system under the trade names and/or trademarks as proposed.
10. Material Safety Data Sheets (MSDS)

1.05 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.

- B. All submittals which do not conform to the following requirements will be rejected.

1. A list of each primary component to be used in the roof system and the Manufacturer's current literature for each component.
2. Sample copy of Roofing Manufacturer's warranty per Item 1.09.E.
3. Sample copy of Applicator's warranty per Item 1.09.E.
4. Letter from Roofing Manufacturer confirming that the Contractor is an authorized applicator of the specified roof system.
5. Material Safety Data Sheets (MSDS)

1.06 CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence

without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

A. Factory Mutual Research Corporation (FM) - Norwood, MA

1. Class 1-90 (Attachment Criteria)

B. Underwriters Laboratories, Inc. - Northbrook, IL

1. Class A assembly

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.
- D. All adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C).
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials which are determined to be damaged by the Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

1.08 JOB CONDITIONS

- A. Membrane materials may be installed under certain adverse weather conditions but only after consultation with the Manufacturer, as installation time and system integrity may be affected.
- B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to the application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.
- G. The Applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membranes. The Applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.
- H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the general



contractor or construction manager shall provide for all necessary protection and barriers as required to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

- I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air and/or similar methods.
- J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.
- L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.
- M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.
- N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- O. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.
- P. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to the manufacturer) to the Owner's Representative for corrective action prior to installation of the roof system.
- Q. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction at the Owner's expense (letter copy to the manufacturer).
- R. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.
- S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.
- T. The Applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.
- U. The adhered membrane shall not be installed under the following conditions without consulting the manufacturer's technical department for precautionary steps:
  - 1. The roof assembly permits interior air to pressurize the membrane underside.
  - 2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
  - 3. The wall/deck intersection permits air entry into the wall flashing area.
- V. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

1.09 CLOSE-OUT:

A. Reports:

None required.

B. As-Builts:

Not required.

C. Operation and Maintenance Data:

Comply with the requirements of General Conditions Article 3.5.

D. Extra Materials:

None required.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. Manufacturer's System Warranty (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner's satisfaction, and receipt of final payment, the twenty (20) Year System Warranty shall be issued. The System Warranty shall provide for the roof membrane, all accessories that comprise a roof system, and contractor labor. The Warranty shall be Non-Prorated provide for No Dollar Limit (NDL), and shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the warranty period. Warranty shall provide for 90 mph wind speed protection. Warranty shall not exclude regular foot traffic or storage on the roof surface.
4. Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner with a separate five-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.
5. Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

**PART 2 --PRODUCTS**

2.01 MANUFACTURER

A. Basis: Sarnafil

B. Acceptable alternates:

1. Tremco TPA
2. FiberTite
3. Or Architect approved equivalent, subject to compliance with all specification requirements herein so stated.

2.02 GENERAL

- A. The components of the Adhered roof system are to be products of the membrane manufacturer as indicated on the Detail Drawings and specified in the Contract Documents.
- B. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the manufacturer. The manufacturer's acceptance of any other product is only for a determination of compatibility with membrane products and not for inclusion in the manufacturer's warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with the manufacturer's products.
- C. Membrane shall be certified by the manufacturer to be within two (2) mils of the specified membrane thickness as stated in this section.

2.03 MEMBRANE

- A. Sarnafil® G410 Feltback fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity.
- B. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I or ASTM D6754 "Ketone Ethylene Ether Sheet Roofing".
  - 1. Sarnafil G410-15 feltback, 20 year Warranty Membrane, thermoplastic membrane with fiberglass reinforcement and a factory applied 9 oz. geotextile felt backing.
- C. Color of Membrane
  - 1. Energy-Smart feltback (White), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.
- D. Typical Physical Properties

<u>Parameters</u>	<u>ASTM Test Method</u>	<u>Minimum ASTM Requirement</u>
Reinforcing Material	-	Fiberglass
Overall Thickness, min., inches (mm)	D638	[0.058 inches]
Tensile Strength, min., psi (MPa)	D638	1600 (11.1)
Elongation at Break, min. (machine x tranverse)	D638	270% / 250%
Seam strength*, min. (% of tensile strength)	D638	80
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D638	95
Elongation, min., (% of original)	D638	90
Tearing Resistance, min., lbf (N)	D1004	14 (63.0)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	10,000 Hours
Cracking (7x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7 x magnification)	-	None

Linear Dimensional Change	D1204	0.02%
Weight Change After Immersion in Water	D570	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass

\*Failure occurs through membrane rupture not seam failure.

## 2.04 FLASHING MATERIALS

### A. Wall/Curb Flashing

1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive.
2. Flashing G459 Membrane: An asphalt-resistant, fiberglass reinforced membrane adhered to approved substrate using adhesive.
3. Clad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side. Color as selected by architect from Sarnafil standards colors, excluding white.

### B. Perimeter Edge Flashing

1. Clad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side. Color as selected by architect from Sarnafil standards color, excluding white.
2. Non-Typical Edge: Project-specific perimeter edge detail reviewed and accepted for one-time use by the manufacturer's Technical Department. Consult Regional Technical Manager prior to job start for review and consideration for acceptance.

### C. Miscellaneous Flashing

1. Flash: A prefabricated expansion joint cover made from membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of new and existing expansion gaps from 1 inch to 4½ inches (25 mm to 114 mm) across.
2. Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet has a 2¼ inch (57 mm) deep profile, and is provided in 10 foot (3 m) lengths. Use prefabricated Reglet mitered inside and outside corners where walls intersect.
3. Stack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick G410 membrane.
4. Circle-"G": Circular 0.048 inch (48 mil/1.2 mm) thick G410 membrane patch welded over T-joints formed by overlapping thick membranes.
5. Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Clad base flashings. Corner is available in 2 outside sizes (5 inch and 8½ inch diameter/127 mm and 215 mm) and 1 inside size.
6. Multi-Purpose Sealant: A sealant used at flashing terminations.

7. StaBond Adhesive: A solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.
8. Felt: A non-woven polyester or polypropylene mat cushion layer that is necessary behind G410 or G459 Flashing Membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.
9. Flashing G459 Membrane: An asphalt-resistant, fiberglass reinforced membrane adhered to approved substrate using adhesive.

2.05 SEPARATION BOARD AND TAPERED INSULATION (Crickets)

- A. Dens-Deck®: A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thickness of 1/2".
- B. Insulation: A rigid polyisocyanurate foam insulation with black mat facers formed for use as saddles or crickets.

2.06 ATTACHMENT COMPONENTS

- A. Membrane adhesive: 2121 Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Application rates are as follows:

APPLICATION RATES FOR FELTBACK MEMBRANE				
	Adhesive Rates - Gallons/100 Ft <sup>2</sup> (Liters/Meter <sup>2</sup> )			Approximate Sq. Ft./Pail (meter <sup>2</sup> )
	Substrate	Membrane	Total	
GP Dens-Deck®	1.75 (0.71)	+ 0	= 1.75 (0.71)	285 (26.48)

Notes:

- a) There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40° F (5° C).
  - b) Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane.
  - c) Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.
- B. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch (75 mm) square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
  - C. Fastener No. 12: Number 12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener No. 12 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.
  - D. Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

- E. Fastener-XPS: A specially designed, heavy-duty, corrosion-resistant fastener used with Stop or Bar to attach G410 roof membrane to steel roof decks. Fastener-XPS has a shank diameter of approximately 0.21 inch (5.3mm) and a thread diameter of approximately 0.26 inch (6.6). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement and simplicity of application.
- F. Fastener-King Con: A nail-in, corrosion-resistant fastener used with Plate to attach insulation or with Bar to attach membrane to poured structural concrete roof decks.
- G. Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes every 6 inches (152 mm) on center.
- H. Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.
- I. Cord: A 5/32 inch (4 mm) diameter, red-colored, flexible thermoplastic extrusion that is welded to the top surface of the membrane and against the side of the Bar, used to hold the membrane in position.

## 2.07 WALKWAY PROTECTION

- A. Tread: A polyester reinforced, 0.096 inch (96 mil/2.4 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Tread is supplied in rolls of 39.3 inches (1.0 m) wide and 32.8 feet (10 m) long.

## 2.08 MISCELLANEOUS ACCESSORIES

- A. Aluminum Tape: a 2-inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at Clad joints.
- B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and windblown moisture entry.
- C. Multi-Purpose Tape: A high performance sealant tape with used with metal flashings as a preventive measure against air and windblown moisture entry.
- D. Seam Welder 641mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of membrane seams.
- E. Perimat Welder: 120 volt, self-propelled, hot-air welding machine used to seal long-lengths of membrane seams along perimeter details.
- F. Solvent: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled. Consult Product Data Sheet for additional information.

## 2.09 MISCELLANEOUS FASTENERS AND ANCHORS

- A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

## 2.10 AIR BARRIER

- A. Sarnavap SA-32: A self-adhered 32 Mil vapor barrier that can also serve as a temporary roof protection. The top surface is a high-density polyethylene grid laminated between two layers of polyethylene film. A silicone release plastic film covers the self-adhesive back side.

## 2.11 RELATED MATERIALS

- A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.
- B. Plywood: When bonding directly to plywood, a minimum ½ inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of Felt behind the flashing membrane. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis.

## **PART 3 --EXECUTION**

### 3.01 PRE-CONSTRUCTION CONFERENCE

- A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.
- B. The meeting shall discuss all aspects of the project including but not limited to:
  - 1. Safety
  - 2. Set up
  - 3. Construction schedule
  - 4. Contract conditions
  - 5. Coordination of the work

### 3.02 SUBSTRATE CONDITION

- A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.
- B. Applicator shall verify that the work done under related sections meets the following conditions:
  - 1. Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
  - 2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
  - 3. All surfaces are smooth and free of dirt, debris and incompatible materials.
  - 4. All roof surfaces shall be free of water, ice and snow.

### 3.03 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Adhered roof system.
- B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

- C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All roof surfaces shall be free of water, ice and snow.
- E. The membrane shall be applied over compatible and accepted substrates only.

#### 3.04 SUBSTRATE PREPARATION

The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

##### A. New Construction

###### 1. Wood Deck:

- a. FM approved wood deck - The roof deck shall be minimum 2 inch (50 mm) thick lumber or ¾ inch (19 mm) thick treated plywood. The deck shall conform to FM requirements for Class 1 fire-retardant and rot-resistant wood decks. Deck shall be installed according to FM and local code requirements.
- b. Non-FM approved wood deck - The roof deck shall be minimum 1½ inch (25 mm) thick lumber or 15/32 inch (12 mm) thick plywood. Deck shall be installed according to local code requirements. Contact Manufacturer's Technical for fastening patterns and methods.

#### 3.05 WOOD NAILER INSTALLATION

- A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.
- B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.
- C. Thickness shall be as required to match substrate or insulation height to allow a smooth transition.
- D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

#### 3.06 SEPARATION BOARD AND INSULATION INSTALLATION

- A. Separation board shall be installed according to insulation manufacturer's instructions.
- B. Separation board shall be neatly cut to fit around penetrations and projections.
- C. Install tapered insulation in accordance with insulation manufacturer's shop drawings.
- D. Install tapered insulation around drains creating a drain sump.
- E. Do not install more insulation board than can be covered with the membrane by the end of the day or the onset of inclement weather.
- F. Use at least 2 layers of insulation when the total insulation thickness exceeds 2½ inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.



## G. Mechanical Attachment

1. Separation board and insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the separation board and insulation manufacturer's, FM's and the manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation or separation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.
2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and the membrane manufacturer.
3. Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

### 3.07 INSTALLATION OF ROOF MEMBRANE

A. The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

#### B. 2121 Adhesive:

1. Over the properly installed and prepared substrate, 2121 adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to the manufacturer's requirements. No adhesive is applied to the back of the G410 feltback membrane. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
2. The G410 feltback roof membrane is unrolled immediately into the wet 2121 adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
3. Weld G410 coverstrips at all G410 feltback seams that do not have a factory selvage edge. Notes:
  - a. 2121 adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
  - b. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
4. Install perimeter bar at 4' and 8' spacing with cover strip throughout building perimeter only to satisfy 90 mph wind speed warranty requirement.

### 3.08 HOT-AIR WELDING OF SEAM OVERLAPS

#### A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.

3. All membrane to be welded shall be clean and dry.

#### B. Hand-Welding

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

#### C. Machine Welding

1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

#### D. Quality Control of Welded Seams

1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or a manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

### 3.09 MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

#### A. Adhesive for Membrane Flashings

1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

- B. Install Stop/Bar/Cord according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stop is required by the manufacturer at the base of all tapered edge strips and at transitions, peaks, and valleys according to the manufacturer's details.
- C. The manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the manufacturer prior to installation.
- D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and the Technical Department.
- E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.
- F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Stop at 6-8 inches (0.15-0.20 m) on center.
- G. Flashings shall be terminated according to the manufacturer's recommended details.
- H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Technical Department for securement methods.

### 3.10 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
  - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
  - 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.
- B. Metal, other than that provided by the manufacturer, is not covered under the warranty.
- C. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
- D. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.
- E. Metal joints shall be watertight.
- F. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).
- G. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.
- H. Counter flashings shall overlap base flashings at least 4 inches (100 mm).
- I. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

### 3.11 CLAD METAL BASE FLASHINGS / EDGE METAL

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

- A. Clad metal flashings shall be formed and installed per the Detail Drawings.

1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
  2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- B. Adjacent sheets of Clad shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint. Each flashed joint shall be covered by a clad metal fascia plate to match the color of the clad edge metal. Install the clad fascia plate per Sarnafil standards.

### 3.12 WALKWAY INSTALLATION

#### A. Tread Walkway

1. Roofing membrane to receive the Tread Walkway shall be clean and dry. Place chalk lines on deck sheet to indicate location of Walkway. Apply a continuous coat of 2170 adhesive to the deck sheet and the back of Walkway in accordance with manufacturer's technical requirements and press Walkway into place with a water-filled, foam-covered lawn roller. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the Walkway to the membrane deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. **Important:** Check all existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and re-weld any inconsistencies before Walkway installation. Do not run Walkway over Bars.

### 3.13 AIR BARRIER INSTALLATION

- A. Install Self-Adhered vapor retarder over a clean and dry substrate. In concrete applications, allow concrete to cure for a least 7 days. Do not install when it is raining, snowing, or on wet / humid surfaces. Install in temperatures 32 degrees F (0 degrees C) and above. The use of a primer is required on the following substrates: wood, concrete, lightweight concrete, gypsum boards and decks, and Dens Deck boards.

1. Begin application at the bottom of the slope. Unroll Sarnavap Self-Adhered onto the substrate without adhering for alignment. Overlap each preceding sheet by 3 in. (75 mm) lengthwise following the reference line and by 6 in. (150 mm) at each end. Stagger end laps by at least 12 in. (300 mm). Do not immediately remove the silicone release sheet.
2. Once aligned, peel back a portion of the silicone release sheet and press the membrane onto the substrate for initial adherence. Hold Sarnavap Self-Adhered tight and peel back the release sheet by pulling diagonally.
3. Use a 75 lb (34 kg) roller to press Sarnavap Self-Adhered down into the substrate including the laps. Finish by aligning the edge of the roller with the lower end of the side laps and rolling up the membrane. Do not cut the membrane to remove air bubbles trapped under the laps. Squeeze out air bubbles by pushing the roller to the edge of the laps.

#### E. TEMPORARY CUT-OFF

- A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation

fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

- B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

3.14 COMPLETION

Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and the manufacturer prior to demobilization.

**\*\*\*END OF SECTION\*\*\***

## SECTION 07600

### FLASHING & SHEET METAL

#### PART 1 -- GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. All metal wall flashings, related flashing, coping and caps.
2. Flashing at curbed openings, and other miscellaneous areas where indicated on the drawings.
3. Flashing flanges for roof drains and overflows.
4. Flashing at parapet walls that receive roofing membrane.
5. Flashing and metal covers at mechanical equipment platforms.
6. Gutters and downspouts.
7. Shop and field priming, shop painting, galvanizing, screening, caulking, anchors and anchor straps, clips, etc.
8. Shop drawings of all sheet metal work including expansion joints.

##### 1.03 QUALITY ASSURANCE

- A. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces.
- B. Report to the Architect all conditions that prevent proper execution of this work.

##### 1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.05 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Shop Drawings: submit: all information required for fabrication, finishing and installation of this work in complete details.

##### 1.06 PRODUCT HANDLING

Adhere to requirements of Section 01620.

##### 1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

###### A. Reports:

None required.

###### B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

###### C. Operation and Maintenance Data:

None required.

D. Extra Materials:

None required.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than FIVE (5) years from the date the Owner records Notice of Completion.

## **PART 2 -- PRODUCTS**

### **2.01 MATERIALS**

- A. Galvanized Sheet Metal: Conform to ASTM A525, thickness indicated or specified, but not less than 24-gauge. Zinc coating shall weigh not less than 1-1/2 ounces, or more than 1-1/2 ounces per square foot of surface covered.
- B. Solder: Standard Grade-A brand of 50:50 Alloy Lead-Tin, complying with ASTM B32. Name of manufacturer and grade designation shall be cast or die-marked on each bar.
- C. Solder Flux: Raw muratic acid for galvanized metal and zinc; resin for tin, lead, and tinned copper; and non-corrosive soldering salts for uncoated copper.
- D. Sheet Metal Fasteners: Rivets, nails, sheet metal screws, self-tapping screws, and stove bolts, of the type and size best adapted to the condition of use. Provide fasteners of the type specified or indicated.
  1. Use: galvanized steel, cadmium-plated steel or 300 Series alloy stainless steel.
  2. Pop rivets may be used for metal-to-metal connections when future disassembly is not required. Open-end type may be used for all applications except where watertight connections are required, in which case, use closed end type.
- E. Caulking Compound: Provide as specified under Section 07900. Apply as recommended by the manufacturer; caulking compound of proper consistencies for gun and knife application as necessary.
- F. Shop Prime Coat: Rust-Oleum Corporation. Apply #3202 to 1/2 mil wet coating thickness, #3268 to 1-mil dry coating thickness or provide primer as specified under Section 09900.
- G. Shop Color Coat: Pre-coat in shop with coating of color to match adjoining surfaces.

## **PART 3 -- EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

### **3.02 FABRICATION AND ASSEMBLY**

- A. Workmanship: Fabricate and finish metal work in a first class manner in accordance with best trade practices with all joints and corners accurately machined, filed and fitted, and rigidly framed together and connected. Carefully match components to produce perfect continuity of line and design. Make joints and connections in exterior face metal watertight, using approved scaling materials and methods of assembly. Fit faces of metal in contact with hairline joints, except as otherwise indicated or required for expansion or fitting. Conceal fastenings, unless otherwise indicated. Conceal required reinforcements within the finished assembly.
- B. Expansion and Contraction: Form and fabricate work to adequately provide for thermal expansion and contraction and building movement in the completed work, without over-stressing the materials, breaking connections, or producing wrinkles and distortion in finished surfaces. Finish sheet metal work water and weathertight throughout.
- C. Attachment Clips: Where subject to thermal expansion and contraction, attach members with clips to permit movement without damage to the installation, or provide slotted or over-size holes with washers where appearance is not critical, as approved by the Architect.
- D. Lock Seams: Make lock seam work flat and true to line; sweat full of solder except where installed to permit expansion and contraction. Lap flat lock seams, and lap seams where soldered, according to pitch but in no case less than 4". Make seams in direction of flow. Fill expansion joints with sealant. Plane surfaces shall be free of buckles. Provide reinforcement as necessary. Cleat and fasten substantially on approximately eight-inch centers. All cap flashing and gutter seams to be flat lock seams.
- E. Soldering: Thoroughly clean and tin material prior to soldering. Solder with heavy coppers of blunt design, properly tinned before use. For flat seam work they shall not weight less than ten pounds per pair, and for other work not less than size pounds per pair. Solder slowly with well-heated coppers, heating the seams thoroughly and completely filling them with solder. Finish surfaces neatly, full flowing and smooth. Wash acid flux thoroughly with a soda solution after soldering and completely remove soldering flux on exposed surfaces.
- F. Welding: Conform to the requirements of AWS "Standard Code for Arc and Gas Welding". Perform welding in a manner resulting in strong, durable, tight, flush, smooth, and clean joints. Weld sheet steel to produce full and complete fusion welds without inducing locked-in stresses in the metal or surface distortions. Welding on exposed surfaces shall be ground smooth and flush and finished to match adjacent surfaces.
- G. Caulking: Where indicated, caulk joints in sheet metal work and between sheet metal work and adjacent construction with polysulfide sealing compound. Apply in accordance with Caulking and Sealants Section.
- H. Coping: Shall be attached to top of parapets in strict conformance with the latest written specifications of the Sheet Metal Industry Fund of Los Angeles, and as indicated on the drawings.
- I. All sheet metal work shall be examined carefully the Contractor, Owner and Architect and if necessary, tested. The Contractor shall make all repairs to damaged items as a result of this testing, leaving them in a condition satisfactory to the Architect.

**\*\*\* END OF SECTION \*\*\***



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## SECTION 07720

### ROOF HATCHES & SAFETY RAILINGS

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

A. Work included: Provide roof hatch system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Section includes:

1. Roof hatches
2. Hatch railing safety system

##### 1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Provide units listed by Underwriters Laboratories, Inc. and/or Factory Mutual Research Corporation (FMRC).

C. OSHA compliant roof hatch safety railing system as required by OSHA Standard 1910.23 and 1910.27.

##### 1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.05 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Product Data: Manufacturer's specifications and technical data including the following.

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures.

D. Quality Control Submittals: Statement of qualifications.

##### 1.06 PRODUCT HANDLING

A. Adhere to requirements of Section 01620.

B. Package and ship in accordance to manufacturer's recommendations.

C. Store in compliance to manufacturer's instructions.

##### 1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Not required.

C. Operation and Maintenance Data:

Provide Operating and maintenance manuals per Section 01770.

D. Extra Materials:

None required.

E. Extended Warranty:

Comply with the requirements of General Condition Article 3.5 and Section 01740.

## **PART 2 -- PRODUCTS**

### **2.01 APPROVED MANUFACTURERS**

A. Nystrom Building Products: (800) 547-2635. Internet: www.nystrom.com

B. Roof Hatch Safety-Railing System: David/Randall (877) 723-3766

### **2.02 ALUMINUM ROOF HATCHES**

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.
2. Model: Nystrom Model RHA

B. Description:

1. Cover and liner: 11-gauge (.090-inch) aluminum cover with 1-inch insulation and 18-gauge (.040-inch) aluminum cover liner.
2. Curb: 11 gauge (.090-inch) aluminum curb with 1-inch rigid fiberboard insulation. Curb to be configured to match roof pitch.
3. Hinges: Tamperproof hinge contained within hatch as part of spring assembly.
4. Latch: Zinc plated steel slam latch with turn handle and inside/outside padlock hasps.
5. Finish: Mill finish
6. Springs: Greased heavy-duty compression springs in telescoping tubes.
7. Hardware: Zinc plated steel hold open arm(s) with rubber handle that automatically locks the door when opened. Furnish hatches with interior padlock hasp and neoprene draft seal.
8. Mounting flange: 3-1/2 inch.

### **2.03 GALVANIZED STEEL ROOF HATCHES**

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.
2. Model: Nystrom Model RHG

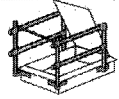
B. Description

1. Cover and liner: 14-gauge (.075-inch) galvanized steel cover with 1-inch insulation and 22-gauge (.0299-inch) galvanized steel cover liner.

2. Curb: 14-gauge galvanized steel with 1-inch rigid fiberboard insulation at curb perimeter. Curb to be configured to match pitch of roof.
3. Hinges: Tamperproof hinge contained within hatch as part of spring assembly.
4. Latch: Zinc coated steel slam latch.
5. Finish: Factory applied powder coat.
6. Springs: Greased heavy-duty compression springs in telescoping tubes.
7. Hardware: Zinc plated steel hold open arm(s) with rubber handle that automatically locks the door when opened. Furnish hatches with interior padlock hasp and neoprene draft seal.
8. Mounting flange: 3½”.

**2.04 SAFETY RAILING SYSTEM**

- A. Nystrom Safety Railing System: Model: Select railing model to match specified hatch types from selection chart attached to this guide specification. For multiple hatch types indicate hatch designation and railing model.
- B. Description: Top rail, mid rail, and chain or swinging gate, with the hatch curb acting as the toe plate.
  1. Test load: 200-pounds.
  2. Height: Minimum 42 inches above finished roof deck.
  3. Pipe: Galvanized, 1-1/4 inch ID, A53 Grade B seamed pipe or galvanized, 1-5/8 inch OD A500 seamed tube.
  4. Flat bar: 2 x 3/8 inch thickness A36 mild steel.
  5. Chain system: 3/16-inch proof coil ASTM specification, zinc plated with quick link on fixed end.
  6. Pipe ends and tops: Covered or plugged with weather and light resistant material.
  7. Bolts and washers: 3/8 x 2-1/2 inch grade Z, zinc plated.
  8. Sealant: As recommended by manufacturer.
  9. Factory finish: Hot dipped galvanized.
- C. Nystrom Safety Railing System selection Chart:

MODEL:	DESCRIPTION:	PICTURE:
RHSR-SS (size)	Nystrom Safety Railing System for standard 2'-6" x 3' roof hatches and with hatchway ladder mounted on 2'-6" side of hatch opposite of hinge lid.	

**PART 3 – EXECUTION**

**3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Check openings for correct size and irregularities.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. Correct conditions detrimental to timely and proper completion of the Work.

- E. Do not proceed until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Comply with manufacturer's recommendations.
- C. Securely anchor roof accessories in compliance with manufacturer's instructions.
- D. Set units plumb, level, and true to line without warp or rack.
- E. Apply bituminous paint on metal surfaces of units in contact with cementitious materials and dissimilar metals on roof units.
- F. Set railing brackets in sealant.
- G. Put operating components through at least five complete operating cycles, adjusting as required, and achieving optimum ease of operation.

3.03 FIELD QUALITY CONTROL

- A. Adjust and retest as required until units operate satisfactorily.
- B. Close hatches, replace links, and leave units in an operable condition.
- C. Touch up coatings as required.

**\*\*\* END OF SECTION \*\*\***

## SECTION 07900

### CAULKING & SEALANTS

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

Work included: Throughout the work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and passage of air.

##### 1.03 QUALITY ASSURANCE

- A. Conform to Sealant and Waterproofers Institute requirements for materials and installation.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

##### 1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.05 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product data: submit:
  - 1. List of items that will be provided under this Section.
  - 2. Manufacturer's Data: catalog cuts, dimensioned drawings, and other data needed to prove compliance with the specified requirements.
  - 3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

##### 1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

##### 1.07 CLOSE-OUT: also comply with the requirements of Section 01770 – Contract Closeout.

- A. Reports:  
None required.
- B. As-Builts:  
Not required.
- C. Operation and Maintenance Data:  
None required.
- D. Extra Materials:

Provide for Owner's use a minimum of 2 percent, but not less than one tube, of the each of the sizes and colors used, boxed and clearly labeled.

E. Extended Warranty:

1. Comply with the requirements of General Condition Article 3.5 and Section 01740.
2. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
3. The guarantee specified herein shall include warranties against leakage, hardening, cracking, crumbling, melting, running, shrinking or staining adjacent surfaces.
4. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than five (5) years from the date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.01 SEALANTS

A. Except as specifically otherwise accepted by the Architect, use only the types of sealants described as follows:

1. One component polyurethane sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, ASTM-C-920, Class 25, for vertical and horizontal joints in connection with all building materials. Do not use in traffic areas. Minimum ¼" joint; maximum 1-1/4" x 3/8"d.
  - a. Dymonic by Tremco
  - b. Sonolastic NP1 by Sonneborn
2. One-part silicone sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Class A, for vertical and horizontal joints in connection with aluminum, glass and concrete materials which require greater movement capabilities. Do not use in traffic areas. Minimum joint ¼" x 3/16"d; maximum 1" x ½"d.
  - a. Spectrum 1 by Tremco
  - b. Omniseal by Sonneborn
  - c. Dow Corning 790
3. One-part silicone sealant, medium modulus, neutral cure, FS S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, ASTM C920, Class 25, for vertical and horizontal joints in connection with non-porous surfaces such as aluminum, glass, tile, laminated plastic and concrete. Do not use in traffic areas.
  - a. Spectrum 2 by Tremco
  - b. Omni Plus by Sonneborn
  - c. Dow Corning 795
  - d. Construction 1200 by GE
4. Multi-Component polyurethane sealant, FS TT-S-00227E, Type I, Class A, ASTM C920 for horizontal joints in traffic areas. Minimum 3/8" wide, depth to be 3/8" to ½" - use primer.
  - a. THC-900/901 by Tremco
  - b. Chem. Caulk 950 by Bostick

5. One-part translucent silicone sealant, low modulus, moisture curing, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, for vertical joints in connection with butt glazing.
  - a. 895 Silicone by Pecora
  - b. Silglaze N by GE
6. One-part mildew resistant silicone sealant meeting requirements of FDA Regulation 21 CFR 177.2600, for vertical and horizontal joints in connection with non-porous applications as sealing around bathroom fixtures, shower-tub enclosures, sinks and urinals.
  - a. Dow Corning 786
  - b. Sanitary 1700 by GE
7. One-part siliconized acrylic latex polymer caulk, ASTM C834-76, for interior horizontal and vertical joints in connection with window and door buck perimeters, interior wall surfaces, etc.
  - a. AC-20 by Pecora
  - b. Acrylic Latex by Tremco
8. Roof Penetrations: Use asphalt mastic conforming to ASTM D491.
9. For other services, provide products especially formulated for the proposed use and accepted in advance by the Architect.

B. Colors:

1. The Architect will select Colors for each sealant installation to match adjacent finishes from a standard color list normally available from the specified manufacturers.
2. Should a matching standard color not be available from the accepted manufacturer except at additional charge, the Contractor shall provide such colors at no additional cost to the Owner.
3. In concealed installations, and in partially or fully exposed installations where so accepted by the Architect, use standard gray or black sealant.

2.02 PRIMERS

Use only those primers that are: non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials that are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

B. Acceptable types include:

1. Closed-cell resilient urethane or polyvinyl chloride foam;
2. Closed-cell polyethylene foam;
3. Closed-cell sponge of vinyl or rubber;
4. Polychloroprene tubes or beads;
5. Polyisobutylene extrusions;
6. Oil-less dry jute.

C. Preformed support strips for ceramic tile control joint and expansion joint work: Use



polyisobutylene or polychloroprene rubber.

2.04 BOND-PREVENTATIVE MATERIALS

Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:

1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated;
2. Aluminum foil complying with MIL-A-148E;
3. Wax paper complying with Fed. Spec. UU-P-270.

2.05 JOINT PACKING

Shall be installed in all joints to receive sealant. Material shall be a resilient type such as closed cell PVC foam or as recommended by the manufacturer. Oakum or other types of absorptive materials shall not be used as packing material.

2.06 OTHER MATERIALS

- A. For masking around joints, provide masking tape complying with Fed. Spec. UU-T-106c.
- B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Concrete and ceramic tile surfaces:
  1. Install only on surfaces that are dry, sound, and well brushed, wiping free from dust.
  2. At open joints, remove dust by mechanically blown compressed air if so required.
  3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
  4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
  5. Remove laitance and mortar from joint cavities.
  6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.
- B. Steel surfaces:
  1. Steel surfaces in contact with sealant:
    - a. Sandblast as required to achieve acceptable surface for bonding.
    - b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
    - c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.

2. Remove protective coatings on steel by sandblasting or by using a solvent that leaves no residue.
- C. Aluminum surfaces:
1. Remove temporary protective coatings, dirt, oil, and grease.
  2. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
  3. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

### 3.03 INSTALLATION OF BACKUP MATERIAL

- A. Use only the backup material recommended by the manufacturer of the sealant used, and accepted by the Architect for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.
- B. When using backup of tub or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.
- C. Interior and exterior joints where no backing has been provided or which is in excess of 3/4" deep shall be packed by this subcontractor with fiberglass or a suitable joint filler to reduce the depth to 1/2" maximum. Maximum movement: the width of the joint shall be at least four times its maximum movement.

### 3.04 PRIMING

- A. Use only the primer recommended by the manufacturer of the sealant, and accepted by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as accepted by the Architect.
- B. The priming of joints shall be by brush to reach all surfaces to which compound will be applied. Primer shall be provided on masonry, concrete and wood surfaces as recommended by sealant manufacturer. Primer shall not be applied to surfaces that will be exposed after caulking is completed.

### 3.05 BOND-BREAKER INSTALLATION

Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the installation recommendations as accepted by the Architect.

### 3.06 INSTALLATION OF SEALANTS

- A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.
- B. Equipment:
  1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.
  2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.
- C. Thoroughly and complete mask joints where the appearance of sealant on adjacent surfaces would be objectionable.
- D. Install the sealant in strict accordance with the manufacturer's recommendations as accepted by the Architect, thoroughly filling joints to the recommended depth.
- E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

F. Cleaning up:

1. Remove masking tape immediately after joints have been tooled.
2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
3. The excess material shall be cleaned from the surfaces adjacent to the joint, following the caulking operation and the top of the compound deposit shall be left with a smooth even finish. No material is permitted on the exposed face of aluminum sections.

**\*\*\* END OF SECTION \*\*\***

## SECTION 08100

### METAL DOORS AND FRAMES

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

Work under this section comprises of furnishing hollow metal doors and frames, including transom frames, sidelight and window frames with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled.

##### 1.03 REFERENCES

###### A. Standards:

1. 2010 NFPA 80 – Fire Doors and Window
2. ANSI/SDI-100 – Recommended Specifications for Standard Steel Doors and Frames
3. ASTM-F 476 – Standard Test Methods for Security of Swinging Doors Assemblies
4. HMMA 862 – Guide Specifications for Commercial Security Hollow Metal Doors and Frames
5. SDI-105 – Recommended Erection Instructions for Steel Frames
6. SDI-107 – Hardware on Steel Doors (reinforcement application)
7. ANSI-A250.4 – Steel Doors and Frames Physical Endurance
8. UL10C - Standard for Positive Pressure Fire Tests of Door Assemblies
9. UL752 – Ballistic Standards

###### B. Codes:

1. 2009 NFPA-101 – Life Safety Code
2. 2009 CBC – California Building Code
3. ANSI-A117.1 – Accessible and Usable Building and Facilities
4. 2010 DOJ – ADA Standards for Accessible Design - DOJ

##### 1.04 QUALITY ASSURANCE

- A. Manufacturer shall be a member in good standing of the Steel Door Institute (SDI).
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- C. Unless specifically otherwise accepted by the Architect, provide all products of this Section from a single manufacturer.
- D. Fire Rated Door Assemblies:
  1. All labeled fire door assemblies to be of a type that have been classified and listed in accordance with the latest edition of NFPA80 and test in compliance with NFPA-252, and UL10C. A physical label is to be affixed to the fire door at an authorized facility; embossed labels are acceptable on standard 3 sided door frames.

2. For openings required to be fire rated exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.
3. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
4. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product data: submit:
  1. List of items that will be provided under this Section.
  2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
  4. Provide a schedule of doors and frames using same reference numbers for details and door openings as those on the contract documents.
  5. Submit shop drawings. Shop drawings should include the following information:
    - a. Material thickness and/or gauge.
    - b. Door core material.
    - c. Mortises and reinforcements.
    - d. Anchorage types.
    - e. Locations of exposed fasteners.
    - f. Glazed, louvered and paneled openings.
    - g. Mounting locations of standard hardware

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Adhere to requirements of Section 01620.
- B. The supplier shall deliver all materials to the project site; direct factory shipments are not allowed unless agreed upon beforehand. Supplier shall coordinate delivery times and schedules with the contractor.
- C. Deliver doors cardboard wrapped or crated to provide protection during transit and jobsite storage. Provide additional protection to prevent damage to any factory-finished doors. Mark all doors and frames with opening numbers as shown on the contract documents and shop drawings.

- D. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the architect. Otherwise, remove and replace damaged goods as directed.
- E. Store doors and frames at the building site in a dry and secure place.
  - 1. Place units on minimum 4" high wood blocking.
  - 2. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber.
  - 3. If cardboard wrapper on door becomes wet, remove carton immediately.
  - 4. Provide 1/4" spaces between stacked doors to promote air circulation.

1.08 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

- 1. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
- 2. All doors and frames shall be warranted in writing by the manufacturer against defects in materials and workmanship for a period of one (1) year commencing on the date of final completion and acceptance.

**PART 2 – PRODUCTS**

2.01 MANUFACTURERS

Subject to compliance with requirements, provide standard hollow metal doors and frames by one of the following:

- A. Security Metals
- B. Door Components
- C. Ceco Corporation
- D. Curries Company
- E. Steelcraft Company

2.02 MATERIALS

- A. All doors and frames shall be manufactured of commercial quality cold rolled steel per ASTM-A366 and A568 general requirements; galvanized to A60 or G60 or galvanealed to A40 minimum coating weight standard per ASTM-A924. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569

- B. Supports and anchors shall be fabricated of not less than 18-gauge sheet steel, galvanized where galvanized frames are used.
- C. Where items are to be built into exterior walls, inserts, bolts and fasteners shall be hot dipped galvanized in compliance with ASTM-A153, Class C or D as applicable.
- D. Rust inhibitive enamel or paint primer shall be used, baked on, and suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces on Steel Doors and Frames."
- E. Where specified supply embossed steel doors with wood grain appearance. Wood grain shall follow the pattern of a stile and rail wood door with both vertical and horizontal grain patterns. Doors with vision lites are required to have wood grain window kits.
- F. Finish: See Door & Hardware Schedule and Finish Schedules.

2.03 METAL DOORS

- A. Provide 1 3/4" thick doors of materials and ANSI/SDI-100 grades and models specified below, or as indicated on drawings or schedules:

- 1. Interior Doors: Level 2, Model 2 – Seamless

Interior doors shall be minimum 16-gauge steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door. Acceptable Manufacturers/Products:

- a. Ceco: Regent-16-SEM
- b. Curries: 707N-16
- c. Steelcraft: LF16
- d. Architect Approved Equal

- 2. Exterior Doors: Level 3, Model 2 – Seamless

Exterior doors shall be minimum 16-gauge galvanized or galvanealed steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door. Exterior doors shall be insulated with a solid slab of expanded polystyrene or polyurethane foam permanently bonded to the inside of each face skin. The top of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes. Acceptable Manufacturers/Products:

- a. Ceco: Legion-16-SEM
- b. Curries: 707N-16
- c. Steelcraft: LF16-Polystyrene
- d. Architect Approved Equal

- 3. Security Doors: Level 3, Model 2 – Seamless

Doors shall be minimum 14-gauge steel with both lock and hinge rail edge of door continuously wire welded the entire height of the door. Doors shall be reinforced, stiffened, insulated, and sound deadened with continuous 20 gauge vertical steel stiffeners spaced not more than 6" (152) apart. The stiffener ends shall be welded together at the top and bottom ends. All spaces between stiffeners shall be insulated with .75 pound density fiberglass insulation. The top of all doors shall be closed flush by the addition of a 14-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes. Acceptable Manufacturers/Products:

- a. Ceco: Medallion-14

- b. Curries: 747T-14
- c. Steelcraft: BW14
- d. Architect Approved Equal

4. Bullet Resistant Doors

- a. Bullet resistant hollow metal doors shall be constructed with vertical steel stiffeners and fully welded vertical edge seams for enhanced strength and aesthetic appearance. Internal door construction and concealed armor plate shall vary and is dependent on the required ballistic rating. Provide ballistic level doors as follows:
  - i. Level 1: Super 38 Automatic
  - ii. Level 2: .357 Magnum Revolver
  - iii. Level 3: .44 Magnum Revolver
  - iv. Level 4: 30-06 Rifle
- b. Subject with compliance to the outline requirements, provide products by the following manufacturers:
  - i. Ceco: Armorshield
  - ii. Curries: 847/857
  - iii. Security Metals
  - iv. Architect Approved Equal

B. All doors shall be reinforced for hardware as shown below where necessary to preclude the use of thru-bolts.

- 1. Exit Devices: 14-gauge
- 2. Door Closers: 12-gauge

C. All doors shall be beveled 1/8" in 2" and shall have top and bottom channels of not less than 16-gauge, flush or inverted, welded to the face sheets. Doors shall have a full height 14-gauge hinge rail reinforcement channel, or individual 10 gauge hinge reinforcements

D. All doors to conform to ANSI-A250.4 Level "A" criteria and shall be tested to 1,000,000 operating cycles and 23 twist tests. Certification of Level "A" doors is to be submitted with approval drawings by supplier upon request. Do no bid or supply any type or gauge of door not having been tested and passed these criteria

2.04 METAL FRAMES

A. Provide hollow metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the drawings and schedules. Conceal fastenings unless otherwise indicated:

- 1. Interior Frames: Level 2, 16-gauge
- 2. Exterior Frames: Level 2, 16-gauge, galvanized or galvanealed
- 3. Security Grade Frames: 14-gauge

B. Acceptable Manufacturers/Products:

- 1. Ceco: SU Series
- 2. Curries: M Series
- 3. Steelcraft: F Series



- C. All frames over 36" in width shall be 14-gauge.
- D. Fabricate frames with mitered corners. Weld both the inside the throat of the corners and the face of the corners, re-prime at the welded areas. All welds to be flush with neatly mitered or butted material cuts.
- E. All frames shall have minimum 7-gauge hinge reinforcements, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.
- F. All frames shall have minimum 7-gauge hinge reinforcements with an additional high frequency 12-gauge hinge reinforcement welded to the top hinge, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.
- G. Provide temporary shipping bars to be removed before setting frames.
- H. Except on weather stripped frames, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.
- I. Provide minimum 0.0179" thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings

## 2.05 DOOR LOUVERS

### A. Fire-Rated Louver:

- 1. Each fire-rated louver shall have the listing mark of Underwriter's Laboratories Inc. affixed to louver assembly.
- 2. All louvers in fire-rated doors shall be 16-gauge cold rolled steel with stainless steel operating springs.
- 3. Louvers shall be sight-proof per SDI-111C.

### B. Fixed-Blade Louver:

- 1. All fixed blade louvers shall be 18-gauge cold rolled steel with mitered and welded frames and countersunk mounting holes.
- 2. Louvers shall be sight-proof per SDI-111C.
- 3. Provide insect screen where louver occur in exterior doors.

## 2.06 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.
  - 1. Clearances shall be no more than 1/8" at jambs and heads except between non fire rated pairs of doors which may be no more than 1/4."
  - 2. Clearances shall be no more than 3/4" at the bottom of the doors.
  - 3. Clearances shall be no more than 1/4" at thresholds and curbs allow unless otherwise detailed.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.
  - 1. All doors shall be of types and sizes on the drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Doors shall be strong, rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.

2. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
  3. Top and bottom edges shall be closed with a continuous recessed 16 gauge steel channel extending the full width and spot welded to both faces. Exterior doors shall have an additional flush closing channel at the top edge. Opening shall be provided in the bottom closer for escape of entrapped moisture.
  4. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully template hardware only. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only, with drilling and tapping to be done in the field.
  5. The Face sheets of Exterior and Security doors shall be stiffened by continuous vertical formed steel sections occupying the full thickness of the interior space between door faces. These stiffeners shall be not less than 20 gauge, spaced not more than 6" apart and securely attached to both face sheets by spot welds not more than 4" o.c. Spaces between stiffeners shall be sound deadened and insulated the full height of the door with an inorganic non-combustible batt-type material.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
1. All door and louver frames shall be strong and rigid, neat in appearance, square, true and free of defects, warp and buckle. Molded members shall be clean cut, straight and of uniform profile and back-bends shall be as detailed.
  2. Corner joints shall have all contact edges closed tight, with trim faces and stops mitered and continuously welded. All welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
  3. Unit frames for installation in stud partitions shall be provided with steel anchors of suitable design for welding to steel studs. Anchors shall be not less than 16-gauge and shall be securely welded inside each jamb. Anchors are to be spaced at 24" on center.
  4. Dust cover boxes of not less than 26-gauge shall be provided at all hardware mortises on frames to be set in masonry or drywall partitions.
- D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
- E. Unless otherwise indicated, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.
- F. Labeled doors and frames shall be provided for those openings requiring fire protection ratings, as scheduled on the drawings. Such doors and frames shall be constructed as tested by the Underwriter's Laboratories, Inc., and shall bear their label for the required rating. Provide additional frame accessories as required to maintain the fire protection ratings once the frames are installed in the openings.
- G. At exterior locations and elsewhere as shown or scheduled, assemblies fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies. Unless otherwise indicated, provide thermal-rated assemblies with a minimum U-value rating of 0.41 Btu/sq. ft. x h x deg F.
- H. Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413. Unless otherwise indicated, provide acoustical assemblies with STC sound ratings of 33 or better.

- I. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI-107 and ANSI-A115 Series specifications for door and frame preparation for hardware.
- J. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site. Provide internal reinforcements for all doors to receive door closers and exit devices.
- K. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- L. Provide glazing stops with minimum 0.0359-inch- thick steel or 0.040-inch- thick aluminum.
- M. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
- N. Provide screw-applied, removable, glazing beads on inside of glass and other panels in doors.

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

#### **3.02 FIELD MEASUREMENTS**

Verify all opening dimensions in the field prior to fabrication and assembly of frames.

#### **3.03 INSTALLATION**

- A. Install steel doors, frames, and accessories according to shop drawings, manufacturer's data, and as specified.
- B. Comply with provisions of SDI-105, "Recommended Erection Instructions for Steel Door Frames," unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
  - 2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
  - 3. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
  - 4. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
  - 5. Install fire-rated frames according to NFPA 80.

- C. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100. Install fire rated doors with clearances specified in NFPA 80.

3.04 ADJUST AND CLEAN

- A. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touch-up of compatible air-drying primer.
- B. Immediately before final inspection, remove protective wrappings from doors and frames.
- C. Final adjustments:
  - 1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
  - 2. Leave work in complete and proper operating condition.
  - 3. Remove defective work and replace with work complying with the specified requirements.

**\*\*\* END OF SECTION \*\*\***

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## SECTION 08360

### INSULATED ROLLING SERVICE DOORS

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

Insulated rolling service doors

##### 1.03 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.04 SUBMITTALS

A. Provide in accordance with Article 3.11 of the General Conditions.

B. Provide the following Product data:

1. List of items that will be provided.
2. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.
3. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

##### 1.05 PRODUCT HANDLING

A. Comply with the requirements of Section 01620.

B. Lift doors and carry them into position. Do not drag doors across one another.

##### 1.06 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

###### A. Reports:

None required.

###### B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

###### C. Operation and Maintenance Data:

None required

###### D. Extra Materials:

None required

###### E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

1. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.

2. All Cookson Rolling Insulated Service Doors shall be warranted for a period of 2 years from the time of shipment against defects in workmanship and materials.

## **PART 2 – PRODUCTS**

### **2.01 MANUFACTURERS**

- A. The Cookson Company (602) 272-4244, <http://www.cooksondoor.com>
- B. Overhead Door (800) 929-Door, <http://www.overheaddoor.com>
- C. Architect approved equal.

### **2.02 MOTOR OPERATED INSULATED ROLLING SERVICE DOOR**

- A. All Rolling Insulated Service Doors shall be as manufactured by The Cookson Company, Phoenix, Arizona. Furnished materials shall include all curtains, bottom bars, guides, brackets, hoods, operating mechanisms and any special features.
- B. Work not to be included by The Cookson Company includes design of, material for, and preparation of door openings but not limited to structural or miscellaneous iron work, access panels, finish painting, electrical wiring, conduit and disconnect switches.

### **2.03 QUALITY ASSURANCE**

- A. Exterior rolling insulated service doors shall be designed to withstand at least twenty (20) pounds per square foot windload. Windlocks shall be installed on doors over 16'1" wide.
- B. All rolling insulated service doors shall be designed to a standard maximum use of 25 cycles per day and an overall maximum of 50,000 operating cycles for the life of the door.

### **2.04 MATERIALS**

- A. The door curtain shall be constructed of interconnected strip steel slats conforming to ASTM A-653. The slats shall be designated by The Cookson Company as No. 45 (measuring 3" high by 7/8" deep) consisting of a 22 gauge exterior slat and a 22 gauge interior slat separated by 13/16" of rigid insulation for doors up to 24' wide, and 20 gauge exterior slat and a 22 gauge interior slat separated by 13/16" of rigid insulation for doors over 24' wide.
- B. The finish on the door curtain shall be Cookson ColorCote consisting of the following:
  - 1. Hot dipped galvanized G-90 coating consistent with ASTM A-653
  - 2. Bonderized coating for prime coat adhesion
  - 3. Factory applied Thermosetting Powder Coating applied with a minimum thickness of 2 mils. The color shall be selected by the architect and shall be chosen from standard color chart.
- C. The bottom bar shall consist of two 1/8" steel angles mechanically joined together and shall include the Cookson Featheredge safety edge system. The finish on the bottom bar shall be the Cookson ColorCote finish as indicated in the curtain section.
- D. The guides shall consist of 4 steel angles bolted together with 3/8" fasteners to form a channel for the curtain to travel. Extruded vinyl snap-on weatherstripping shall be furnished continuously along the exterior leg of each guide. The wall angle portion shall be continuous and fastened to the surrounding structure with either minimum 1/2" fasteners or welds, both on 36" centers. The finish on the guide angles shall be the Cookson ColorCote finish as indicated in the curtain section.
- E. The brackets shall be constructed of steel not less than 1/4" thick and shall be bolted to the wall angle with minimum 1/2" fasteners. The finish on the brackets shall be the Cookson ColorCote finish as indicated in the curtain section.

- F. The barrel shall be steel tubing of not less than 6" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the width of the curtain. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of bronze rust-inhibiting prime paint.
- G. The hood shall be fabricated from 24 gauge galvanized steel and shall be formed to fit the curvature of the brackets. The hood shall contain a waterproof baffle to control air infiltration. The finish on the hood shall be the Cookson ColorCote finish as indicated in the curtain section.

## 2.05 OPERATION

- A. The door shall be operated at a speed of 2/3 foot per second by an open drip-proof electric motor with gear reducer in oil bath. The motor operator shall include a geared limit switch, and an electrically interlocked emergency chain operator. The motor starter shall be housed in a NEMA 1 housing and include a magnetic reversing starter size 0, a 24 volt control transformer, and complete terminal strip to facilitate field wiring. The motor operator shall be activated by [a 3 button push-button station] [other controls as selected] in a NEMA 1 enclosure. The motor shall be size as required by the door [115 volts single phase] [230 volts single phase] [230 volts three phase] [460 volts three phase]. The motor operator shall be mounted to the door bracket as shown on drawings. All motor operators shall be U.L. listed.
- B. The service door shall include the Featheredge rolling door safety edge system as manufactured by The Cookson Company and shall include the following features:
  - 1. The Featheredge shall be installed on the bottom bar of the door and shall automatically reverse the door if the device detects an obstruction in the downward travel of the door.
  - 2. The Featheredge shall consist of a rubber boot attached below the bottom bar with an electrical switch secured to the back of the bottom bar. The Featheredge shall operate with air wave technology and shall not rely on pneumatic pressure or electrical strip contacts to operate properly. The Featheredge shall create an air wave that shall be detected and reverse the direction of the rolling door.
  - 3. The operation of the Featheredge shall not be subject to interferences by temperature, barometric pressure, water infiltration, or cuts in the rubber boot.
  - 4. The Featheredge shall be connected to the motor operator with a coil cord.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

### 3.02 INSTALLATION

An authorized Cookson distributor shall install all Cookson Rolling Insulated Service doors.

### 3.03 ADJUSTING AND CLEANING

- A. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion.



- B. Touch-up damaged coatings and finishes and repair any damage. Clean all exposed surfaces as recommended by manufacturer.

**\*\*\* END OF SECTION \*\*\***

## SECTION 08500

### ALUMINUM WINDOWS

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SUMMARY

This section includes the following:

1. AA<sup>®</sup>900 ISOWEB<sup>®</sup> Fixed Window
2. Heavy Commercial Grade (HC rating)/Architectural Grade (AW rating)
3. Architectural details, product descriptions and product performance specifications are based on products manufactured by the Kawneer Company Inc.

##### 1.03 REFERENCES

###### A. Aluminum Association (AA):

DAF-45: Designation System for Aluminum Finishes

###### B. American Architectural Manufacturers Association (AAMA):

1. 2605: Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
2. 611: Voluntary Specification for Anodized Architectural Aluminum.

###### C. American National Standards Institute (ANSI):

Z97.1: Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

###### D. American Society for Testing and Materials (ASTM):

1. A123: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2. A525: General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.
3. A526: Sheet Steel, Zinc Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
4. B209: Aluminum and Aluminum-Alloy Sheet and Plate.
5. B221: Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
6. B308: Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
7. C716: Installing Lock-Strip Gaskets and Infill Glazing Materials.
8. C920: Elastomeric Joint Sealants.
9. E283: Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors.
10. E330: Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
11. E331: Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
12. E773: Test Method for Seal Durability of Sealed Insulating Glass Units.

- 13. E774: Sealed Insulating Glass Units.
- E. Consumer Product Safety Commission (CPSC)
  - 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- F. Federal Specifications (FS):
  - TT-P-645A: Primer, Paint, Zinc Chromate, Alkyd Type.
- G. Glass Association of North America (GANA):
  - Glazing Manual

1.04 SYSTEM DESCRIPTION

- A. General: Commercial Grade Architectural Aluminum Windows, including glass and glazing, metal panels, perimeter trims, sills and stools, window installation hardware and accessories, shims and anchors, and perimeter sealing of window units.
- B. Aluminum Windows include: Kawneer Company, Inc., AA<sup>®</sup>900 ISOWEB<sup>®</sup> Window in accordance with AAMA /WDMA/CSA 101/I.S.2/A440-05 Standard/Specification for Windows, Doors, and Unit Skylights for a Class and Grade of FW-HC90/FW-AW90 and in accordance with CAN/CSA-A440-00 Windows.
- C. Test Units:
  - 1. All test unit sizes and configurations shall conform to the minimum size in accordance with AAMA /WDMA/CSA 101/I.S.2/A440-05 for the designation FW-HC90/FW-AW90 and CAN/CSA-A440-00 Windows.
  - 2. Units submitted for laboratory testing shall be units of the manufacturer's standard construction, glazed and assembled in accordance with the manufacturer's specifications and AAMA /WDMA/CSA 101/I.S.2/A440-05 and CAN/CSA-A440-00 Windows.
- D. Fixed Window Performance Requirements:
  - 1. Wind loads: Provide window system; include anchorage, capable of withstanding wind load design pressures of based on 85 mph, exposure C, Occupancy Category IV of an enclosed structure. The design pressures are based on the (California) Building Code; (2010) Edition.
  - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E283 at a minimum size of 60" x 90" (1524 x 2286). Air infiltration rate shall not exceed 0.10 cfm/ft<sup>2</sup> at a static air pressure differential of 6.24 psf (300 Pa). The test specimen shall meet the Fixed rating of less than 0.25 (m<sup>3</sup>/h)/m at 300Pa when tested in accordance with CAN/CSA-A440-00 Windows.
  - 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E547 and ASTM E331 at a minimum size of 60" x 90" (1524 x 2286). There shall be no leakage as defined in the test method at a static air pressure differential of 15 psf (720 Pa). The test specimen shall meet the B7 rating with no water leakage at 720 Pa when tested in accordance with CAN/CSA-A440-00 Windows.
  - 4. Uniform Load Deflection: A minimum static air pressure difference of 90 psf (4310 Pa) shall be applied in the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of L/175 of the span of any framing member. The test specimen shall meet the C5 rating when tested in accordance with CAN/CSA-A440-00 Windows.
  - 5. Uniform Load Structural: A minimum static air pressure difference of 135 psf (6465 Pa) shall be applied in the positive and negative direction in accordance with ASTM E330. The unit shall be evaluated after each load.

6. Component Testing: Window components shall be tested in accordance with procedures described in AAMA/WDMA/CSA 101/I.S.2/A440-05.
7. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than 0.34 BTU/hr/ft<sup>2</sup>/°F.
8. Condensation Resistance (CRF): When tested to AAMA Specification 1503 and CAN/CSA-A440, the condensation resistance factor (CFR) shall not be less than 67 (66 I-Frame).
9. Forced Entry Resistance: All windows shall conform to AAMA 1302.5.
10. Thermal Barrier Test: Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

#### 1.05 QUALITY ASSURANCE

##### A. Qualifications:

1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.

- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

#### 1.06 SUBSTITUTIONS

- A. Substitutions will be considered per Article 3.3 of the Instruction to bidders of the Bid Package Section 00003.

##### B. Substitution Documentation. Provide for evaluation:

1. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
2. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for window system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum windows for a period of not less than ten (10) years. (Company Name)
3. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
4. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

#### 1.07 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.

##### B. Submit the following:

1. Product Data.
2. Samples
3. Shop drawings showing installation details for Architect's approval. These drawings shall also show elevations of windows, full-sized details of all sections of windows, collateral materials, details of anchorage and hardware.

4. Supplemental data shall contain instructions for storage, handling and erection of windows

C. Quality Assurance/Control Submittals:

Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.08 PRODUCT HANDLING

- A. Adhere to requirements of Section 01620.
- B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Packing, Shipping, Handling and Unloading: 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. Handle window material and components to avoid damage. Protect window material against damage from elements, construction activities, and other hazards before, during and after window installation.

1.09 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

1. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.
2. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for window system as follows: Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer.

## **PART 2 -- PRODUCTS**

2.01 MANUFACTURERS

- A. Kawneer Company, Inc.
- B. Oldcastle Building Envelope
- C. Arcadia
- D. Architect approved equal.

2.02 WINDOW SYSTEM

- A. Kawneer Aluminum Window System
- B. Series: AA<sup>®</sup>900 ISOWEB<sup>®</sup> Thermal Window System
- C. Window Member Profile: 2-5/8" (67) nominal dimension.
- D. Finish/Color: (See 2.09 Finishes)

2.03 MATERIALS

- A. Aluminum (Windows and Components): Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of Extruded Material Standard: ASTM B 221, 6063-T6 alloy and temper.
- B. Steel Reinforcement: Complying with ASTM A 36/ A 36M for structural shapes, plates and bars; ASTM A 611 for cold-rolled sheet and strip or ASTM A 570/ A 570M for hot-rolled sheet and strip.
- C. Glazing Gaskets: Dry glazing gaskets shall be an extruded EPDM in accordance with ASTM C864.
- D. Glazing Sealant: Wet glazing material shall be a 100 percent silicone, neutral-cure sealant in accordance with AAMA 805.2-94, Group A.
- E. Fasteners: Where exposed, shall be 300 Series Stainless Steel.
- F. Thermal Barrier: The thermal barrier shall be Kawneer ISOWEB<sup>®</sup> consisting of two parallel glass fiber-reinforced nylon strips installed continuously and mechanically bonded to the aluminum.

2.04 ACCESSORIES

- A. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- B. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- C. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section "Joint Sealants".
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- E. Glazing: Factory glazing as required and specified in Division 8 Section "Glazing".
- F. Coupling Mullions: Shall be extruded aluminum of 6063-T6 alloy and temper of profile and dimensions indicated on drawings. Mullions shall provide structural properties to resist wind pressure required by performance criteria and standards.

2.05 RELATED MATERIALS

- A. Sealants: Refer to Division 7 Section "Joint Sealants"
- B. Glass: Glass thickness and type shall be in accordance with glass manufacturer's recommendations for prescribed design pressure. Refer to Division 8 Section "Glass and Glazing".
  - 1. Factory glazing (if required) shall be in accordance with manufacturer's standard requirements.
  - 2. Glazing materials shall be compatible with aluminum and those sealants and sealing materials used in composite structure which have direct contact with the gasket.
- C. Insulation: Refer to Division 7 Section "Building Insulation".

- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

## 2.06 COMPONENTS

- A. The frame depth shall be not less than 2-5/8".
- B. All frame members shall have minimum wall thickness of 0.070" and shall provide the structural strength sufficient to meet the specified performance requirements.
- C. Glazing beads shall be extruded aluminum and shall be a minimum thickness of 0.060".
- D. Reference to tolerances for wall thickness and other cross-sectional dimensions of window members are nominal and in compliance with AA Aluminum Standards and Data.
- E. All references to dimensions for wall thicknesses and other cross-sectional dimensions of window members are nominal and in compliance with ANSI H35.2-1990.
- F. All frame members shall be tubular.

## 2.07 FABRICATION

- A. General: Fabricate components per manufacturer's installation instructions. When assembled, components shall be accurately fitted to produce hairline joints.
- B. Window Frame Joinery: Mitered and mechanically clipped and/or staked.
- C. Factory sealed frame and corner joints.

## 2.08 FINISHES

Factory Finishing -

Fluropon® (70% PVDF), AAMA 2605, Fluoropolymer Coating

Interpon® D2000, AAMA 2604, Powder Coating

## 2.09 FINISH

- A. Cover all exposed areas of aluminum windows and components. Exterior finish shall be 70% Polyvinylidene Fluoride.
- B. Type: high performance baked-on organic coating.
- C. AAMA Specification: Comply with AAMA 2605.
- D. Aluminum Association Designation: AA.M10.C22.A4X.
- E. Color: As indicated in Architectural drawings.

## 2.10 SOURCE QUALITY CONTROL

- A. Single Source Quality: Provide aluminum windows specified herein from a single source.
- B. Building Enclosure System: When aluminum windows are part of a building enclosure system, including entrances, entrance hardware, curtain walls, storefront systems, sliding glass doors, slope glazing, and related products, provide building enclosure system products from a single source manufacturer.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

- B. 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. Verify openings are sized to receive window system and sill plate is level in accordance with manufacturer's acceptable tolerances.
- C. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

### 3.02 INSTALLATION

- A. General: Install window system in accordance with manufacturer's instructions and AAMA window guide specifications manual.
  - 1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
  - 2. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
  - 3. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
  - 4. Provide alignment attachments and shims to permanently fasten system to building structure.
  - 5. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
- B. Related Products Installation Requirements:
  - 1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.
  - 2. Glass: Refer to Glass and Glazing Section.
  - 3. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

### 3.03 FIELD QUALITY CONTROL

Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

### 3.04 PROTECTION AND CLEANING

- A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum window system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
- B. Cleaning: Repair or replace damaged installed products.
- C. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- D. Remove construction debris from project site and legally dispose of debris.

**\*\*\* END OF SECTION \*\*\***



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**SECTION 08710**  
**FINISH HARDWARE**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

**1.02 SCOPE OF WORK**

**A. Section Includes:**

1. Door Hardware, including electric hardware.
2. Card Access control system.
3. Power supplies for electric hardware.

**B. Specific Omissions: Hardware for the following is specified or indicated elsewhere.**

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.
8. Folding partitions, except cylinders where detailed.
9. Access doors and panels, except cylinders where detailed.

**1.03 REFERENCES:**

Use date of standard in effect as of Bid date.

- A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- B. ICC/ANSI A117.1 - 1998 – Specifications for making buildings and facilities usable by physically handicapped people.
- C. ADA – Americans with Disabilities Act of 1990
- D. BHMA – Builders Hardware Manufacturers Association
- E. DHI – Door and Hardware Institute
- F. NFPA – National Fire Protection Association
  1. NFPA 80 – Fire Doors and Windows
  2. NFPA 105 – Smoke and Draft Control Door Assemblies
  3. NFPA 252 – Fire Tests of Door Assemblies
- G. UL – Underwriters Laboratories
  1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
  2. UL 305 – Panic Hardware
- H. WHI – Warnock Hersey Incorporated State of California Building Code
- I. Local applicable codes

- J. SDI – Steel Door Institute
- K. WI – Woodwork Institute
- L. AWI – Architectural Woodwork Institute
- M. NAAMM – National Association of Architectural Metal Manufacturers

1.04 QUALITY ASSURANCE:

A. Qualifications:

- 1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.

- a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

- B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / UBC Standard 7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
- E. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
- F. See 2.6.E for added information regarding resilient and intumescent seals.
- G. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.
- H. Pre-Installation Meetings: Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware and door closers in the meetings. Convene prior to commencement of related work.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
- C. Deviations: Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.
- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, not the discrepancy in the submittal and request direction from Architect for resolution.
- E. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.

- F. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Comply with the requirements of Section 01620.
- B. Delivery: coordinate delivery to appropriate locations (shop or field).
  - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
- C. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- D. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.08 PROJECT CONDITIONS AND COORDINATION

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: 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 proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
  - 1. Location of embedded and attached items to concrete.
  - 2. Location of wall-mounted hardware, including wall stops.
  - 3. Location of finish floor materials and floor-mounted hardware.
  - 4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
  - 5. Manufacturer templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

1.09 COMMISSIONING

- A. Conduct these tests prior to request for certificate of substantial completion:
  - 1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
  - 2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
  - 3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.10 REGULATORY REQUIREMENTS

- A. Locate latching hardware between 30" to 44" above the finished floor, per California Building Code, Section 1133B.2.5.1.

- B. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.
- C. Adjust door closer sweep periods so that from an 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, per California Building Code Section 1133B.2.5.1
- D. All hardware to meet California Building Code Sections 1133B.2.1, 1133B.2.5.1 and 1003.3.1.8I.
- E. Thresholds: Comply with California Building Code Section 1133B.2.4.1.
- F. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls.

1.11 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

1. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.
2. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:

1.	Locksets:	Three years
2.	Exit Devices:	Three years mechanical One year electrical
3.	Closers:	Ten years mechanical
4.	Hinges:	One year
5.	Other Hardware	Two years

## PART 2 – PRODUCTS

### 2.01 MANUFACTURERS

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:
Hinges	(IVE) Ives	Bommer
Key System	(SCH) Schlage Primus	Owner Standard
Locks	(SCH) Schlage	Owner Standard
Exit Devices	(VON) Von Duprin	Owner Standard
Closers	(LCN) LCN	Owner Standard
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	DCI
Silencers	(IVE) Ives	Rockwood
Push & Pull Plates	(IVE) Ives	Rockwood
Kickplates	(IVE) Ives	Rockwood
Stops & Holders	(IVE) Ives	Rockwood
Overhead Stops	(GLY) Glynn-Johnson	None available
Thresholds	(NGP) NGP	Zero
Seals & Bottoms	(NGP) NGP	Zero

### 2.02 HINGING METHODS

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

- C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
  2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

## 2.03 LOCKSETS, LATCHSETS, DEADBOLTS

### A. Mortise Locksets and Latchsets: as scheduled.

1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
  - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
5. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
6. Deadbolts: stainless steel 1-inch throw.
7. Electric operation: Manufacturer-installed continuous duty solenoid.
8. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
9. Scheduled Lock Series and Design: Schlage L series, 06A design.
10. Certifications:
  - a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
  - b) ANSI/ASTM F476-84 Grade 31 UL Listed.

## 2.04 EXIT DEVICES / PANIC HARDWARE

### A. General features:

1. Independent lab-tested 1,000,000 cycles.
2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. 0.75-inch throw deadlocking latchbolts.
4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 15-lb. maximum operating force per UBC Standard 10-4, and with 32 lb. maximum pressure under 250-lb. load to the door.
8. Flush end cap design as opposed to typical "bottle-cap" design end cap.
9. Comply with CBC Section 1003.3.1.9.

B. Specific features:

1. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
2. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
3. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
4. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.
5. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.

2.05 CLOSERS

A. Surface Closers: 4041

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV) not permitted.

2.06 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.



- D. Door Stops: Provide stops to protect walls, casework or other hardware.
  - 1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
  - 2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.
  - 1. Proposed substitutions: submit for approval.
  - 2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
  - 3. Non-corroding fasteners at in-swinging exterior doors.
- F. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- G. Thresholds: As scheduled and per details. Comply with CBC Section 1133B.2.4.1. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
  - 1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
  - 2. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
  - 3. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- H. Through-bolts: Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.
- I. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

## 2.07 FINISH

- A. Generally BHMA 626 Satin Chromium
  - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

## 2.08 KEYING REQUIREMENTS

- A. Key System: Schlage Everest Primus high-security utility-patented keyway, interchangeable core throughout. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner and I-R Security Technologies representatives to determine system keyway(s), keybow styles, structure, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system. Contractor will install permanent cylinders/cores.
1. Primus Level 9
  2. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
  3. Temporary cylinders/cores remain supplier's property.
  4. Furnish 10 construction keys.
  5. Furnish 2 construction control keys.
  6. Key Cylinders: furnish 6-pin solid brass construction.
- B. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.
- C. Permanent keys: use secured shipment direct from point of origination to Owner.
1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
- D. Bitting List: use secured shipment direct from point of origination to Owner at completion.

## **PART 3 – EXECUTION**

### 3.01 ACCEPTABLE INSTALLERS

- A. Can read and understand manufacturers' templates, suppliers hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

### 3.02 PREPARATION

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
1. Notify Architect of code conflicts before ordering material.
  2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor, per CBC Section 1133B.2.5.1.
  3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

### 3.03 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
  - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
  - 2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
  - 3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
  - 4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.
- D. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- E. Drill pilot holes for fasteners in wood doors and/or frames.
- F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

### 3.04 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
  - 1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.
  - 2. Adjust doors to fully latch with no more than 1 pound of pressure.
  - 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
  - 4. Adjust door closers per 1.9 this section.
- B. Inspection: Use hardware supplier's consultant or consultant's agent. Include supplier's report with closeout documents.
- C. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:
  - 1. Re-adjust hardware.
  - 2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
  - 3. Identify items that have deteriorated or failed.
  - 4. Submit written report identifying problems

3.05 DEMONSTRATION

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.06 PROTECTION/CLEANING

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.07 SCHEDULE OF FINISH HARDWARE

A. See door schedule in drawings for hardware set assignments.

B. Miscellaneous Material:

HW SET: 01

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	L9050JD 06A L583-363	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 02

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY	L9040 06A L583-363	626	SCH
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 03

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE	L9010 06A	626	SCH
1	EA	OVERHEAD HOLDER	450S	626	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 04

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080JD 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	OVERHEAD HOLDER	450H	626	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 05

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070JD 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041-H	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 06

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	L9050JD 06A L583-363	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 07

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8300 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4041-DA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 08

2	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU STOREROOM LOCK	L9080JEU RX 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE

CARD READER(S) BY ACCESS CONTROL SECTION  
 OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED. DOOR UNLOCKED VIA  
 CARD READER OR MECHANICAL KEY .  
 FREE EGRESS AT ALL TIMES.

HW SET: 09

2	EA	HINGE	3CB1HW 5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1HW 5 X 4 TW4	652	IVE
1	EA	EU INSTITUTION LOCK	KL9082JDCEU 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	DOOR POSITION SWITCH	679-05 WD		SCE

CARD READER(S) BY ACCESS CONTROL SECTION  
 OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED BOTH SIDES. DOOR UNLOCKED VIA CARD READER OR MECHANICAL KEY.

HW SET: 10

2	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU INSTITUTION LOCK	KL9082JDCEU 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOMESTOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	DOOR POSITION SWITCH	679-05 WD		SCE

CARD READER(S) BY ACCESS CONTROL SECTION  
 OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED BOTH SIDES. DOOR UNLOCKED VIA CARD READER OR MECHANICAL KEY.

HW SET: 11

2	EA	HINGE	3CB1HW 5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1HW 5 X 4 TW4	652	IVE
1	EA	EU INSTITUTION LOCK	KL9082JDCEU 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOMESTOP	FS436/438 AS REQ'D	626	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	POWER SUPPLY	PS902		SCE
1	EA	DOOR POSITION SWITCH	679-05 WD		SCE

CARD READER(S) BY ACCESS CONTROL SECTION  
 OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED BOTH SIDES. DOOR UNLOCKED VIA CARD READER OR MECHANICAL KEY.

HW SET: 12

2	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU INSTITUTION LOCK	L9082JDCEU 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	DOOR POSITION SWITCH	679-05 WD		SCE

CARD READER(S) BY ACCESS CONTROL SECTION

OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED BOTH SIDES. DOOR UNLOCKED VIA CARD READER OR MECHANICAL KEY .

HW SET: 13

6	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	SET	AUTO FLUSH BOLT	FB31/41 AS REQ'D	626	IVE
1	EA	DUST PROOF STRIKE	DP1/2 AS REQ'D	626	IVE
1	EA	STOREROOM LOCK	L9080JD 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
2	EA	OVERHEAD HOLDER	450H	626	GLY
2	EA	SILENCER	SR64	GRY	IVE

HW SET: 14

6	EA	HINGE	3CB1HW 5 X 4.5	652	IVE
2	EA	POWER TRANSFER	EPT-10	689	VON
1	EA	EXIT DEVICE	RX EL9947EO	626	VON
1	EA	EXIT DEVICE	RX EL9947NL-OP	626	VON
1	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	PRIMUS IC MORT CYL	20-798 FOR ALARM	626	SCH
1	EA	ELECTROMAGNETIC LOCK	M490DEP	628	SCE
2	EA	OFFSET DOOR PULL	8190-0 10" CTOC	630	IVE
1	EA	ASTRAGAL	357SP	600	NGP
1	EA	ASTRAGAL SEAL	5050N	BRN	NGP
2	EA	SURFACE CLOSER	4041	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW	630	IVE
2	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
2	EA	SILENCER	SR64	GRY	IVE
1	EA	OPTION BOARD	900-4RL FA		SCE
1	EA	POWER SUPPLY	PS914		SCE
1	EA	ELECTRONIC HORN	1910-1	WHT	SCE
1	EA	KEYSWITCH	653-05-L2	630	SCE
2	EA	DOOR POSITION SWITCH	679-05 HM		SCE

CARD READER(S) BY ACCESS CONTROL SECTION

OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND SECURED. PANIC DEVICES AND MAG LOCKS RELEASED BY CARD READERS OUTSIDE OR INSIDE. UNAUTHORIZED PERSONS

ATTEMPTING TO EXIT WILL BE DELAYED 15 SECONDS WHILE ALARM SOUNDS. ALARM RESET BY KEY AT DOOR. DURING EMERGENCY EGRESS IS FREE

HW SET: 15

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	TOILET LOCK	L9486JD 06A L/OST	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 16

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	PANIC HARDWARE	98 NL/OP	626	VON
1	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 17

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	STOREROOM LOCK	L9080JD 06A L/OST	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	OVERHEAD HOLDER	100H-ADJ	630	GLY
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 18

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	STOREROOM LOCK	L9080JD 06A L/OST	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS441/442 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP



HW SET: 18A

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	PANIC HARDWARE	98 NL/OP	626	VON
1	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS441/442 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 19

4	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	POWER TRANSFER	EPT-10	689	VON
1	EA	PANIC HARDWARE	RX-EL9875NL-OP	626	VON
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	PRIMUS IC MORT CYL	20-798 FOR ALARM	626	SCH
1	EA	IC MORTISE CYLINDER	30-007 ICX	626	SCH
1	EA	ELECTROMAGNETIC LOCK	M490DE	628	SCE
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
1	EA	OPTION BOARD	900-4RL FA		SCE
1	EA	POWER SUPPLY	PS914		SCE
1	EA	ELECTRONIC HORN	1910-1	WHT	SCE
1	EA	KEYSWITCH	653-05-L2	630	SCE
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE

CARD READER(S) BY ACCESS CONTROL SECTION

OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND SECURED. PANIC DEVICES AND MAG LOCKS RELEASED BY CARD READERS OUTSIDE OR INSIDE. UNAUTHORIZED PERSONS ATTEMPTING TO EXIT WILL BE DELAYED 15 SECONDS WHILE ALARM SOUNDS. ALARM RESET BY KEY AT DOOR. DURING EMERGENCY EGRESS IS FREE

HW SET: 20

4	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	POWER TRANSFER	EPT-10	689	VON
1	EA	PANIC HARDWARE	RX-EL9875NL-OP	626	VON
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	PRIMUS IC MORT CYL	20-798 FOR ALARM	626	SCH
1	EA	IC MORTISE CYLINDER	30-007 ICX	626	SCH
1	EA	ELECTROMAGNETIC LOCK	M490DE	628	SCE
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP	FS441/442 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	320N	AL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
1	EA	OPTION BOARD	900-4RL FA		SCE
1	EA	POWER SUPPLY	PS914		SCE
1	EA	ELECTRONIC HORN	1910-1	WHT	SCE
1	EA	KEYSWITCH	653-05-L2	630	SCE
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE

CARD READER(S) BY ACCESS CONTROL SECTION

OPERATION DESCRIPTION: DOOR NORMALLY CLOSED AND SECURED. PANIC DEVICES AND MAG LOCKS RELEASED BY CARD READERS OUTSIDE OR INSIDE. UNAUTHORIZED PERSONS ATTEMPTING TO EXIT WILL BE DELAYED 15 SECONDS WHILE ALARM SOUNDS. ALARM RESET BY KEY AT DOOR. DURING EMERGENCY EGRESS IS FREE

HW SET: 21

6	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	SET	AUTO FLUSH BOLT	FB31/41 AS REQ'D	626	IVE
1	EA	DUST PROOF STRIKE	DP1/2 AS REQ'D	626	IVE
1	EA	STOREROOM LOCK	L9080JD 06A L/OST	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900LLP	630	IVE
1	EA	COORDINATOR	COR2-COMPLETE	628	IVE
1	EA	ASTRAGAL	357SP	600	NGP
1	EA	ASTRAGAL SEAL	5050N	BRN	NGP
2	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
2	EA	DOOR SWEEP	600A	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 22

8	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	PANIC HARDWARE	CD9847EO	626	VON
1	EA	PANIC HARDWARE	CD9847NL-OP	626	VON
1	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
3	EA	PRIMUS CORE ONLY	20-740	626	SCH
2	EA	PRIMUS IC MORT CYL	20-798 FOR DOGGING	626	SCH
1	EA	DOOR PULL	VR900LLP	630	IVE
1	EA	DOOR PULL	VR900LLP NO CYL HOLE	630	IVE
1	SET	ASTRAGAL	675A	AL	NGP
2	EA	CLOSER	4041-EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW	630	IVE
2	EA	FLOOR STOP	FS441/442 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	160S HEAD AND JAMBS	AL	NGP
2	EA	DOOR SWEEP	600A	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
2	EA	DOOR POSITION SWITCH	679-05 HM		SCE

HW SET: 23

ALL HARDWARE BY DOOR MANUFACTURER B/O

CARD READER(S) BY ACCESS CONTROL SECTION

HW SET: 24

ALL HARDWARE BY DOOR MANUFACTURER B/O

HW SET: 25

1	EA	PANIC HARDWARE	98 NL/OP	626	VON
1	EA	IC RIM CYLINDER	20-057-ICX	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE

BALANCE OF HARDWARE BY GATE MANUFACTURER

\*\*\*END OF SECTION\*\*\*

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## SECTION 08740

### ACCESS CONTROL HARDWARE

#### PART 1 -- GENERAL

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

- A. The work of this performance specification consists of furnishing and installing prescribed systems and equipment, in accordance with the Owner's directives and requirements. The Contractor shall design, install, and configure systems to provide the exact function described herein and in related Section 087100 Door Hardware, and will be held to the operational criteria. The Contractor shall be responsible for furnishing and installing a complete and fully operational system, with the intended features and capabilities, whether or not all required parts, components, systems or accessories are specified in the construction documents. Contractor shall provide all required parts, components, systems, labor, materials and accessories needed for a complete and operational system, without additional cost to the owner
- B. Furnish all labor, software, materials, tools, equipment, and services for all Access Control Equipment, as indicated, in accord with provisions of Contract Documents. Final terminations and system commissioning to be performed by a factory certified technician.
- C. Items include but are not limited to the following:
  - 1. Schlage Security Management System (SMS) and PC Server.
  - 2. Reader Controller.
  - 3. Reader Interface
  - 4. Power Supplies.
  - 5. Schlage AD-300 Series Electronic Locks/Trim.
  - 6. Card Readers and Credentials.
  - 7. Enrollment Reader and HHD Kit.
  - 8. All low voltage wiring, switches, and ancillary equipment. (Any required conduit and 120 VAC electrical installation is the responsibility of the Project Electrical Contractor.)
  - 9. Although such work is not specifically indicated, provide and install supplementary or miscellaneous items, appurtenances and devices incidental to, or necessary for, a sound, secure and complete installation.
  - 10. Training on operation and software of the access control system per Section 3.7 of this specification section.
- A. Intent of Access Control specification
  - 1. The following specification shall be considered as coordinated with the general conditions, special conditions and the preamble of this and other related sections. It shall be the Access Control Contractor's responsibility to furnish all necessary systems and equipment, in accordance with the Owner's directives and requirements.
  - 2. Where items aren't definitely or correctly specified and are required for completion of the work, a written statement of such omission, error, or other discrepancy shall be sent to the 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.

3. Adjustments to the Contract Sum will not be allowed for omissions not clarified prior to bid opening.

1.03 REFERENCES

- A. All State and Local Codes including Authority Having Jurisdiction
- B. UL - Underwriter's Laboratories
- C. ADA – Americans with Disabilities Act
- D. NFPA 70 National Electric Code

1.04 ABBREVIATIONS AND ACRONYMS

- A. ACS: Access control system.
- B. LAN: Local area network.
- C. LED: Light-emitting diode.
- D. TCP/IP: Transport control protocol/Internet protocol.
- E. UPS: Uninterruptible power supply.

1.05 DEFINITIONS

- A. Proximity Readers and Credentials: Card and reader designed to validate when card is presented within the proximity of the card reader.
- B. Smart Card: Contactless credential designed to add additional layers of security protection having diversified key encryption, with data storage and memory available.
- C. Credential: Data assigned to an entity and used to identify that entity.
- D. RS-485: A TIA/EIA standard for multipoint communications.
- E. Workstation: A PC that is connected to the network and can access the controller

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.07 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Submit data consisting of shop drawings and catalog cuts complete with technical data necessary to evaluate the material and equipment. Include dimension, wiring and block diagrams, performance data, ratings, control sequences, and other descriptive data necessary to describe the item proposed and its operating characteristics. Include a complete technical specification for the submitted equipment, noting differences and adherence to all Division 26 sections and this section.
- C. Submit installation shop drawings and product data in accordance with Division 01 and this Section.
  1. Coordinate with other trades in submittal of shop drawings.
  2. Shop drawings shall detail space conditions and shall be subject to final review by the Architect.
  3. Provide an operational narrative of each component/system. See Section 087100 Door Hardware for operational description.
  4. Submit to Owner a complete listing of proposed devices, indicating interconnection equipment locations and specifying terminal/connecter termination locations. Submit

a complete set of proposed drawings, identifying equipment locations, types of cabling, numbers of conductors, raceway locations, and termination points of each conductor.

5. Cable Requirements
    - a. Twisted, shielded, plenum-rated type cable shall be used.
    - b. All exposed wiring shall be in rigid conduit and surface "Wiremold" raceway unless otherwise noted in Division 26.
    - c. All cables shall be fastened to the structure at least every 4 feet where not in conduit.
  6. The approval of shop drawings or samples does not relieve the Access Control Contractor of responsibility for any deviation from the requirements of the Contract Documents, unless the Access Control Contractor has informed the Architect in writing of such deviation at the time of submission, has noted the deviation on the shop drawings, and the Architect has given written approval of the specific deviation. The Architect's approval also does not relieve the Access Control Contractor from responsibility for errors or omissions in the shop drawings or samples.
  7. Coordinate equipment submittals with construction schedules.
  8. Do not purchase or install equipment requiring submittal until the review process is complete.
- D. Qualification Data: For system supplier. Compliance with this Section shall include letters of certification. Certifications shall be submitted for approval with and be incorporated with submittal. Submittals will not be considered without the certifications from the equipment manufacturer on the Manufacturer's letterhead.
- E. Closeout submittals Warranty Documentation provide copies of manufacturers warranties for all system components and applicable equipment. Include statement of labor warranty from the manufacturer, Access Control Contractor, and/or 3rd party entity
- F. Record Documentation.
1. Submit a copy of a signed agreement between the Access Control Contractor and the Owner stipulation that the license of all software and operation systems residing on the server and workstations shall become the sole property of the Owner.
  2. Submit to Owner upon completion of Work, all passwords used to access all aspects of the operating system software and database utilized by the system. Documentation shall include the name and position of anyone who has knowledge or record of these passwords.
- G. Extra Stock Materials: Furnish materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses of all kinds, power and electronic, equal to 10 percent of amount installed for each size used, but no fewer than three units.
  2. Substantial Design Closeout Documentation
  3. Operation and Maintenance Manual Data: Submit data in accordance with Division 01 and this Section for all equipment specified in this Section. Include complete set of supplier's operating instructions, installation instructions, and troubleshooting guide. Include final listing of doors, locations and normal status in MS Excel format.
  4. Prior to Substantial Completion, provide schematic drawings depicting type and location of interface equipment/components, number of cables and conductors, raceway locations, types of connectors, circuit requirements and type and

dimensions of enclosures.

H. Tools

1. The Access Control Contractor shall provide documentation of any specialized tools required by the End User in order to perform routine maintenance.
2. Commissioning Reports: Access Control Contractor shall provide documentation of both the Final Test Acceptance and Start Up Testing as per Part 3, 3.07.

1.08 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Furnish security equipment to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
2. Furnish security equipment to comply with the requirements of American National Standards for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People (ICC/ANSI A117.1), the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.

B. System supplier to be certified by the equipment manufacturer as capable of purchasing, designing, selling, installing, supporting, maintaining and servicing the products to be furnished. Certification shall be submitted on the equipment manufacturer's letterhead. The Access Control Contractor shall be certified to the Enterprise Level for the Schlage Security Management System.

C. Contractor Qualifications:

1. Company that is trained, authorized, and certified to sell, purchase, design, engineer, install, train, maintain and service the specified products.
2. Company with a minimum of 5 (five) years system design, engineering supervision, and installation experience for projects of similar complexity and electronic product mix including Schlage AD Series Electronic Locksets.
3. The contractor will maintain a fully staffed local office within 100 miles of the work site. The service center will be staffed by factory trained technicians and must be adequately equipped to provide emergency phone service within twenty four (24) hours on a twenty-four (24) hour, 365 days per year basis, whether or not the owner purchases a maintenance contract with the contractor.
4. Within the local service center, the contractor must maintain an inventory of spare parts and other items critical to system operation and as necessary to meet the emergency service requirements.
5. The contractor must have in-house engineering and project management capability consistent with the requirements of this project. The contractor shall provide a project manager who is actively in the project. This person shall be the same individual throughout the course of the project and shall be the person responsible for the scheduling of the system programming, preparation of the Operation and Maintenance Manuals, Training Programs, documentation and system testing, maintenance of Drawings and the coordination of all subcontract labor. The owner reserves the right to approve the contractor's Project Manager.

D. Testing Agency: Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Pre-Installation Conference: Prior to installation, arrange conference between supplier and related trades to review materials, procedures, and coordinating related work.

F. Sequencing: The work shall be performed in the following sequence:



1. Installation of Access Controllers & Modules.
  2. Installation of new devices and new readers.
  3. Installation of site control equipment.
  4. Commissioning of the new system components.
- G. The Authorized Dealer will provide pricing for both 1 and 5 year maintenance/warranty/service contracts from date of purchase.

#### 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Acceptance: Upon delivery to the site, Contractor shall inspect all products and materials for any damage. Acceptance of the units constitutes that the inspection has occurred and no damaged or unacceptable products were found, and any damage or unacceptable products would be the responsibility of the Contractor.
- B. Product Storage and Handling Requirements
1. Central Server, Workstations, and Controllers:
    - a. Store in temperature and humidity controlled environment in original manufacturer's sealed containers. Maintain ambient temperature between 50 and 85 deg F (10 and 30 deg C), and not more than 80 percent relative humidity, non-condensing.
    - b. Open each container; verify contents against packing list, and file copy of packing list, complete with container identification for inclusion in operation and maintenance data.
    - c. Save original manufacturer's containers and packing materials and deliver as directed under provisions covering extra materials.

#### 1.10 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.

#### 1.11 COORDINATION

- A. Coordinate work of this Section with other directly affected Sections and work/information indicated on the electrical and communication drawings.
- B. Conduit and raceways as needed for electrical hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
- C. The Access Control Contractor shall be responsible for coordinating with Section 08 7100 Door Hardware. That Section shall provide certain items of door hardware for use by the System including power transfer hinges, door position switches, request-to-exit switches and other accessories. The Access Control Contractor shall be responsible for all low voltage installation required to integrate the devices furnished by Section 087100 into the SMS.
- D. The Access Control Contractor shall be responsible for coordinating with Section 08 7100 Door Hardware to determine what type of Schlage AD 300 Series Electronic Lock/Exit Trim or card reader is required for each door. The Access Control contractor shall furnish and install the AD 300 Series Electronic Lock/Trim or card reader and furnish and install the low voltage power supplies required to power the locks.

#### 1.12 WARRANTY

- A. All components shall be supplied with a one- (1) year warranty against defects in materials and workmanship, commencing with substantial completion of the project.

- B. During system warranty period, system updates are to be made available to owner at no charge to owner.
- C. During warranty period, provide twenty-four (24) hour toll-free technical support.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

#### **A. Access Control System Hardware/Firmware/Software:**

- 1. This performance specification is based on Schlage Security Management System (SMS) as manufactured by Schlage Electronics.

### **2.02 SYSTEM CAPABILITIES**

- A. The access control system software shall serve as a database manager, controlling badge data, access rights, time schedules, multiple operation modes, elevator control, visitor sign-in/sign-out and access privileges and alarm point information. Database changes shall be updated or downloaded automatically from the system server to the field panels. The system server shall determine which changes are to be downloaded to which field panels.
- B. All databases should have the ability to add, delete, report, view and edit information.
- C. The system shall provide storage of all system transactions in a retrievable file.
- D. Log all events by time and date.
- E. The software shall use drop-down menus for all previously entered system-required data.
- F. The system shall offer 'lock-down' capability in which the user can lock (or change the state of) all doors simultaneously with one single mouse click.
- G. The system shall provide mode of system operation that requires the operator to enter a response to an event when acknowledging it.
- H. The system shall provide a hierarchical structure of alarm set up and acknowledgement that allows acknowledged alarms to be automatically cleared.
- I. The system shall provide a mode of operation where unacknowledged alarms can be re-routed to different groups of workstations.
- J. The system shall provide a mode of operation that does not allow the operator to clear an alarm prior to being restored to normal.
- K. The system shall provide ability to manually operate the system doors. The manual functions include the ability to Lock, Un-Lock, Shunt, Un-Shunt and Return to Time Zone.

### **2.03 SYSTEM PROGRAMMING**

- A. The contractor shall furnish and install all hardware, software, devices and components to meet the performance and functional requirements described in these contract documents. Include all items required, whether or not individually specified, to ensure a completely operational integrated Security Management System. The contractor must complete all database entry, and provide the owner with training on cardholder entry, as well as all system programming. No additional costs shall be allowed to make the system operational or to meet specifications.
- B. The contractor shall coordinate with Section 087100 to insure that the sequence of operation specified in the respective electric/electronic Hardware Sets is achieved through system programming and appropriate access control system hardware and accessory device installation.

### **2.04 SYSTEM ARCHITECTURE:**

#### **A. System Description:**

- 1. Primary function is to regulate access through specific portals to Secured areas.

2. Shall utilize card technology as its primary access device.
3. Surge Protection Components must be protected from voltage surges originating externally to equipment housing and entering through power, communication, signal, control, or sensing leads. Must also include surge protection for external wiring of each conductor-entry connection to components.
4. Power: Any special power treatment required, such as filtering or spike elimination that may be required for proper operation and protection of the ACS, shall be provided with the system. Step down power supply with battery backup of at least 4 hours of system Reader Controllers, electronic locks, and lock power supplies of at least 4 hours.
5. Backup Power: ACS equipment power shall be supplied from a UPS system, which shall be tied to emergency building power circuits. The UPS shall power the equipment including, but not limited to, the Reader Controller, electronic locks and lock power supplies for a minimum of 4 hours.

## 2.05 SYSTEM SOFTWARE:

### A. Software and Server Package

1. SPRE-SVR-5 Premier 5 Client Software with PC Server. The Contractor shall furnish and install the Software and Server package.
2. Access Control & Alarm monitoring software includes in base package:
  - a. Transaction & Alarm monitoring / routing
  - b. Cardholder management (includes special access needs)
  - c. Unlimited card holder capacity
  - d. Unlimited card reader capacity
  - e. Unlimited alarm capacity
  - f. Unlimited operator capacity
  - g. Manage on-line and off-line locks/readers
  - h. Complete Auditing/Reporting capabilities
  - i. Auto scheduling of predefined reports
3. Unless otherwise specified by owner, server shall be provided by the Access Control Contractor. Minimum requirements are MS Windows XP Pro Operating System or higher, network card, DVD/CD-RW, 17" flat screen monitor, 104-key keyboard and mouse.
4. Enrollment Reader: The Access Control Contractor shall furnish and install one (1) enrollment reader. Schlage Model No. SENROLL.
5. Hand Held Device: The Access Control Contractor shall furnish to the owner, one (1) hand-held device for AD Series Locksets. Schlage Model No. HHD Kit.

## 2.06 SYSTEM HARDWARE

- A. Reader Controllers: Mount in selected Electrical/Communication Rooms as noted on the Construction Documents. The Project Electrical Contractor shall provide 120VAC power and TCP/IP network drop for each Reader Controller.
- B. Reader Controller SRCNX-R – as manufactured by Schlage Electronics. Furnish and installed as required to integrate all specified AD-300 Electronic Locks/Trim, wall-mounted card readers and reader interfaces, and interface with electric/electronic door hardware.
  1. The reader controllers shall be independently programmed, intelligent devices, which shall be able to make decisions and store transactions at the local level. The system shall provide reader controllers for one reader up to 16 reader capacity, and field configurable by standard system software. Capable of being fully networked into (TCP/IP LAN/WAN) network connectivity. Downstream communication shall be done

through RS-485. Enclosure to be lockable NEMA rated 20"x 20" x 4".

2. Downstream communication via RS-485 connects directly to the following devices:
  - a. SRINX.
  - b. SIONX-8.
  - c. Schlage AD Series locks.
  - d. Schlage wireless PIM-485
3. Scalable for the following:
  - a. 1-16 door controller: SRCNX-R
4. Specifications:
  - a. Up to 16 input device channels
  - b. Up to 16 supervised or non-supervised inputs
  - c. Up to 16 SP/DT relays
  - d. Flashable Firmware
  - e. 64 MB RAM for ID capability
  - f. Power requirements 24 VAC @ 14 amps

C. Reader Interface:

1. Reader Interface model. SRINX – as manufactured by Schlage Electronics. Furnish and install as required for any door requiring a Card Reader only, rather than an AD-300 Electronic Lock/Trim.
2. Each reader in the system shall have a dedicated reader interface panel able to connect to the controller via RS-485 protocol, able to support proximity, smart card, magnetic stripe, biometric, bar code, and Wiegand technologies. The reader interface panel shall have two form "C" SP/DP 1 amp relay outputs, four supervised or unsupervised contact inputs.
3. Specifications:
  - a. Dimensions - 8 ¼"H x 7 ½"W x 3 ½"D
  - b. Power input - 14-24 VDC
  - c. Max. Current req. – 120 mA (without read head)
  - d. Operating Temperature - 0° to 49° C or 32° to 120° F
  - e. Cable spec. – 18 AWG 2 conductor stranded, shielded, twisted for data to SRCNX-R & 18 AWG 2 conductor stranded, shielded, twisted for power, & 18 AWG 6 conductor for readers.
  - f. Cable distance – with RS-485 4,000 ft. for data to SRCNX-R & 500 ft for power & 500 ft for read head.
  - g. Operating humidity – 10% to 90% (non condensing)
  - h. UL Listed for UL294.

D. Card Read Into and Out of Areas:

1. Certain high security areas within the building will require both a card read into and out of, the protected area. These areas are noted on the Architectural Hardware / Door Schedule in the remarks area as "Access Control-Exterior and Interior." The Contractor shall integrate these card readers independently into the SMS with their own respective Reader Interface.
2. Secured Parking: The secured parking area shall require a card read into the area

and out of the area. The contractor shall furnish and install card readers for this purpose, interface with the Parking Control Equipment and integrate them into the SMS.

2.07 POWER SUPPLIES:

- A. Schlage PS900 Series as mfg. by Schlage Electronics. Furnish and install as required to power Reader Controllers and AD300 Electronics Locks/Trim, and electric locks or door strikes. Electric latch retraction panic hardware furnished by Section 008710, shall have their power supply furnished by that Section.
1. Having LED's indicators show good AC power and DC on.
  2. Model PS902, PS904, PS906 as required.
  3. Emergency Interface Relay (FA.)
  4. Isolated SPDT contacts to monitor AC power status.
  5. 900-BBK-Battery Backup Kit with (2)-7/AH Batteries.
  6. Specifications:
    - a. Power input – 120VAC-240VAC
    - b. Power output – 2A, 4A, or 6A @ 12 or 24 VDC
    - c. Enclosure dimension – 14.0" x 12.0" x 4.0"
    - d. Operating temperature - -32F° to 120° F (0° to 49°C)
    - e. UL listed for UL294 access control; RoHS, FCC Part 15.

2.08 AD-300 SERIES ELECTRONIC LOCKSETS/EXIT TRIM

- A. AD300 Series Electronic Locks/Exit Trim: General: The AD300 Series shall combine all hardware components required at the door for a complete access control system into one integrated design that includes the electrified lock/trim, credential reader, request-to-exit switch and tamper guard. The AD300 Series shall be modular in design allowing the lock to be customized for current requirements and changed in the future such that the credential reader, communication method, function, etc. can be changed without having to take the lock off the door.
- B. AD300 Series – AD300 as mfg. by Schlage Electronics.
1. Specifications:
    - a. Power supply – 12VDC or 24VDC
    - b. Voltage range – 4-26 VDC
    - c. Max. current req. – Up to 250 mA
    - d. Cabling spec – Data; 24AWG/4 conductor shielded; DC Power 18AWG/2 conductor.
    - e. System interface – RS485 Direct, Wiegand or Clock and Data via PIB300
    - f. Cable distance – RS485 up to 4000 ft, DC power up to 500 ft.
    - g. Operating temperature - -31F to 151F
    - h. Visual/Audible Communications--Tri-Color LED's and Audible Indicators
    - i. Operating temperature - 31° to 151°F
    - j. UL listed for UL294 access control, ANSI/BHMA A156.25 Grade 1, UL10C
    - k. FCC Part 15, ADA, RoHS.
- C. AD300-Multi-Technology Reader Electronic Lockset/Trim– as mfg. by Schlage Electronics.

1. The Access Control Contractor shall determine the proper AD-300 model required by coordinating with Section 08710 and the respective door's Hardware Set. Where Section 087100 Door Hardware or the Construction Documents specifies that AD300 Electronic Exit Trim, Mortise Lock or Cylindrical Lock; with Smart Card Reader shall be furnished and installed by this related Access Control Section for a door, The Access Control Contractor shall furnish, install, power, and integrate into the SMS the following:

- a. AD-300-993R-70-MT-RHO-626-JD (Exit Trim with Multi-Tech Card Reader.)
- b. AD-300-MS-70-MT-RHO-626-JD (Mortise Lock with Multi-Tech Card Reader.)
- c. AD-200-MD-40-MT-RHO-626-JD (AD200 Mortise Deadbolt with Privacy Function and Multi-Tech Card Reader.) AD200 with Privacy Function is for Secured, Single-Person Restroom, Door 134 only. The AD200 shall be programmed through the SMS.
- d. Coordinate with Section 08710 for specific device type and door location.

D. Miscellaneous Items.

1. Roll-Up Door: The Contractor shall furnish and install a card reader for the Large Property Storage Roll-Up Door, and integrate it into the SMS.

**2.09 PROXIMITY CREDENTIALS AND MULTI-TECHNOLOGY CARD READERS:**

- A. Proximity Cards: The Contractor shall furnish to the Owner, 100 hundred (100) 125 kHz proximity technology, ISO, Glossy White Proximity Credentials. Schlage Electronic Model Number: SXF7510.
- B. Multi-Tech Card Readers: Certain doors will be equipped with electrified door hardware and wall-mounted Multi-Tech card readers in lieu of the AD-300 Locksets. Those doors will be identified in Section 087100 by the statement "card reader by Access Control Section." The Contractor shall furnish and install a wall-mounted Multi-Technology card reader, Schlage Electronic Model SXF1500. The Contractor shall integrate the card reader and door position switch, request-to-exit switch and accessories furnished by Section 087100 and integrate them into the SMS.

**PART 3 - EXECUTION**

**3.01 SITE VERIFICATION OF CONDITIONS:**

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine rough-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Furnish any inserts required for building into concrete, masonry, and other work, to support and attach work of this section. Furnish in ample time to comply with schedule of work into which inserts are built.
- B. Verify that power and outlets are in correct locations.
- C. Verify that building structure is properly prepared for mounting, attachment and support of equipment.

- D. Prior to installation of systems components and devices, verify all required preparations have been properly performed and that substrates are acceptable for installation.
- E. Verify all rough-ins and field dimensions.
- F. Report in writing to the Architect any prevailing conditions that will adversely affect satisfactory execution of Work in this Section.
  - 1. Architect reserves the right to review proposed methods of construction/installation, reject proposed methods, and have the installation done in a satisfactory method at the Contractor's cost.

### 3.03 INSTALLATION OF SYSTEM

- A. Install work in accordance with manufacturer's recommendations, instructions and final Shop Drawings. All control panels and power supplies should be installed so as to allow easy access for service in the future
- B. Anchor components securely in place, plumb, level, and accurately aligned. Provide separators and isolators to prevent corrosion and electrolytic deterioration.
- C. For card readers that are located in equipment traffic areas, and that are exposed to damage due to collision or impact from forklifts, or manually moved carts, carriers, or other equipment used by the Owner, provide protective bollards, railings, coverings etc. to ensure that all card readers installed are properly protected from such damage.
- D. Provide fastenings, plates, and other incidental items required for complete and operational installation.
- E. Provide all required low voltage electrical work for installation of the system. Provide low voltage work in accordance with code requirements.

### 3.04 SYSTEM SOFTWARE

- A. Develop, install, and test software databases for the complete and proper operation of systems involved. Assign software license to Owner and assign secured IP address to / or supplied by Owner

### 3.05 SYSTEM PROGRAMMING

- A. The Contractor shall work with the owner to ensure that the new components will be properly programmed into the existing system.
- B. Coordination required is as follows;
  - 1. Personal/staff information.
  - 2. Access time for all personal /staff.
  - 3. Definitions of openings for staff access.
  - 4. Holiday definition.
  - 5. Special access privileges.
  - 6. Lock down conditions.

### 3.06 SITE QUALITY CONTROL

- A. The Contractor shall develop a Final Test and Acceptance (FTA) Plan. The plan shall identify each new system component provided in the work, intent of test, method or methods of test and expected results. Each component listed in the plan shall include space for test part signatures, brief comments, time of test and pass/fail check boxes. The FTA plan shall be submitted to the owner's representative 30 days prior to the scheduled final test.
- B. Provide manufacturer's certified representative supervision of final testing of each system.
  - 1. On-Site Testing: Manufacturer trained and certified Systems Integrator shall functionally test each component in the system after installation to verify proper

operation and confirm that the wiring and dressing conform to the wiring documentation.

- C. Each system shall test free from interference, opens, grounds, and short circuits.
- D. Start-up Test
  - 1. Following completion of the Final Test, the system shall undergo a thirty (30) day Operational Demonstration Test (ODT). This operational demonstration period shall start when all specified systems and equipment have been installed and "Substantial Completion" is reached, with only a moderate number of punch list items remaining.
  - 2. During this period, the system shall be operated under a normal facility traffic load for no less than 30 days. If any item or system fails during the ODT, the 30-day burn-in period shall be suspended for that item until repaired or replaced. Once repaired or replaced, the burn-in period shall recommence.
  - 3. Final system acceptance of the entire project will be withheld until after successful completion of this operational demonstration period for all systems and components.
  - 4. System will not be considered substantially complete until the following activities have been successfully completed:
    - a. Acceptance of all submittals.
    - b. Delivery of final documentation
    - c. Successful Final Test and Inspection
    - d. Successful Operational Demonstration Test
    - e. Successful training and demonstration, including operation of systems using the manuals.
    - f. Purging of Contractor User privileges and return of all key card media.

### 3.07 OWNER PERSONNEL TRAINING

- A. On Site Operator training: instruct administrative/operating staff in proper operation, including hands-on training.
  - 1. Minimum of sixteen (16) hours covering the operations for each system installed. Training to cover all administrative and management functions for all owner designated individuals.
  - 2. Training sessions shall be provided to supervisors, staff utilizing systems and equipment provided under this section, maintenance personnel and any other personnel designated by the owner.
- B. Refresher training: provide a refresher training session to operators and administrators scheduled at the discretion of the owner 30-90 days after the original training.
  - 1. Minimum of eight (8) hours of refresher training for all owner-designated individuals.
  - 2. Training shall cover summaries of all operator and administrator training topics and shall include greater detail on subject areas or operations not yet mastered by operators or administrators.
- C. Review in detail all information in the operations and maintenance manuals for each system provided.
- D. Prior to administering the above training, the contractor(s) shall prepare an outline of the training, identifying the goals and expectations of the course and detailing what students are expected to learn.
- E. Training course shall be equivalent to Schlage End User Course part no. SEUADMIN performed on site by a factory trained instructor.

### 3.08 CLEANING AND WASTE MANAGEMENT



- A. Cleaning and Touchup: Immediately after installation, including the completion of wiring and testing, clean all work and touchup all damaged factory finishes.

3.09 PROTECTION

- A. Maintain strict security during the installation of equipment and software. Rooms housing the control station, and workstations that have been powered up shall be locked and secured during periods when a qualified operator in the employ of Contractor is not present.
- B. Protection: Provide protective covers, fenders, and barriers as necessary to maintain Work of this Section in same condition as installed until time of Substantial Completion.

3.10 LIFE CYCLE ACTIVITIES

- A. Commissioning: All system components shall be commissioned as to conform to the manufacturer's recommendations for maximum life cycle.
- B. Operation and Use: Provide, in writing, Operation and Use procedures for each system component. Such procedures shall be written in order to conform to the manufacturer's recommendations for maximum life cycle.
- C. Maintenance: Provide, in writing, Maintenance procedures for each system component. Such procedures shall be written in order to conform to the manufacturer's recommendations for maximum life cycle.

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## SECTION 08800

### GLAZING

#### **PART 1 – GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

##### 1.02 SCOPE OF WORK

Section includes High performance architectural insulating glass.

##### 1.03 REFERENCES

- A. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- B. ASCE 7 - "Minimum Design Loads for Buildings and Other Structures".
- C. ASTM International (ASTM):
  - 1. ASTM C 162 - Standard Terminology of Glass and Glass Products.
  - 2. ASTM C 1036 - Standard Specification for Flat Glass.
  - 3. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
  - 4. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.
  - 5. ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
  - 6. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
  - 7. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
  - 8. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

##### 1.04 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or other specified gas.
- D. Sealed Insulating Glass Unit Surface Designations:
  - 1. Surface 1 - Exterior surface of the outer glass lite.
  - 2. Surface 2 - Interspace surface of the outer glass lite.
  - 3. Surface 3 - Interspace surface of the inner glass lite.
  - 4. Surface 4 - Interior surface of the inner glass lite.

##### 1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: PPG Certified Fabricator Network, as acceptable to the manufacturer.

- B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- C. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
  - 2. GANA Publications: "Laminated Glazing Reference Manual"; "Glazing Manual."
- F. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
  - 1. Insulating Glass Certification Council.
  - 2. Associated Laboratories, Inc.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
  - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
  - 2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
  - 3. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf. or less in area, provide glazing products that comply with Category I or II materials.

1.06 PERFORMANCE REQUIREMENTS

- A. General: Provide glass capable of withstanding thermal movement and wind and impact loads (where applicable) as specified in paragraph B following.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
  - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
  - 2. Design Wind Loads: Determine design wind loads applicable to the Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.

- a. Basic Wind Speed: 85 mph
  - b. Importance Factor: 1.5
  - c. Exposure Category: C
  - d. Wind Load Duration: Short duration, as defined in ASTM E 1300 or ASCE 7-05 for 3-second gust wind speed.
  - e. For monolithic-glass lites heat treated to resist wind loads.
  - f. For insulating glass.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
  2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
  4. U-Factors: NFRC 100 expressed as Btu/ sq. ft. per h per degree F.
  5. Solar Heat Gain Coefficient: NFRC 200.
  6. Solar Optical Properties: NFRC 300.

1.07 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.08 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product Data: For each glass product and glazing material indicated.
- C. Verification Samples: For the following products, in the form of 12 inch (305 mm) square samples for insulating glass units.
- D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.
- F. Qualification Data: For installers.
- G. Product Test Reports: For each of the types of glazing products.
- H. Warranties: Special warranties specified in this Section.

1.09 PRODUCT HANDLING

- A. Comply with the requirements of Section 01620.
- B. Protect glazing materials according to manufacturer's written instructions and as needed to

prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

- C. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.10 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

1. Warranties listed in this Section shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.

2. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.

Warranty Period: 5-years from date of Substantial Completion

## **PART 2 -- PRODUCTS**

2.01 ACCEPTABLE GLASS MANUFACTURERS

- A. Insulated Glass: PPG Industries, Inc.
- B. Security Glazing: Nippon Electric Glass Company (800) 426-0279.
- C. Clear Fire-Rated Window Glazing: Pyrobel by Interedge (877) 376-3343.
- D. Clear Fire-Rated Door/Sidelight Glazing: PyroEdge or Pyrobel by Interedge (877) 376-3343.

2.02 GLASS MATERIALS (As indicated on the Window Schedule):

- A. General: Exposed "tong" marks are not acceptable.
- B. Interior Tempered Glass: Clear, Tempered 1/4" thick. Grade B (tempered), Style I (uncoated), Type I (float or plate).
- C. Insulated Glass Units: Double pane 1/4" units with edge seal; interpane 1/2" space purged with dry hermetic air; total unit thickness of 1 inch. Tempered as required by Code and indicated on drawings. Tinting as indicated on Window Schedule.
- D. Interior Wired Glass: 1/4" clear wire glass.

- E. Interior laminated glazing - one way: Two pieces of 1/8" clear float glass, tempered as required by code, laminated with .030 in. polyvinyl butyl plastic interlayer conforming to 16CFR 1201 Category II for one-way glazing.
- F. Security Glazing: 11/16" thick, glazing assembly consisting of two outer lights of 1/8" clear chemically strengthened glass with a core of two 1/8" polycarbonate sheets laminated with four inter-layers of .50 inch thick urethane.
- G. Clear Fire Glazing: Model as required for required Fire-Rated Assembly.

2.03 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
  - 2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 3. For uncoated glass, comply with requirements for Condition A.
  - 4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
  - 5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated or required.
- C. Pyrolitic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolitic deposition process during initial manufacture, and complying with other requirements specified.
- D. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required.
  - 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
  - 4. Sealing System: Comply with requirements in Section 07920 - Joint Sealants. Dual seal, with primary and secondary sealants of polyisobutylene and silicone.
  - 5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
  - 6. Spacer Material: Aluminum with mill or clear anodic finish.
  - 7. Desiccant: Molecular sieve or silica gel, or blend of both.
  - 8. Corner Construction: Manufacturer's standard corner construction.

2.04 FABRICATION OF GLAZING UNITS

Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.05 GLAZING COMPOUNDS

- A. Glazing Compound: Modified oil type, non-hardening, knife grade consistency.
- B. Butyl Sealant: Single component; Shore-A hardness of 10-20; black color; non-skinning.
- C. Acrylic Sealant: Single component, solvent curing, cured Shore hardness, non-bleeding.
- D. Silicone Sealant: Single component, non-bleeding, non-staining; Capable of water immersion without loss of properties.

2.06 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene; 80-90 Shore A durometer hardness; 4 inch minimum long x 1/4 inch thick.
- B. Spacer Shims: Neoprene; 40-50 Shore A durometer hardness; 4 inch long on 18 inch centers for wet-glazed systems.
- C. Glazing Clips: Manufacturer's standard type.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the area and conditions under which work of this Section will be performed.
- B. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.
- C. Verify surfaces of glazing channels or recesses are clean, square in plane, free of obstructions, and ready for work of this Section.
- D. Verify weep holes in exterior frame are provided.
- E. Correct conditions detrimental to timely and proper completion of the Work.
- F. Do not proceed until unsatisfactory conditions are corrected.
- G. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses.

3.03 EXTERIOR WET METHOD (SEALANT AND SEALANT)

- A. Place setting blocks at 1/4 points and install glass pane.
- B. Install removable stops with pane centered in space by inserting spacer shims both sides at 18-inch intervals, 1/4 inch below sightline.
- C. Fill gap between pane and stops with sealant to depth equal to bite of frame on pane, but not more than 3/8 inch below sightline.
- D. Apply sealant to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth appearance. Security Glazing to be sealed with security sealant as recommended by manufacturer.



- E. Drain or weep the sill of each opening to the outdoors at three points using 3/8-inch diameter weep holes or the equivalent.

3.04 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, project 1/16 inch above sightline.
- B. Place setting blocks at 1/4 points.
- C. Rest glass on setting blocks and push against tape to ensure full contact at perimeter of pane.
- D. Install: removable stops, spacer shims between glass, and applied stops at 18-inch intervals 1/4 inch below sightline.
- E. Fill gap between pane and applied stop with sealant to depth equal to bite of frame on pane to uniform and level line.
- F. Trim protruding tape edge.

3.05 INTERIOR WET METHOD (COMPOUND AND COMPOUND)

- A. Install glass resting on setting blocks. Install applied stop and center pane by use of spacer shims at 18-inch centers, kept 1/4 inch below sightline.
- B. Locate and secure glass pane using glaziers' clips.
- C. Fill gaps between pane and stops with glazing compound until flush with sightline.

3.06 CLEANING

- A. After installation, mark pane with an "X" by using plastic tape or removable paste.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is completed.
- D. Clean glass with solvent and normal wash. Final cleaning and polishing shall be done prior to final inspection.
- E. Remove and replace broken, scratched, chipped or otherwise defective glass with new materials and leave the entire installation in a neat, clean, and acceptable condition.

\*\*\* END OF SECTION \*\*\*

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**SECTION 09200**  
**LATH AND PLASTER**

**PART 1 -- GENERAL**

1.01 **GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section

1.02 **SCOPE OF WORK**

Supply and install all Lath and Plaster Work as shown on the Drawings and as specified herein, for a complete and proper installation.

1.03 **REFERENCE STANDARDS**

Comply with all applicable requirements of the California Lathing and Plastering Contractor's Association "Reference Specifications" except where more stringent requirements are indicated herein or in local building codes.

1.04 **SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 **SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Submit Product Data and color samples and manufacturers application data.
- C. Make (2) samples, at least one-foot square, of selected specified plaster system.

1.06 **QUALITY ASSURANCE**

- A. In all Work under this Section, coordinate with all other trades whose work connects with, is affected or concealed by lathing and plastering. Before proceeding, make certain all required inspections have been made. Do all cutting and patching required to accommodate the work of other trades.
- B. Inspect surfaces to receive lath and plaster before starting Work and do not start until surfaces are acceptable. Starting Work under this Section implies acceptance of surfaces.

1.07 **PRODUCT HANDLING**

- A. Adhere to requirements of Section 01620.
- B. Deliver all manufactured materials in original packages bearing manufacturer's name and brand. Use only one brand of each material throughout job. Store materials in dry areas.

1.08 **CLOSE-OUT:** Comply with the requirements of Section 01770 – Contract Closeout.

A. **Reports:**

None required.

B. **As-Builts:**

Comply with the requirements of Section 01770 – Contract Closeout.

C. **Operation and Maintenance Data:**

None required

D. **Extra Materials:**

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

**PART 2 -- PRODUCTS**

2.01 LATH

Paperbacked Lath: K-Lath Corporation: "Aqua K-Lath", or as approved by Architect, 16 gauge wires spaced 1-1/2 inches o.c. vertically and welded to 16 gauge wires spaced 2 inches o.c. horizontally, with perforated Kraft paper to insure plaster embedment and Type I Class B waterproof building paper laminated to back side.

2.02 ACCESSORIES

- A. Corner Bead: #1X Type, Keene or equal, expanded metal flanges integral with nose bead of solid metal, galvanized.
- B. Corner Lath: As specified for expanded metal, three (3) inch legs bent to a 105-degree corner, - "Cornemaster #30" by Keene, or equal.
- C. Casing Beads: #66 Type, Western, or equal, expanded metal flange, galvanized, depth as required by plaster thickness, weighing approximately 200# per 1000 lineal feet for 3/4-inch and 7/8-inch types.
- D. Expansion Joints: #15 by Keene or equal. Cut lath passing under expansion joints. Install where indicated on Drawings, with the following minimum conditions:
  - 1. No length should be greater than 18 feet in either direction
  - 2. No panel shall exceed a maximum of 144 square-feet for vertical applications.
  - 3. No panel shall exceed a maximum of 100 square-feet for horizontal, curved or angular sections.
  - 4. No length-to-width ratio should exceed 2.5 to 1 in any given panel.
- E. Bonding Agent: As recommended for application over smooth monolithic concrete shells. Concrete shells shall be cleaned with bonding agent applied prior to plastering interior.
- F. Wire: Soft, annealed, galvanized steel, 8-gauge for hangers, 16-gauge for channel ties and 18-gauge for lath ties.
- G. Nails: Concrete nails, case hardened steel, 3/4 inch long.
- H. Weep Screed: by Keene or equal. 1-1/4" ground, galvanized.
- I. Building Paper: 15#, asphalt impregnated. Install over Weather Barrier specified in Section 07250 and shown on the Drawings.
- J. Miscellaneous Items: Furnish all miscellaneous components not specified herein but shown on the Drawings and any other items required to complete the installation.
- K. Water: Clean and free of deleterious matter.

2.03 PORTLAND CEMENT PLASTER

- A. Portland Cement: Conforming to ASTM C-150, Type 1.
- B. Sand for Cement Plaster: Conforming to ASA A42.2.
- C. Hydrated Lime: Conforming to ASTM C-206, Type S.
- D. Quick Lime: Conforming to ASTM C-5.

E. Exterior Cement Plaster:

1. Scratch Coat: One part Portland Cement, four (4) parts sand and hydrated lime equal to 25% volume of cement.
2. Brown Coat: One part Portland Cement, five parts sand and hydrated lime equal to 25% of the volume of cement.
3. Finish Coat: Portland Cement-Lime: one part standard Portland Cement, not more than 1/2 part dry hydrated lime (or an equivalent amount of lime putty) and not more than one part #20 mesh, and one part #16 mesh silica sand. Submit finish sample(s) for Architect's approval.
4. Thickness: 7/8 inch thick, measured from back of lath.
5. Finish coat to contain integral color. Submit samples to Architect for approval based upon colors indicated on Drawings.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and condition under which work of this Section will be performed.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 GENERAL

- A. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.
- B. Provide ventilation to properly dry plaster during and subsequent to application. In glazed areas, accomplish by keeping windows open sufficiently to provide air circulation; in enclosed areas lacking normal ventilation, mechanically remove moisture-laden air.

3.03 LATHING

- A. Apply lath with long dimension at right angles to supports; lap side and ends as recommended by manufacturer. Stagger vertical laps. Make no vertical joints at any corner; bend lath around all corners, internal and external.
- B. Attach lath to studs by fasteners at spacings required by local building codes. All attachments to be corrosion resistant.
- C. Install all accessories to plumb, true and level lines, and backing plates as located by the trade furnishing these items.
- D. Install beads, corner laths, control joints, reglets, screeds, and like items, using single lengths wherever possible. Provide corner beads at all exterior corners shown, mitering or coping as required, and fastening at six (6) inches o.c., both sides. Provide casing beads wherever interior plaster angles are shown and wherever one or both abutting surfaces are metal lathed, except corner laths are not required where metal lath is continuous around corner at junctions of walls, or where ceiling lath turns down a wall. Tie outer edges only to adjoining lath at six (6) inches o.c. or stub nail to any concrete. Install access panels supplied by other trades.
- E. Start installation at bottom of wall, working up and from right to left. Apply lath with long dimension at right angles to supports; lap sides and ends as recommended by manufacturer.

Stagger vertical laps. Make no vertical joints at any corner; bend lath around all corners, internal and external.

- F. Attach lath to metal and/or wood studs by means of tie wire and nails respectively at spacings as required by Local Building Codes. All attachments shall be corrosion resistant.
- G. Install corner beads at all external corners. Use single length except where standard length is not sufficient. Miter or cope as required; fasten with tie wire at six (6) inches o.c., both sides.
- H. Install at interior angles and sheer one or both abutting surfaces are metal lath. Corner laths are not required where metal lath is continued around corner at junction of walls and where ceiling lath turns down wall unless otherwise noted on drawings. The outer edges only to adjoining lath at six (6) inches o.c., or stub nail to concrete.

### 3.04 PLASTERING

- A. Do not apply plaster below 55 degrees F temperature. Apply no plaster to frosty surfaces. Dampen any surfaces on which suction must be reduced with fog-spray. Maintain all screeds plumb and true.
- B. Except when had mixing small batches is approved, use approved mechanical mixers. Clean mixers, mixing boxes and tools after mixing each batch. Thoroughly mix with water until uniform in color and consistency. Retempering not permitted. Discard plaster, which has begun to stiffen. Mix in strict accordance with manufacturer's printed directions.
- C. Except in the case of specifically formulated plasters, which require only water added job site, proportion by volume as specified.
- D. Scratch coat: Apply with sufficient material and pressure to shove material through metal lath and form a good key; 3/8 inch minimum thickness, score in horizontal direction with metal scorer with clipped teeth to provide good mechanical key for second coat. Dampen concrete and concrete block surfaces to reduce suction prior to application.
- E. Brown coat: Apply not sooner than 48 hours after application of scratch coat; properly dampen scratch coat; apply sufficient pressure to force plaster into scratches and build out to within 1/8 inch to screeds; for, float and darby to true, plumb surfaces and corners; leave rough for finish coat.
- F. Curing: Keep Brown coat moist for at least 48 hours; commence moistening as soon as plaster has hardened sufficiently so to prevent injury; apply water in a fine fog spray; avoid soaking; curing shall proceed over holidays, Saturdays and Sundays if necessary. If atmospheric conditions are hot and dry, curing time shall be extended as necessary at no additional cost to Owner. Allow plaster base coats to cure for a minimum of fourteen (14) days before applying finish coat.
- G. Finish coats Apply to partially dry base coat, or to a thoroughly dry base coat that has been evenly wetted by brushing or spraying; avoid use of excessive water. Trowel all finish surfaces of plaster to perfectly true and even surface without scratches, ridges, voids, cracks, etc. Fill fissures or breaks in brown coat and existing plaster before application of finish coat. Make coats uniform in thickness with average thickness about 1/8 inch; minimum thickness anywhere: 1/16 inch.

### 3.05 CLEANING AND PATCHING

- A. A clean floor of droppings immediately after each coat is applied. At any exterior locations, remove droppings or splashes from all concrete, masonry or other finish surfaces.
- B. Patch after all other Work, except painting, has been completed. Cut out damaged or broken plaster to straight lines with clean, sharp edges. Cut out cracks to width of at least one (1) inch. Fill areas to be patched with base materials, and then give a finish coat of same material as adjoining plaster. Patched areas shall match adjoining work in finish and texture.

Joining shall be flush and smooth so joints between patch and existing plaster are not noticeable.

- C. At completion of Work, remove excess plaster from beads, screeds, etc., and leave Work clean and ready for painting. Promptly remove plaster, rubbish, surplus material, scaffolding and other equipment from job site. Leave areas broom clean.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 09250**  
**GYPSUM BOARD SYSTEMS**

**PART 1 - GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

1.02 SCOPE OF WORK

- A. Fire-Resistance Rated Gypsum Board
- B. Mold and Moisture Resistant Gypsum Board
- C. Fire-Resistance, Mold and Moisture Resistant Gypsum Board
- D. Abuse Resistant Gypsum Board
- E. Cement Board

1.03 PERFORMANCE CRITERIA

A. Abuse Resistant Gypsum Board

1. Classification:

- a. Surface Abrasion: Level 1-3
- b. Surface Indention: Level 1
- c. Soft Body Impact: Level 1-2

2. Wall Assembly Fire-Resistance Rating: locations per the drawings.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.05 SUBMITTALS

Provide in accordance with Article 3.11 of the General Conditions.

1.06 PRODUCT HANDLING

Comply with the requirements of Section 01620.

1.07 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

A. Reports:

None required.

B. As-Builts:

Comply with the requirements of Section 01770 – Contract Closeout.

C. Operation and Maintenance Data:

None required

D. Extra Materials:

None required

E. Extended Warranty:

Comply with the requirements of the General Condition Article 3.5 and Section 01740.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURER / PRODUCTS**

Basis of Design: Products of National Gypsum Company

### **2.02 FIRE-RESISTANCE RATED GYPSUM BOARD**

A. Basis of Design: Gold Bond® BRAND Fire-Shield C Gypsum Board.

B. Panel Physical Characteristics:

1. Core: Enhanced fire-resistance rated gypsum core
2. Surface paper: 100% recycled content paper on front, back and long edges
3. Long Edges: [Square] or [Tapered] at Contractor's discretion.
4. Overall thickness: 5/8 inch.
5. Panel complies with Type X requirements of ASTM C 1396 Standard Specification for Gypsum Board

### **2.03 MOLD AND MOISTURE RESISTANT GYPSUM BOARD**

A. Basis of Design: Gold Bond® BRAND XP® Gypsum Board

B. Panel Physical Characteristics

1. Core: Mold and moisture resistant gypsum core.
2. Surface paper: 100% recycled content moisture/mold/mildew resistant paper on front, back, and long edges.
3. Long Edges: Square or Tapered at Contractor's discretion.
4. Overall thickness: 5/8 inch.
5. Panel complies with requirements of ASTM C 1396 Standard Specification for Gypsum Board.
6. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

### **2.04 FIRE-RESISTANCE RATED GYPSUM BOARD WITH ENHANCED MOLD AND MILDEW RESISTANCE**

A. Basis of Design: Gold Bond® BRAND XP® Fire-Shield® C Gypsum Board

B. Type C, Panel Physical Characteristics

1. Core: Mold and moisture resistant, with enhanced fire-resistance rated gypsum core
2. Surface paper: 100% recycled content moisture/mold/mildew paper on front, back and long edges
3. Long Edges: Square or Tapered at Contractor's discretion.
4. Overall thickness: 5/8 inch.
5. Panel complies with requirements Type X of ASTM C 1396 Standard Specification for Gypsum Board
6. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

### **2.05 ABUSE RESISTANT GYPSUM BOARD**

A. Basis of Design: Gold Bond® BRAND Hi-Abuse® XP® Gypsum Board

## B. Panel Physical Characteristics

1. Core: Fire resistance rated gypsum core, with additives to enhance, surface indentation resistance and impact resistance.
2. Surface paper: Abrasion resistant, 100% recycled content moisture/mold/mildew resistant paper on front, back and long edges
3. Long Edges: Square or Tapered at Contractor's discretion.
4. Overall thickness: 5/8 inch.
5. Panel complies with Type X requirements ASTM C 1396 Standard Specification for Gypsum Board.
6. Surface Abrasion Resistance: 0.009 inch when tested in accordance with ASTM D 4977 Standard Test Method for Granule Adhesion to Mineral Surfaced Roofing by Abrasion
7. Indentation Resistance: 0.132 inch when tested in accordance with ASTM D 5420 Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)
8. Soft Body Impact: 210 ft-lbf when tested in accordance with ASTM E 695 Standard Method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading
9. Mold/Mildew Resistance: score of 10 when tested in accordance with ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

## 2.06 CEMENT BOARD

### A. Cement Backerboard

1. Basis of Design: PermaBase® BRAND Cement Board
2. Panel Physical Characteristics
  - a. Core: Cementitious, water-durable
  - b. Surface: Fiberglass mesh on front and back
  - c. Long Edges: Tapered
  - d. Overall Thickness: 5/8 inch.
  - e. Panel complies with requirements of ASTM C 1325 Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units and ANSI A118.9
  - f. Density: 72 lbs. per cu. ft.
  - g. Water Absorption: Not greater than 8% when tested for 24 hours in accordance with ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products

### B. Cement Board Underlayment

1. Basis of Design: PermaBase® BRAND Cement Board
2. Panel Physical Characteristics
  - a. Core: Cementitious, water-durable
  - b. Surface: Fiberglass mesh on front and back
  - c. Long Edges: Tapered
  - d. Overall Thickness: 1/4 inch

- e. Panel complies with requirements of ASTM C 1325 and ANSI A118.9
- f. Density: 72 lbs per cu. ft.
- g. Water Absorption: Not greater than 8% when tested for 24 hours in accordance with ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products

2.07 ACCESSORY PRODUCTS

A. Acoustical sealant

- 1. Conform to ASTM C 919 Standard Practice for Use of Sealants in Acoustical Applications
- 2. Products/Manufacturer
  - a. Grabber Acoustical Sealant GSC
  - b. STI SpecSeal Smoke N Sound Caulk
  - c. BOSS 824 Acoustical Sound Sealant

B. Firestopping

- 1. Conform to ASTM E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- 2. Products/Manufacturer
  - a. STI SpecSeal SSP Putty Pads
  - b. BOSS 818 Fire Rated Putty Pads

C. Fasteners for use with 5/8 inch thick tile backer panels: As recommended by Manufacturer.

D. Fasteners for use with Cement Board:

- 1. PermaBase Cement Board Hi-Lo thread screws (No. 8).
- 2. Wafer head, corrosion-resistant.
- 3. Overall Thickness: As recommended by Manufacturer.
- 4. For use with wood framing and complying with ASTM C 1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

E. Joint Treatment

- 1. Tape - As recommended by Manufacturer:
  - a. Paper Tape: 2-1/16 inches wide.
  - b. Paper Tape: 2 inches wide with metal strips laminated along the center crease to form inside and outside corners.
  - c. Fiberglass Tape: Nominal 2 inches wide self adhering tape.
  - d. Alkali-resistant Fiberglass Tape: Nominal 2 inches wide polymer coated alkali-resistant mesh tape.
- 2. Drying Type Compound - As recommended by Manufacturer:
  - a. Ready Mix vinyl base compound.
  - b. Ready Mix vinyl base compound formulated for enhanced mold and mildew resistance.
  - c. Ready Mix vinyl base compound formulated to reduce airborne dust during sanding.
  - d. Ready Mix vinyl base topping compound for finish coating.

- e. Ready Mix vinyl base compound for embedding joint tape, corner beads or other accessories.
  - f. Field Mix vinyl base compound.
3. Setting Compound - As recommended by Manufacturer:
    - a. Field mixed hardening compound.
    - b. Field mixed hardening compound for fire resistance rated construction and penetrations.
  4. Joint Sealant: Conform to ASTM C920 Standard Specification for Elastomeric Joint Sealants.
  5. Finish Level: Provide a Level 4 Finish, with a light orange-peel texture. All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compounds shall be smooth and free from tool marks and ridges. The prepared surface shall be coated with Sheet Rock Brand First Coat Primer, or equal, prior to the application of the light orange-peel texture.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine areas to receive gypsum products to verify conditions.
- B. Report conditions contrary to contract requirements that would prevent a proper installation.
- C. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the conditions.
- E. Installation indicates acceptance of the conditions with regard to conditions existing at the time of installation.

#### **3.02 INSTALLATION, ABUSE RESISTANT GYPSUM BOARD**

Install in accordance with manufacturer recommendations

#### **3.03 INSTALLATION, CEMENT BOARD**

Install in accordance w/manufacturer recommendation and ANSI A108.11

#### **3.04 INSTALLATION, TILE BACKER**

##### **A. General:**

1. Install in accordance with manufacturer recommendations, ASTM C840 and GA-216
2. Install with acrylic coated water barrier side facing away from the framing, so that finishes shall be applied to the coated side.
3. Caulk or seal penetrations and abutments to dissimilar materials.

##### **B. Tile Backer Installation for walls:**

1. Install panels horizontal or vertical to supports spaced a maximum of 16 inches on center without blocking or 24 inches on center with blocking at all joints for ½ inch thick panels and 24 inches on center for 5/8" inch thick panels.
2. Space fasteners 8 inches on center along all support members. Drive fasteners flush with the panel surface, do not countersink.
3. Dry Non-Tile Applications

- a. Tape joints with fiberglass mesh tape and embed with setting type joint compound.
  - b. Skim the surface with a setting or ready-mix joint compound.
4. Wet Non-Tile Applications
- a. Finish walls with a direct applied finish systems, or materials suitable for humid environments.
  - b. Seal transitions and abutments to dissimilar materials with flexible joint sealant.

**\*\*\*END OF SECTION\*\*\***

## SECTION 09300

### TILEWORK

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to ceramic floor, base and wall tile and installation of stone tiles for floor. All the requirements of the Contract Documents apply to this Section.

##### 1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.
- B. Comply with recommendations of the Ceramic Tile Institute and the Tile Council of America.
- C. Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Meet with Owner and Architect prior to start of installation to review all requirements. Report to the Architect all conditions, which prevent proper execution of this work.
- D. Environmental Conditions:
  - 1. Maintain temperature at 50 degrees F. minimum during tilework and for seven (7) days after completion. Do not apply to frozen surfaces.
  - 2. Vent temporary heaters to outside to avoid carbon dioxide damage to new tilework.
  - 3. Provide adequate lighting for work and walking on newly tiled floors.
  - 4. Use kneeling boards for work and walking on newly tiled floors.
  - 5. Provide shade for all tile, materials and work area on exterior applications as required to prevent rapid evaporation caused by excessive heat.

##### 1.04 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.05 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. List of items to be provided under this Section.
  - 2. Manufacturer's Specifications, catalog cuts, and other data needed to prove compliance with the specified requirements of tile, sealants, grout, trim, fasteners, adhesives and sealers.
  - 3. Samples of each type, class, and color of ceramic tile required, not less than 12"

square, mounted on plywood or hardboard backing, and grouted as specified. Sample shall include border pattern.

1.06 PRODUCT HANDLING

Blend all tiles at factory and again on site to achieve an even color throughout to the Architect's approval.

1.07 CLOSE-OUT: Comply with the requirements of Section 01770 – Contract Closeout.

- A. Provide maintenance instructions and product for one cleaning of project subsequent to closeout.
- B. Furnish written guarantee covering workmanship and materials for one (1) year after acceptance of the buildings.

**PART 2 -- PRODUCTS**

2.01 CERAMIC TILE

- A. Provide ceramic tile and accessories complying with Tile Council of America Specifications 137.1, in colors and patterns selected by the Architect from standard colors and patterns of the accepted manufacturers.
- B. Material:
  - 1. Furnish: size(s), color(s), pattern(s) and shape(s) as indicated on the drawings.
  - 2. Provide standard accessory shapes as required and as accepted by Architect.
  - 3. Use appropriate trim shapes to conform to drawings.
  - 4. Metal trims shall have a clear anodized finish – protected as to resist discoloration from adhesives and grouts.
- C. Floor Tile: Provide coefficient of friction not less than 0.60 when tested in accordance with ASTM F489, ASTM F609, and the National Bureau of Standards Technical Note 895 at floor tile.
- D. Extra Stock: Supply 2% of each type of tile used in clean marked cartons for Owner.

2.02 SETTING MATERIALS

- A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installation".
- B. Dry set mortar:
  - 1. Provide a commercially prepared mixture of Portland Cement, sand, and additives imparting water retentivity, for use as a leveling / bond coat for setting interior tile floors and all exterior mortar beds.
  - 2. Comply with ANSI A118.1, except where specifically indicated on the Drawings or directed in advance by the Architect, provide conductive dry-set mortar complying with ANSI A118.2.
  - 3. Provide acrylic latex additive formulated for use with dry set mortar.
  - 4. Acceptable products:
    - a. S-759 Thin Set Mortar for floors, S-763 Thin Set for Walls and S-800 Setting Acrylic Latex Additive, as manufactured by Summitville Tiles, Inc., Summitville, Ohio 43962.



- b. Equal products of other manufacturers when accepted in advance by the Architect.
- C. Organic Adhesive: TCA A136.1 Type 1, AO 1700 or approved equal; thin set bond for walls.
- D. Epoxy Adhesive: TCA AO 4000 AAR-11, ANSI 118.3 Epoxy resin and epoxy hardener
- E. Special tile setting mortars will be considered by the Architect when complete technical data is submitted in advance.
- F. Mortar system for thin set bond type for interior floors. Typical in all potentially wet areas such as restrooms.

### 2.03 GROUT

- A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installation" in colors selected by the Architect from standard colors available from the accepted manufacturers.
- B. Latex Portland Cement Grout:
  - 1. Provide a commercially prepared mixture of Portland cement and latex additives producing water-retentivity, and suitable for grouting all walls and floors subject to ordinary use.
  - 2. Provide a product licensed by the Tile Council of America, and bearing that license symbol.
  - 3. Acceptable products:
    - a. "S-700 Sanded Joint Filler" with "S-775 Grouting Acrylic Latex Additive", as manufactured by Summitville Tiles, Inc.
    - b. Equal products of other manufacturers when accepted in advance by the Architect.
- C. Expansion Joint: Colors to be selected by Architect.
  - 1. Provide expansion joint backing material as closed cell polyethylene foam weighing not less than 2.7 lbs. Per cubic foot and in dimension approximately 20% thicker than the width of the expansion joint in which used.
  - 2. Expansion joints in floors shall be a two component polyurethane sealant with Shore-A hardness between 35-45. Use at perimeter of all stone flooring especially when adjoining other tilework.
- D. At joints between floors and walls and at perimeter of metal doorframes, provide one-part silicone material.

### 2.04 PROTECTIVE MATERIALS

- A. Neutral cleaner such as Hillyard Super Shine-All.
- B. Grout release agents such as Klein Company Standard Grout Guard.
- C. Sealer: Overall the finished work of this Section, provide a sealer, cleaner or water repellent coating and apply in strict accordance with the Manufacturer's recommendations.
- D. Heavy-duty non-staining construction paper with compatible tape for securing it.

### 2.05 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

### 2.06 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

### **PART 3 -- EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

#### **3.02 PREPARATION**

A. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.

B. Acceptability of Surfaces:

- 1. Before tiling, confirm variations of surface to be tiled fall within maximum variations shown below:

		Walls	Floors
1.	Cement Mortar Bed	1/4" in 8'	1/4" in 10'
2.	Epoxy Adhesive	1/8" in 8'	1/8" in 10"
3.	Organic Adhesive	1/8" in 8'	1/8" in 8"

- 2. Report all unacceptable surfaces to the Architect and do not tile such surfaces until they are leveled enough to meet above requirements. Leveling cost is included in this section.
- 3. Remove all adhesives for substrate for clean floor. Before tiling, be certain surfaces to be tiled are free from coating, curing membranes, oil, grease, wax, and dust. Scarify concrete substrate, which is hard steel trowel finished or pores filled with curing compound or other adhesive.
- 4. Verify that grounds anchors, plugs, recess frames, bucks, electrical work, mechanical work and similar items in or behind the tile have been installed before proceeding with the installation of the mortar bed or tile.

#### **3.03 INSTALLATION**

A. General:

- 1. Comply with ANSI A108.1, A108.5, A108.6 and A108.10 and the "Handbook for Ceramic Tile installation" of the Tile Council of America, except as otherwise directed by the Architect or specified herein.
- 2. Maintain minimum temperature limits and installation practices recommended by materials manufacturers.

B. Layout:

- 1. Determine locations of all movement joints before starting tilework.
- 2. Layout tile work and center tile fields both direction in each space or on each wall area.
- 3. Lay out all tilework so as to minimize cuts less than one-half tile in size.

4. Locate cuts in both walls and floors so as to be least conspicuous.
  5. Provide uniform joint width.
  6. Align all floor joints to give straight uniform grout lines, parallel with walls, base and trim.
  7. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.
  8. Align the joints when adjoining tiles on floor, base, trim, and walls are the same size.
- C. Install the work of this Section in accordance with the following Handbook procedure:
1. Floors interior – No. F115 at porcelain / stone floors.
  2. Floors exterior – No. F101.
  3. Walls – No. W242.
- D. Limits of tile:
1. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruptions. Omit behind full width mirrors above counter lavatories to allow smooth setting of mirror.
  2. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
- E. Provide expansion and control joints where shown on the Drawings, and where otherwise recommended by the "Handbook for Ceramic Tile Installation" of the Tile Council of America, sealing in accordance with Section 07900 of these Specifications, but not less than:
1. 24'-0" to 36'-0" in each direction on interior.
  2. 12'-0" to 16'-0" in each direction on exterior.
  3. At all perimeter walls, building expansion joints and where tile abuts restraining surfaces such as walls, curbs, dissimilar floors, pipes, columns or where changes in backing materials occur.
  4. Extend joints completely through the tile, mortar, mortar bed and reinforcing.
- F. Install metal edge strips at all openings where floor tile abuts dissimilar materials and a threshold has not been called out. Grout solid all thresholds indicated adjacent to tilework.
- G. Workmanship:
1. Supply first class workmanship in all tilework.
  2. Use all products in strict accordance with recommendations and directions of manufacturer.
  3. Proportion all mixes in accordance with latest ANSI Standard Specifications.
  4. Be sure all tilework is free of grout film upon completion, conforming to ANSI A 108.5 sub-section A-4.3.4.7.
- H. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded, and otherwise defective units.
- I. Provide required protection of tile surfaces to prevent damage and wear prior to acceptance of the Work by the Owner.

### 3.04 GROUTING

- A. Allow tile to set for a minimum of 48 hours prior to grouting. Remove all spacers, ropes, glue and foreign material prior to grouting.

- B. Follow grout manufacturer's recommendations as to grouting procedures and precautions.
  - 1. Force maximum amount of grout into joints in accordance with pertinent recommendations in ANSI 108.10.
  - 2. Fill-in joints of cushion edged tile to depth of cushion; fill square edged tile flush with surface.
  - 3. Provide hard finished grout which is smooth and without voids, pinholes or low spots.
- C. Remove all grout haze, observing grout manufacturer's recommendations as to use of acid and chemical cleaners.
- D. Use recommended sealant for perimeter grouting of stone tile to allow for movement of field.
- E. Cleaning:
  - 1. Upon completion of placing and grouting, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.
  - 2. Protect metal surfaces, cast iron, and vitreous items from effects of acid cleaning.
  - 3. Flush surfaces with clean water before and after cleaning.
  - 4. Cure the joints by keeping damp until hardened, during which time all traffic is kept off newly tiled floor areas.
  - 5. Protect grouted floors from drying out for at least three days with a layer of bituminous building paper lapped 4" and sealed against escape of moisture. Keep traffic off floor during this curing period.

3.05 PROTECTION

- A. Apply sealer over all finished surfaces of work of this Section. Use in strict accordance with manufacturer's printed instructions.
- B. Protection from Construction Dirt:
  - 1. Apply to all clean, completed tile walls and floors a protective coat of neutral cleaner solution, 1 part cleaner to 1 part water.
  - 2. In addition, cover all tile floors with heavy-duty, non-staining construction paper, masked in place.
  - 3. Just before final acceptance of tilework, remove paper and rinse protective coat of neutral cleaner from all tile surfaces.
- C. Protection from Traffic:
  - 1. Prohibit all foot and wheel traffic from using newly tiled floors for at least 3 days, preferably 7 days.
  - 2. Place large flat boards in walkways and wheel-ways for 7 days where use of newly tiled floors with cement type grout is unavoidable.

**\*\*\* END OF SECTION \*\*\***

**SECTION 09510**  
**ACOUSTICAL CEILING SYSTEMS**

**PART 1 -- GENERAL**

1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Supply and install all Acoustical Ceiling Work as shown on Drawings and as specified herein. All the requirements of the Contract Documents apply to this Section.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.04 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Submit complete layout of all systems including attachments, intersections of members and edge conditions.

1.05 QUALITY ASSURANCE

- A. Have applicators approved by manufacturer of material or system being installed.
- B. Work hereunder requires coordination with trades who's Work connects with, is affected, or concealed by acoustical units. Before proceeding with Work, make certain all required inspections have been made.
- C. Examine sub-surfaces to receive Work. Commencement of Work will be construed as acceptance of all sub-surfaces.
- D. Comply with all applicable requirements of Acoustical Materials Association, Bulletin "Architectural Acoustical Materials".

1.06 DELIVERY AND STORAGE

Deliver all manufactured materials in original containers bearing manufacturer's name and brand. Use only one brand for each type of unit throughout job. Store materials within building in locations directed.

1.07 EXTRA MATERIALS

Order additional 3% of each type of acoustical unit specified, for maintenance use, at no additional cost to Owner (One box minimum).

**PART 2 -- PRODUCTS**

2.01 GRID

- A. Ceiling Suspension Materials: Comply with ASTM C635, as applicable to the type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceilings.
- B. Manufacturer, Type, Location, and Pattern: as indicated on the drawings.

- C. Edge Mouldings: Manufacturer's standard channel moulding for edges and penetrations of ceiling, with a single flange of moulding exposed, white baked enamel finish, unless otherwise indicated.

## 2.02 ACOUSTICAL TILE

Manufacturer, Type, Location, and Pattern: as indicated on the drawings.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

### 3.02 INSTALLATION

- A. Provide all materials and accessories for complete installation per Drawings and manufacturer's printed instructions and recommendations.
- B. Install units to sub-surfaces from setout points and to pattern shown on Drawings. Verify location of Work of other trades so their items occur within a whole unit or at joints as shown.
- C. Install units in place fitting snugly. Provide spacers or hold-down clips where shown or required.
- D. After installation, clean any soiled surfaces. Replace any damaged units at no additional cost to the Owner.
- E. Arrange acoustical units in the manner shown by reflected ceiling plans. Consult with Architect pertaining to any adjustments.

### 3.03 SUPPORT SYSTEMS FOR SUSPENDED CEILING

- A. General: Ceilings shall not support material or building components other than grills, insulation batts or light fixtures. Duct work, plumbing and like work shall have its own support system and shall not use the ceiling system or suspension wires.
- B. Vertical Support System: Suspension wires shall be a minimum of 12-gauge galvanized wire attached to the main runner at 4 ft. maximum spacing in both directions. Each wire shall be anchored to the structure above with a device capable of supporting a minimum of 75 pounds. Wires supporting fixtures shall be capable of supporting four times the fixture weight. Suspension wires shall not hang more than 1 in 6 out of plumb unless counter sloping wires are provided. Wires shall not attach to or bond around interfering material such as ductwork. Trapeze or equivalent devices shall be used where obstructions interfere with direct suspension.
- C. Horizontal Support System: The lateral support system for ceilings shall be shown in detail shop Drawings. Provisions shall be made for possible differential movement between ceilings and sidewalls. Terminal ends of each main and each cross runner shall be wire supported; wall trim angles shall not provide primary support for runners. Lateral support of ceilings shall not be provided by the angle trim and runner shall not be riveted to wall trim.
- D. Light Fixture Support: All recessed or drop-in light fixtures shall be supported directly from the fixture housing to the structure above with a minimum of two 12 gauge wires; leveling and positioning of fixture may be provided by the ceiling grid. Fixture support wires may be slightly loose to allow fixture to seat in heavy-duty grid system only.

- E. Secure wire hangers by looping and wire tying either directly to structures or to inserts, eye-screws or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures.

3.04 CLEANING AND PROTECTION

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge mouldings and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- B. The installer shall advise the Contractor of required protection for the acoustical ceilings, including temperature and humidity limitations and dust control, so that the Work will be without damage and deterioration at the time of acceptance by the Owner.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 09650**  
**RESILIENT FLOORING**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

**1.02 SCOPE OF WORK**

Furnish all materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to these major items:

1. Resilient tile flooring.
2. Floor substrate surface.
3. Rubber base.

**1.03 REGULATORY REQUIREMENTS**

Conform to applicable code for flame rating requirements of 75 or less in accordance with ASTM E84.

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.05 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Provide product data on specified products, describing physical and performance characteristics.
- C. Submit two samples, illustrating color and pattern for each floor material or base, substituted for those indicated in the Drawings.
- D. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedure used on the Work.

**1.06 OPERATION AND MAINTENANCE DATA**

Submit cleaning and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

**1.07 ENVIRONMENTAL REQUIREMENTS**

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

**1.08 EXTRA MATERIALS**

Provide 5% of each pattern and color of flooring and of base specified.

## **PART 2 -- PRODUCTS**

### 2.01 VINYL COMPOSITION TILE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

### 2.02 SHEET VINYL

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

### 2.03 BASE MATERIALS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

### 2.04 ACCESSORIES

- A. Subfloor Filler: Latex cement underlayment as recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Sealer and Wax: Types recommended by flooring manufacturer.
- D. Welding rod: Use same manufacturer as flooring manufacturer and install per manufacturer's instructions. Colors to be selected from standard colors. All flooring in medical procedure rooms and in restrooms shall be heat welded.
- E. Provide other materials, not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Architect.

### 2.05 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

## **PART 3 -- EXECUTION**

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.
- E. Verify concrete floors are dry to the maximum moisture content of 2.5% (two and one half percent); and exhibit negative alkalinity, carbonization, or dusting. Provide test results to indicate that the substrate meets moisture requirements prior to starting work. Higher moisture content will be as accepted by manufacturer in their written warranty.
- F. Beginning of installation means acceptance of 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 from area until filler is cured.
- D. Vacuum clean substrate.
- E. Maintain the temperature of the space to receive the flooring and the materials to be installed at

a minimum of 65 degrees F and maximum of 100 degrees F for at least 48 hours prior to, during, and 48 hours after installation. Maintain a minimum temperature of 55 degrees F thereafter.

F. Install flooring after all other trades, including painting, have been completed.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, conventional full-spread system.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set flooring in place; press with heavy roller to attain full adhesion.
- D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- E. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- F. Scribe flooring to walls, columns, permanent cabinets, floor outlets, and other appurtenances to produce tight joints.

### 3.04 INSTALLATION -- BASE MATERIAL

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of thickness and fold.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to doorframes and other interruptions.

### 3.05 PROTECTION

Prohibit traffic on floor finish for 48 hours after installation.

### 3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 09670**  
**EPOXY RESINOUS FLOORING**

**PART 1 -- GENERAL**

1.01 **GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 **RELATED DOCUMENTS**

Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Section in Division 1 of these Specifications.

1.03 **DESCRIPTION/SUMMARY**

A. Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

B. Work Included the work includes, but is not limited to, providing all materials, labor, equipment and transportation to provide an epoxy resinous flooring system complete as indicated and as specified herein.

Surface preparation

Primer, base coat and cove base

C. Related Work Specified Elsewhere Note: Coordinate work of this section with work of other sections to properly execute the work and maintain satisfactory progress of work of other sections including:

CAST-IN-PLACE CONCRETE, Division 3

ROUGH CARPENTRY, Division 6

SEALANTS, Division 6

PLUMBING, Division 15

1.04 **REFERENCES**

References made herein to published specifications; standards, methods of testing and recommended methods of trade, industry and governmental organizations shall apply to the year of original adoption or the year of the latest revision or approvals.

Refer to Division 1, Section: REFERENCE STANDARDS.

1.05 **SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

1.06 **SUBMITTALS**

Submit samples, manufacturers literature and installation instructions per Division

1. Provide in accordance with Article 3.11 of the General Conditions.

1.07 **QUALITY ASSURANCE**

A. Applicator shall have minimum of five years experience in application of the specified type of flooring.

B. Provide certification from the manufacturer that the applicator is approved for installation of the flooring.

1.08 WARRANTY

Provide one (1) year guarantee for material and installation.

1.09 PRODUCT HANDLING AND DELIVERY

Deliver all material in manufacturers sealed containers and store under cover in a well-ventilated area.

**PART 2 -- PRODUCTS**

2.01 MATERIALS

- A. Basis of Design: Sunbelt Flooring, Inc.; Phone: (909) 628-1090; Fax: (909) 628-1280; Website: [www.sunbeltflooring.com](http://www.sunbeltflooring.com)
- B. System: The Sunbelt Flooring System as installed by Sunbelt Flooring, Inc., including: Preparation and installation on the "Heavy-Duty Sunbelt Flooring No. 1100 Chemical Resistant Industrial Floor" The General Contractor shall coordinate scheduling with adequate advance notice prior to floor installation as agreed upon with Sunbelt Flooring, Inc.
- C. Products: Primer as recommended for conditions. Chemical Resistant Industrial Flooring No. 1100 (Color to be selected by Architect from the Sunbelt Flooring, Inc., sample boards as submitted) and installed only by Sunbelt Flooring, Inc. System shall be solids, translucent quartz grains, coated, pigmented, inorganic ceramic film, grade #28.
- D. Sunbelt 1100 Flooring System Physical Properties

TEST

PHYSICAL PROPERTIES

Compressive Strength (Kpsi) <b>ASTM C579</b>	18.5
Tensile Strength (psi) <b>ASTM C-307</b>	2000
Flexural Strength (Kpsi) <b>ASTM C-580</b>	6.15
Flexural Modulus of Elasticity (psi) <b>ASTM D-790</b>	2.2 x 10 <sup>5</sup>
Hardness (Shore D) <b>ASTM D-2240</b>	86
Bond Strength (psi) <b>ASTM D-454</b>	600
Indentation (mil/Kpsi) <b>Mil D-3124F</b>	11 (No visible indentation)
Abrasion Resistance (mg/Kcyc) <b>ASTM C-501</b>	597.4
Coefficient of Friction <b>ASTM D-2047</b>	>0.9

Flammability  
**ASTM D-635**

Burning time (sec) 104 (Self extinguishing)  
Extent of burning (mm) 6.5

Thermal Coefficient of  
Linear Expansion (in/in °C)  
**ASTM E-831**

25° to 65°C 2.6 x 10<sup>5</sup>  
65°C to 135°C 5.7 x 10<sup>5</sup>  
135°C to 220°C 2.3 x 10<sup>5</sup>

TEST

PHYSICAL PROPERTIES

Water Absorption (%)  
**ASTM C-413**

.01%

Heat Resistance limit (°F)  
**ASTM N/A**

**DRY** - 250° Continuous / 275° Intermittent  
**WET** - 140° Continuous / 200° Intermittent

Impact Resistance / Indention  
**Mil D-3124**

5x10<sup>-4</sup> in. (No visible indentation)

Weather Resistance  
Weather-O-Meter  
200 Hr Exposure

No visible cracking or deterioration

Resistance to Elevated Temperatures

A sample of the flooring was warmed to 158 degrees. There was no discernable softening. After cooling sample showed no measurable slip or flow.

U.S.D.A

Approved

Fungus/Bacteria Resistance

Will not support growth of fungus or bacterial when subject to mildew and bacteria test specified in TT-P-34

Electrical Conductivity

Electrically non-conductive

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION OF EXISTING CONCRETE

Cleaning of interior concrete slabs: Vacuum shot blast ("Blastrac") all designated existing interior concrete floor slabs that are to receive new flooring materials or leveling underlayment coating. Vacuum shot blasting shall be with steel pellets 330-5 to 390-5 for optimum surface profile in

order for all sealers or adhesives to penetrate and bond. Coordinate all vacuum shotblasting with respective floor covering contractor. Dustless diamond cup grinding may be used in some instances in lieu of shot blasting.

### 3.03 PREPARATION AND INSPECTION

- A. Insure structural substrate to receive flooring is designed to prevent random cracking and/or deflection. Provide adequate control and expansion joints. Finish shall be "light steel trowel finish."
- B. Concrete to receive flooring shall be wet cured for a minimum of 28 days. Do not permit use of chemical surface curing agents that may interfere with adhesion.
- C. Ensure substrate is sound, dry, and free of dust, dirt, paint, grease, oil or other foreign substances.
- D. Substrates in contact with ground must have an effective vapor barrier to prevent potential problems resulting from hydrostatic or capillary moisture pressure.
- E. Variations in substrate level should not exceed 1/8" in ten feet. Ensure deviations or deteriorated concrete is corrected prior to start of this work.
- F. Advise other trades of finished, fixtures and fittings not to be installed until decking is cured, such as: Painting, floor supported equipment, caulking, plumbing fixtures, etc.
- G. Dirt, dust, plaster, oil, grease, tar, paint or any substrate that might impair adhesion must be thoroughly removed with suitable cleaners.
- H. All cracks, holes broken and crumbling areas must first be cut out, cleaned and repaired with sand filled Sunbelt 1100.
- I. Moving of settling cracks shall be cut or routed out and filled with flexi-caulk or resilient caulk and reinforced with 20 by 20 fiberglass tape.
- J. Building shall be encased with roof, walls, windows and doors prior to floor installation. Exceptions shall be agreed upon, in writing, by flooring installer and architect.

### 3.04 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations. Mix Sunbelt Flooring No. 1100 industrial flooring liquids with manufacturers approved equipment.
- B. Troweled apply Sunbelt 1100 self-priming epoxy for the first build coat.
- C. Add clean, dry aggregates as recommended by manufacturer. Allow to dry.
- D. Sand if needed to remove all laitance and vacuum clean.
- E. Apply finish coat with trowels to a tight flat surface.
- F. If a skid resistant surface is required by Architect or indicated on drawings, non-skid aggregates shall be broadcast onto surface of finish coat, then back rolled for sealing.
- G. Allow to cure thoroughly before opening floor to normal use. Use of heating equipment or infrared lamps is suggested if the seal coat cannot be given more than twelve hours of curing time before normal use.
- H. Protection: Supply barricades and precautions to allow traffic after and during start of installation, and for the cure period of the final coat.



**Sunbelt Flooring 1100  
Chemical Resistance Table  
ASTM D - 1308-57**

Test involved completely submerged a cured disk of Sunbelt 1100 in each of the following solutions. Maximum submersion time was 30 days. Most actual commercial applications are far less demanding, particularly where solvents and other evaporating materials are concerned.

<u>Chemical</u>	<u>Results</u>
Acetic Acid 5%	No Effect
Acetic Acid 10%	Ok 3 days then very slow
Acetone	Ok 3 days then slight deterioration
Ammonium Hydroxide 10%	No Effect
Blood	No Effect
Boric Acid	No Effect
Brake Fluid	Very minor swelling over 30 days
Calcium Chloride	No Effect
Carbolic Acid	Ok 2 days then slow dissolve
Acid 5%	No Effect
Detergent Solution	No Effect
Gasoline	No Effect
Hydrochloric Acid 10%	No Effect
Jet Fuel	No Effect
Lactic Acid 5%	No Effect
Methanol	Ok 3 days then Minor surface attack
Mineral Spirits	No Effect
Nitric Acid 5%	No Effect
Phenol	Ok 2 days then slow dissolve
Seawater	No Effect
Skydrol	Very minor swelling over 30 days
Sodium Hydroxide 50%	No Effect
Sodium Hypo chlorite	No Effect
Sugar Solution	No Effect
Sulfuric Acid 25%	No Effect
Toluene	Ok 3 days then very minor effect
Vegetable Oil	No Effect
Urine	No Effect
Vinegar	No Effect
Xylene	Ok 3 days then very minor effect

\*\*\*END OF SECTION\*\*\*

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## SECTION 09680

### CARPET

#### **PART 1 -- GENERAL**

##### 1.01 GENERAL REQUIREMENTS

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

##### 1.02 SCOPE OF WORK

Furnish all Materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. Direct glue down carpet with backing.
2. Metal edge trim and backing for carpet covered wall base if indicated on the drawings.

##### 1.03 SUBSTITUTIONS

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

##### 1.04 SUBMITTALS

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Submit product data on specified products, describing physical and performance characteristics: sizes, patterns, colors available, and method of installation.
- C. Submit two samples illustrating color and pattern for each carpet material specified if substituting from color board.
- D. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on this Work.

##### 1.05 OPERATION AND MAINTENANCE DATA

Submit operation and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

##### 1.06 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 72 degrees F ambient temperature plus/minus 5 degrees with relative humidity not exceeding 65% three days prior to, during, and 72 hours after installation of materials.

##### 1.07 EXTRA MATERIALS

Provide 5% of carpeting of each color specified.

#### **PART 2 -- PRODUCTS**

##### 2.01 CARPET

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

##### 2.02 FLOOR BASE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.03 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.04 OTHER ACCESSORIES

- A. Sub-Floor Filler: White premix latex; type recommended by carpet manufacturer.
- B. Primers and Adhesives: Waterproof; of types recommended by carpet manufacturer.

**PART 3 -- EXECUTION**

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work. Have all previous adhesives removed.
- D. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting. Provide test results to prove compliance prior to initiating installation.
- E. Do not proceed until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of 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 manufacturers' instructions. Direct glue-down.
- B. Lay out rolls of carpet.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Locate seams in area of least traffic. Carpet shall be installed in full lengths wherever possible.
- E. Fit seams straight, not crowded or peaked, free of gaps.
- F. Lay carpet on floors with run of pile in same direction as anticipated traffic. Lay carpet so that seams perpendicular to a wall do not occur at door openings in that wall.
- G. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- H. Cut and fit carpet around interruptions.
- I. Fit carpet tight to intersection with vertical surfaces without gaps.
- J. All seams shall be beaded and sealed with "seam sealer". The seam sealer shall be applied to the cut edge of the carpet at the level of the carpet backing.

- K. No stretching will be permitted.
- L. Unroll carpet face up and cut the lengths required with pile-lay runs in the same direction. Check starting wall for squareness and allow for off-square walls. Strike chalk line the entire length of area where seam falls.
- M. Place two lengths in proper position for installing; trim salvage, and line up seam edge with chalk line. Lay carpet perfectly flat and tension free.
- N. Roll both widths back 3' from seam area the entire length of carpet.
- O. Spread adhesive from approximate center towards each end.
- P. When sufficient floor area has been covered with adhesive, drop or roll first width into place. Apply coating of edge sealer to seam edge of first width. Follow this procedure on each succeeding width at seam. Drop or roll second width into position and fit the seam in tightly using knee-kicker if necessary. Brush or roll looseness and air bubbles away from seam.
- Q. Fold or roll the remaining portion of the first width from the wall. Apply adhesive to the floor and drop or roll carpet into place.
- R. Roll or fold back dry portion of second width towards seam; spread adhesive and place carpet 3' from where next seam will fall.
- S. Brush or roll out looseness and air bubbles as carpet is put into place. Repeat above procedure on continuing widths. Trim carpet at wall using razor blade knife or suitable wall trimmer.

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.
- B. Cover with non-staining building paper, firmly fastened down to protect floor surfaces.
- C. Near completion of the project, remove paper, clean and vacuum carpet.

**\*\*\* END OF SECTION \*\*\***

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**SECTION 09710**  
**ACOUSTICAL WALL PANELS**

**PART 1 – GENERAL**

**1.01 GENERAL REQUIREMENTS**

Division 0, Contract Requirements and Division 1, General Requirements apply to this Section.

**1.02 SCOPE OF WORK**

A. Section Includes:

1. Acoustical wall panels and installation components.

**1.03 REFERENCES**

Test Methods:

1. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM E 84/CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.
3. CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.
4. NFPA 265 (UBC 8-2) Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls

**1.04 SUBSTITUTIONS**

Substitutions will be considered per Article 3.3 of the Instruction to Bidders of the Bid Package Section 00003.

**1.05 SUBMITTALS**

- A. Provide in accordance with Article 3.11 of the General Conditions.
- B. Product Data: Submit manufacturer's technical data for each type of acoustical wall panel required.
- C. Samples: Minimum 6 inch x 6 inch samples of specified acoustical wall panel; minimum 4 inch long samples of attachment method including trim and decorative accents.
- D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry Factory Mutual Laboratory classification of NRC.
- E. Shop Drawings: Submit shop drawings showing how panels are to be laid out on the walls, details of trim members and width of panels. Width of panels and location of vertical seams are critical.

**1.06 QUALITY ASSURANCE**

- A. Single-Source Responsibility: Provide acoustical panel units and installation components by a single manufacturer.
- B. Fire Performance Characteristics: Identify acoustical wall components with appropriate markings of applicable testing and inspecting organization.
  1. Surface Burning Characteristics: As follows, tested per ASTM E 84,

- a. Flame Spread: 25 or less
- b. Smoke Developed: 200 or less
- 2. Room/Corner Wall Test: Fabric-covered material shall meet the acceptance criteria of the NFPA 265 (UBC 8-2) Corner Test.
- C. Coordination of Work: Coordinate acoustical wall work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical wall panels 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 wall panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical wall panels carefully to avoid chipping edges or damaged units in any way.

1.08 PROJECT CONDITIONS

Space Enclosure:

- 1. Soundsoak Fiberglass Panels: All wet work must be complete and dry prior to installation. Installation shall be carried out where the temperature is between 40 degrees F and 120 degrees F. These temperature conditions must be maintained throughout the life of the
- 2. Soundsoak Mineral Fiber Panels: All wet work must be complete and dry prior to installation. Installation shall be carried out where the temperature is between 32 degrees F and 86 degrees F. These temperature conditions must be maintained throughout the life of the warranty. All wet work must be complete and dry.

1.09 WARRANTY

- A. Acoustical Wall Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
  - 1. Acoustical Wall Panels: Manufacturer's defects
- B. Warranty Period:
  - 1. Acoustical wall panels: One (1) year 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 the requirements of the Contract Documents.

1.010 MAINTENANCE

Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

- 1. Acoustical Wall Panels: Furnish quantity of full-size units equal to 5.0 percent of amount installed.