

# **SPECIFICATIONS**

**PROJECT:**

**THE FRANCIS  
749 CONGRESS STREET  
PORTLAND, ME**

**OWNER:**

**747 CONGRESS LLC  
190 US ROUTE ONE, BOX 294  
FALMOUTH, ME 04105**

**ARCHITECT:**

**ARCHETYPE, P.A.  
48 UNION WHARF  
PORTLAND, MAINE 04101**

**CONSTRUCTION MANAGER:**

**WRIGHT RYAN CONSTRUCTION  
10 DANFORTH STREET  
PORTLAND, ME 04101**

**CONSTRUCTION SET  
July 12, 2016**

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SECTION 01045

CUTTING AND PATCHING

1. GENERAL

1.1 REFERENCES

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this Section.
- B. Divisions 2 through 16.

1.2 DESCRIPTION OF WORK

- A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition. This section does not apply to new work that has been installed as part of the Work.
- B. Structural Work: Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.
- C. Operational/Safety Limitations: Do not cut-and-patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance.
- D. Visual/Quality Limitations: Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of aesthetic qualities and similar qualities, as judged by the Architect/Engineer.
- E. Limitation on Approvals: The Architect/Engineer's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as judged by the Architect/Engineer.
- F. Materials marked to be removed and reused shall be repaired as necessary to maintain their existing condition. When repair is not sufficient, existing materials shall be disposed of and new materials installed to match existing materials.
- G. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.
- H. Unless otherwise specified, requirements of this Section apply to Mechanical and Electrical work. Refer to Divisions 15 and 16 for additional requirements and limitations on cutting and patching of mechanical and electrical work.

### 1.3 QUALITY ASSURANCE

- A. Refer to Section 01631, Products and Substitutions, for general provisions covering product selection, substitutions, material storage and installation.
- B. Refer to Section 01400, Quality Control Services, for provisions for testing and inspections.
- C. Refer to specific Specification Section covering subject in question for quality assurance requirements.

### 1.4 SUBMITTALS

- A. Issue submittals in accordance with Section 01300, Submittals.
- B. Refer to specific Specification Section covering subject in question for submittal requirements.

## 2. PRODUCTS

### 2.1 GENERAL

- A. Use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.
- B. Fire-stopping:
  - 1. Seal openings in fire-rated walls and floors to make a tight fit with penetrating items, using appropriate non-combustible filler material. to provide a rating equivalent to wall/floor assemble.
  - 2. Acceptable filler materials include:
    - a. Concrete
    - b. Cementitious proprietary product: Zonolite Firestop ZF-1
    - c. Blanket-type mineral-fiber or ceramic-fiber insulation (glass-fiber insulation is not acceptable)
    - d. Fire-resistant sealant: Domtar Fire-Halt, Dow Corning Fire Stop, Hilti CS 240 Firestop, or Nelson CLK or CMP
    - e. Fire-resistant silicone foam: Dow Corning RTV Foam Penetration Seal System, Hilti CB 120 Adhesive Filling and Sealing Foam, Tremco Fyre-Sil
    - f. Flexible intumescent strip wrapped around pipe penetrations: Dow Corning Fire Stop Intumescent Wrap, Hilti CS 24720 Intumescent Wrap, Nelson RSW, Tremco TREMstop WS

- g. Intumescent fibrous material enclosed in a polyethylene envelope: Nelson PLW, Tremco TREMstop PS
  - h. Pliable intumescent putty: Nelson FSP Flameseal, Tremco TREMstop WBM
  - i. Water-based intumescent fire-protective coating for electrical cables: Nelson CTG
3. Neatly patch and seal exposed-to-view openings, using sealants, tooled mortar joints, escutcheons, or flanged collars, as appropriate.

### 3. EXECUTION

#### 3.1 INSPECTION

- A. Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.
- B. Cutting and patching of Structural Work shall be prohibited unless approved by the Engineer.
- C. Cutting of Operational and Safety appurtenances shall be prohibited unless approved by the Architect and that other safety provisions have been implemented.

#### 3.2 TEMPORARY SUPPORT

- A. To prevent failure provide temporary support of work to be cut.

#### 3.3 PROTECTION

- A. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

#### 3.4 PERFORMANCE

- A. Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect/Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.
- B. Cutting:
  - 1. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Provide dust barriers to prevent dust from entering existing building beyond immediate work area. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

2. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.
3. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.
4. By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off conduit and pipe in walls or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

C. Patching:

1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of work.
3. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.
4. Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.
5. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.
6. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.5 MAINTENANCE OF TRAFFIC, ACCESS, AND UTILITIES

- A. Maintain accessibility from street at all times to any fire hydrants within construction area. Ensure that utilities serving adjacent buildings remain in service.

END OF SECTION

SECTION 01300

SUBMITTALS, MEETINGS AND RECORD DOCUMENTS

1. GENERAL

1.1 PRE-CONSTRUCTION MEETING

A. Architect will schedule a pre-construction meeting within 15 days of issuance of Notice to Proceed, to be attended by the owner, all project managers, Contractor's field superintendent, representatives of financial institutes and representatives of major sub-contractors. Within 48 hours of contract signing, CM shall submit to Owner the specified pre-construction submittals including the following:

1. Typed list of sub-contractors with addresses and telephone numbers.
2. Certificates of insurance.
3. Approved construction schedule. See General Conditions, Paragraph 3.10.
4. Schedule of values.
5. Start-up authorization or certificates.
6. Completed CM Contract; Building Permits; SFMO Permits and Bonds.

B. Pre-construction meeting agenda will include following:

1. Processing application for payment.
2. Processing and distribution of submittals.
3. Maintenance of record documents and provisions of As-Built documents.
4. Procedure for field changes, change estimates, change orders, etc.
5. Site and building security.
6. Location and maintenance of temporary storage areas, field offices, vehicular parking and access, waste disposal, etc.
7. Safety and first-aid procedures and policy for visitors and non construction personal to site.
8. Date and time for regular monthly coordination and progress meeting (to be coordinated with monthly application for payment).

1.2 CONSTRUCTION SCHEDULE

- A. Refer to General Conditions, Paragraph 3.10, for general provisions concerning construction progress schedule. Schedule shall show activities, itemized according to specification Section, and be organized in bar-chart or graph form so as to show both projected and actual progress of work.
- B. Arrange schedule to indicate required sequencing of units, and to show time allowances for submittals, inspections, and similar time margins.
- C. Show critical submittal dates related to each time bar, or prepare a separate coordinated listing of critical submittal dates.

- D. Show phases of work within each time bar for major elements which involve purchase lead-time, fabrication, seasonal treatment, mockups, testing, or similar phases as well as installation.
- E. Submit updated schedule monthly, together with application for payment.

### 1.3 SCHEDULE OF VALUES

- A. Refer to General Conditions, Paragraph 9.2 for general provisions concerning schedule of values.
- B. For these submittals, use AIA Document G702/703, Application and Certificate for Payment.
- C. Use specifications Sections as listed in Table of Contents as basis for format for listing costs.
- D. Itemize separately general cost items, such as bonds and allowances.
- E. Itemize change orders separately as they are approved.

### 1.4 MEETINGS AND REPORTING

- A. Contractor shall conduct general progress and coordination meetings at least once each month, attended by a representative of each primary entity engaged for performance of work. Record discussions and decisions, and distribute copies to those attending and others affected, including Architect/Engineer, Owner and MaineHousing.
- B. Date and time of at least one regular monthly progress and coordination meeting shall be determined at the pre-construction meeting. Timing of this monthly meeting shall be coordinated with payment requests.

### 1.5 APPLICATION FOR PAYMENT

- A. Refer to General Conditions, Paragraph 9.3, for general provisions concerning applications for payment.
- B. Use AIA Form G702/703, fully completed and executed.
- C. Submit the forms in triplicate including attachment of waivers and similar documentation with one copy.

### 1.6 SHOP DRAWINGS, PROJECT DATA, SAMPLES

- A. Refer to General Conditions, Product Data and Samples, paragraph 3.12, for general provisions covering this type of submittal. Refer to specification section 01330 - Submittal Procedures for specific provisions for all submittals.
- B. Coordinate the preparation and processing of work-related submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities that require sequential activity. Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the necessity of reviewing a related submittal.
- C. Architect/Engineer Review:
  - 1. Allow ten working days for the Architect/Engineer's initial processing of each submittal. Allow one week for reprocessing each submittal. No extension of time will be authorized because of failure to transmit submittals to the Architect/Engineer sufficiently in advance of the work.
  - 2. The Architect/Engineer will stamp each submittal to be returned with a uniform, self-explanatory action stamp, appropriately marked and executed to indicate the status of the submittal.
- D. Mark each submittal with a permanent label for identification. Provide project name, date, name of Architect/Engineer, name of Contractor, number and title of appropriate specification section and similar definitive information. Provide a space on the label for Contractors and Architect/Engineer's review markings.
- E. Package each submittal appropriately for transmittal and handling. Send each submittal from the Contractor to the Architect/Engineer and other destinations using AIA Transmittal Form G810.
- F. Provide additional copies of submittals required by governing authorities that are in addition to copies specified for submittal to the Architect/Engineer.
- G. Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals.
- H. Submit as follows:
  - 1. Shop drawings (original drawings prepared by Contractor or sub-contractor illustrating fabrication, layout, erection details, etc.): six prints, or one reproducible transparency and one opaque print, to Architect.
  - 2. Manufacturers' specifications, installation instructions, charts, schedules, catalogs, brochures, etc.: number of copies required by Contractor for distribution, plus one copy for Architect's retention.

3. Samples: one sample to Architect only, unless otherwise specified.
4. In submitting shop drawings and product data to Architect, use separate transmittals for material in different specification Sections, with applicable specification Section clearly numbered.
  - I. Architect will review submittals within ten working days, measured from date of receipt by Architect until date of mailing. Contractor shall promptly make corrections and resubmit when so directed. Where submittal is marked "Approved as Noted" or similar, assume that all items are approved other than those to which specific exception is taken. Do not delay fabrication, assembly and delivery pending receipt of entirely "Approved" submittal.
  - J. Distribute approved submittals to job site and record document files, and to suppliers and sub-contractors as required. Samples not designated by Contractor for incorporation into Work shall be kept on file until job completion. Any sample not reclaimed within 30 days after job completion will be considered unclaimed, and will be disposed of as directed by Architect.

#### 1.7 PROJECT RECORD DOCUMENTS

- A. Keep on file at job site one complete set of up-to-date Contract Documents, including drawings and specifications, addenda, shop drawings and product data, testing data, change orders, field orders, and other modifications. Documents shall be neatly and securely stored in files or on racks, clearly indexed by trade activity or specification Section, and shall not be used for construction purposes.
- B. Legibly mark significant field changes such as following, using colored pencils or felt-tipped pens:
  1. Drawings: locations of concealed utilities, field changes of dimension and detail, changes resulting from change order or field order, and details not on original drawings.
  2. Specifications: manufacturer and model number of equipment actually installed.
  3. Shop drawings and manufacturers' literature: changes made after Architect's review.
- C. At completion of Work, deliver completed record documents to Architect. Final payment for Project will not be made until Architect reviews and approves these documents.

#### 1.8 SUBSTANTIAL COMPLETION

- A. Refer to General Conditions, Article 9, Substantial Completion, for general provision concerning substantial Completion.



- B. Following issuance by Architect/Engineer of Certificate of Substantial Completion, Contractor may submit special payment request, provided the following have been completed:
1. Obtain permits, certificates of inspection and other approval and releases by governing authorities, required for Owner's occupancy and use of project.
  2. Submit warranties and similar documentation.
  3. Submit maintenance manuals and provide instruction of Owner's operational/maintenance personnel.
  4. Complete final cleaning of the work.
  5. Submit record documents.
  6. Submit listing of work to be completed before final acceptance.
- C. Following completion of the following requirements, final payment request may be submitted:
1. Complete work listed as incomplete at time of substantial completion, or otherwise assures Owner of subsequent completion of individual incomplete items.
  2. Settle liens and other claims, or assure Owner of subsequent settlement.
  3. Submit proof of payment on fees, taxes and similar obligations.
  4. Transfer operational, access, security and similar provisions to Owner; and remove temporary facilities, tools and similar items.
  5. Completion of requirements specified in "Project Closeout" section.
  6. Obtain consent of surety for final payment.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Section Includes:
  - 1. Submittal procedures.
  - 2. Product Data, Shop Drawings, and Samples.
  - 3. Assurance/Control submittals.
    - a. Certificates.
    - b. Manufacturer's installation instructions.
  - 4. Architect's action.
- B. Related Documents: The Contract Documents, as defined in Section 01110 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 SUBMITTALS

- A. Submit two copies of proposed Schedule of Submittals to Contracting Officer Representative within 30 days after receipt of Notice to Proceed. List all items require submittal for review and approval by Contracting Officer.
- B. Submit two copies of final Schedule of Submittals to Contracting Officer Representative within 2 days after receipt of proposed Schedule of Submittals review from Contracting Officer.
- C. Submit schedule on Contracting Officer approved form provided to Contractor by Contracting Officer Representative.
- D. Schedule of Submittals: Include the following.
  - 1. Indicate type of submittal; product data, shop drawing, sample, certificate, or other submittal.
  - 2. Identify by Specification Section number, Specification paragraph number where item is specified, and description of item being submitted.
  - 3. Indicate scheduled date for initial submittal, date for approval, and date for possible resubmittal for each submittal.
- E. Coordinate Schedule of Submittals with Construction Schedule. Revise and update Schedule of Submittals when required by changes in the Construction Schedule. Provide Contracting Officer Representative with updated schedules within 2 days of date schedule is revised.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Contracting Officer accepted form. Submit 3 copies of each transmittal.

- B. Sequentially number transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Lessor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to comply with scheduling requirements of Construction Schedule
- F. For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- H. Provide space for Contractor and Architect of Record review stamps.
- I. Revise and resubmit, identify all changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.
- K. Submittals not requested will not be recognized or processed.

#### 1.4 PRODUCT DATA

- A. Product data includes printed information such as catalog cuts, manufacturer's published instructions, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, performance curves and other similar items.
- A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by Contracting Officer Representative and Architect of Record.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

#### 1.5 SHOP DRAWINGS

- A. Submit in the form of one reproducible transparency and one opaque reproduction.

- B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above.
- C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

#### 1.5 SAMPLES

- B. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- C. Submit samples of finishes in colors selected, textures, and patterns for Contracting Officer selection.
- D. Include identification on each sample, with full Project information.
- E. Submit the number of samples specified in individual specification sections; one of which will be retained by the Contracting Officer.

#### 1.6 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer to Contracting Officer, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Contracting Officer.

#### 1.7 MANUFACTURER INSTALLATION INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Contracting Officer Representative in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

#### 1.8 CONTRACTING OFFICER ACTION

- A. For submittals where action and return is required or requested, Contracting Officer Representative will review each submittal, mark to indicate action taken, and return promptly; generally within 10 calendar days from date of receipt.
  - 1. Compliance with specified characteristics is the Lessor's responsibility.
  - 2. Submittals for information, closeout documents, record documents and other submittals for similar purposes, no action will be taken.

- B. Action Stamp: Architect of Record will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken.
  - 1. "Accepted": Final Unrestricted Release. Where submittals are marked "Accepted", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
  - 2. "Accepted as Noted": Final-But-Restricted Release. When submittals are marked "Accepted as Noted", that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
  - 3. "Rejected: Submit Specified Item" or "Revise and Resubmit": Returned for Resubmittal. When submittal is marked "Rejected: Submit Specified Item", "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
    - a. Do not permit submittals marked "Rejected: Submit Specified Item" or "Revise and Resubmit," to be used at the Project site, or elsewhere where Work is in progress.
  - 4. "Returned - Not Required": Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Returned - Not Required".

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01400

QUALITY CONTROL SERVICES

1. GENERAL

1.1 DESCRIPTION

- A. Quality control services include inspections and tests performed by independent agencies and governing authorities, as well as by the Contractor.
- B. Inspection and testing services are intended to determine compliance of the work with requirements specified.
- C. Specific quality control requirements are specified in individual specification sections.

1.2 RESPONSIBILITIES

- A. Except where indicated as being the Owner's responsibility, quality control services are the Contractor's responsibility, including those specified to be performed by an independent agency and not by the Contractor.
- B. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.
- C. The Owner will engage and pay for services of an independent agency to perform the inspections and tests that are specified as Owner's responsibilities.
- D. Where results of inspections or tests do not indicate compliance with contract document, retests are the Contractor's responsibility.
- E. The Contractor shall cooperate with independent agencies performing inspections or tests. Provide auxiliary services as are reasonable. Auxiliary services include:
  - 1. Provide access to the work.
  - 2. Assist taking samples.
  - 3. Deliver samples to test laboratory.

1.3 COORDINATION

- A. The Contractor and independent test agencies shall coordinate the sequence of their activities. Avoid removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections and tests.

#### 1.4 QUALIFICATIONS FOR SERVICE AGENCIES

- A. Engage inspection and test service agencies which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories.
- B. Each agency shall be employed with the approval of the Architect/Engineer.

#### 1.5 SUBMITTALS

- A. Notify the Architect/Engineer of the testing schedule.
- B. Submit a certified written report of each inspection test or similar service, in duplicate to the Architect/Engineer. Submit additional copies of each report to governing authority, when the authority so directs.

#### 1.6 REPORT DATA

- A. Written inspection or test reports shall include:
  - 1. Name of testing agency or test laboratory.
  - 2. Dates and locations of samples, tests or inspections.
  - 3. Names of individuals present.
  - 4. Complete inspection or test data.
  - 5. Test results.
  - 6. Interpretations.
  - 7. Recommendations.
- B. Reports shall be provided to the Architect/Engineer in a timely manner.

#### 1.7 REPAIR AND PROTECTION

- A. Upon completion of inspection or testing repair damaged work and restore substrates and finishes. Comply with requirements for "Cutting and Patching".

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

1. GENERAL

- 1.1 DESCRIPTION OF REQUIREMENTS: Provide temporary services and facilities ready for use when first needed to avoid delay in the work. Field office facility shall be sufficiently large to accommodate all persons and furniture/equipment convening for project meetings (progress and requisition meetings). Maintain, expand and modify as needed. Do not remove until no longer needed, or replaced by authorized use of permanent facilities.
- 1.2 USE CHARGES: Usage charges for temporary services or facilities are not chargeable to the Owner or Architect/Engineer.
- 1.3 REGULATIONS: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities.
- 1.4 STANDARDS: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".
- 1.5 INSPECTIONS: Inspect and test each service before placing temporary utilities in use. Arrange for inspections and tests by governing authorities, and obtain certifications and permits for use.
- 1.6 SUBMITTALS: Submit copies of reports and permits required or necessary for installation and operation, including reports of tests, inspections and meter readings performed on temporary utilities, and permits and easements necessary for installation, use and operation.
- 1.7 MATERIALS AND EQUIPMENT
  - A. Provide materials and equipment that are suitable for the intended use.
  - B. Provide new materials and equipment for temporary services and facilities; if acceptable to the Architect/Engineer, used materials and equipment that are undamaged may be used.
- 1.8 INSTALLATION
  - A. Use qualified tradesmen for installation.
  - B. Locate temporary services and facilities where they will serve the project adequately and result in minimum interference with the work.
- 1.9 TEMPORARY UTILITY INSTALLATION



## The Francis – Portland, Maine

- A. Engage, or make arrangements if necessary with, the local utility company to make connections to existing service.
- B. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.
- C. Establish a service implementation and termination schedule. As early as possible change to use of permanent service, to enable removal of the temporary utility and eliminate possible interference with completion of the work.
- D. Provide adequate capacity at each stage of construction. Prior to availability at the site, provide, trucked-in services for start up of construction operations.
- E. Obtain and pay for easements required to bring temporary utilities to the site, where the Owner's easement cannot be utilized for that purpose.

### 1.10 ELECTRIC POWER SERVICE

- A. Coordinate with Owner to use existing electrical service during construction.
- B. Comply with applicable requirements of NEMA, NECA and UL standards and governing regulations.
- C. Install temporary lighting of adequate illumination levels to perform the work specified.
- D. Comply with NEC pertaining to installation of temporary wiring service and grounding. Provide meters, transformers, and overcurrent protective devices at main distribution panel for power and light circuitry. Provide disconnects for equipment circuits.

### 1.11 POWER DISTRIBUTION SYSTEM

- A. Provide circuits of proper sizes, characteristics, and ratings for each use indicated.
- B. Install wiring overhead, and risers vertically where least exposed to damage.
- C. Provide rigid steel conduit to protect wiring on grade, floors, decks or other areas exposed to possible damage.
- D. Provide 20 amp, 4-gang receptacle outlets, equipped with ground-fault circuit interrupters, reset button and pilot light, spaced that a 100 foot extension cord can reach each area of work. Use only grounded extension cords; use "hard- service" cords where exposed to abrasion and traffic.
- E. Provide warning signs at power outlets that are other than 110/120 volt. Provide outlets of proper NEMA configuration to prevent insertion of 110/120 volt plugs into higher voltage outlets.

#### 1.12 TEMPORARY LIGHTING

- A. Provide general service incandescent lamps of wattage required for adequate illumination.
- B. Protect lamps with guard cages or tempered glass enclosures, where exposed to breakage.
- C. Provide exterior type fixtures where exposed to weather or moisture.
- D. Provide one 200-watt incandescent lamp per 1000 square feet of floor area for general construction lighting, one 100-watt incandescent lamp every 50 feet in corridors, and one lamp per story, located to illuminate each landing and flight in stairways.
- E. Install temporary lighting to fulfill security and protection requirements, without having to operate the entire temporary lighting system.

#### 1.13 TEMPORARY TELEPHONES

- A. Install telephone for each temporary office and first aid station.
- B. At each telephone location post a list of operational and emergency telephone numbers.

#### 1.14 TEMPORARY HEAT

- A. Provide temporary heat where needed for performance of work, for curing or drying of recently installed work or for protection of work in place from adverse effects of low temperatures or high humidity.
- B. Provide UL or FM tested and labeled heating units known to be safe and without adverse effect upon work in place or being installed. Coordinate with ventilation requirements to produce the ambient condition.
- C. Maintain a minimum temperature of 45 deg. F (7 deg. C) in permanently enclosed portions of the building and areas where finished work has been installed.
- D. Except where use of the permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat. Do not use open burning or salamander type heating units.

#### 1.15 FIELD OFFICES

- A. Provide standard prefabricated or mobile units, or the equivalent job-built field offices of sufficient size to accommodate required office personnel at the site.
- B. Provide insulated, weathertight units with lockable entrances.

- C. Provide vented space heater, capable of maintaining an indoor temperature of 68 deg. F (20 deg. C).

1.16 SANITARY FACILITIES

- A. Sanitary facilities include temporary toilets.
- B. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities.
- C. Supply toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.
- D. Install single occupant self-contained toilet units of the chemical, aerated recirculation or combustion type, properly vented and fully enclosed with glass fiber reinforced polyester shell. Use of pit-type privies will not be permitted.
- E. Provide separate toilet facilities for male and female construction personnel.
- F. Provide drinking water fountains where and when piped potable water, approved by local authorities, is reasonably accessible from permanent or temporary lines. Otherwise, provide containerized tap-dispenser bottled-water type drinking water units.

- 1.17 FIRST AID SUPPLIES: Comply with governing regulations and recognized recommendations within the construction industry.

1.18 DEWATERING FACILITIES AND DRAINS

- A. For temporary drainage and dewatering facilities and operations not directly associated with performance of work included under other sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities.
- B. Maintain the site, excavations and construction free of water.
- C. Dispose of rainwater in a lawful manner which will not result in flooding and project or adjoining property, nor endanger either permanent work or temporary facilities.

1.19 TEMPORARY ENCLOSURE

- A. Provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection from exposure, foul weather, other construction operations, and similar activities.

- B. Unless provided by subcontractor, provide enclosures where temporary heat is needed and the permanent building enclosure is not completed, and there is no other provision for containment of heat. Coordinate with ventilating and material drying or curing requirements to avoid dangerous conditions.
- C. Provide temporary enclosures by installing waterproof, fire-resistant, UL labeled tarpaulins with a flame-spread rating of 15 or less, using a minimum of wood framing. Use translucent nylon reinforced laminated polyethylene tarpaulins to admit the maximum amount of daylight. Individual openings of 25 square feet or less may be closed with plywood or similar materials.
- D. Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

#### 1.20 COLLECTION AND DISPOSAL OF WASTES

- A. Establish a system for daily collection and disposal of waste materials, including separation and recycling of waste material. Do not hold collected materials longer than 7 days.
- B. Handle waste materials that are hazardous, dangerous, or unsanitary separately from other waste by containerizing.
- C. Burying or burning of waste materials on the site or washing waste material down sewers will not be permitted.

#### 1.21 MISCELLANEOUS SERVICES AND FACILITIES

- A. Design, construct, and maintain miscellaneous services and facilities as needed to accommodate performance of the work, including temporary stairs, ramps, ladders, staging, shoring, scaffolding, temporary partitions, waste chutes and similar items.

#### 1.22 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect/Engineer and the Owner.
- B. Maintain site in a safe, lawful and publicly acceptable manner.
- C. Take necessary measures to prevent erosion.
- D. Except for utilization of permanent fire protection facilities, as soon as available, do not change over to use of permanent facilities until substantial completion.

#### 1.23 TEMPORARY FIRE PROTECTION

- A. Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection of the types needed to protect against losses.

- B. Comply with recommendations of NFPA Standard 10.
- C. Locate fire extinguishers where most effective; provide not less than one on each floor at or near each stairwell.
- D. Provide type "A" fire extinguishers for temporary offices and spaces where there is minimal danger of electrical or flammable liquid fires, and type "ABC" dry chemical extinguishers elsewhere.
- E. Store combustible materials in containers in fire-safe locations.
- F. Review fire prevention and protection needs with local fire department officials and establish procedures to be followed in the event of fire. Instruct personnel in procedures and post warnings and information.
- G. Maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways and other access routes.
- H. Prohibit smoking in hazardous areas.
- I. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of ignition.
- J. At temporary water outlets provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign, indicating that hoses are for fire protection purposes and are not to be removed.
- K. At the earliest feasible date complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities which may not be self-explanatory.

1.24 BARRICADES, WARNING SIGNS AND LIGHTS

- A. Comply with recognized standards and code requirements for erection of substantial, barricades where needed to prevent accidents.
- B. Paint with appropriate colors and warning signs to inform personnel at the site and the public, of the hazard being protected against.
- C. Provide lighting where needed, including flashing red lights where appropriate.

1.25 SECURITY ENCLOSURE AND LOCKUP: Where materials and equipment must be temporarily stored, and are of substantial value or attractive for possible theft, provide a secure lockup.

1.26 ENVIRONMENTAL PROTECTION

- A. Conduct construction activities, and by methods that comply with environmental regulations, minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result from the performance of work at the site.
- B. Avoid the use of tools and equipment which produce harmful noise.
- C. Restrict the use of noise making tools and equipment to hours of use that will minimize complaints.

1.27 OPERATION, TERMINATION AND REMOVAL

- A. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installations to be abused or endangered.
- B. Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized. Do not overload services or facilities. Protect from damage by freezing temperatures and similar elements.
- C. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.
- D. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24- hour basis where required to achieve indicated results and avoid the possibility of damage to the Work or to temporary facilities.
- E. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation.
- F. Remove each temporary service and facility promptly when need has ended, or when replaced by use of a permanent facility, but no later than substantial completion. Complete, or, if necessary, restore permanent work delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work which cannot be repaired.
- G. At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

END OF SECTION

SECTION 01631

PRODUCTS AND SUBSTITUTIONS

1. GENERAL

1.1 PROCEDURAL REQUIREMENTS

A. Source Limitations:

1. To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work. Where it is not possible to do so, match separate procurements as closely as possible.
2. To the extent that the product selection process is under the Contractor's control, provide products that are compatible with previously selected products.
3. Where standard products are available that comply with specified requirements, provide those standard products that have been used successfully before in similar applications, and that are recommended by the manufacturers for the applications indicated.

1.2 PRODUCT SELECTION LIMITATIONS

A. Product Selections: Comply with the following requirements in the selection of products, materials and equipment:

1. Single Product Name: Where only a single product or manufacturer is named, provide the product, unless it is not available, is incompatible with existing work, or does not comply with specified requirements or governing regulations.
2. Two or More Products Named: Where two or more products or manufacturers are named, the selection is at the Contractor's option, provided the product selected complies with specified requirements.
3. "Or Approved Equal" Provisions": Where products or manufacturers are specified by name accompanied by the term "or approved equal", provide either the product named, or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product.
4. Compliance with Standards: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting any product that complies with specified requirements provided no product names are indicated.

5. Performance Requirements: Where the specifications require compliance with indicated performance requirements, the Contractor has the option of selecting any product that complies with the specific performance requirements, provided no product names are indicated.
  6. Visual Requirements: Where the specifications indicate that a product is to be selected from the manufacturer's standard options, without naming the manufacturer, the Architect/Engineer has the option of making the selection, after the Contractor has determined or selected the manufacturer.
- B. Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

### 1.3 SUBSTITUTIONS

- A. Conditions: The Contractor's requests for substitutions will be considered when they are reasonable, timely, fully documented, and when they qualify under one or more of the following circumstances.
1. The proposed substitution is related to an "or approved equal" or similar provision in the contract documents.
  2. The required product cannot be supplied in time for compliance with Contract Time requirements.
  3. The required product is not acceptable to governing authorities.
  4. The required product cannot be properly coordinated with other materials in the work, or cannot be warranted or insured as specified.
  5. The proposed substitution will offer a substantial advantage to the Owner after deducting offsetting disadvantages including delays, additional compensation to the Architect/Engineer for redesign, evaluation and other necessary services, and similar considerations.
- B. Submittals: Include the following information, as appropriate, in each request for substitution:
1. Provide complete product documentation, including product data and samples, where appropriate.
  2. Provide detailed performance comparisons and evaluation, including testing laboratory reports where applicable.



3. Provide coordination information indicating the effect of the substitution on other work and the time schedule.
4. Provide cost information for the proposed change order.
5. Provide the Contractor's general certification of the recommended substitution.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Receive, store and handle products, materials and equipment in a manner which will prevent loss, deterioration and damage.
- B. Schedule deliveries so as to minimize long-term storage at the project site.

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

1. GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Provisions of this section apply to the procedural requirements for the actual closeout of the Work, not to administrative matters such as final payment or the change over of insurance.
- B. Closeout requirements relate to both substantial and final completion of the Work; they also apply to individual portions of completed work as well as the total Work.
- C. Specific requirements contained in other sections have precedence over the general requirements contained in this section.

1.2 PROCEDURES AT SUBSTANTIAL COMPLETION

- A. Prerequisites: Comply with General Conditions and complete the following before requesting Architect's/Engineer's inspection of the Work, or a designated portion of the Work, for certification of substantial completion.
  - 1. Submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates and similar required documentation for specific units of work, enabling owner's unrestricted occupancy and use.
  - 2. Submit record documentation, maintenance manuals, tools, spare parts, keys and similar operational items.
  - 3. Complete instruction of Owner's operating personnel, and start-up of systems.
  - 4. Complete final cleaning, and remove temporary facilities and tools.
- B. Inspection Procedures:
  - 1. Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled.

2. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Contractor of work which must be performed prior to issuance of the certificate of substantial completion.
3. The Architect/Engineer will repeat the inspection when requested and assure that the Work has been substantially completed.
4. Results of the completed inspection will form the initial "punch-list" for final acceptance.

### 1.3 PROCEDURES AT FINAL ACCEPTANCE

#### A. Reinspection Procedure:

1. The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that, except for those items whose completion has been delayed due to circumstances that are acceptable to the Architect/Engineer, the Work has been completed, including punch-list items from earlier inspections.
2. Upon completion of reinspection, the Architect/Engineer will either recommend final acceptance and final payment, or will advise the Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, this procedure will be repeated.

### 1.4 RECORD DOCUMENTATION

#### A. Record Drawings:

1. Maintain a complete set of either blue- or black-line prints of the contract drawings and shop drawing for record mark-up purposes throughout the Contract Time.
2. Mark-up these drawings during the course of the work to show both changes and the actual installation, in sufficient detail to form a complete record for the Owner's purposes. Give particular attention to work which will be concealed and difficult to measure and record at a later date, and work which may require servicing or replacement during the life of the project.
3. Require the entities marking prints to sign and date each mark-up.
4. Bind prints into manageable sets, with durable paper covers, appropriately labeled.

B. Maintenance Manuals:

1. Provide 3-ring vinyl-covered binders containing required maintenance manuals, properly identified and indexed.
2. Include operating and maintenance instructions extended to cover emergencies, spare parts, warranties, inspection procedures, diagrams, safety, security, and similar appropriate data for each system or equipment item.

1.5 GENERAL CLOSEOUT REQUIREMENTS

- A. Operator Instructions: Require each Installer of systems requiring continued operation and maintenance by owner's operating personnel, to provide on-location instruction to Owner's personnel, sufficient to ensure safe, secure, efficient, non-failing utilization and operation of systems. Construction Manager/General Contractor shall provide video record of this meeting. Provide instructions for the following categories of work:
1. Mechanical/electrical/electronic systems (not limited to work of Divisions 15 and 16).
  2. Live plant materials and lawns.
  3. Roofing, flashing, joint sealers.
  4. Floor finishes.
- B. Final Cleaning: At the time of project close out, clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program. Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completions.
1. Remove non-permanent protection and labels.
  2. Polish glass.
  3. Clean exposed finishes.
  4. Touch-up minor finish damage.
  5. Clean or replace mechanical systems filters.
  6. Remove debris.
  7. Broom-clean unoccupied spaces.
  8. Sanitize plumbing and food service facilities.
  9. Clean light fixtures and replace burned-out lamps.
  10. Sweep and wash paved areas.
  11. Police yards and grounds

END OF SECTION



SECTION 02225

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Procedures for demolition and removal of existing building elements.
  - 2. Removal of designated building equipment and fixtures.
  - 3. Salvaged items.
  - 4. Salvaged material.
  - 5. Salvaged items for re-use.

1.2 SYSTEM DESCRIPTION

- A. The extent of Selective Demolition Work is that Work necessary, and required to facilitate the new construction indicated.
- B. Demolition shall be such that all construction, new and existing, can be performed, and completed in accordance with the construction documents.
- C. Verify the scope of the Work under this Section including salvage material.

1.3 QUALITY ASSURANCE

- A. Engage only personnel who can demonstrate not less than five years successful experience in Work of similar character.
- B. Performance Criteria:
  - 1. Requirements of Structural Work: Do not cut structural work in a manner resulting in a reduction of load-carrying capacity of load/deflection ratio.
  - 2. Operational and Safety Limitations: Do not cut operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in a manner intended or resulting in a decreased operational life, increased maintenance or decreased safety.
  - 3. Visual Requirements: Do not cut work which is exposed on the exterior or exposed in occupied spaces of the building in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the demolition work judged by the Architect to be cut and patched in a visually unsatisfactory manner.

4. Loading: Do not superimpose loads at any point upon existing structure beyond design capacity including loads attributable to materials, construction equipment, demolition operations and shoring and bracing.
5. Vibration: Do not use means, methods, techniques or procedures which would induce vibration into any element of the structure.
6. Fire: Do not use means, methods, techniques or procedures which would produce any fire hazard unless otherwise approved by Contracting Officer.
7. Water: Do not use means, methods, techniques or procedures which would produce excessive water run-off, and water pollution.
8. Air Pollution: Do not use means, methods, techniques or procedures which would produce uncontrolled dust, fumes or other damaging air pollution.

#### 1.4 PROJECT SITE

- A. The Contractor shall verify all existing conditions and notify the Contracting Officer of discrepancies before proceeding with the Work.
- B. Perform the removal, cutting, drilling, etc., of existing work with extreme care, and using small tools in order not to jeopardize the structural integrity of the building.
- C. The Contractor shall have full use of the facility during construction.
- D. Condition of Structure: The Owner assumes no responsibility for the actual condition of portions of the structure to be demolished.
- E. Partial removal: Items of salvageable value to the Contractor may be removed from the structure as the work progresses if not claimed by the Owner. Salvaged items must be transported from the site as they are removed.
- F. Protection: Make sure that the safe passage of persons around the area of demolition is maintained during the demolition operation. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

#### 1.5 PROTECTION OF EXISTING CONSTRUCTION

- A. Provide temporary protection of existing construction (floors, roof, and walls) when adjoining new work and in traffic areas.
- B. Provide temporary construction, constructed of framing and plywood, to protect existing construction and surrounding surfaces from damage by movement of materials and personnel.
- C. The contractor is responsible for all damage to existing structure and shall replace or repair all areas of damage.

- D. Repair, replace, or rebuild existing construction as required or as directed which has been removed, altered or disrupted to allow for new construction. Existing construction shall be corrected to match adjacent construction, new or existing.
- E. Perform cutting of existing concrete and masonry construction with saws and core drills. Do not use jack-hammers or explosives.

#### 1.6 SHORING AND BRACING

- A. Provide temporary shoring of existing construction to allow removal of existing structural elements. Maintain shoring until new structural elements are in place and accepted.

### PART 2 - PRODUCTS

#### 2.1 SALVAGED ITEMS

- A. The Contract Documents indicate the existing materials that are to be reinstalled in the new construction. The Contractor shall remove, protect and reinstall these items as indicated.
  - 1. Items for "Reinstallation" include the cabinetry & trim and are indicated as such within the Contract Documents.
- B. Coordinate with the Owner on disposition of salvage items note scheduled for reinstallation, demolished materials, and equipment.

#### 2.2 SALVAGED MATERIALS

- A. Removed and salvaged materials of value not designated for reinstallation, unless claimed as salvage by the Owner, shall become the property of the Contractor and shall be removed from the premises by the Contractor.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.



- C. Report in writing to the Owner prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

### 3.2 PREPARATION

- A. Temporary Support: Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work.
- B. Provide adequate protection of other work during selective demolition to prevent damage and provide protection of the work from adverse weather exposure.

### 3.3 PROCEDURE

- A. Employ only skilled tradesmen to perform selective demolition.
- B. Cut work by methods least likely to damage work to be retained and work adjoining.
- C. In general, where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete and masonry work.
- D. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
- E. Where selective demolition terminates at a surface or finish to remain, completely remove all traces of material selectively demolished, including mortar beds. Provide smooth, even, substrate transition.

### 3.4 POLLUTION CONTROLS

- A. Use temporary enclosures and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level.
- B. Comply with governing authorities pertaining to environmental protection.
- C. Clean adjacent portion of the structure and improvement of dust, dirt and debris caused by demolition operations, as directed by the Owner and governing authorities. Return adjacent areas to conditions existing prior to the start of the work.

### 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Collect, recycle, reuse, and dispose of demolished materials per governing regulatory authorities.

### 3.6 SCHEDULE OF SELECTIVE DEMOLITION

- A. Exterior Masonry:
  - 1. Locate portion of existing masonry wall to be removed.
  - 2. Using small power tools, remove only that portion of the exterior wall which is required for the indicated new construction.
- B. Interior Walls and Partitions:
  - 1. Interior wall and partitions shall be removed as indicated on drawings.
- C. Mechanical System:
  - 1. Remove all mechanical equipment and related ductwork.
  - 2. Provide temporary weathertight protection of all openings in roof and exterior walls.
  - 3. Remove all accessories to the mechanical system including hanger straps.
- D. Plumbing:
  - 1. Remove all plumbing fixtures and accessories including all exposed supply, waste, and vent piping.
  - 2. Concealed piping within and below slab construction shall be identified, and capped a minimum of 3 inches (8 cm) below finish floor.
- E. Electrical Service:
  - 1. All electrical circuits within the existing structure shall be abandoned from the existing service entrance section, beyond.
  - 2. Remove all abandoned electrical conduit, boxes, and wiring back to the existing electrical service which is to remain.
- F. Provide additional selective demolition as indicated and required by the Owner and as required for indicated new construction.

END OF SECTION

## **SECTION 31 10 00 - SITE CLEARING**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

Provide all labor, tools, equipment and materials necessary to protect designated structures, trees and other vegetation within clearing limits and clear the area indicated on the drawings and as necessary to complete the work.

1. Protecting trees and vegetation beyond the clearing limit as necessary.
  2. Remaining trees and other vegetation within the clearing limits.
  3. Grubbing.
  4. Stripping and stockpiling topsoil.
- A. Coordinating this work with surveyor and protect property monuments and ground control for new work.
  - B. Coordinating site clearing with installation of temporary erosion control measures.
  - C. Coordinating with Owner prior to conducting site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
  - D. Restoring damaged improvements to their original condition, as acceptable to property owners.

#### 1.02 RELATED SECTIONS:

- A. Section 31 20 00 - Earthwork
- B. Section 31 25 13 – Temporary Erosion Control

#### 1.03 QUALITY ASSURANCE:

- A. General: Comply with requirements of Section 01 40 00 - Quality Assurance.

### **PART 2 - PRODUCTS (Not Applicable)**

## **PART 3 - EXECUTION**

### **3.01 PROTECTION OF EXISTING TREES AND VEGETATION:**

- A. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.
- B. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
- C. Provide protection for roots over 1-1/2 inches in diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Owner. Employ a licensed arborist to repair damages to trees and shrubs.

### **3.02 SITE CLEARING:**

- A. Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposal of stumps and roots. Stumps and roots may be ground and used on site as erosion control berms.
- B. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
- C. Use only hand methods for grubbing inside drip lines of trees indicated to be saved or protected.

### **3.03 TOPSOIL STRIPPING:**

- A. Topsoil is defined as friable loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, other objects over 2 inches in diameter, weeds, roots, and other objectionable material.
- B. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
- C. Leave topsoil in place within drip lines of trees specified to remain to prevent damage to root system.
- D. Stockpile topsoil in storage piles in areas indicated or specified as stockpile areas. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion, or seed with temporary seed mix.

3.04 DISPOSAL OF WASTE MATERIALS:

- A. Remove and legally dispose of all unsuitable material, waste materials, and spoil from the site.
- B. Burning will not be permitted.

3.05 TRAFFIC: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Comply with contractor site utilization areas for access to work areas.

3.06 PROTECTION OF EXISTING IMPROVEMENTS: Protect improvements on adjoining properties and on Owner's property.

3.07 RESTORE DAMAGED IMPROVEMENTS: to their original condition, as acceptable to property owners.

3.08 INSTALL APPROPRIATE SOIL EROSION MEASURES: prior to commencement of work.

\* END OF SECTION 31 10 00 \*

## **SECTION 31 20 00 - EARTHWORK**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

- A. Work Includes: All excavating, filling, backfilling, removal of materials, shoring and bracing, and dewatering.

Earthwork for utilities is included in this section.

#### 1.02 PROTECTION:

- A. Paved Surfaces: Do not operate equipment on paved surfaces which will damage these surfaces. If damaged, the repair will be at the cost of the contractor.
- B. Maintain excavations with approved barricades, lights, and signs to protect life and property until excavation is filled and graded to a condition acceptable to the Engineer.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

#### 1.03 QUALITY ASSURANCE:

- A. Testing and Inspection Service by Owner: Owner will engage soil testing and inspection service for quality control testing during earthwork operations. See Section 01 40 00 for general requirements. Contractor will pay for all aggregate gradation testing. Owner will pay for moisture maximum density tests and field compaction tests as stated in Section 01 40 00.

#### 1.04 SUBMITTALS:

- A. Test Reports: Submit the following reports:
- Reports on Material Gradations
  - One optimum moisture-maximum density curve for each type of soil encountered

#### 1.05 JOB CONDITIONS:

- A. Site Information: Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data is made available for convenience of Contractor. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

- B. Existing Utilities: Locate existing utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult Owner immediately for directions. Cooperate with Owner in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Owner.

Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with Owner for shutoff of services if lines are active.

- C. Use of Explosives: Not permitted unless required by change order for rock excavation.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS:

A. General:

1. Suitable Materials: Materials shown on the Drawings, or specified herein.
2. Unsuitable Materials: Materials containing clay, vegetation, organic matter, debris, pavement, stones, or boulders over 6 inches in greatest dimension, and frozen material. Any material which, in the opinion of the Engineer, will not provide a suitable foundation or subgrade.
3. On-Site Materials: Any suitable material from on-site excavation must meet the gradation for its intended use.
4. Material for embankments and general fills may contain pieces of excavated ledge having a greatest dimension of up to 12 inches if approved by the Engineer.
5. Inspection: The Engineer may inspect off-site sources of materials and order tests of these materials to verify compliance with these specifications.

B. Gravel: Hard, durable stone with coarse to fine sand. Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing</u>
3"	100
1/4"	30 - 70
40	0 - 30
200	0 - 5

C. Sand: Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing</u>
3/8"	100
No. 4	95 - 100
No. 16	50 - 85
No. 100	2 - 10

D. 3/4" Crushed Stone: Durable, clean angular rock fragments obtained by breaking and crushing rock material. Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing</u>
1"	100
3/4"	95-100
1/2"	35-70
3/8"	0-25

E. Structural Fill: Durable, clean angular rock fragments obtained by breaking and crushing rock material. Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing</u>
4"	100
3"	90-100
1/4"	25-90
#40	0-30
#200	0-5

F. Aggregate Base: Hard, durable crushed gravel, containing only particles passing the 2" sieve. Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing</u>
1/2"	45-70
1/4"	30-55
No. 40	0-20
No. 200	0-5



- G. Aggregate Subbase and Gravel: Hard durable gravel containing only particles passing the 6" sieve. Sieve analysis for portion passing 3 inch sieve:

<u>Sieve Size</u>	<u>% Passing</u>
1/4"	25-70
No. 40	0-30
No. 200	0-7.0

- H. Refill Material: Crushed stone for refilling excavation below grade or rock excavation unless otherwise directed by the Engineer.
- I. Granular Fill: Sand or gravel of hard, durable particles, free from clay, organic material, vegetation, and debris; less than 10% passing the No. 200 sieve.  
  
 Unsuitable Material for Granular Fill: Pieces of concrete, masonry, and pavement; stones having a dimension of 6 inches or more; material that cannot be properly compacted.  
  
 Obtain approval from the Engineer before using any material as granular fill.
- J. Select Backfill: Use gravel as specified above.

**PART 3 - EXECUTION**

3.01 EXCAVATION:

- A. General: Remove all materials encountered to the limits shown on the drawings, or designated in the specifications.  
  
 Do not perform excavation for structure, rock excavation, or excavation below grade until material to be excavated has been cross-sectioned and classified by Engineered.
- B. Classifications: Excavation will be classified as earth excavation or rock excavation when unanticipated rock excavation is encountered in work.  
  
 Do not perform rock excavation until material to be excavated has been cross-sectioned and classified by Engineer. Rock excavation will be paid on basis of contract conditions relative to changes in work.
- C. Earth Excavation: Removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation.
- D. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

- E. Rock Excavation: Removal and disposal of materials that cannot be excavated without drilling and blasting, or the use of special equipment, except such materials that are classified as earth excavation.

Typical materials classified as rock are solid rock, rock in ledges, and rockhard cementitious aggregate deposits one cubic yard or more in volume.

Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

- F. Rock Excavation Does Not Include:

Removal of material which can be removed with a hand pick or power shovel. Loose or previously blasted rock or broken stone in rock fills or elsewhere.

Over excavate rock encountered near the bottom of excavations as directed by Engineer if partial bearing of foundation on rock may result. Refill material, if required, will be paid for as Select Backfill.

- G. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations, and grades as shown.

- H. Excavation in Paved Areas: Cut pavement prior to excavation to provide a clean, uniform edge. Minimize disturbance of remaining pavement. Cut and remove the minimum amount of pavement required to do the work.

Use shoring and bracing where sides of excavation will not stand without undermining pavement.

- I. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of bedding material prior to installation of pipe.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

- J. Unauthorized Excavation: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, including refilling, is at Contractor's expense.

K. Refilling Unauthorized Excavation:

1. Trenches: Use crushed stone or gravel.
2. Earth Excavation for Structures: Use gravel.
3. Elsewhere: Backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.
4. Rock excavation for structures: Use concrete having 28-day compressive strength of 2000 psi or granular material as directed by the Engineer.

L. Excavation Below Grade: When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions. If unsuitable materials exist at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Engineer.

Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

M. Material Storage: Stockpile suitable excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.

Locate and retain soil materials away from edge of excavations.

3.02 STABILITY OF EXCAVATIONS:

A. General: Slope sides of excavations to comply with OSHA regulations and local codes. Shore and brace where sloping is not possible.

Maintain sides and slopes of excavations in safe condition until completion of backfilling.

B. Shoring and Bracing: Provide materials for shoring and bracing to comply with OSHA requirements and local codes.

Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

3.03 DEWATERING:

A. General: Perform all work in the dry. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Provide and maintain pumps and dewatering system components necessary to convey water away from excavations.

Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

- B. Payment: Costs of dewatering are incidental to other work. No payment will be made for dewatering, including dewatering required for excavation below normal grade.

3.04 BACKFILL AND FILL:

- A. General: Place acceptable soil material in layers to required elevations as shown on the Drawings and as listed below.

Fill, backfill, and compact to produce minimum subsequent settlement of the material and provide adequate support for the surface treatment or structure to be placed on the material. Place material in approximately horizontal layers beginning at lowest area to be filled. Do not impair natural drainage.

- B. Backfill excavations as promptly as work permits, but not until completion of the following:

Acceptance of construction below finish grade, including dampening, waterproofing, and perimeter insulation.

Inspection, testing, approval, and recording locations of underground utilities and pipe.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

Removal of trash and debris.

Permanent or temporary horizontal bracing is in place on horizontally supported walls.

Use care in backfilling to avoid damage or displacement of underground structures and pipe.

- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of materials. Plow, strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

- D. Placement: Place backfill and fill materials in layers not more than 12" in loose depth for material compacted by heavy compaction equipment and not more than 6" in loose depth for material compacted by hand operated tampers. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures to required elevations. Take care to prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

Backfill cast-in-place concrete structures when the concrete has developed adequate strength. Do not allow heavy machinery within 5 feet of structure during backfilling and compacting.

E. Pipe Bedding: Bed pipe in stone.

F Replacement of Unsuitable Materials:

1. Below Normal Grade: See Paragraph 3.01
2. Above Normal Grade: Replace unsuitable material with suitable on-site material or common borrow. If additional material is required, use Select Backfill. Payment for Select Backfill will be made on the basis of contract conditions relative to change in the work.

3.05 COMPACTION:

A. Methods: Use methods which produce the required degree of compaction throughout the entire depth of material placed without damage to new or existing facilities and which are approved by the Engineer. Adjust moisture content of soil as required. Remove and replace material which is too wet to compact to required density.

B. Degree of Compaction: Compact to the following minimum densities:

Fill & Backfill Location	Density
Under Structure Foundations	95% of max.
Top 2 Feet Under Pavement	95%
Below Top 2 Feet Under Pavement	93%
Trenches Through Unpaved Areas	90%
Embankments	90%
Pipe Bedding	90%
Within 10 Feet of Structure Foundation	
Walls, Tank Walls, & Retaining Walls	91-93%
Subfloor Fill Not Supporting Footings	92%

Maximum Density: ASTM D1557, modified

Field Density Tests: ASTM D1556 (sand cone), ASTM D2167 (rubber balloon), or ASTM D2922 (nuclear)

- C. Testing: Determine actual in-place densities using field tests as directed by the Engineer. Tests will be made by an independent laboratory. Costs for initial tests will be paid by Owner; see Section 01 40 00.

Perform additional work to obtain proper compaction if in-place densities do not meet the specified densities. Retesting may be required by the Engineer.

- D. Minimum Number of Tests:

1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be related tested strata, when acceptable to Engineer.
2. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 square feet of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying building slab or paved area, but in no case less than 3 tests.
2. Foundation Wall Backfill Outside of Structure: Make at least two field density tests at locations and elevations as directed.

### 3.06 GRADING:

- A. Grading: Uniformly grade areas within limits of grading, including adjacent transition areas. Smooth finished surface within specified tolerances and compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to structure line to drain away from structures and to prevent ponding.
- C. Finish surfaces free from irregular surface changes as follows:
1. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.
  2. Fill Under Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.
  3. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.
  4. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

- D. Compaction: After grading, compact subgrade surfaces to the percentage of maximum density for each area classification.
- E. Pavement Base: Place on prepared subgrade in layers of uniform thickness conforming to indicated cross-section and thickness.

3.07 PAVEMENT SUBBASE COURSE:

- A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.
- B. Grade Control: During construction, maintain lines and grades, including crown and cross-slope of subbase course.
- C. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.08 BUILDING SLAB DRAINAGE COURSE:

- A. General: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.
- B. Placing: Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations. When a compacted drainage course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.09 MAINTENANCE:

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

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

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

B. Removal to Designated Areas on Owner's Property: Transport acceptable excess excavated material to designated soil storage areas on Owner's property. Stockpile soil or spread as directed by Engineer.

3.10 GEOTEXTILES:

A. Install as shown on the Drawings in accordance with manufacturer's recommendations.

\* END OF SECTION 31 20 00 \*



## **SECTION 31 25 13 - TEMPORARY EROSION CONTROL**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

- A. Provide and maintain erosion control devices to control erosion that occurs during construction operations, prior to completion of permanent erosion control devices.
- B. Related Work Specified Elsewhere: Other specifications sections which directly relate to the work of this section include, but are not limited to the following:
  - 1. Stripping of Topsoil: Section 31 10 00 - Site Clearing.
  - 2. Establishment of Subgrade Elevation: Section 31 20 00 - Earthwork

#### 1.02 QUALITY ASSURANCE:

- A. Prior to the start of construction, meet with the Engineer to discuss erosion control requirements.
- B. Payment of fines issued to Owner as a result of poor erosion control by the Contractor.

#### 1.03 SUBMITTALS:

- A. Prepare an Erosion Control Program and submit to Engineer for approval prior to construction startup.

### **PART 2 - MATERIALS**

- 2.01 Use the following materials in construction of erosion control devices. Other materials require approval of the Engineer.
  - A. Baled Hay: Securely tied and staked twice per bale.
  - B. Sand Bags: Heavy cloth bags of approximately 1 cubic foot capacity filled with sand or gravel.
  - C. Mulches:
    - 1. Asphalt emulsion, loose hay, straw, pine straw or needles, sawdust, wood chips, wood excelsior, or wood fiber cellulose.
    - 2. Type and use as specified in the Maine Erosion and Sediment Control Handbook For Construction: Best Management Practices prepared by the Cumberland County Soil and Water Conservation District and the DEP, hereinafter referred to as the BMP's.

D. Mats and Nettings:

1. Twisted craft paper, yarn, juts, excelsior, wood fiber mats, glass fiber, and plastic film.
2. Type and use shall be as specified by the Environmental Quality Handbook.

E. Seed:

1. Standard conservation mix of 100% annual rye grass or field brome grass.
2. Equivalent seed mixture as approved by the Engineer.

F. Sod:

1. Grown from certified seed of adapted varieties to produce high quality sod free of any serious thatch, weeds, insects, diseases, and other pest problems.
2. At least one year old and not older than three years. Cut with a 1/2-inch to 1-inch layer of soil.

G. Drains:

1. Flexible drains consisting of collapsible neoprene pipe, minimum 8-inch diameter, or an approved equal.
2. Corrugated metal pipe and inlet or a gauge consistent with the loading conditions, minimum 12-inch diameter or approved equal.

H. Siltation Fence: Mirafi Environfence or approved equal.

### **PART 3 - EXECUTION**

3.01 TEMPORARY DEVICES: Use the following devices to control erosion. Other devices require approval of the Engineer.

- A. Temporary Erosion Checks: Construct temporary erosion checks at 100-foot minimum intervals in ditches or where designated by the Engineer using baled hay and temporary siltation fence.
- B. Temporary Berms: Construct temporary barriers along the toe of embankments using side drains as required.
- C. Temporary Slope Drains: Drains shall be collapsible pipe with corrugated metal pipe inlet.
- D. Sedimentation Basins: Barriers and berms shall be used to construct sedimentation basins to prevent off-site transport of silt with site runoff. Basins shall be sized to limit pass-through flow velocities to 0.01 feet per minute.

3.02 APPLICATION RATES:

- A. Seed for Temporary Cover: 40 pounds per acre
- B. Loose Hay or Straw: 2 tons per acre

3.03 REMOVAL OF TEMPORARY EROSION CONTROL:

- A. Temporary materials and devices shall be removed when permanent soil stabilization has been achieved. Materials in good condition may be reused on the site if approved by the Engineer. Materials unsuitable for reuse shall become the property of the Contractor and shall be disposed of in a manner and location approved by the Engineer.

\* END OF SECTION 31 25 13 \*

## **SECTION 32 12 16 – ASPHALT PAVING**

### **PART 1 - GENERAL**

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:

1. Hot-mix asphalt patching.
2. Hot-mix asphalt paving.
3. Hot-mix asphalt paving overlay.
4. Pavement-marking paint.

- B. Related Sections:

1. Division 31 Section "Earthworks" for aggregate subbase and base courses and for aggregate pavement shoulders.

#### 1.03 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: MDOT "Standard Specifications" section 401.08.

#### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
2. Job-Mix Designs: For each job mix proposed for the Work.

- B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

- C. Material Certificates: For each paving material, from manufacturer.

- D. Material Test Reports: For each paving material.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: MDOT Standard Specifications Section 401.08

- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Standard Specifications Highways and Bridges of MDOT for asphalt paving work.
  - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.
- D. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
    - a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
    - b. Review condition of subgrade and preparatory work.
    - c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
    - d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

#### 1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
  - 1. Prime Coat: Minimum surface temperature of 50 deg F (15.6 deg C).
  - 2. Tack Coat: Minimum surface temperature of 50 deg F (15.6 deg C).
  - 3. Asphalt Base Course: Minimum surface temperature of 40 deg F (4.4 deg C) and rising at time of placement.
  - 4. Asphalt Surface Course: Minimum surface temperature of 50 deg F (15.6 deg C) at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4.4 deg C) for oil-based materials, 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

## **PART 2 – PRODUCTS**

### 2.01 MATERIALS

- A. Comply with material requirements, MDOT “Standard Specifications”.
- B. Water: Potable.

### 2.02 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.
  - 1. Color: White and Blue as indicated.
- C, Glass Beads: AASHTO M 247, Type 1.

### 2.03 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
  - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
  - 2. Base Course: 19.0 mm
  - 3. Surface Course: As noted on the drawings

## **PART 3 – EXECUTION**

### 3.01 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Completely proof-roll subgrade in one direction repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
  - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
  - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.
- D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

### 3.02 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
  - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

### 3.03 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
  - 1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).
  - 1. Clean cracks and joints in existing hot-mix asphalt pavement.
  - 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
  - 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

### 3.04 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
  - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### 3.05 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
  2. Place hot-mix asphalt surface course in single lift.
  3. Spread mix at minimum temperature of 250 deg F (121 deg C).
  4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
  5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

### 3.06 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
  2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
  3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
  4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
  5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
  6. Compact asphalt at joints to a density within 2 percent of specified course density.



### 3.07 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
  - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### 3.08 ASPHALT CURBS

- A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at minimum temperature of 250 deg F (121 deg C).
  - 1. Asphalt Mix: Same as pavement surface-course mix.
- B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

### 3.09 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus 1/2 inch (13 mm), no minus
  - 2. Surface Course: Plus 1/4 inch (6 mm), no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: 1/4 inch (6 mm)
  - 2. Surface Course: 1/8 inch (3 mm)
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).

### 3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
  - 1. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal. (0.72 kg/L).

### 3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to AASHTO T 168.
  - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
  - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

- a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than 3 cores taken.
  - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

### 3.12 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them.
- 1. Do not allow milled materials to accumulate on-site.

\* END OF SECTION 32 12 16 \*

## **SECTION 32 15 01 – GRANITE CURBING**

### **PART 1 – GENERAL**

#### 1.01 GENERAL PROVISIONS

- A. The Conditions of the Contract and all sections of divisions are hereby made a part of this section.

#### 1.02 DESCRIPTION OF WORK

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this section, and without limiting the generality thereof furnish and install the following:
1. Section 31 10 00 - Site Clearing
  2. Section 31 20 00 – Earthwork
  3. Section 32 12 16 – Asphalt Paving
  4. Coordinate setting of curbs with related work.

#### 1.03 QUALITY ASSURANCE AND SUBMITTALS

- A. Reference Standards: Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, most restrictive requirements govern.
1. American Society for Testing Materials (ASTM):  
  
C 131 Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.  
  
C 615 Structural granite
  2. State of Maine Department of Transportation (MDOT): Standard Specifications for Highways and Bridges (1995 Edition)
- B. Product Data: Submit product data for curbing and accessory materials.
1. Include certificate of compliance for materials.

#### 1.04 JOB CONDITIONS

- A. Weather Limitations: Comply with requirements in MDOT.
- B. Work on Public Ways: Comply with all regulations and requirements of local/state agencies having jurisdiction.

## 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver curbing to job adequately protected from damage during transit.
- B. Protect curbing against staining, chipping and other damage. Cracked, badly chipped, or stained units will be rejected and not employed in the Work.

## **PART 2 – PRODUCTS**

### 2.01 GRANITE CURBING

- A. Granite: Provide structural granite conforming to ASTM C 615, Class I Engineering Grade, suitable for curbstone use.
  - 1. Provide material that is light gray, free from seams which impair structural integrity and with percentage of wear less than 32 percent as determined by ASTM C 131.
- B. Curbing: Provide curbing complying with MDOT Specifications Section 712.04, Vertical Curb, Type 1 and sloped Granite Curbing complying with MDOT Material Specifications 712.04.
  - 1. Provide radius curbing where indicated.
  - 2. Provide with split-face and sawn top.

## **PART 3 – EXECUTION**

### 3.01 SETTING CURBING

- A. Install as indicated on Drawings and except as otherwise specified or indicated in compliance with MDOT 609.03.
- B. Set curbing in 18-inch wide trench, with trench bottoms at 6 inches below bottom of curb. Fill excavation to required level with base course material conforming to requirements of Section 31 20 00 – Earthwork.
- C. Set curb with vertical face plumb, curb top parallel to adjacent surface.
- D. Set curb accurately to line and grade. Fit units as closely together as possible. Do not field cut curbing.
  - 1. Do not exceed 1/2 inch width for expansion joints.
- E. Backfill material on each side of curb as specified for adjacent surface, thorough compacted by power tampers. Exercise extreme care not to destroy alignment.

1. Reset any curb section disturbed during backfilling or otherwise reset to proper line and grade and properly backfill.

\*END OF SECTION 32 15 01\*

## **SECTION 32 92 00 - LAWNS AND GRASSES**

### **PART 1 - GENERAL**

#### **1.01 GENERAL PROVISIONS:**

- A. The Conditions of the Contract and all Sections of Division are hereby made a part of this Section.

#### **1.02 DESCRIPTION OF WORK:**

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, and without limiting the generality thereof furnish and install the following:
1. Topsoil.
  2. Seeding.
  3. Sodding.
- B. Related Work Specified Elsewhere: Carefully examine all Contract Documents for requirements which affect the work of this Section. Other specifications sections which directly relate to the work of this section include, but are not limited to the following:
1. Stripping of Topsoil: Section 31 10 00 - Site Clearing.
  2. Establishment of Subgrade Elevation: Section 31 20 00 - Earthwork.

#### **1.03 QUALITY ASSURANCE; SUBMITTALS:**

- A. General: Comply with requirements of Section 01 40 00-Quality Assurance and Section 01 33 00-Submittals.
- B. Reference Standards: Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, most restrictive requirements govern.
1. American Society for Testing and Materials (ASTM): C136 Sieve Analysis of Fine and Coarse Aggregates, E11 Wire-Cloth Sieves for Testing Purposes
- C. Manufacturers Product Data: Submit manufacturer's product data for following materials:
1. Aluminum Sulfate
  2. Fertilizer

- D. Certificates of Compliance: Submit labels from manufacturer's container certifying that product meets specified requirements, for the following materials:
1. Grass Seed
  2. Ground Limestone
  3. Commercial Fertilizer

1.04 INSPECTION AND TESTING:

- A. Work will be subject to inspection at all times by Architect. Owner reserves the right to engage an independent testing laboratory in accordance with the requirements of Section 01 40 00, Testing Laboratory Services, to analyze and test materials used in the construction of the work. Where directed by Architect, the testing laboratory will make material analyses and will report to Architect whether materials conform to the requirements of this specification.
1. Cost of initial tests and material analyses made by the Testing Laboratory will be borne by the Owner. Costs of retesting resulting from initial tests indicating non-compliance shall be borne by Contractor.
  2. Testing equipment will be provided by and tests performed by Testing Laboratory. Upon request by Architect, Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereby to the permanent work.
- B. Testing, analyses, and inspection required by Contractor for own information or guidance shall be at Contractor's expense.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver seed in original sealed containers, labeled with analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, location of packaging, and name of seed grower. Damaged packages will not be accepted.
- B. Deliver fertilizer in sealed waterproof bags, printed with manufacturer's name, weight, and guaranteed analysis.



1.06 PLANTING SEASON:

A. Planting season for seeding shall be as follows:

<u>Item</u>	<u>Planting Period</u>	
	<u>Spring</u>	<u>Fall</u>
Seed Mix - Lawn Grass	5/1 to 7/1	8/20 to 10/1

B. Perform planting only when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.

C. Planting season may be extended with written permission of Architect.

1.07 ACCEPTANCE:

A. Acceptance:

1. Architect will inspect all work for Substantial Completion upon written request of Contractor. Request shall be received at least ten calendar days before anticipated date of inspection.
2. Acceptance of material by Architect will be for general conformance to specified requirements, and shall not relieve Contractor of responsibility for full conformance to Contract Documents.
3. Upon completion and reinspection of all repairs or renewals necessary in the judgement of Architect, Architect will recommend to Owner that the work of this Section be accepted.

B. Seeded areas will be accepted only when in compliance with all the following conditions:

1. Roots are thoroughly knit to the soil;
2. All areas show a uniform stand of specified grass in healthy condition;
3. At least 60 days have elapsed since completion of work under this Section.

PART 2 - PRODUCTS

2.01 SEED:

A. Seed Mixture: Standard grade seed of the most recent season's crop, dry and free of mold, mixture as follows:

<u>Name of Seed</u>	<u>% by Weight in Mixture</u>	<u>Minimum % Purity</u>	<u>Minimum % Germination</u>
Pennlawn Creeping Red Fescue	50	98	90
Kentucky 31 Tall Fescue	30	95	90
Common Perennial Ryegrass	10	95	90
Red Top	5	90	95
Ladino Clover	5	85	96

2.02 TOPSOIL:

A. Obtain topsoil from a previously established stockpile on the site, to extent available. Obtain additional topsoil from Architect approved off-site sources. If on site topsoil is used, modify soil to meet the standards.

B. Topsoil, whether stripped from site or supplied from off-site, shall be a sandy loam or loam soil as defined by the USDA Soil Conservation Service, Soil Classification System, and shall have the following mechanical analysis:

<u>Textural Class</u>	<u>% of Total Weight</u>	<u>Average</u>
Sand (0.05-2.0 mm dia. range)	45 to 75	60
Silt (0.002-0.05 mm dia. range)	15 to 35	25
Clay (less than 0.002 mm dia. range)	5 to 25	15

1. 95% of topsoil shall pass a 2.0 mm sieve.
2. Topsoil shall be free of stones 1 inch in longest dimension, earth clods, plant parts, and debris.
3. Organic matter content shall be 4 to 8% of total dry weight.

C. Provide topsoil having a pH value range of 6.0 to 6.5. If the soil does not fall within the pH range specified, it may be amended to bring the pH within the specified limit.

2.03 PEAT MOSS:

- A. Provide horticultural grade, sphagnum peat moss containing partially decomposed fibrous or cellular stems and leaves of any of the many species of sphagnum mosses from fresh water sources, conforming to following requirements:
1. Homogeneous material free of decomposed colloidal residue lumps, roots, stones, and other foreign matter; and of such consistency that peat can pass a 1/2 inch mesh and can be readily incorporated with the topsoil.
  2. pH not less than 3.5 nor greater than 6.0 at 25 deg. C.
  3. Organic matter content not less than 90%, by weight, on an oven-dry basis.
  4. Ash content not more than 10%, by weight, on an oven-dry basis.
  5. Moisture absorption capacity not less than 800%, by weight, on an oven-dry basis.

2.04 LIMESTONE:

- A. Ground Limestone: An agricultural limestone containing minimum of 85% total carbonates, by weight, graded within the following limits:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
No. 10	100
No. 20	90
No. 100	60

2.05 WATER:

- A. Water shall be suitable for irrigation and free from ingredients harmful to seeded areas.

2.06 ALUMINUM SULFATE:

- A. Aluminium sulfate shall be unadulterated and shall be delivered in containers with the name of the material and manufacturer, and net weight of contents.

2.07 COMMERCIAL FERTILIZER:

- A. Provide fertilizer conforming to the following:
1. When applied as a topsoil amendment, provide fertilizer having an analysis that will deliver appropriate amounts of nitrogen, phosphorus, and potassium as required to remedy deficiencies revealed by testing the topsoil.
  2. When used as a top dressing for the maintenance of sod, conform to following:
    - a. 50% of nitrogen from natural organic source of ureafoam.
    - b. Available phosphorus derived from superphosphate, bone meal, or tankage.

- c. Potassium derived from muriate of potash containing 60% potash.
- B. Deliver fertilizer in manufacturer's standard container printed with manufacturer's name, material weight, and guaranteed analysis.
- C. Fertilizers with N-P-K analysis other than that stated above may be used provided that the application rate per square foot of nitrogen, phosphorus, and potassium is equal to that specified.

### PART 3 - EXECUTION

#### 3.01 PREPARATION OF SUBGRADE:

- A. Examine subgrade to assure that rough grading and all other subsurface work in lawn areas and other areas to be seeded is done prior to start of seeding.
- B. Loosen existing subgrade or scarify to a minimum depth of 3 inches prior to spreading topsoil. Bring subgrade to true and uniform grade. Clear of stones greater than 3 inches, stocks, and other extraneous material.

#### 3.02 SPREADING OF TOPSOIL:

- A. Spread topsoil until it is possible to follow immediately or within 24 hours with seeding operations. If topsoil is spread prior to this time, cultivate to loosen soil prior to seeding.
- B. Do not place soil when subgrade or topsoil material are frozen, excessively wet, or excessively dry.
- C. Spread topsoil in a uniform layer, to a thickness which will compact to depth required to bring final lawn and grass surfaces to required elevation. Unless otherwise indicated, provide minimum topsoil depth of 6 inches.
- D. Grade and smooth surfaces, eliminating all sharp breaks by rounding, scraping off bumps and ridges, and filling in holes and cuts.

#### 3.03 APPLICATION OF FERTILIZER AND CONDITIONERS:

- A. Apply fertilizer and conditioners at following rates:
  - 1. Peat Moss: 1 inch thick.
  - 2. Limestone: As required by test results of topsoil.
  - 3. Fertilizer: As required by test results of topsoil.
- B. Mixing with Topsoil:
  - 1. Spread fertilizer and conditioners over entire lawn areas at application rates indicated above.

2. Uniformly and thoroughly mix material into top 4 inches of topsoil by discing, rototilling, or other approved method.

3.04 FINISH GRADING:

- A. Provide final surface of topsoil immediately before seeding with +1/2 in. of required elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Remove stones, roots, and other debris greater than 1 in. in any dimension, which are visible at the surface, and fill resulting holes with topsoil, leaving a uniform planar surface.
- B. Finish grade surface with a drag or rake. Round out all breaks in grade, smooth down all lumps and ridges, fill in all holes and crevices. Rolling with a light roller is acceptable, if surface is scarified afterward.
- C. In event of settlement, readjust work to required finished grade.

3.05 SEED APPLICATION:

- A. Broadcast seed by means of an approved mechanical spreader, to give a uniform application at the following rates:

<u>Seed</u>	<u>Application Rate lb/1,000 s.f.</u>
Seed Mixture - Lawn Grass	4.5

- B. Apply seed in two equal applications for uniform coverage; direction of travel of spreader for second pass perpendicular to that of the first pass. Do not seed when it is raining or snowing, or when wind velocity exceeds 5 mph.
  1. At Contractor's option, and with the permission of Architect, seed may be spread by hydroseeding method, utilizing power equipment commonly used for that purpose. Mix and apply seed, lime, fertilizer, and mulch to achieve application quantities specified herein for the conventional seeding method, with mulch applied at the rate of 1,200 lb/acre. Other provisions specified for conventional seeding also apply to hydroseeding.
- C. Protect seeded slopes greater than 1:2 against erosion with erosion netting or other methods acceptable to Architect.
- D. Following seeding, lightly rake the area to mingle seed with top 1/8 to 1/4 in. of soil, then fine grade. Remove stones and other debris greater than 1 in. in any dimension which are visible on surface. Roll surface with hand roller having a weight of 60 to 90 lb/ft of width, and a minimum diameter of 2 feet.
- E. Following seeding and raking, water entire area by use of lawn sprinklers, or other approved means. Continue initial watering until equivalent of a 2-in. depth of water has been applied to entire seeded surface, at rate which will not dislodge the seed. Repeat watering thereafter as frequent as required to prevent drying of the surface, until grass

attains an average height of 1/4 in. Watering methods and apparatus which may cause erosion of the surfaces are not permitted.

3.06 MAINTENANCE:

- A. Except as otherwise specified below, include all operations required to produce an established lawn, including but not limited to:
  - 1. Fertilizing
  - 2. Mowing
  - 3. Replanting
  - 4. Watering
  - 5. Weeding
- B. Begin maintenance of seeded areas upon completion of seeding and continue until acceptance of the building, until mowing as specified below is completed, or until average height of grass is 1-1/2 in., whichever occurs later.
- C. After grass has sprouted, replace seeded areas which fail to show a uniform stand of grass as often as necessary to establish acceptable stand of grass.
  - 1. Scattered bare spots shall not exceed 72 square inches each.
- D. Do first mowing when average height of grass is 2-1/2 in., with mower set to cut at a height of 1-1/2 in. Perform subsequent mowings at not over two week intervals, with height of cut set at 1-1/2 in. With prior permission of owner, mowings during periods of slow growth or dormancy may be spaced at greater intervals.
- E. Remove weed and growth other than varieties of grass named in grass seed formula. Removal may be accomplished by use of suitable herbicides or by physical removal, in which case remove both top growth and roots, and reseed bare spots exceeding specified limits.
- F. If lawn or grass is established in the fall maintenance is required to continue into spring months. Provide an extra application of lime and fertilizer to lawn and grass in the spring. Spread lime and fertilizer in a uniform layer over entire lawn surface, at following rates:

<u>Material</u>	<u>Application Rate</u>
Lime	100 lb/1000 sf
Fertilizer	20 lb/1000 sf

\* END OF SECTION 32 92 00 \*

## **SECTION 32 93 00 – PLANTS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. General: Provide and install all trees and shrubs as shown on drawings. This work includes preparation of subsoil, planting, protection and maintenance of the plant materials.

#### **1.2 RELATED SECTIONS**

- A. Section 31 20 00 - Earthwork
- B. Section 32 92 00 - Lawns and Grasses

#### **1.3 QUALITY ASSURANCE**

- A. Standards: ANSI - Z60.1 "American Standards for Nursery Stock".
- B. Subcontract landscape work to a single firm specializing in landscape work.
- C. Do not make substitutions. If specialized landscape materials are not obtainable, submit proof or non-availability to Engineer, together with proposal for use of equivalent material.

Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

Topsoil: Before delivery of topsoil, furnish Engineer with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, and crops grown during past 2 years.

- D. Trees, Shrubs, and Plants: Provide trees and shrubs of quantity, size, genus, species, and variety shown and scheduled for landscape work.
- E. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.

#### **1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Plant and Material Certifications:
  - 1. Manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.

- 2. Label data substantiating that plants, trees, shrubs and planting materials comply with specified requirements.
- C. Planting Schedule: Indicate dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- D. Maintenance Instructions: Typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

1.5 DELIVERY, STORAGE AND HANDLING

- A. Trees and Shrubs: Provide freshly dug trees and shrubs or those in containers for at least one season. Provide protective covering during delivery, cover to protect from wind exposure during delivery. Do not drop balled and burlapped stock during delivery.
- B. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
- C. Do not remove container-grown stock from containers until planting time.

1.6 JOB CONDITIONS

- A. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- B. Do not install plants when ambient temperatures go below 35 degrees F. or above 90 degrees F.
- C. Do not install plants when wind velocity exceeds 30 mph.

1.7 SEQUENCING AND SCHEDULING

- A. Planting Time: Proceed with, and complete landscape work as rapidly as portions of site become available.
- B. Plant or install materials during normal planting seasons for each type of plant material required.
- C. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.

1.8 PROJECT WARRANTY

- A. Warranty trees and shrubs, for a period of one year after date of substantial completion, against defects including death and unsatisfactory growth, except for



defects resulting from neglect by Owner, abuse or damage by others, or unusually phenomena or incidents which are beyond Landscape Installer's control.

- B. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period.
- C. A warranty inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection.

## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL**

- A. General: Use topsoil as provided in Section 32 92 00 - Lawns and Grasses.

### **2.2 SOIL AMENDMENTS**

- A. Lime: Natural dolomitic limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates, ground so that not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.
- B. Aluminum Sulfate: Commercial grade.
- C. Peat Humus: Finely divided peat, so completely decomposed and free of fibers that its biological identity is lost. Provide in granular form, free of hard lumps and with pH range suitable for intended use.
- D. Bonemeal: Commercial, raw, finely ground; 4 percent nitrogen and 20 percent phosphoric acid.
- E. Superphosphate: Soluble mixture of treated minerals; 20 percent available phosphoric acid.
- F. Sand: Clean, washed sand, free of toxic materials.
- G. Perlite: Conforming to National Bureau of Standards PS 23.
- H. Vermiculite: Horticulture grade, free of toxic substances.
- I. Sawdust: Rotted sawdust, free of chips, stones, sticks, soil, or toxic substances and with 7.5 pounds of nitrogen uniformly mixed into each cubic yard of sawdust.
- J. Manure: Well rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust or other bedding materials and containing no chemicals or ingredients harmful to plants.
- K. Mulch: Organic mulch free from deleterious materials and suitable for top dressing of trees or shrubs, and consisting of ground or shredded bark.

- L. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:
  - 1. For trees and shrubs, provide fertilizer with not less than 5 percent total nitrogen, 10 percent available phosphoric acid and 5 percent soluble potash.
- M. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of plants.

### 2.3 PLANT MATERIALS

- A. Quality: Provide trees, shrubs, and other plants of size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".
- B. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
  - 1. Provide balled and burlapped (B&B) deciduous trees.
  - 2. Container grown deciduous trees will be acceptable in lieu of balled and burlapped deciduous trees subject to specified limitations of ANSI Z60.1 for container stock.
- C. Deciduous Shrubs: Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
  - 1. Container grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to specified limitations for container grown stock.
- D. Coniferous and Broadleafed Evergreens: Provide evergreens of sizes shown or listed. Dimensions indicate minimum height. Provide normal quality evergreens with well balanced form.
  - 1. Provide balled and burlapped (B&B) evergreens.
  - 2. Container grown evergreens will be acceptable, subject to specified limitations for container grown stock.
- E. Miscellaneous Landscape Materials:
  - 1. Anti-Erosion Mulch: Provide clean, seed-free salt hay or threshed straw of wheat, rye, oats, or barley.
  - 2. Wrapping: Tree-wrap tape not less than 4 inches wide, designed to prevent borer damage and winter freezing.
  - 3. Stakes and Guys: Provide stakes and deadmen of sound new hardwood, treated softwood, or redwood, free of knot holes and other defects. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire, not lighter than 12 ga. with zinc-coated turnbuckles. Provide not less than 1/2 inch diameter rubber or plastic

hose, cut to required lengths and of uniform color, material, and size to protect tree trunks from damage by wires.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION OF PLANTING SOIL**

- A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
- B. Mix specified soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
- C. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.
  - 1. Mix lime with dry soil prior to mixing of fertilizer.
  - 2. Prevent lime from contacting roots or acid-loving plants.
  - 3. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.

#### **3.2 PREPARATION OF PLANTING BEDS**

- A. Loosen subgrade of planting bed areas to a minimum depth of 6 inches using a culti-mulcher or similar equipment. Remove stones measuring over 1-1/2 inches in any dimension. Remove sticks, stones, rubbish, and other extraneous matter.
- B. Spread planting soil mixture to minimum depth required to meet lines, grades, and elevation shown, after light rolling and natural settlement. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.

#### **3.3 EXCAVATION FOR TREES AND SHRUBS**

- A. Excavate pits and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation.
  - 1. For balled and burlapped (B&B trees and shrubs), make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill: Allow for 3 inch thick setting layer of planting soil mixture.
  - 2. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.
- B. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.

- C. Fill excavations for trees and shrubs with water and allow water to percolate out prior to planting.

### 3.4 PLANTING TREES AND SHRUBS

- A. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

- B. Set container grown stock, as specified, for balled burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls.

- C. Dish top of backfill to allow for mulching.

Mulch pits, trenches, and planted areas. Provide not less than 4" thickness of mulch, and work into top of backfill and finish level with adjacent finish grades.

- D. Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Do not cut tree leaders. Remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character.

- E. Remove and replace excessively pruned or misformed stock resulting from improper pruning.

- F. Wrap tree trunks of 2 inches caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping.

- G. Guy and stake trees immediately after planting, as indicated.

### 3.5 MAINTENANCE

- A. Begin maintenance immediately after pruning.

- B. Maintain trees, shrubs, and other plants until final acceptance.

- C. Maintain trees, shrubs, and other plants by pruning, cultivating, and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

### 3.6 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work area in an orderly condition.

- B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

### 3.7 INSPECTION AND ACCEPTANCE

- A. When landscape work is completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability.

- 1. Landscape work may be inspected for acceptance in portions provided each portion of work offered for inspection is complete, including maintenance.

When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Engineer and found to be acceptable. Remove rejected plants and materials promptly from project site.

\* END OF SECTION 32 93 00 \*

## **SECTION 33 11 00 - WATER PIPE AND APPURTENANCES**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

- A. Provide all labor and equipment necessary to install all pipe, fittings, thrust blocks, and thrust anchors as shown on the drawings or as required for a complete working system.
- B. Provide all labor, equipment, and chemicals necessary to test as specified herein and disinfect the new water system in accordance with AWWA C651-86.

#### 1.02 RELATED SECTIONS:

- A. Section 312000 - Earthwork
- B. Section 312513 - Temporary Erosion Control

#### 1.03 QUALITY ASSURANCE:

- A. Remove damaged pipe, fittings, and valves from the job site.
- B. Testing and installation will be observed by the Owner's Representative and an agent of the Portland Water District.
- C. Standards: All work will be in accordance with Portland Water District Standards.

#### 1.04 SUBMITTALS:

- A. Manufacturer's Technical Product Data and installation instructions for all pipe and fittings and replacement valves if required.
- B. As work progresses, submit as-built sketches to the Owner's representative accurately showing location, type of pipe, and depth of all buried fittings, valves, and ends of pipe.
- C. Reports of all testing and disinfection procedures. Reports will indicate:
  - 1. Date of test.
  - 2. Number of the test including all failed tests.
  - 3. Name of organization and person(s) performing the test.
  - 4. Type of test; i.e., hydrostatic pressure test or disinfection.
  - 5. Time(s): Start Fill, End Fill, Begin Test, End Test.
  - 6. Size, type, length, and location of pipe.

7. Pressure and/or chemical concentration at start of test, at intervals during test where appropriate, and end of test.
8. Certification by tester that test was performed in accordance with AWWA Standards.
9. Signature of Owner's Representative observing the test and a notation that test was approved or rejected. If rejected, reason for rejection will be stated on the report.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS:**

- A. Ductile Iron Pipe: Ductile iron pipe shall conform to the latest edition of AWWA C151 (American Water Works Association standards). Pipe shall be double cement lined with seal coat. The minimum thickness shall be Class 52, unless otherwise agreed to by the Portland Water District. Factory applied bituminous coating shall be furnished on all underground piping. The cement lining shall conform to the latest revisions of AWWA C104.
- B. Fittings: Fittings for ductile iron water shall be ductile or cast iron and shall meet the requirements of AWWA C110. Fittings shall be cement lined in accordance with AWWA C104. The minimum pressure rating for the fitting shall be 250 psi unless a higher-pressure class is required for the specific installation. Unless otherwise required for joint restraint, joints on fittings shall be mechanical joints in accordance with AWWA C111.
- C. Retainer Glands: Retainer glands shall be made of ductile iron with ductile iron set screws. For sizes up to 8 inches the working pressure rating shall be 350 psi and for sizes 8 through 16 inches the working pressure shall be 250 psi. Test pressure shall be at least 2 times the working pressure.
- D. Valves: Gate valves shall be iron body bronze mounted, double disc, parallel seat, mechanical joint, for underground use, wrench operated, non-rising stem, "O-Ring" seal and shall meet or exceed the minimum requirements of AWWA C500. Valves shall be designed for a water working pressure of 250 –Metroseat 250- pounds per square inch. The disc-spreading device shall be constructed of metal; no elastomeric compounds shall be used. Gate valves shall have a 2-inch nut for wrench operation and operating nut shall have an arrow cast in the metal indicating the direction of the opening. Valves shall "OPEN LEFT". Valves shall have maker's initial, pressure rating and a year of manufacture cast on the body.
- E. Valve Boxes: Valve boxes shall be heavy pattern cast or ductile iron, cast in two or three telescoping sections of sliding construction and of such lengths as will provide, without full extension, the required cover. The lower section shall be 5 – 1/4-inch minimum inside diameter and shall be belled or domed at the bottom of fit over the valve nut. The upper section shall fit over the lower section. Covers shall be at least 6 inches in diameter shall fit flush with the top, shall have the word "WATER" cast thereon in raised letters, and shall be coated with coal-tar pitch enamel to other approved coating. Valve boxes shall be suitable for the size valve on which they are used.

- F. Tapping Sleeves and Valves: Tapping valves shall be flanged by mechanical joint meeting the requirements of Gate Valves. The tapping sleeve shall be made of cast or ductile iron and be of the split type with mechanical joint ends.
- G. Thrust Blocks: Thrust blocks shall be precast concrete clocks with a minimum compressive strength of 4000 psi at 28 days. Retainer glands, frictions clamps, and rods may also be required and shall be determined by the Portland Water District on a case by case basis.
- H. Chemicals for Disinfection: As specified in ANSI/AWWA C651-86.
- I. Domestic service Pipe and Fittings: Copper Type K.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. The excavation shall be made to secure a flat bottom trench (undisturbed earth bottom) for the full length of the pipe to give a uniform support to the pipe. Provide a minimum of 5 feet 6 inches of cover. Should the pipe bottom contain unsuitable material, as indicated in Section 312000, the Contractor shall over-excavate and replace with Select Backfill as required and authorized by the Architect. The quantity of unsuitable material will start at the bottom outside of the pipe.

Should ledge be encountered, it shall be removed to a depth of 6" below the bottom of the pipe, and replaced with Select Backfill.

- B. As soon as the excavation is completed and the existing trench bottom has been brought to the proper grade, the pipe shall be laid.
- C. All pipe, before being placed into the trench, shall be inspected and both ends shall be cleaned. Care shall be taken to lay the pipe to the lines shown on the drawings and with a continuous slope toward the well.
- D. Bed and cover pipe with 6" of sand.
- E. Plug ends of pipe watertight, except when making connection to another length or a lateral service.
- F. Do not lay pipe in water or when trench conditions or weather are unsuitable for such work.

#### **3.02 TESTING AND DISINFECTION:**

- A. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipe line 24 hours prior to testing, and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.



Test fails if leakage exceeds 2 quarts per hour per 100 gaskets or joints, irrespective of pipe diameter. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

C. Cleaning:

1. Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C651-86 "Standard for Disinfecting Water Mains."

\* END OF SECTION 33 11 00 \*

## **SECTION 33 30 00 - SEWERS AND DRAINS**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

- A. Provide sanitary sewer and storm drain system as shown on the drawings. This section includes sanitary sewer pipe and house service pipes.

Sanitary sewer pipe  
Storm drain pipes  
Underdrains

- B. Earthwork: Section 31 20 00 (includes excavation, bedding, backfill).  
C. Manholes and Catchbasins: Section 33 39 00.

#### 1.02 QUALITY ASSURANCE:

- A. Remove damaged pipe from job site.

#### 1.03 SUBMITTALS:

- A. Manufacturer's product data and installation instructions.

### **PART 2 - PRODUCTS**

#### 2.01 PIPE AND FITTINGS:

- A. General: Furnish fittings of same type and class of materials as pipe.  
B. PVC Non-Pressure Pipe: ASTM D3034 or ASTM D3033, strength requirement SDR 35, push-on joints ASTM D3212, gaskets ASTM F-477.  
C. Underdrain: Polyethylene perforated pipe, AASHTO M190.

#### 2.02 MISCELLANEOUS:

- A. Flexible Adaptors: Neoprene sleeve with stainless steel bands equal to those manufactured by Fernco, Calder Couplings.  
B. Manhole Seals: Segmented neoprene seal with stainless steel bolts equal to "Link-Seal" as manufactured by Thunderline Corp.  
C. Insulation: Equal to Styrofoam SM by Dow Chemical Co., sheet size 2' by 4' by 2" thick.  
D. Backflow Preventor: CleanCheck® extendable backwater valve distributed by Rectorseal, or equal

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION OF GRAVITY PIPE AND FITTINGS:**

- A. Methods: Install in accordance with manufacturer's recommendations using a laser beam for line and grade. Secure each length of pipe with bedding before placing next length. Plug open ends when work is suspended. Bed pipe as shown on drawings.
- B. Grade and Line: Lay pipe to line and grade shown on the drawings. If grade is not shown, determine elevations of start and finish points for each run of pipe. Lay pipe to a uniform grade between these points.
- C. Conditions: Lay pipe in the dry. Do not use installed pipe to remove water from work area.
- D. Cleaning: Flush all pipe and remove debris.
- E. Connections to Manholes: Provide short length of pipe so that joints are located within 3 feet of inside surface of manholes.

### **3.02 INSULATION:**

- A. Install as shown on Drawings.

### **3.03 CONNECTION TO EXISTING STRUCTURES:**

- A. Where connections to existing manholes and catchbasins are required, core the existing structure and seal with Manhole Seals or Flexible Adaptors.

### **3.04 TESTING:**

- A. General: Test all pipes after backfilling. Install all house service leads on main line before testing. Perform tests in presence of Engineer or authorized representative of the Sewer District or Public Works Department.
- B. Gravity Sewer-Leakage Tests: Use low-pressure air test as follows:
  - 1. Plug ends of section to be tested.
  - 2. Supply air slowly to the pipe to be tested until the air pressure inside the pipe is 4.0 psi greater than the average back-pressure of any groundwater submerging the pipe.
  - 3. Disconnect air supply and allow a minimum of two minutes for stabilization of pressure.
  - 4. Following stabilization period, measure drop in pressure over a 6-minute test period.

- 5. Acceptable Drop: No more than 1.0 psi.
- C. Repair and retest: Repair all pipes not passing tests using materials and methods approved by the Engineer, and retest.

\* END OF SECTION 33 30 00 \*

## **SECTION 33 39 00 – MANHOLES AND CATCHBASINS**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

A. Provide manholes as shown on the drawings. This section includes:

- Precast Manholes
- Masonry Inverts
- Frames and Covers
- Precast Catchbasin and Concrete Masonry Catch Basins

B. Earthwork: Section 31 20 00

C. Sewers and Drains: Section 33 30 00

D. Concrete: Section 03 30 00

#### 1.02 QUALITY ASSURANCE:

A. General: Provide complete manhole and catchbasin structures capable of supporting AASHTO H2O loading.

B. Precast Manhole and Catchbasin Components: ASTM C478

#### 1.03 SUBMITTALS:

A. Shop Drawings: Submit for precast manholes. Show components to be used, elevations of top, base and pipe inverts, location of pipe penetrations, steps, etc.

B. Product Data: Manufacturers' product data and installation instructions for frames, grates, precast items, manhole sleeves, and joint sealants for precast sections.

### **PART 2 - PRODUCTS**

#### 2.01 MANHOLES:

A. Base Sections: Precast monolithic construction to a joint 16" minimum above crown of highest incoming pipe.

B. Top Sections: Precast eccentric cone. Use flat cover only if shown on drawings.

C. Pipe to Manhole Connections: Pipe sizes 8" or larger: Flexible manhole sleeves equal to CP series manufactured by Interpace Corp. size to fit diameter and type of pipe without use of gaskets.

- D. Pipe to Catchbasin Connections: For pipe sizes 6" or larger, use flexible manhole sleeves equal to CP series manufactured by Interpace Corp., sized to fit diameter and type of pipe without use of gaskets.

8" PVC pipe, use CP-6  
12" PVC pipe, use CP-10

Pipe sized less than 8": schedule 40 galvanized steel pipe sleeve with segmented rubber seal equal to "Link-Seal" by Thunderline Corp.

- E. Joints Between Precast Sections: Watertight, shiplap type; seal with two rings of 1" diameter butyl rubber sealant.
- F. Dampproofing: Bituminous coating on exterior of precast sections and parged brick.

## 2.02 CATCH BASINS:

- A. Base Sections: Precast
- B. Barrel Sections: Precast or combination of precast and concrete masonry units barrel block.
- C. Top Sections: Precast eccentric cone or flat cover if required by grade.
- D. Joints between precast sections: Shiplap type sealed with one ring of 1" diameter or square butyl rubber sealant.
- E. Dampproofing: Bituminous coating on exterior of precast barrel block sections.

## 2.03 MASONRY MATERIALS:

- A. Sewer Brick: ASTM C32, Grade SS, hard brick.
- B. Concrete Masonry Units: ASTM C139.
- C. Mortar: Type M, ASTM C270. Use Type II Portland cement, Type S lime.  
1 part Portland cement, ¼ part hydrated lime. 3 to 3 ¾ parts sand.

## 2.04 FRAMES, GRATES, AND COVERS:

- A. General:
  - 1. Coatings for All Frames, Grates, and Covers: Two coats coal tar pitch varnish applied after sandblasting to provide a smooth, tough, non-brittle, non-scaling finish. Repair damage to coatings to the satisfaction of the Engineer.
  - 2. Cast Iron: ASTM A48 Class 30.

B. Manhole Frames and Covers:

1. General: Minimum 22" dia. opening, minimum weight 350 pounds, labeled with "SEWER" in 3" high raised letters on cover.
2. Standard Frames and Covers: Equal to:  
  
LC258-2 frame and L25C5 cover by E.L. Lebaron Foundry, Model R1760 frame and Type C cover with self-sealing application by Neenah Foundry, or Equivalent
3. Catchbasin Frames and Grates: Equal to:  
  
Model R2504-D frame and type C grate by Neenah Foundry, Model M72 x 7G by Etheridge Foundry.

2.05 MISCELLANEOUS:

- A. Dampproofing: Provide bituminous coating equal to Dehydrate No. 4 Dampproof by W.R. Grace or Bitumastic Super Service Black by Koppers Co. for field application.

**PART 3 - EXECUTION**

3.01 INSTALLATION OF MANHOLES:

- A. Placement: Place bases on compacted bedding material so catchbasin structure is plumb and pipe inverts are at proper elevations. Place barrel and top sections in the appropriate height combinations. Plug all lifting holes inside and out with non-shrink mortar.
- B. Joints: Follow manufacturer's instructions for sealing joints between precast sections. Point joints with non-shrinking mortar.
- C. Frames and Covers: Set to final grade as shown on the drawings or set flush with pavement grade in paved areas. Provide adequate temporary covers to prevent accidental entry until final placement of frame and grate is made.
- D. Inverts: Construct smooth channels using sewer brick with semi-circular bottoms that match inside surface of pipes to be connected. Where changes in direction of flow are made, fit pipes flush to inside surfaces of manholes and form channel with as large a radius as possible.  
  
Slope bench 1/8 inch per foot from channel up to manhole wall.
- E. Dampproofing: Repair damage to dampproofing and apply dampproofing to masonry as shown on drawings.

3.02 INSTALLATION OF CATCHBASINS:

- A. Placement: Place bases on compacted bedding material so that structure is plumb and pipe inverts are at proper elevations.
- B. Plug: lifting holes inside and out, fill spaces between pipes and catch basin walls with mortar and/or masonry and trowel smooth.
- C. Concrete Masonry Construction: Construct walls in horizontal courses with vertical joints broken. Lay units in mortar, fill all joints completely with mortar. Parge inside and out with 1/2" parge coat of mortar.
- D. Frames and Grates: Set to grade as shown on the Drawings.
- E. Dampproofing: Repair damage to dampproofing and apply dampproofing to masonry as shown on the drawings.

3.03 MANHOLE TESTING:

- A. General: Use vacuum test or exfiltration test for all sanitary sewer manholes. Perform tests before constructing invert or backfilling. No allowance will be made for absorption during the 8-hour exfiltration test period. No allowance will be made for leakage at test plugs.
- B. Retests: Retest unacceptable manholes following repairs until acceptable leakage rate is attained.
- C. Vacuum Test:
  - 1. Plug pipes into and out of MH and seal MH opening.
  - 2. Draw a vacuum of 10 inches of Hg and hold for duration specified below:

MH diameter (ft)	Duration (seconds)
4	60
5	75
6	90
  - 3. Acceptable Vacuum Drop: Not more than 1 inch of Hq over the specified timeframe.
- D. Exfiltration Test:
  - 1. Plug pipes into and out of manhole and secure plugs.
  - 2. Lower groundwater table (GWT) to below manhole. Maintain GWT at this level throughout test. Provide means of determining GWT level at any time throughout test.
  - 3. Fill manhole with water to top of cone.



4. Allow a period of time for absorption (determined by Contractor).
5. Refill to top of cone.
6. Determine volume of leakage in an 8-hour minimum test period and calculate rate.
7. Acceptable Leakage Rate: Not more than 1 gallon per vertical foot per 24 hours.

3.04 REPAIRS:

- A. Determine causes of all leaks and repair them. Perform the necessary earthwork if manhole has been backfilled.
- B. Perform repairs using methods and material approved by the Engineer. Remove and replace or reconstruct manhole if necessary. Remove and replace defective sections if required by Engineer.

\* END OF SECTION 33 39 00 \*

## SECTION 05400

### LIGHTGAGE METAL FRAMING

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. RELATED DOCUMENTS: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

##### 1.02 DESCRIPTION OF THE WORK

- A. Work specified within this Section includes, but is not necessarily limited to, the following:
  - 1. Provide and install lightgage framing for interior walls, as shown on the Drawings. Contractor to provide engineering for gage, see drawings for wall heights.
  - 2. Provide and install lateral strap bracing, anchors and bridging as required.
  - 3. Provide and install miscellaneous fasteners, hat channels, stiffeners, expansion joints, and accessories necessary to complete the work.

##### 1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Interior Partition Walls: Section 09250 - Gypsum Wallboard Systems

##### 1.04 QUALITY ASSURANCE

- A. Materials and installation shall conform to recommendations of the following publications:
  - 1. American Iron and Steel Institute Cold-Formed Steel Design Manual, Parts I & II "Specification for the Design of Cold-Formed Steel Structural Members".
  - 2. AWS D1.1-90 "Structural Welding Code" - Steel.
  - 3. AWS D1.3-89 "Structural Welding Code" - Sheet Steel.

4. ASTM C 954, "Specification for Steel Drill Screws for the Application of Gypsumboard or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. Thickness."
  5. ASTM C 955, "Specification for Load-Bearing (Transverse and Axial)Steel Studs, Runners (Tracks), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
  6. ASTM C 1007 "Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories."
  7. ASCE 7-98 "Minimum Design Loads for Building and Other Structures," (formerly ANSI A58.1).
- B. Slip Track Tolerances: Where non-bearing light gage framing abuts the structure, provide a slip joint capable of accommodating the vertical movement of the structure. Slip joint gaps shall allow for 1" Live Load deflection of the supporting member

#### 1.04 SUBMITTALS

- A. The Engineer shall receive all submittals a minimum of two weeks prior to the start of fabrication. The Contractor shall have reviewed and approved all submittals prior to review by the Engineer. All review of submittals by the Contractor, Architect and Engineer shall be completed prior to fabrication and installation of any material or product.

The Engineer's review of shop drawings will consist of a review of the design criteria and loads used for calculations and a review of the type and position of elements and connections to the Primary Structural System. Any errors in calculations, shop drawings and verification of field dimensions shall be the responsibility of the General Contractor.

- B. Product Data: Submit Manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications.
1. Steel Studs, tracks, cold rolled channels and hat channels.
  2. Anchors and anchor bolts
  3. Self drilling screws
- C. Shop Drawings:
1. General: Submit shop drawings showing the following:
    - a. Member type, gauge and spacing.
    - b. Sizes, gauges and fastenings for all built-up members including but not limited to roof trusses, headers and jambs.
    - c. Shop Coatings
    - d. Type, size, quantity, locations and spacing of all anchorages and self drilling screws.

- e. Details of attachment to structure and adjacent work.
  - f. Supplemental strapping, bracing, splices, bridging, hat channels and other accessories required for proper installation.
  - g. Critical installation procedures.
- D. Submit (3) reproductions of each shop drawing. Submit (2) copies of design calculations.

## PART 2 - PRODUCTS

### 2.01 FRAMING MEMBERS

#### A. Steel Studs:

1. Acceptable manufacturers:
  - Dale/Incor
  - Marino
  - Dietrich
  - Superior
  - Ware
2. Provide channel-shaped studs, channel-shaped joists, runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, stiffeners, fasteners, and other accessories recommended by manufacturer for complete framing system.
3. Steel framing materials (all gauges) shall comply with ASTM A 653. Fabricate all components from structural quality sheet steel with the following minimum yield points:
  - A. Studs and truss components, 40,000 psi
  - B. Bracing, bridging and blocking, 33,000 psi
4. Manufacture of studs, runners (track), and other framing members shall comply with ASTM C 955.
5. Framing components shall be galvanized per ASTM A 525, minimum G-60 coating.

#### B. Screws and other attachment devices:

1. Provide a protective coating equivalent to cadmium or zinc plating and comply with ASTM A 165 type NS.
2. Self-drilling screws shall comply with the Industrial Fastener Institute Standard for steel self-drilling and tapping screws (IFI-113).
3. Penetration through jointed materials shall not be less than three (3) exposed threads.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Product Storage: Store studs, trusses, joists, track etc. on a flat plane. Material damaged (i.e. rusted, dented, bent or twisted) shall be discarded. Protect adhesives and sealants from freezing.
- B. Construction Methods: Wall construction may be either piece-by-piece (stick-built), or by fabrication into panels either on or off site.
- C. Material Fit up: All framing components shall be cut squarely or at an angle to fit squarely against abutting members. Members shall be held firmly in position until properly fastened. Prefabricated panels, if used, shall be square and braced against racking.
- D. Attachment: Components shall be joined by self-drilling screws, so that connection meets or exceeds required design loads. Wire tying of framing components will not be permitted. Field welding will be permitted only where shown on the drawings or approved by the engineer.
- E. Anchorage to Structure: Securely anchor studs and track to floor construction and overhead structure. Provide slip joints where non-bearing vertical studs meet floor or roof structural steel, or as indicated on the drawings.
- F. Welding: Shop and field welds shall conform to applicable AWS and AISI standards, and may be fillet, plug, butt or seam type. Touch-up damage to galvanizing caused by welding with zinc-rich paint.
- G. Openings: Frame openings larger than 2 ft. square with double studs. Provide suitable reinforcements (double studs, headers, jack studs, cripples, bracing, etc.) at control joint intersections, corners, and other special conditions.
- H. Tolerances: Finished installation shall be level and plumb within a tolerance of 1/8 inch 10 feet horizontally and vertically. Maximum deviation from plan or section dimension shall not exceed 1/8 inch. Spacing of studs shall not be more than 1/8 inch from design spacing, providing that cumulative error does not exceed requirements of finishing materials.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

1. GENERAL

1.1 REFERENCES

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 specifications, apply to work in this section.
- B. Rough Carpentry: Section 06100
- C. Finish Carpentry: Section 06200
- D. Roofing and Flashing: Section 07300
- E. Painting: Section 09900
- F. American Society of Testing Materials (ASTM)
- G. Steel Structures Painting Council (SSPC)
- H. National Association of Architectural Metal Manufacturers (NAAMM)

1.2 DESCRIPTION OF WORK

- A. Extent of Metal Fabrications is shown on the drawings and railings.
- B. Elevator pit metal ladder.

1.3 QUALITY ASSURANCE

- A. Refer to Section 01631, Products and Substitutions, for general provisions covering product selection, substitutions, material storage, and installation.
- B. Refer to Section 01400, Quality Control Services, for provisions for testing and inspection.

1.4 SUBMITTALS

- A. Issue submittals in accordance with Section 01300, Submittals.
- B. Submittals under this section include:
  - 1. Shop drawings showing details of fabrication, assembly, and installation showing all connections to other work.

2. Samples of materials and finished products as may be requested by the Architect.

## 2. PRODUCTS

### 2.1 MATERIALS

1. Railing assembly shall withstand a minimum concentrated load of 200 lbs. applied in any direction at any point on top rail. Intermediate rails, balusters, and panel fillers shall be designed for uniform load of not less than 25 lbs./sq. ft. over gross area of guard. Assembly shall comply with all provisions of the applicable Building Codes.
2. Accurately miter and cope intersections, and weld all around. Form rail-to-end post connections and changes in rail direction with mitered corners or radius bends, as detailed. Form elbow bends and wall returns to uniform radius, free from buckles and twists.

## 3. EXECUTION

### 3.1 FABRICATION

#### A. GENERAL

1. Use materials of size and thickness shown, or if not shown, of required size, grade, and thickness to produce strength and durability in finished product.
2. Provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes on exposed surfaces.
3. Form metalwork to required shapes and sizes, with true lines, curves and angles. Provide necessary rebates, lugs and brackets for assembly and installation. Use concealed fasteners wherever possible. Mill joints to tight hairline fit; cope or miter corners.
4. Welding:
  - a. Weld corners and seams continuously; grind exposed welds smooth and flush.
  - b. Welding Electrodes and Filler Metal: Type and alloy to match metal to be welded.
5. Anchors and Inserts: Furnish as required for installation in other work. Use copper, cadmium or galvanized anchors and inserts for exterior work.
6. Fasteners
  - a. Type and alloy to match metal to be fastened; use Phillips flat-head screws for exposed fasteners if not otherwise indicated.
  - b. Provide bolts, nuts, lag bolts, machine screws, wood screws, toggle bolts, masonry anchorage devices, lock washers as required for application indicated and complying

with applicable Federal standards. Hot-dip galvanize fasteners for exterior applications to comply with ASTM A 153.

7. Shop Finishing

- a. Comply with NAAMM "Metal Finishes Manual".
- b. Apply shop primer to surface of metal fabrications except those embedded in concrete or galvanized; comply with SSPC-PA1.
- c. Surface Preparation: Comply with SSPC-SP6 "Commercial Blast Cleaning" for exterior work, and with SSPC-SP3 "Power Tool Cleaning" for interior work.
- d. Shop Primer: Fabricator's standard, fast-curing, lead-free, "universal" primer complying with performance requirements of FS TT-P-645.
- e. Stripe paint edges, corners, crevices, bolts, welds and sharp edges.
- f. Protect finished metal items.

3.2 INSTALLATION

- A. Perform cutting, drilling and fitting required for installation; set work accurately in location, alignment and elevation, measured from established lines and levels.
- B. Provide anchorage devices and fasteners where necessary for installation to other work.
- C. Repair or replace damaged items as directed by the Architect.
- D. Touch-up shop paint after installation. Clean field welds, bolted connections and abraded areas, and apply same type paint as used in shop.
- E. Restore damaged protective coverings after installation. Maintain until other work in same areas is completed. Remove protective coverings and clean exposed surfaces prior to final inspection.

END OF SECTION



## SECTION 06100

### ROUGH CARPENTRY

#### PART I - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. RELATED DOCUMENTS: The drawings and the general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

##### 1.02 DESCRIPTION OF WORK:

- A. Work covered by this Section includes the furnishing of all labor, material, equipment and accessories, and the performing of all operations in connection with the wood framing, other carpentry as indicated on the Drawings and/or specified within this Section.
- B. The work covered by this Section includes, but is not necessarily limited to, the following:
  - 1. Furnishing and installing all rough carpentry, including miscellaneous grounds, blocking, sills, plates, shoes, shims, and furring, framing, framing anchors, and fasteners.
  - 2. Furnishing and installing plywood wall back up panels and backer boards for telephone and electrical equipment.
  - 3. Drilling concrete and masonry and drilling and tapping of metal work as required for installation of rough carpentry.
  - 4. Any other items of carpentry necessary to complete work properly.

##### 1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Finish Carpentry - Section 06200.

- B. Flashing and Sheet Metal - Section 07500.
- C. Caulking and Sealants - Section 07900.
- D. Glazing - Section 08800.
- E. Finish Hardware - Section 08710.

#### 1.04 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. International Building Code - 2009
  - 2. AITC Timber Construction Manual - 2004
  - 3. NFPA National Design Specification For Wood Construction - 1991

### PART 2 - PRODUCTS

#### 2.01 LUMBER

- A. Lumber shall conform to American Softwood Lumber Standard Voluntary Product Standard PS20-05. Lumber shall bear the grade and trademark of the Association under whose rules it is produced and a mark of mill identification.
- B. Protect all lumber and keep dry, both in transit and at the job site.
- C. All lumber shall be well seasoned and contain not more than 15% moisture content (marked "S-Dry").
- D. All two inch nominal framing lumber shall have the following minimum base values, unless otherwise noted:
  - 1. Extreme Fiber Stress in Bending,  $F_b = 750$  psi.
  - 2. Horizontal Shear,  $F_v = 70$  psi.
  - 3. Compression Perpendicular to Grain,  $F_{c\perp} = 335$  psi.
  - 4. Compression Parallel to Grain,  $F_c = 975$  psi.
  - 5. Tension Parallel to Grain,  $F_t = 325$  psi.
  - 6. Modulus of Elasticity,  $E = 1,100,000$  psi.

## 2.02 PRESERVATIVE TREATED LUMBER

- A. The following wood members shall be Southern Yellow Pine Treated with CCA to 0.4 #/CF in accordance with AWPA C-18. Lumber embedded in or in contact with soil shall be treated to 0.6#/CF in accordance with MaineHousing's construction manual. Wood shall be air dried or kiln-dried to reduce maximum moisture content to 15 percent. Each piece shall bear the AWPA stamp, indicating the plant number, preservative symbol, symbol of standard, date of treatment and moisture content after treatment:
1. Wood sills plates, rough bucks and frames in exterior masonry wall openings.
  2. Wall plates and furring in contact with exterior masonry or concrete.
  3. Nailers that are set into, or are in contact with, concrete or masonry.
  4. Blocking and nailers for roof deck, sub-fascia members, roof cants and saddles.
  5. Lumber in contact with the ground, embedded in or in contact with concrete or masonry and all exterior trim.
- B. Cut Surfaces: Cut surfaces of preservative-treated materials shall be brush coated with at least two coats of the same preservative used in the pressure treatment.
- C. Odors and Compatibility: Treated wood exposed in the final structure shall be free from objectionable odors and shall not be harmful or corrosive to adjacent materials or anchorages.
- D. Plywood Backer Panels:
1. Plywood telephone and electrical backer panels, roof framing, and any other wood designated as fire-retardant treated on drawings, shall be pressure-treated with fire-retardant 2 chemicals to achieve a UL FR-S rating, designating a surface-burning characteristics rating of 25 or less for flame-spread, fuel contributed, and smoke developed, per ASTM E 84, in compliance with AWPA C 20 (lumber) and AWPA C 27 (plywood). Each piece shall be dried to a 15-to-19 percent moisture content after treatment.
  2. Acceptable products include: Koppers Dricon, Osmose Flame-Proof, and Hoover Pro-Tex.
  3. Strength reduction factors used in the design of fire retardant treated wood shall be in accordance with the NFPA "National Design Specification."

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Wood Framing:

1. General Requirements:

- a. Wood construction practices shall conform to recommendations of the NFPA "National Design Specification" and the AITC "Timber Construction Manual". Wall framing will conform to the Optimum Value Engineering framing practices detailed in Appendix A of this section.
- b. All members are to be installed as shown on the drawings.
- c. When individual members have built-in camber, the members shall be placed with camber up.
- d. No cutting of holes or notches in trusses for pipe, conduit or other reasons will be allowed.
- e. All bearing surfaces shall be horizontal and even over the entire width of support.
- f. Accurately and properly fit and brace all work. Secure in proper position and orientation. Framing, studding and blocking shall be as indicated on the Design Drawings, or as required by the work.
- g. Cooperate with all other trades as required.
- h. Use acoustical sealant along shoe and header of all party walls.

2. Cutting and Patching: Do all cutting, patching, heading and blocking required for work of all trades. Notify Telephone Company to place jacks at rough-in stages.

3. Blocking and Supports:

- a. Install 2" nominal blocking in stud partitions for anchoring all cabinets, mirrors, towel bars, grab bars, handrail brackets and other items applied to or in the walls.
- b. Set all blocking required to erect all exterior and interior woodwork, cabinets, plumbing, electrical and mechanical equipment, rough bucks and blocking for roofing work.
- c. Backing Boards: Install 3/4" plywood backer boards for electrical and mechanical trades as required.

- d. Provide pressure-treated blocking at exterior window openings in steel stud walls.
- B. Fastening:
- 1. Fastening shall be as indicated on the Design Drawings, or in accordance with Table 2304.9.1 of the International Building Code.
  - 2. Framing supported by concrete or masonry shall be anchored with built-in threaded bolts or lags, as indicated on the design drawings. Powder actuated fasteners shall not be substituted, except in the attachment of wall furring strips.
  - 3. Fasteners shall be non-corrosive on exposed and exterior locations.
- C. Firestops: Firestops of 2" nominal stock, shall be provided in all concealed spaces not otherwise cut off from passage of air from one space to another.

### 3.02 CLEAN-UP

- A. Keep the premises and working surfaces in a neat, safe, and orderly condition at all times during execution of this portion of the work.
- 1. At the end of each day, or more often if necessary, remove accumulation of sawdust, cut-ends, and other debris to proper storage areas for disposal.
- B. Upon completion of this portion of the work, thoroughly clean up the area.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

1. GENERAL

1.1 GENERAL PROVISIONS: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK:

A. The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

1. All finished carpentry work and millwork as required by Drawings and as specified under this section.
2. Installation of metal and other items furnished by other trades, if specifically noted in these Specifications.

2. PRODUCTS:

2.1 BOARD LUMBER shall comply with the American Lumber Standards Simplified Practice Recommendation No. 16. Grade of board lumber shall be suitable for its intended use. Finish lumber is to be painted and shall be dressed free of tool marks and other objectionable defects. All exposed lumber to be architectural quality grade: Custom.

2.2 INTERIOR TRIM: See Drawings for type, style and finish.

2.3 NAILS: 6d for 1/2" finish stock and 4d finish for thinner wood. Use 8d generally for nailing 3/4" wood trim to framing.

2.4 SCREWS, BOLTS & OTHER FASTENERS: as shown on Drawings with penetration into framing or blocking adequate to support loads shown. Where not shown, consult Architect.

2.5 COUNTERTOPS: Bathroom and Kitchen counter tops to be granite

2.6 PLASTIC LAMINATE: Not used, see drawings

2.7 CLOSET SHELVING: Not used, see drawings

3. EXECUTION:

3.1 ALL ITEMS OF MILLWORK shall be carefully erected, leveled and plumbed with tight-fitting joints and square corners, carefully cut and secured. Exposed nails shall be set adequately for putty. Moulds and faces shall be free from hammer or other tool marks, clean-cut and true pattern. All work shall be thoroughly cleaned and sanded to receive the finish. Sharp corners of small members of finished woodwork shall be slightly rounded. All trim baseboards, etc. fastened to

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walls shall be secured to wall framing members and nails set. Care shall be taken to avoid splitting ends of trim boards.

- 3.2 INTERIOR TRIM: Install trim with finishing nails and glue where required to assure permanent, tight joints, according to Drawing details.

END OF SECTION

**SECTION 066119**

**QUARTZ SURFACING FABRICATIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Quartz Surfacing
  - a. Vanity Tops

**B. Related Sections:**

1. Division 1 – Administrative, Procedural and Temporary Work Requirements
2. Division 5 – Section Metal Fabrication for Blocking
3. Division 6 – Section Rough Carpentry for Blocking
4. Division 6 –Solid Surface Fabrications
5. Division 7 – Section Joint Sealers
6. Division 9 – Ceramic Tiling
7. Division 15 – Plumbing Fixtures

**1.02 REFERENCES**

**A. ASTM International**

1. ASTM C97 – Absorption and Bulk Specific Gravity of Dimension Stone
2. ASTM C99 – Modulus of Rupture of Dimension Stone
3. ASTM C170 – Compressive Strength of Dimension Stone
4. ASTM C482 – Bond Strength of Ceramic Tile to Portland Cement
5. ASTM C531 – Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
6. ASTM C880 – Flexural Strength of Dimension Stone
7. ASTM C1028 – Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
8. ASTM D256 – Izod Pendulum Impact Resistance of Plastics
9. ASTM E84 – Surface Burning Characteristics of Building Materials

**B. American National Standards Institute (ANSI)**

1. ANSI Z124.6 – Stain Resistance
2. ANSI/N 42.14 – Radiation

**1.03 SUBMITTALS**

**A. Submit “Letter of Conformance” in accordance with Section 01 33 00 (01330) with the following supporting data:**

1. Submit manufacturer’s product data, and fabrication and installation instructions
2. Accessories: Submit manufacturer’s product data and installation instructions.

**B. Shop Drawings Identify color[s] and finish[es] , and show the following**

1. Field-verified dimensions
2. Quartz surfacing dimensions
3. Locations and dimensions of cutouts



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4. Required locations of support and blocking members;
  5. Edge profiles
  6. Installation details and methods
- C. Samples
1. Indicate full range of color and pattern variation.
  2. Samples for Color Selection: Submit one set of manufacturer's standard colors and finishes 10 x 10 inches, (250 x 250 mm) of each color and finish selected.
- D. Closeout Submittals: Submit completed warranty form
- E. Product Certificates: For each type of product, provide product certificates signed by product manufacturer.
- F. Maintenance Data: Submit manufacturer's care and maintenance data. Include in project closeout documents

### 1.04 QUALITY ASSURANCE

- A. Applicable Standards
1. Standards of the following, as referenced herein:
    - a. American National Standards Institute (ANSI)
    - b. American Society for Testing and Materials (ASTM)
    - c. National Electrical Manufacturers Association (NEMA)
    - d. NSF International e. International Organization for Standardization (ISO)
  2. Fire Test response characteristics
    - a. Provide with the following Class A (Class 1) surface burning characteristics as evidenced by testing identical products against ASTM E84 (UL 723) or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - b. Flame Spread Index: 25 or less
    - c. Smoke Developed Index: 450 or less
- B. Allowable Tolerances
1. Variation in component size  $\pm 1/8"$  (3mm) over a ten (10) foot length
  2. Location of openings:  $\pm 1/8"$  (3mm) from indicated location
  3. Maximum  $1/8"$  (3mm) clearance between quartz surfaces and each wall

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packaging, Shipping, Handling, and Unloading
1. Observe manufacturer's recommendations and handle accordingly in order to prevent breakage or damage
  2. Brace parts if necessary.
  3. Transport in the near-vertical position with finished face turned toward finished face.
  4. . Do not allow finished surfaces to rub during shipping or handling.
- B. Storage and Protection
1. Store in racks in near-vertical position.
  2. Prevent warpage and breakage.
  3. Store inside away from direct exposure to sun.
  4. Store between 25°F and 130°F (-4 °C and 54°C).
  5. Store with finished face turned toward finished face

1.06 WARRANTY

- A. Provide manufacturer's Limited Commercial 10-Year Warranty against product defects when fabricated and installed by a CaesarStone certified fabricator.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Qualifications: Manufacturer shall be ISO 9002 and ISO 14001 certified.
- B. Acceptable Manufacturer: Provide CaesarStone Quartz Surfacing distributed by U.S. Quartz Products Inc. (CaesarStone U.S.A., Inc.); Van Nuys, CA; phone 877-9-QUARTZ (978.2789); www.caesarstoneus.com.

2.02 QUARTZ SURFACING

- A. Composition: 93 percent crushed quartz aggregate combined with resins and pigments and fabricated into slabs using a vacuum vibro-compaction process.
- B. Dimensions
  - 1. Thickness: 3cm
  - 2. Size: as indicated on drawings
- C. Identification: Material shall be labeled with a batch number and imprinted with a manufacturer's identifying mark on the back.
- D. Color and Finish: Calacatta Nuvo 5131 Polished Finish
- E. Edges: Square

2.03 ACCESSORIES

- A. Mounting Adhesives
  - 1. Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
  - 2. Acceptable Silicone Manufacturers
    - a. Dow Corning®
    - b. GE Sealants and Adhesives
  - 3. Acceptable Epoxy Manufacturers
    - a. Akemi North America
    - b. Bonstone Materials Corporation
    - c. Tenax U.S.A.
  - 4. Provide spacers, if required, of type recommended by adhesive manufacturer
- B. Stone Adhesive
  - 1. Provide epoxy or polyester adhesive of type recommend by manufacturer for application and conditions of use.
  - 2. Acceptable Manufacturers
    - a. Akemi North America
    - b. Bonstone Materials Corporation
    - c. Tenax U.S.A
  - 3. Color: Adhesive that will be visible in finished work should be tinted to match quartz surfacing.
- C. Joint Sealant
  - 1. Clear silicone sealant as recommended by manufacturer for application and per conditions of use

2. Provide anti-bacterial type in Bathrooms and kitchenettes
3. Acceptable Manufacturers
  - a. Dow Corning®
  - b. GE Sealants and Adhesives
- D. Solvent: Product recommended by adhesive manufacturer to clean surface of quartz surfacing to assure adhesion of adhesives [and sealants].
- E. Cleaning Agents: Non-abrasive, low pH cleansers.

#### 2.04 FABRICATION

- A. Fabricator: Firm shall have five years' experience fabricating architectural stone and shall have water-cooled cutting tools.
- B. Shop Assembly: Observe proper safety procedures and comply with manufacturer's instructions.
- C. Inspect Material
  1. Inspect material for defects prior to fabrication.
  2. Color Match
    - a. Materials used throughout the project shall be from the same batch and bear labels with the same batch numbers.
    - b. Visually inspect materials to be used for adjacent pieces to ensure acceptable color match.
    - c. Inspect in lighting conditions similar to those existing at the jobsite.
  3. Variation in distribution of aggregates in quartz surfacing that is within manufacturer's tolerances is not a defect.
- D. Tools: Cut and polish with water-cooled power tools.
- E. Cutouts As with any type of stone, smaller radii increase potential for crack propagation at inside corners; in no case should radius less than 3/8 inch be used.
  1. Cutouts shall have 3/8 inches (10 mm) minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
  2. Polish edges where they will be exposed in finished work.

### **PART 3 EXECUTION**

#### 3.01 ACCEPTABLE INSTALLER

- A. Installer: Firm shall have five years' experience installing architectural stone

#### 3.02 EXAMINATION

- A. Site Verification
  1. Verify dimensions by field measurements prior to fabrication.
  2. Verify that substrates supporting quartz surfaces are plumb, level, and flat to within 1/16 inch in ten feet (1.6 mm in 3000 mm), and that necessary supports and blocking are in place.
  3. Base Cabinets: Cabinet units shall be securely fixed to adjoining units and back wall.
- B. Materials Review
  1. Inspect finished surfaces for damage.
  2. Do not install until damaged materials have been repaired or replaced in an acceptable manner.

### 3.03 PREPARATION

#### A. General

1. Protect finished surfaces against scratches.
2. Apply masking where necessary.
3. Guard against grit, dust, and other potentially abrasive dirt or residue.

### 3.04 INSTALLATION

#### A. General

1. Install materials in accordance to manufacturer's recommendations.
2. Lift and place carefully to avoid breakage.

#### B. Preliminary Installation and Adjustment

1. Position materials to verify correct sizing and preparation.
2. Make necessary adjustments.
3. If cutting, grinding, or polishing is required at the jobsite, use water-cooled tools.
4. Protect jobsite and surfaces against dust and water.
5. Perform work away from installation site, if possible
6. Allow gaps for expansion of not less than 1/16 inch (1.5 mm) per five feet when installed between walls or other fixed conditions.
7. Drainage: Adjacent to sinks and where drainage is required, shim countertops slightly to ensure positive drainage.

#### C. Permanent Installation

1. After verifying fit:
  - a. Remove quartz surfacing from position.
  - b. Clean substrates of dust and contamination.
  - c. Clean quartz surfacing back side and joints with solvent.
2. Apply sufficient quantity of mounting adhesive in accordance with adhesive manufacturer's recommendations to provide permanent, secure installation
3. Install surfacing plumb, level, and square and flat to within 1/16 inch in ten feet (1.6mm in 3000 mm).

#### D. Joints

1. Joints between adjacent pieces of quartz surfacing
  - a. Joints shall be flush, tight fitting, level, and neat.
  - b. Securely join with stone adhesive.
  - c. Fill joints level with quartz surfacing.
  - d. Clamp or brace quartz surfacing in position until adhesive sets.
2. Joints between backsplashes and countertops - Seal joints with silicone sealant.

### 3.05 REPAIR

Repair or replace damaged material in a satisfactory manner

### 3.06 CLEANING

Remove masking and excess adhesives and sealants. Clean exposed surfaces.

### 3.07 PROTECTION

Protect surfacing from damage by other Sections

**END OF SECTION**



## GUIDE SPECIFICATION

CaesarStone® is a quartz-based fabricated stone which can be used for attractive and functional countertops, shower and tub surrounds, interior wall cladding, and other interior applications. Compared to natural stone surfacing, CaesarStone offers many attractive advantages including greater strength, wear resistance, ease of handling, and a unique aesthetic character.

Edit this Guide Specification according to project requirements. Samples, product literature, and design assistance are available by contacting CaesarStone at 877-978-2789 or by visiting caesarstoneus.com. Since fabrication and installation of CaesarStone are similar to that of natural stone, publications such as the Marble Institute of America's *Dimension Stone Design Manual* can also be consulted.

### **SECTION 06 61 19 – QUARTZ SURFACING FABRICATIONS SECTION 12 36 61 – QUARTZ SURFACING COUNTERTOPS**

#### **PART 1 GENERAL**

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##### **1.0 RELATED DOCUMENTS**

Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

##### **1.01 SUMMARY**

Coordinate the following with terminology used to identify CaesarStone on drawings. In most instances, CaesarStone should be called-out as "Quartz Surfacing."

A. Section Includes: [Quartz surfacing] [Engineered stone] [Stone] for

1. Countertops
2. Interior [wainscots] [and] [wall cladding]
3. [Shower] [and] [bath] enclosures
4. Window Sills
5. Vanity Tops
6. Table Tops
7. Bar tops
8. Seating
9. Cold Cafeteria Surfaces
10. Interior Steps
11. Hot Cafeteria Surfaces
12. Reception Areas
13. Nurses' Stations
14. [\_\_\_\_\_]
15. Other interior applications as shown on drawings

B. Related Sections

1. Division 1 – Administrative, Procedural and Temporary Work Requirements
2. Division 1 – "LEED Requirements" for Additional LEED Requirements
3. Division 5 – Section Metal Fabrication for Blocking
4. Division 6 – Section Rough Carpentry for Blocking



- 5. Division 6 – Solid Surface Fabrications
- 6. Division 7 – Section Joint Sealers
- 7. Division 9 – Section Solid Surface Wall Cladding
- 8. Division 9 – Section Quartz Surface Wall Cladding
- 9. Division 10– Quartz Surface Toilet Partitions
- 10. Division 15 – Plumbing Fixtures
- 11. Division 16 – Wiring Devices

Templates may be required for sinks and plumbing trim, stove tops, hardware, etc.

Templates showing cutouts required for installation of items installed on or penetrating through quartz surfacing shall be provided under Sections where items are specified.  
[Indicate if [sink] [and] [lavatory] cutouts are for top mount or under cabinet installation.]

C. ALTERNATES: Refer to Division 1 Section “Alternates” for description of work in this section affected by alternates.

## 1.02 REFERENCES

### A. ASTM International

- 1. ASTM C97 – Absorption and Bulk Specific Gravity of Dimension Stone
- 2. ASTM C99 – Modulus of Rupture of Dimension Stone
- 3. ASTM C170 – Compressive Strength of Dimension Stone
- 4. ASTM C217 – Weather Resistance of Slate
- 5. ASTM C482 – Bond Strength of Ceramic Tile to Portland Cement
- 6. ASTM C484 – Thermal Shock Resistance of Glazed Ceramic Tile
- 7. ASTM C501 – Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
- 8. ASTM C531 – Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
- 9. ASTM C880 – Flexural Strength of Dimension Stone
- 10. ASTM C1026 – Resistance of Ceramic Tile to Freeze-Thaw Cycling
- 11. ASTM C1028 – Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
- 12. ASTM C1243 – Relative Resistance to Deep Abrasive Wear of Unglazed Ceramic Tile by Rotating Disc
- 13. ASTM D256 – Izod Pendulum Impact Resistance of Plastics
- 14. ASTM D2047 – Static Coefficient of Friction of Polish-Coated Floor Surfaces by the James Machine
- 15. ASTM E84 – Surface Burning Characteristics of Building Materials

### B. American National Standards Institute (ANSI)

- 1. ANSI Z124.6 – Stain Resistance
- 2. ANSI/N 42.14 – Radiation

### C. National Electrical Manufacturers Association (NEMA)

- 1. NEMA LD3-3.5 – Boiling Water Resistance
- 2. NEMA LD 3-3.6 – High Temperature Resistance

### D. European Standards (EN)

- 1. EN 14617-1 – Determination of Apparent Density and Water Absorption
- 2. EN 14617-4 – Determination of Abrasion Resistance



- 3. EN 14617-5 – Determination of Freeze/Thaw Resistance
- 4. EN 14617-9 – Determination of Impact Resistance
- 5. EN 14617-12 – Determination of Dimensional Stability
- 6. EN 14617-13 – Determination of Electrical Resistivity
- 7. EN 14617-15 – Determination of Compressive Strength

E. ISO (International Organization for Standardization)

- 1. ISO 9002 – Model for Quality Assurance in Production
- 2. ISO 14001 – Environmental Management Systems

F. Others

- 1. NSF – ANSI/NSF Standard 51
- 2. MEA – New York Materials and Equipment Acceptance
- 3. OHSAS – 18001- Occupational Health & Safety System
- 4. GREENGUARD – “Children and Schools”
- 5. SCS – Certified recycled content
- 6. Kosher

### 1.03 SUBMITTALS

A. Product Data

- 1. Quartz Surfacing: Submit manufacturer’s product data, [sample warranty form,] and fabrication and installation instructions.
- 2. Accessories: Submit manufacturer’s product data and installation instructions.

B. Shop Drawings: Identify color[s] and finish[es], and show the following:

- 1. Field-verified dimensions
- 2. Quartz surfacing dimensions
- 3. Locations and dimensions of cutouts
- 4. Required locations of support and blocking members;
- 5. Edge profiles
- 6. Installation details and methods

C. Samples

Coordinate Subparagraphs 1, 2, and 3 with the color specifications in Part 2 – Products.

- 1. Cut sample and seam together for representation of seaming techniques.
- 2. Indicate full range of color and pattern variation.
- 3. [Samples for Color Selection: Submit [two] [ ] sets of manufacturer’s standard colors and finishes.]
- 4. Samples for Color Approval: Submit [two] [ ] samples, 10 x 10 inches, (250 x 250 mm) of [each] color and finish selected.
- 5. Stone Adhesive: Submit [two] [ ] samples of an adhesive joint for [each] color quartz surfacing selected. Show color match of adhesive.

D. Fabricator Qualifications: Submit evidence of fabricator’s qualifications.

E. Closeout Submittals: Submit completed warranty form.

F. LEED Submittals: Provide LEED submittals as required.



G. Product Certificates: For each type of product, provide product certificates signed by product manufacturer.

H. Maintenance Data

1. Submit manufacturer's care and maintenance data.
2. Include in project closeout documents.

#### **1.04 QUALITY ASSURANCE**

A. Applicable Standards

1. Standards of the following, as referenced herein:
  - a. American National Standards Institute (ANSI)
  - b. American Society for Testing and Materials (ASTM)
  - c. National Electrical Manufacturers Association (NEMA)
  - d. NSF International
  - e. International Organization for Standardization (ISO)
2. Fire Test response characteristics
  - a. Provide with the following Class A (Class 1) surface burning characteristics as evidenced by testing identical products against ASTM E84 (UL 723) or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - b. Flame Spread Index: 25 or less
  - c. Smoke Developed Index: 450 or less

B. Allowable Tolerances

1. Variation in component size  $\pm 1/8"$  (3mm) over a ten (10) foot length
2. Location of openings:  $\pm 1/8"$  (3mm) from indicated location
3. Maximum  $1/8"$  (3mm) clearance between quartz surfaces and each wall

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

A. Packaging, Shipping, Handling, and Unloading

1. Observe manufacturer's recommendations and handle accordingly in order to prevent breakage or damage.
2. Brace parts if necessary.
3. Transport in the near-vertical position with finished face turned toward finished face.
4. Do not allow finished surfaces to rub during shipping or handling.

B. Storage and Protection

1. Store in racks in near-vertical position.
2. Prevent warpage and breakage.
3. Store inside away from direct exposure to sun.
4. Store between 25°F and 130°F (-4 °C and 54°C).
5. Store with finished face turned toward finished face.

#### **1.06 WARRANTY**

A. Commercial: Provide manufacturer's Limited Commercial 10-Year Warranty against product defects when fabricated and installed by a CaesarStone certified fabricator.

B. Residential: Provide manufacturer's Residential Lifetime Warranty against product defects when fabricated and installed by a CaesarStone certified fabricator.



## PART 2 PRODUCT

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### 2.01 MANUFACTURERS

A. Qualifications: Manufacturer shall be ISO 9002 and ISO 14001 certified.

B. Acceptable Manufacturer: Provide **CaesarStone Quartz Surfacing** distributed by **U.S. Quartz Products Inc. (CaesarStone U.S.A., Inc.)**; Van Nuys, CA; phone 877-9-QUARTZ (978.2789); [www.caesarstoneus.com](http://www.caesarstoneus.com).

The following product is included as a convenience to specifiers who require multiple suppliers. It is not warranted or recommended by CaesarStone.

C. Substitutions: Zodiaq manufactured by DuPont may be substituted in accordance with [Instructions to Bidders.] [Section 01 25 00 – Substitution Procedures.]

### 2.02 QUARTZ SURFACING

A. Composition: 93 percent crushed quartz aggregate combined with resins and pigments and fabricated into slabs using a vacuum vibro-compaction process.

Due to its superior flexural strength compared to natural stone, CaesarStone can be fabricated in larger sized pieces. This may reduce the number of joints in an installation, which is more economical and may produce a better-looking end result. It may also allow the use of thinner material, producing additional economies and weight reductions.

*Thickness:* 3/4" (2 cm) is the minimum recommended for countertops; use 1-1/4" (3 cm) material when greater strength or thicker edges are required.

B. Dimensions

1. Thickness: Nominal [3/4 inch (20 mm)] [1-1/4 inches (30 mm)] [As shown on drawings.]
2. Size: Slabs shall be not less than [56.5 x 120 inches (1.44 x 3.05 m)] to minimize the number of joints used in installation.

The back of each slab of CaesarStone is imprinted with a trademarked zigzag pattern to simplify jobsite identification.

C. Identification: Material shall be labeled with a batch number and imprinted with a manufacturer's identifying mark on the back.

## D. Performance - CaesarStone Quartz Surfaces Technical Data

Test Performed	Test Standard	Results
<b>Physical Properties</b>		
Water Absorption	ASTM C97*	<0.05%
Density	ASTM C97* EN 14617-1*	2.2-2.4 gr/cm <sup>3</sup> 2.2-2.4 gr/cm <sup>3</sup>
Flexural Strength	ASTM C880 EN 14617-2*	6,500–10,770 psi; 44.8-74.3 MPa 57.6-70 MPa
Dimension Stability	EN 14617-12*	Class A
Electrical Stability	EN 14617-13*	Volume resistance (R <sub>v</sub> ) = 0.92 x 10 <sup>14</sup> Ω Volume resistivity (ρ <sub>v</sub> ) = 4.88 x 10 <sup>14</sup> Ωm
<b>Durability</b>		
Impact Resistance	ASTM D1709* EN 14617-9*	26.3 lbs (117N) 4,000 - 10,000 (J)
Compressive Strength	ASTM C170* EN 14617-15*	21,312 - 27,133 psi 178.3-210.6 MPa
Abrasion	ASTM C501* ASTM C1243 EN 14617-4*	216-696 Volume of chord: V=132-244 mm <sup>3</sup> Groove length = 21.8 mm or V=86 mm <sup>3</sup>
Freeze-Thaw Resistance	ASTM C1026* EN 14617-5*	No defects after 15 freeze-thaw cycles No defects after 25 freeze-thaw cycles
Mohs Hardness Scale		6.5-7
<b>Stain, Chemical Resistance and Cleanability</b>		
Stain Resistance**	ANSI Z124.6	Pass
Wear and Cleanability	ANSI Z124.6	Pass
Chemical Resistance	ANSI Z124.6 EN 14617-10*	Pass Class C <sub>4</sub>
<b>Thermal Properties</b>		
Linear Thermal Expansion	ASTM D696 EN 14617-11*	-30 to +30°C: 1.3-1.9 x 10 <sup>-5</sup> cm/cm/°C -30 to +30°C: 2.1 x 10 <sup>-5</sup> (°C <sup>-1</sup> ); -30 to +60°C: 2.7 x 10 <sup>-5</sup> (°C <sup>-1</sup> )
Thermal Conductivity	EN 12664/ISO 8301*	1.75 W/m. /°K (mean T of 10°C)
Thermal Shock	EN 14617-6*	No visual defects after 10 cycles Loss in mass = 0.02%-0.05% Loss in flexural strength = 0.7%-1.1%
Boiling Water Resistance	NEMA LD3-3.5	Pass
High Temperature Resistance	NEMA LD3-3.6	Pass
<b>Safety</b>		
Cigarette Test	ANSI Z124.6	Pass
Surface Burning	ASTM E84*	Class 1 and Class A
Fire Classification	EN 13501-1*	Wall cladding: B-s1-d0 Flooring and stairs: B-fl-s1
Static Coefficient of Friction	ASTM C1028*	As received — Dry: 0.8; Wet: 0.6 As renovated — Dry: 0.9; Wet: 0.6
Slip Resistance	DIN 51130* DIN 51097* EN 14231* AS/NZS 4586*	Oil wet ramp: R9-10 Wet barefoot ramp: C Wet: 13-21 SRV; Dry: 43-53 SRV Four 5 rubber pendulum: 25-30 BPN Wet barefoot ramp: B Oil wet ramp: R10
Radiation	ANSI/N 42.14	<sup>226</sup> Ra = 1.4–6.8 <sup>232</sup> Th = 1.4–3 <sup>40</sup> K = <3–30.3 (Bq/kg dry weight)

**Notes:** Test reports and certifications can be viewed at [www.CaesarStoneUS.com](http://www.CaesarStoneUS.com).

\* Results represent a partial series range. \*\* Some models require scrubbing to remove stains.



**Certifications and Approvals**

ISO 14001	Environmental Management Systems	Certified by IQNet	Certificate # IL-44679
ISO 9001	Quality Systems – Model for Quality Assurance in Production, Installation, and Servicing	Certified by IQNet	Certificate # IL-29318
OHSAS 18001	Health and Safety Systems	Certified by IQNet	Certificate # IL-43226
Kosher		Certified by Rabbi Yisrael Rozen, the Zomet Institute	Certificate # 58-003-523-6
GREENGUARD	Certified for "Indoor Air Quality" and "Children and Schools"		CaesarStone is a low-emitting material.
Scientific Certification Systems (SCS)	Recycled Content	Certified by SCS	See page 11
New York City Materials and Equipment Acceptance (MEA)		Approved by City of New York	MEA 202-08-M
ANSI/NSF Standard 51	Food Equipment Materials	Listed by NSF	Safe to use in food preparation areas.

**E. Color and Finish**

CaesarStone - Polished: 42 stocked colors.

CaesarStone - Honed: 5 stocked colors. Note that dark honed colors will show fingerprints and require increased maintenance.

CaesarStone - Recycled: 8 stocked SCS certified recycled content colors.

CaesarStone - Motivo: 2 stocked patterned finishes

Custom Colors and Finishes: Available without additional charge on orders of 4,500 sq. ft. or more.

Edit the following according to color selection method and coordinate with submittals.

1. Provide color[s] and finish[es] selected by [architect] [\_\_\_\_\_] from manufacturer's stocked standards. [Allow for selection of up to [two] [four] [\_\_\_\_\_] colors.]
2. Provide custom color and finish to match [sample in [architect's] [\_\_\_\_\_] office.][\_\_\_\_\_].

All standard colors are available with polished finish. See color charts or samples for availability of honed finish.

3. Provide [Champagne Limestone, Color No. 2400] [\_\_\_\_\_, Color No. \_\_\_\_\_] with [polished] finish.
4. Finish
  - a. Polished surface shall have gloss greater than or equal to 35% at 50°.
  - b. Honed surface shall have a matte finish.

Retain the following if edges and corners are not detailed on drawings.

**F. Exposed Edges [and Corners]**

1. Countertops
  - a. Edges: [Square] [Bullnose] [Beveled] [Waterfall] [\_\_\_\_\_] profile, [single] [double] layer thick



Quartz Surfaces

- b. Outside Corners: [Square] [[3/4 inch (20 mm)] [\_\_\_\_ inch[es] (\_\_\_\_ mm)] radius]
- 2. [Backsplash] [and] [Wall Cladding]
  - a. Edges: [Square] [\_\_\_\_\_]
  - b. Outside Corners: [Square butt joints] [\_\_\_\_\_]

### 2.03 ACCESSORIES

#### A. Mounting Adhesives

- 1. Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
- 2. Acceptable Silicone Manufacturers
  - a. Dow Corning®
  - b. GE Sealants and Adhesives
  - c. [\_\_\_\_\_]
- 3. Acceptable Epoxy Manufacturers
  - a. Akemi North America
  - b. Bonstone Materials Corporation
  - c. Tenax U.S.A.
  - d. [\_\_\_\_\_]
- 4. Provide spacers, if required, of type recommended by adhesive manufacturer.

#### B. Stone Adhesive

- 1. Provide epoxy or polyester adhesive of type recommend by manufacturer for application and conditions of use.
- 2. Acceptable Manufacturers
  - a. Akemi North America
  - b. Bonstone Materials Corporation
  - c. Tenax U.S.A.
  - d. [\_\_\_\_\_]
- 3. Color: Adhesive that will be visible in finished work should be tinted to match quartz surfacing.

In most countertop and interior cladding applications, CaesarStone can be installed with structural adhesive. Where required, however, CaesarStone can also be set in grout or installed with ties, clips, or other types of hardware recommended for thin stone veneers. Edit below and coordinate Section as required.

C. [Fasteners] [Grout] [Hardware]: [\_\_\_\_\_]

#### D. Joint Sealants

- 1. Clear silicone sealant as recommended by manufacturer for application and per conditions of use.
- 2. Provide anti-bacterial type in [toilet] [and] [bath] rooms,] [food preparation areas,] [and] [\_\_\_\_\_].
- 3. Acceptable Manufacturers:
  - a. Dow Corning®
  - b. GE Sealants and Adhesives
  - c. [\_\_\_\_\_]



E. Solvent: Product recommended by adhesive manufacturer to clean surface of quartz surfacing to assure adhesion of adhesives [and sealants].

F. Cleaning Agents: Non-abrasive, low pH cleansers.

## 2.04 FABRICATION

Include manufacturer authorization if manufacturer's warranty is specified.

A. Fabricator: Firm shall have five years' experience fabricating architectural stone and shall have water-cooled cutting tools. [Firm shall be authorized in writing by manufacturer.]

B. Shop Assembly: Observe proper safety procedures and comply with manufacturer's instructions.

C. Layout: Layout joints [as shown on drawings.] [to minimize joints and to avoid L-shaped pieces of quartz surfacing.]

D. Inspect Material

1. Inspect material for defects prior to fabrication.
2. Color Match
  - a. Materials used throughout the project shall be from the same batch and bear labels with the same batch numbers.
  - b. Visually inspect materials to be used for adjacent pieces to ensure acceptable color match.
  - c. Inspect in lighting conditions similar to those existing at the jobsite.
3. Variation in distribution of aggregates in quartz surfacing that is within manufacturer's tolerances is not a defect.

E. Tools: Cut and polish with water-cooled power tools.

F. Cutouts

As with any type of stone, smaller radii increase potential for crack propagation at inside corners; in no case should radius less than 3/8 inch be used.

1. Cutouts shall have [3/8 inches (10 mm)] [\_\_\_\_ inches (\_\_\_\_ mm)] minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
2. Polish edges where they will be exposed in finished work.

The following is recommended in areas subject to heavy usage or where additional strength is justified:

3. [If the remaining material outside a cutout is less than [three inches (76 mm)] [\_\_\_\_ inches (\_\_\_\_ mm)] wide, reinforce area by laminating it with a strip of quartz surfacing.]

G. Laminations: Laminate layers of quartz surfacing as required to create built-up [edges,] [trim,] [and other areas requiring additional thickness].

## PART 3 EXECUTION

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### 3.01 ACCEPTABLE INSTALLER

Installer: Firm shall have five years' experience installing architectural stone.

### 3.02 EXAMINATION

#### A. Site Verification

1. Verify dimensions by field measurements prior to fabrication.
2. Verify that substrates supporting quartz surfaces are plumb, level, and flat to within 1/16 inch in ten feet (1.6 mm in 3000 mm), and that necessary supports and blocking are in place.
3. [Base Cabinets: Cabinet units shall be securely fixed to adjoining units and back wall.]

#### B. Materials Review

1. Inspect finished surfaces for damage.
2. Do not install until damaged materials have been repaired or replaced in an acceptable manner.

### 3.03 PREPARATION

#### A. General

1. Protect finished surfaces against scratches.
2. Apply masking where necessary.
3. Guard against grit, dust, and other potentially abrasive dirt or residue.

Retain the following if quartz surfacing is to be installed on existing countertops or walls.
---

#### B. Remodeling

1. Where necessary, remove existing [countertops] [and] [materials to be demolished] in accordance with [Section 02 42 00 – Removal and Salvage of Construction Materials] [\_\_\_\_\_].
2. Verify that remaining construction is of sufficient strength and tolerances to support quartz surfacing, and make necessary repairs.
3. [Disconnect utilities as specified in other sections.]

### 3.04 INSTALLATION

#### A. General

1. Install materials in accordance to manufacturer's recommendations.
2. Lift and place carefully to avoid breakage.

#### B. Preliminary Installation and Adjustment

1. Position materials to verify correct sizing and preparation.
2. Make necessary adjustments.
3. If cutting, grinding, or polishing is required at the jobsite, use water-cooled tools.
4. Protect jobsite and surfaces against dust and water.
5. Perform work away from installation site, if possible.



6. Gypsum drywall back walls [which are not [fire] [or] [acoustically] [rated] may be routed up to half the thickness of the drywall to allow the countertop to fit.
7. Allow gaps for expansion of not less than 1/16 inch (1.5 mm) per five feet when installed between walls or other fixed conditions.
8. [Drainage: [Adjacent to sinks] [and] [where drainage is required], shim countertops slightly to ensure positive drainage.]

#### C. Permanent Installation

1. After verifying fit:
  - a. Remove quartz surfacing from position.
  - b. Clean substrates of dust and contamination.
  - c. Clean quartz surfacing back side and joints with solvent.
2. Apply sufficient quantity of mounting adhesive in accordance with adhesive manufacturer's recommendations to provide permanent, secure installation.
3. Spacing of mounting adhesive shall not exceed:
  - a. Horizontal surfaces: [\_\_\_\_\_] inches ([\_\_\_\_\_] mm) on center
  - b. Vertical surfaces: [\_\_\_\_\_] inches ([\_\_\_\_\_] mm) on center; provide temporary shims until adhesive cures
4. [Fasteners] [Grout] [Hardware]: [\_\_\_\_\_]
5. Install surfacing plumb, level, and square and flat to within 1/16 inch in ten feet (1.6mm in 3000 mm).

#### D. Joints

1. Joints between adjacent pieces of quartz surfacing
  - a. Joints shall be flush, tight fitting, level, and neat.
  - b. Securely join with stone adhesive.
  - c. Fill joints level with quartz surfacing.
  - d. Clamp or brace quartz surfacing in position until adhesive sets.
2. Joints [between backsplashes and countertops] [and] [around [tub] [and] [shower] enclosures]: Seal joints with silicone sealant.

### 3.05 REPAIR

Repair or replace damaged materials in a satisfactory manner.

### 3.06 CLEANING

Remove masking and excess adhesives and sealants. Clean exposed surfaces.

### 3.07 PROTECTION

Protect surfacing from damage by other Sections.

Use below if drawings do not adequately specify scope of work or locations of CaesarStone products. The following are examples only.

### 3.08 SCHEDULES

- A. Toilet Rooms: Rooms 102 and 103
  1. Countertops



- a. CaesarStone Sierra, Color 9255
  - b. 3/4" thick
  - c. Waterfall front edge
  - 2. Wainscot
    - a. CaesarStone Baja, Color 3200
    - b. 3/4" thick
    - c. Square top edge and butt joint corner
- B. Lobby: Room 101
- 1. Reception Desk
    - a. Countertops
      - i. CaesarStone Concrete, Color 2003, polished finish
      - ii. 1-1/4" thick
      - iii. Bullnosed exposed edges
    - b. Vertical Cladding
      - i. CaesarStone Concrete, Color 2003, honed finish
      - ii. 3/4" thick
      - iii. Quirk joints
  - 2. Wall Behind Desk:
    - a. Copper Canyon, Color 9480
    - b. 3/4" thick
    - c. See drawings for edge trim and sandblasted graphics

#### **END OF SECTION**

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## **SECTION 07210**

### **CELLULOSE INSULATION**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Cellulose Insulation:
  - 1. Pneumatically blown dry into floor assemblies.
  - 2. Pneumatically sprayed damp into open wall cavities.

##### **1.2 REFERENCE STANDARDS**

- A. ASTM C 739 – Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation.
- B. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM E 119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. CPSC Standard 16 CFR Parts 1209 and 1404.
- E. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, including installation instructions.
- B. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- C. Warranty Documentation: Submit manufacturer's standard warranty.

##### **1.4 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Manufacturer regularly engaged, for past 10 years, in manufacture of cellulose insulation of similar type to that specified.
- B. Installer's Qualifications:
  - 1. Installer regularly engaged, for past 1 year, in installation of cellulose insulation of similar type to that specified.
  - 2. Employ persons trained for installation of cellulose insulation.
  - 3. Installer: Certified by cellulose insulation manufacturer.

4. Installer's Equipment: Approved by cellulose insulation manufacturer.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  1. Store and handle materials in accordance with manufacturer's instructions.
  2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
  3. Store materials in clean, dry area indoors.
  4. Protect materials during storage, handling, and installation to prevent damage.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURER**

- A. Nu-Wool Company, Inc., 2472 Port Sheldon Street, Jenison, Michigan 49428. Toll Free (800) 748-0128. Phone (616) 669-0100. Fax (616) 669-2370. Website [www.nuwool.com](http://www.nuwool.com). E-mail [info@nuwool.com](mailto:info@nuwool.com).

### **2.2 THERMAL INSULATION**

- A. Cellulose Insulation:
  1. Pneumatically Blown Dry into Attics Assemblies: Nu-Wool Premium Cellulose Insulation.
  2. Pneumatically Sprayed Damp into Open Wall Cavities: Nu-Wool WALLSEAL Insulation.
- B. Material Description:
  1. Manufactured from recycled newspapers.
  2. Post-Consumer Recycled Content: 85 percent minimum.
  3. Fibers: Treated with boric acid and sodium polyborate additives to create permanent flame resistance.
  4. Fungicide Additive:
    - a. EPA registered.
    - b. Makes insulation resistant to mold growth.
  5. Additives:
    - a. Non-toxic.
    - b. Non-corrosive.
    - c. Does not irritate normal skin.
    - d. Does not give off odor during or after installation.
    - e. Does not attract vermin or insects.
    - f. Does not adversely affect other building materials.
- C. Compliance:
  1. UL classified R-8078.
  2. CPSC Standard 16 CFR Parts 1209 and 1404.
  3. ASTM C 739.

4. ASTM E 119: Firewalls U382, U369a, U369b, U360.
5. ES Report ESR-2217.

D. Test Results:

1. Settled Density:
  - a. Maximum density after long-term settling of dry installation: 1.6 lbs per cu ft.
2. Thermal Resistance:
  - a. Average thermal resistance (R-value) per inch: 3.8.
3. Flammability Characteristics:
  - a. Critical Radiant Flux: 0.12 W/cm<sup>2</sup> minimum.
  - b. Smoldering Combustion: No evidence of flaming and weight loss of 15.0 percent maximum.
4. Moisture Vapor Sorption:
  - a. Moisture Gain in Insulation: 15 percent maximum by weight.
5. Environmental Characteristics:
  - a. When in contact with steel, copper, aluminum, or galvanized materials: Non-corrosive.
  - b. Does not support fungal growth.
6. Surface Burning Characteristics, ASTM E 84 and UL 723: Nu-Wool Premium Cellulose Insulation.
  - a. Flame Spread Index: 15.
  - b. Smoke Developed Index: 5.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine areas to receive cellulose insulation.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

#### **3.2 PREPARATION**

- A. Protection of In-Place Conditions:
  1. Protect adjacent surfaces, electrical boxes, open pipes, and register openings in accordance with manufacturer's instructions.
  2. Protect adjacent surfaces from contact with pneumatically blown dry or pneumatically sprayed damp cellulose insulation.
- B. Preparation: Ensure mechanical, plumbing, electrical, and other utility installations have been completed before installation of cellulose insulation.

#### **3.3 INSTALLATION**

- A. Install cellulose insulation in accordance with manufacturer's instructions at locations indicated on the Drawings.

- B. Install cellulose insulation to uniform density without voids, gaps, or air pockets.
- C. Install cellulose insulation to density and depth to achieve required R-values, see drawings.
- D. Pneumatically Blown Dry Cellulose Insulation:
  - 1. Pneumatically blow cellulose insulation dry into roof and floor assemblies after mechanical, plumbing, electrical, and other utility installations have been completed.
  - 2. Ensure heat-producing devices have barriers constructed around them to prevent contact with cellulose insulation.
  - 3. Install cellulose insulation to a density of 1.6 lbs. per cu. ft.
- E. Pneumatically Sprayed Damp Cellulose Insulation:
  - 1. Pneumatically spray cellulose insulation with controlled water fog for adhesion into open wall cavities after mechanical, plumbing, electrical, and other utility installations have been completed.
  - 2. Install cellulose insulation to a density of 3.0 to 3.5 lbs. per cu. ft to prevent settling in wall cavities.
  - 3. Use quantity of water in installation to ensure proper adhesion into wall cavities and proper density.
  - 4. Install gypsum board a minimum of 24 hours after installation of pneumatically sprayed damp cellulose insulation.  
**Construction Manager (or General Contractor) shall notify the Architect of intent to enclose cellulose. Additional time above the 24 hours may be required depending upon climatic conditions during and after the damp cellulose installation.**

### 3.4 PROTECTION

- A. Protect installed cellulose insulation from damage during construction.

**END OF SECTION**

## **SECTION 07216**

### **SPRAY FOAM INSULATION**

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

##### **1.01 WORK INCLUDED**

- A. Spray application closed cell polyurethane foam insulation.

##### **1.02 GENERAL REQUIREMENTS**

- A. RELATED DOCUMENTS: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work

##### **1.03 SUBMITTALS AND SAMPLES**

- A. Before commencing work, submit in accordance with Section 01300.

##### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. Materials shall be delivered in manufacturers original sealed containers clearly labelled with manufacturer's name, product identification, safety, information, net weight of contents and expiration date.
- B. Material is to be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.
- C. Empty containers have to be removed from site on a daily basis.

##### **1.05 PROTECTION**

- A. Ventilate area to receive insulation to maintain safe working conditions.
- B. Protect workers as recommended by standards and manufacturer's recommendations.
- C. Protect adjacent surfaces, windows, equipment and site areas from damage of over-spray.

## **PART 2- PRODUCTS**

### **2.1 MATERIALS**

- A. Spray Applied Semi Rigid Polyurethane Foam Insulation system – BASF Comfort Foam Insulation and Air Barrier or equal. R value is to equal 6.0 per inch.

### **2.2 EQUIPMENT**

Equipment used to apply the foam insulation shall be as per manufacturer's written instructions.

## **PART 3- EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that surfaces and conditions are suitable to accept work as outlined in this section.
- B. Report in writing, any defects in surfaces or conditions which may adversely affect the performance of products installed under this section to the consultant prior to commencement of work.
- C. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

### **3.2 APPLICATION**

- A. Spray-application of polyurethane foam shall be performed in accordance with manufacturer recommendations.
- B. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer. Refers to technical data sheets.
- C. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings.

### **3.3 PROTECTION**

All plastic insulation (including but not limited to polyurethane spray foam) shall be separated from the interior of the building by an approved thermal barrier of ½ -inch gypsum wallboard or equivalent thermal barrier material as approved by Maine State Fire Marshall.

**END OF SECTION**

**SECTION 07530  
ELASTOMERIC MEMBRANE ROOFING**

**PART 1        GENERAL**

1.01 DESCRIPTION OF WORK

- A. Fully adhered EPDM sheet roofing, elastomeric flashing and shop formed metal edge strips.

1.02 CODES, REGULATIONS AND STANDARDS

A. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and local codes, regulations and standards pertaining to work practices, hauling, disposal, protection of workers and visitors to the site, and persons occupying areas adjacent to the site. This includes modification of procedures to comply with changes to codes, regulations and standards which occur during the work of this contract. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State and local regulations. The Contractor shall hold the Owner and Owner's Representatives harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulations on the part of himself, his employees or his subcontractors.

1.03 QUALITY ASSURANCE

- A. Roofing contractor to be approved in writing by the membrane manufacturer. Contractor shall be able to substantiate that he has been trained by the membrane manufacturer.
- B. Roofing and flashing workmanship to comply with industry standards. The National Roofing Contractors Association's (NRCA) **ROOFING AND WATERPROOFING MANUAL** along with **ARCHITECTURAL SHEET METAL MANUAL** as published by Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) will be used to establish industry standards.

1.04 SUBMITTALS

- A. Sample ten (10) year watertight warranty for the EPDM membrane. **Warranty shall include wind speeds up to 72 miles per hour. The standard 55 MPH is not acceptable for this job.**
- B. Sample twenty (20) year material warranty for the EPDM membrane.
- C. Current EPDM membrane manufacturer's application specifications.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original, unopened containers, clearly labeled with manufacturer's name. All material to be stored in waterproof trailers or sheds, up on raised platforms and under lock and key until use. Do not use materials damaged in handling or storage. Replace damaged material with new material. Store adhesives between 60 and 80 degrees F. Should they be exposed to lower temperatures, restore to room temperature for three to five days prior to use.

## 1.06 WARRANTY

- A. A ten (10) year watertight warranty and twenty (20) year material warranty shall be issued by the EPDM membrane manufacturer. **Warranty shall include wind speed up to 72 MPH.**
- B. The roofing contractor shall furnish the Owner with his personal two (2) year watertight warranty.

## PART 2 PRODUCTS

### 2.01 ROOF INSULATION

- A. Over roof deck install one layer of APA rated 7/16" oriented strand board (OSB) with screws and plates as required by the EPDM manufacturer. Nails are not acceptable.
- B. Tapered edge strips to be 1-1/2" by 18" fiberboard.

### 2.02 MEMBRANE ROOF SYSTEM

- A. Membrane roofing to be fully adhered .060" EPDM sheet roofing furnished in twenty five foot (25') wide (or wider) rolls by Firestone, Carlisle or Versico. Roof membrane to be fully adhered to the OSB.
- B. Use the roof membrane for flashing of curbs and walls per the manufacturer's standard details. Use reinforced EPDM anchor strips to avoid splice joints at walls and edges.
- C. Adhesives, sealants, thinner, cleaner and accessories to be furnished by the membrane manufacturer.
- D. **Six inch (6") wide seam tape will be required for all field seams.**

### 2.03 METAL FLASHING

- A. Edge strip and concealed clips to be formed using .040" mill finish aluminum.

### 2.04 FASTENERS

- A. Use annular-ring aluminum nails to secure the new aluminum edge strip.
- B. Use fasteners recommended by the membrane manufacturer to secure anchor bars and termination bars.
- C. Fasteners used to secure the OSB to the wood deck to be #14-10 Heavy Duty Roofing Fasteners with CR-10 coating, a minimum shank diameter of 0.170" and a thread diameter of 0.125". Pressure plates to be 3" diameter Galvalume plates. Screws and plates to be manufactured by Olympic Fasteners or approved equal. Length, size and accessories to be as required by the EPDM membrane manufacturer selected.

### 2.05 WALKWAY PADS

- A. Walkway pads to be 30" x 30" x .30" thick Firestone Rubbergard Walkway pads or approved equal.



## **PART 3 EXECUTION**

### 3.01 PREPARATION OF SURFACES

- A. Completely remove existing roofing, roof insulation, base flashing, edge strips, vent flashing and roof drains. Promptly remove from site and dispose of properly.
- B. Surfaces on which the roofing system is to be applied shall be clean, smooth, dry, free of fins, rot, sharp edges, loose and foreign materials, oil and grease.

### 3.02 ROOF MEMBRANE

- A. Adhere the .060" EPDM membrane to the 7/16" OSB in strict accordance with the manufacturer's specifications.
- B. **Six inch (6") wide seam tape will be required for all field seams.**

### 3.03 FLASHING - - WALLS, PARAPETS, CURBS AND VENTS

- A. Remove all existing flashing.
- B. Use the longest pieces of material which are practical. All flashing and terminations shall be done in accordance with the applicable manufacturer's details.
- C. Care must be taken to set the elastomeric flashing so it does not bridge where there is a change of direction (i.e. where a parapet meets the roof deck). This can be accomplished by creasing the membrane into the angle change prior to adhering up the wall. Excess bridging will be cause for rejection and will be re-done at the contractor's expense.
- D. Install termination bars at the top of all base flashing, fastening a minimum of 6" on center.
- E. Raise existing curb height as necessary to obtain a minimum of 8" high flashing.

### 3.04 FASCIA AND EDGE STRIPS

- A. Bottom edge of aluminum edge strips to be secured with continuous cleats. Nail top flange with annular-ring nails, three inches (3") on center. Strip top flange with 6" pressure sensitive flashing.

### 3.05 CAP FLASHING

- A. Remove existing cap flashing. Cut a new reglet to a minimum depth of 1-1/4". Secure new cap flashing with lead wool plugs at 24" on center. Seal joint with NP1 by Sonneborn.

### 3.06 WALKWAY PADS

- A. Adhere walkway pads to roof membrane in accordance with the manufacturer's instructions.

### 3.08 TEMPORARY WATER CUT-OFF

- A. Temporary water cut-offs are to be constructed at the end of each working day to protect the insulation, roofing, building and building interior from damage due to wind, snow and rain.
- B. Temporary water cut-offs are to be detailed by the contractor and approved by the manufacturer and Owner.

### 3.09 CLEAN UP

- A. Site clean-up shall be complete and to the satisfaction of the Owner.
- B. All roofs, building, landscape and parking areas shall be cleaned of all trash, debris and dirt caused by or associated with this work.
- C. Any areas stained, dirtied, discolored or otherwise damaged due to this work shall be cleaned, restored and replaced as required.
- D. All debris shall be removed from the premises promptly and the construction area left clean daily.

### 3.10 INSPECTION AND TESTING

THE OWNER RESERVES THE RIGHT TO INSPECT AND TEST ALL CONSTRUCTION OPERATIONS AND MATERIALS.

- A. Any defect or noncompliance discovered by inspection shall be reported to the contractor who shall promptly remove any defective material from the site.
- B. The Owner reserves the right to inspect the work or parts of it as he chooses. His failure to inspect the work in progress shall not relieve the contractor of the responsibility for properly executing the contracted work nor shall it impair the Owner's right to reject deficiencies he may subsequently discover.

## PART 4 JOB CONDITIONS

- A. Roofing to be applied in dry weather.
- B. Completed roof areas shall not be trafficked. The work shall be coordinated to prevent this situation by working toward the roof edges.
- C. This project is subject to compliance with all requirements of the Occupational Safety and Health Administration (OSHA). All work on this project must meet the requirements of all applicable state and local codes, laws and ordinances.

END OF SECTION

**SECTION 07840  
FIRESTOPPING**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

- A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- B. Safing slot gaps between edge of floor slabs and curtain walls.
- C. Openings between structurally separate sections of wall or floors.
- D. Gaps between the top of walls and ceilings or roof assemblies.
- E. Expansion joints in walls and floors.
- F. Openings and penetrations in fire-rated partitions or walls containing fire doors.
- G. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
  - 1. Section 03 30 00 - Cast-In-Place Concrete
  - 2. Section 04 20 00 - Unit Masonry
  - 3. Section 07 90 00 - Joint Sealants
  - 4. Section 09 20 00 - Plaster and Gypsum Board
  - 5. Section 13 48 00 - Sound, Vibration and Seismic Control
  - 6. Section 21 00 00 - Fire Suppression
  - 7. Section 22 00 00 - Plumbing
  - 8. Section 23 00 00 - Heating, Ventilating, and Air Conditioning (HVAC)
  - 9. Section 26 00 00 - Electrical
  - 10. Section 26 00 00 – Communications

## 1.05 REFERENCES

- A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"
- B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops"
- C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems"
- D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
  - 1. UL Fire Resistance Directory:
    - a. Firestop Devices (XHJI)
    - b. Fire Resistance Ratings (BXRH)
    - c. Through-Penetration Firestop Systems (XHEZ)
    - d. Fill, Voids, or Cavity Material (XHHW)
    - e. Forming Materials (XHKU)
    - f. Joint Systems (XHBN)
    - g. Perimeter Fire Containment Systems (XHDG)
  - 2. Alternate Systems: "Omega Point Laboratories Directory" (updated annually).
- E. Test Requirements: ASTM E 1966, "Standard Test Method for Fire Resistive Joint Systems"
- F. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus"
- G. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops"
- H. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"
- I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- J. International Building Code (IBC 2009)
- K. NFPA 101 - Life Safety Code
- L. NFPA 70 - National Electric Code

## 1.06 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems and fire-resistive joint systems that comply with specified requirements of tested systems.
- B. Fire stop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed fire stop materials and methods shall conform to applicable governing codes having local jurisdiction.

- D. Fire stop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

#### 1.07 SUBMITTALS

- A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 30 00.
- B. Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.
- C. Submit material safety data sheets provided with product delivered to job-site.
- D. LEED Submittals: Complete the LEED Materials Documentation Sheet and provide manufacturers' product data for construction adhesives and sealants, including printed statement of VOC content and MSDS Sheets

#### 1.08 INSTALLER QUALIFICATIONS

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- B. Installation Responsibility: assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.
  - NOTE: THE REQUIREMENT FOR A SINGLE SOLE SOURCE FIRESTOP SPECIALTY CONTRACTOR IS A CONDITION OF THE BUILDING PERMIT FROM THE CITY OF PORTLAND AND IS NOT NEGOTIABLE. FIRESTOPPING CANNOT BE INSTALLED ON A TRADE-BY-TRADE BASIS.
- C. The work is to be installed by a contractor with at least one of the following qualifications:
  - FM 4991 Approved Contractor
  - UL Approved Contractor
  - Hilti Accredited Fire Stop Specialty Contractor

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

#### 1.10 PROJECT CONDITIONS

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

### **PART 2 - PRODUCTS**

#### 2.01 FIRESTOPPING - GENERAL

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
  - 1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.
- D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
  - 1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
  - 2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
  - 3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.

- E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
  - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- F. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.
- G. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.
- H. LEED Requirements: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 VOC limits, corresponding to an effective date of July 1, 2005 and rule amendment date of January 7, 2005. For aerosol adhesives, comply with Green Seal Standard 36 (GS-36) VOC Limits. Aerosol adhesives should meet Green Seal Standard GS36 Green Seal Standard for Commercial adhesives in effect on October 19, 2000.

## 2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:
  - 1. Hilti, Inc., Tulsa, Oklahoma  
800-879-8000  
[www.us.hilti.com](http://www.us.hilti.com)  
Chris Allington 508-509-8316  
Chris.allington@hilti.com
  - 2. Substitution requests shall be considered in accordance with contract provisions.

## 2.03 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:
  - 1. Hilti Cast-In Place Firestop Device (CP 680-P)
    - a. Add Aerator Adaptor when used in conjunction with aerator system.
  - 2. Hilti Tub Box Kit (CP 681) for use with tub installations.
  - 3. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
  - 4. Hilti Speed Sleeve (CP 653) for use with cable penetrations.
  - 5. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
  - 6. Hilti Firestop Block (CFS-BL)

- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
  - 1. Hilti Intumescent Firestop Sealant (FS-ONE)
  - 2. Hilti Self-leveling Firestop Sealant (CP 604)
  - 3. Hilti Fire Foam (CP 620)
  - 4. Hilti Flexible Firestop Sealant (CP 606)
  - 5. Hilti Elastomeric Firestop Sealant (CP 601S)
  
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
  - 1. Hilti Elastomeric Firestop Sealant (CP 601S)
  - 2. Hilti Flexible Firestop Sealant (CP 606)
  - 3. Hilti Intumescent Firestop Sealant (FS-ONE)
  
- E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
  - 1. Hilti Firestop Joint Spray (CFS-SP WB)
  - 2. Hilti Elastomeric Firestop Sealant (CP 601S)
  - 3. Hilti Flexible Firestop Sealant (CP 606)
  - 4. Hilti Self-leveling Firestop Sealant (CP 604)
  
- F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
  - 1. Hilti Speed Plugs (CP 777)
  - 2. Hilti Speed Strips (CP 767)
  
- G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
  - 1. Hilti Intumescent Firestop Sealant (FS-ONE)
  
- H. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
  - 1. Hilti Intumescent Firestop Sealant (FS-ONE)
  - 2. Hilti Fire Foam (CP 620)
  - 3. Hilti Elastomeric Firestop Sealant (CP 601S)
  - 4. Hilti Flexible Firestop Sealant (CP 606)
  
- I. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
  - 1. Hilti Firestop Putty Stick (CP 618)
  - 2. Hilti Firestop Plug (CFS-PL)
  
- J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
  - 1. Hilti Firestop Putty Pad (CP 617)
  - 2. Hilti Firestop Box Insert



- K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
  - 1. Hilti Firestop Collar (CP 643N)
  - 2. Hilti Firestop Collar (CP 644)
  - 3. Hilti Wrap Strips (CP 648E/648S)
  
- L. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
  - 1. Hilti Firestop Mortar (CP 637)
  - 2. Hilti Firestop Block (CFS-BL)
  - 3. Hilti Fire Foam (CP 620)
  - 4. Hilti Firestop Board (CP 675T)
  
- M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
  - 1. Hilti Firestop Block (CFS-BL)
  - 2. Hilti Firestop Board (CP 675T)
  
- N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
  - 1. Hilti Firestop Joint Spray (CFS-SP WB)
  - 2. Hilti Elastomeric Firestop Sealant (CP 601S)
  - 3. Hilti Flexible Firestop Sealant (CP 606)
  - 4. Hilti Self-leveling Firestop Sealant (CP 604)
  
- O. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
  - 1. Hilti CFS-BL Firestop Block
  - 2. Hilti CFS-PL Firestop Plug
  
- P. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
  
- Q. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION**

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
  - 1. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

### 3.02 COORDINATION

- A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

### 3.03 INSTALLATION

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
  1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
  2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
  3. Protect materials from damage on surfaces subjected to traffic.

### 3.04 FIELD QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

- E. Manufacturer's Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

### 3.05 IDENTIFICATION & DOCUMENTATION

- A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

- A.1 The Documentation Form for through penetrations is to include:

1. A Sequential Location Number
2. The Project Name
3. Date of Installation
4. Detailed description of the penetrations location
5. Tested System or Engineered Judgment Number
6. Type of assembly penetrated
7. A detailed description of the size and type of penetrating item
8. Size of opening
9. Number of sides of assemblies addressed
10. Hourly rating to be achieved
11. Installers Name

- A.2 The Documentation Form for Construction Joints is to include:

1. A Sequential Location Number
2. The Project Name
3. Date of Installation
4. Detailed description of the Construction Joints location
5. Tested System or Engineered Judgment Number
6. Type of Construction Joint
7. The Width of the Joint
8. The Lineal Footage of the Joint
9. Number of sides addressed
10. Hourly rating to be achieved
11. Installers Name

- B. Copies of these documents are to be provided to the general contractor at the completion of the project.

- C. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's Name, address, and phone number.
3. Through-Penetration firestop system designation of applicable testing and inspecting agency.
4. Date of Installation.
5. Through-Penetration firestop system manufacturer's name.

6. Installer's Name.

3.06 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS

- A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

**END OF SECTION**

SECTION 07920  
JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Exterior polyurethane sealants.
  - 2. Exterior and interior polyurethane traffic sealants.
  - 3. Interior polyurethane sealants.
  - 4. Interior latex sealants.
  - 5. Interior sanitary silicone sealants.
  - 6. Exterior and interior water immersed polyurethane sealants.
  - 7. Metal lap joint sealants.
  - 8. Threshold and sheet metal bedding sealants.
  - 9. Joint accessories.
  
- B. Related Sections:
  - 1. Section 08 80 00 – Glazing: Glazing sealants and protective glazing systems.

1.2 REFERENCES

- A. ASTM International Inc.
  - 1. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
  - 2. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
  - 3. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
  - 4. ASTM C834 - Standard Specification for Latex Sealants.
  - 5. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
  - 8. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
  - 9. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
  - 10. ASTM C 1311 - Standard Specification for Solvent Release Sealants.
  - 11. ASTM D 2203 - Standard Test Method for Staining from Sealants.

1.3 SUBMITTALS

- A. Shop Drawings:
  - 1. Submit details to show installation and interface between sealants and adjacent work.
  
- B. Product Data:
  - 1. Materials list of items proposed to be provided under this Section;
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
  
- C. Samples:

1. Submit color charts for each sealant type for initial selection.
  2. Submit standard cured color samples for each sealant type illustrating selected colors.
- D. Manufacturer's Installation Instructions:
1. Submit manufacturer's published installation procedures.
  2. Include instructions for completing sealant intersections when different materials are joined.
  3. Include instructions for removing existing sealants and preparing joints for new sealant.
- E. Manufacturer's Certificate:
1. Certify products are suitable for intended use and products meet or exceed specified requirements.
  2. Certify applicator is approved by manufacturer.
- F. Qualifications Data:
1. Submit applicator's qualifications, including reference projects of similar scope and complexity, with current phone numbers and contact names of architects and owners for verification.
- G. Manufacturer's Field Reports:
1. Indicate time present at project site.
  2. Include observations, indicate compliance with manufacturer's installation instructions, and supplemental instructions provided to installers.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:
1. Submit recommended inspection intervals.
  2. Submit instructions for repairing and replacing failed sealant joints.

#### 1.5 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
1. Building Joints: ASTM C 1193.
- B. Field Pre-Construction Testing:
1. Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:
    - a. Install sealants in field samples using joint preparation methods determined by laboratory pre-construction testing.
    - b. Remove existing sealant, clean joint, and install new sealant using manufacturer's recommended joint preparation methods.
    - c. Install field-test joints in location as approved by Architect.
    - d. Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
    - e. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Applicator Qualifications:
  - 1. Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity, and approved by manufacturer.
  - 2. Designate one individual as project foreman who shall be on site at all times during installation.

## 1.7 MOCKUP

- A. Install sealants in mockups specified in other sections including sealant and joint accessories to illustrate installation quality and color.
- B. Incorporate accepted mockup as part of Work.
  - 1. Repair seal joint mockups used for field adhesion testing.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in manufacturers unopened original packaging. Inspect for damage.
- B. Store primers and sealants in cool dry location with ambient temperature range of 60 to 80 degrees F.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40 degrees F.

## 1.10 SCHEDULING

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

## 1.11 WARRANTY

- A. Submit signed copies of the following warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of 3 years from date of completion.
  - 1. Manufacturer's standard warranty covering sealant materials.
  - 2. Applicator's standard warranty covering workmanship.

## PART 2 PRODUCTS

2.1 Caulking for joints at all junctions as necessary to obtain complete watertight construction. VOC content shall comply with MaineHousing's Green Standards

### 2.2 MANUFACTURERS

- A. Tremco Sealant/Weatherproofing Division of RPM International, Inc.
- B. Or equal

### 2.3 URETHANE SEALANTS

- A. Multi-Component Urethane: two component, chemical curing, nonstaining, nonbleeding, color as selected.
  - 1. Dymeric 240
  - 2. Dymeric 240FC
  - 3. Or equal
- B. Single Component Urethane: single component, moisture curing, nonstaining, non-bleeding, color as selected.
  - 1. Dymonic FC
  - 2. Or equal

### 2.4 SILICONE SEALANTS

- A. Multi-Component Silicone: ASTM C920, Type M, Grade NS, Class 50; Uses NT, M, G, A and O: multi-component, neutral curing, nonstaining, nonbleeding, color as selected
  - 1. Spectrem 4-TS.
  - 2. Or equal
- B. Single Component Silicone: ASTM C920, Type S, Grade NS, ; Uses NT, M, G, A and O: single component, nonstaining, nonbleeding, color as selected.
  - 1. Spectrem 1.
  - 2. Spectrem 2.
  - 3. Spectrem 3.
  - 4. Or equal
- C. Single Component Silicone: ASTM C920, Type S, Grade NS, Class 25; Uses NT, G, A and O: single component, nonstaining, nonbleeding, color as selected.
  - 1. Proglaze.
  - 2. Trensil 200.

### 2.5 OTHER SEALANTS

- A. Latex Sealant: ASTM C 834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected.
  - 1. Tremflex 834.
- B. Synthetic Rubber Sealant:
  - 1. Acoustical Sealant.



- C. Butyl Sealant: ASTM C 1311, butyl or polyisobutylene, single component, nondrying, non-skinning, non-curing.
  - 1. Butyl Sealant.

## 2.6 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Joint Backing: Round foam rod compatible with sealant; oversized 25 to 50 percent larger than joint width; recommended by sealant manufacturer to suit application
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
  - 1. Verify joint surfaces are clean and dry.
  - 2. Ensure concrete surfaces are fully cured.
- B. Report unsatisfactory conditions in writing to the Architect;
- C. Do not proceed until unsatisfactory conditions are corrected.

### 3.2 PREPARATION

- A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.
- B. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
  - 1. Clean concrete joint surfaces to remove curing agents and form release agents.
- C. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

### 3.3 EXISTING WORK

- A. Mechanically remove existing sealant.
- B. Clean joint surfaces of residual sealant and other contaminants capable of affecting sealant bond to joint surface.

- C. Allow joint surfaces to dry before installing new sealants.

### 3.4 SEALANT INSTALLATION

- A. INTERIOR CAULKING shall be applied to seal all penetrations through top plates of interior walls, (due to electrical or plumbing), and at tubs, showers, counter tops, bottom of party walls GWB, and other as shown on Drawings.
- B. ALL POTENTIAL INFILTRATION cracks & joints to be caulked. Caulking shall be done only by workmen who are thoroughly experienced in this work. Exterior caulking shall be applied around windows, doors, vents, utilities, and any other infiltration "crack".
- C. IN GENERAL see Drawings for any additional applications. Joints and spaces to be caulked shall be dry and free from dust. Finished caulking "bead" shall be neat and smooth, free of gaps and sags and run continuously. Complete all caulking work and allow to stand for the manufacturer's recommended time period before painting. Prime if required before finish coat of paint is applied.
- D. Install primer and sealants in accordance with ASTM C 1193 and manufacturer's instructions.
- E. Caulking shall apply to sealing of joints less than 3/4 inches in width. Any joint in excess of this width shall be filled with a low-expansion closed cell foam insulation or as directed by Architect.
- F. Install joint backing to maintain the following joint ratios:
  - 1. Joints up to 1/2 inch Wide: 1:1 width to depth ratio.
  - 2. Joints Greater than 1/2 inch Wide: 2:1 width to depth ratio; maximum 1/2 inch joint depth.
- G. Install bond breaker where joint backing is not used.
- H. Apply primer where required for sealant adhesion.
- I. Install sealants immediately after joint preparation.
- J. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- K. Tool exposed joint surface concave.

### 3.5 MANUFACTURER'S FIELD SERVICES

- A. Require sealant manufacturer to be present at project site to:
  - 1. Observe sealant mockup installation and to issue reports of observations.
  - 2. Conduct field pre-construction testing.

### 3.6 CLEANING

- A. Remove masking tape.

- B. Clean adjacent surfaces soiled by sealant installation.

### 3.7 SCHEDULE – SEALANT JOINTS

#### A. Exterior Sealant Joint [Type A]:

- 1. Applications:
  - a. Control and expansion joints in cast-in-place concrete.
  - b. Joints between architectural precast concrete units.
  - c. Control and expansion joints in unit masonry.
  - d. Control and expansion joints in stone masonry.
  - e. Butt joints between metal panels.
  - f. Joints between different materials listed above.
  - g. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers and similar openings.
  - h. Control and expansion joints in soffits and overhead surfaces.
  - i. Other exterior joints in vertical surfaces and non-traffic horizontal surfaces for which no other sealant is specified.
  - j. Or equal
- 2. Multi-Component Urethane Sealants:
  - a. Dymeric 240/240FC.
  - b. Vulkem 227.
  - c. Or equal
- 3. Single Component Urethane Sealants:
  - a. Dymonic FC.
  - b. Dymonic.
  - c. Vulkem 116.
  - d. Or equal
- 4. Multi-Component Silicone Sealants:
  - a. Spectrem 4-TS. D.O.E
- 5. Single Component Silicone Sealants:
  - a. Spectrem 1.
  - b. Spectrem 2.
  - c. Spectrem 3.
  - d. Or equal

#### B. Interior Sealant Joint [Type C]:

- 1. Applications:
  - a. Control and expansion joints on exposed interior surfaces of exterior walls.
  - b. Perimeter joints on exposed interior surfaces of exterior openings.
  - c. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, louvers, elevator entrances and similar openings.
  - d. Other interior joints in vertical surfaces and non-traffic horizontal surfaces subject to movement for which no other sealant is specified.
- 2. Multi Component Urethane Sealants:
  - a. Dymeric 240/240FC.
  - b. Vulkem 227.
  - c. Or equal
- 3. Single Component Urethane Sealants:
  - a. Dymonic FC.

- b. Dymonic.
      - c. Vulkem 116.
      - d. Or equal
    - 4. Single Component Silicone Sealants:
      - a. Spectrem 1.
      - b. Spectrem 2.
      - c. Spectrem 3.
      - d. Or equal
    - 5. Other Sealants:
      - a. Tremflex 834.
      - b. Or equal
- C. Interior Sanitary Sealant Joint [Type G]:
  - 1. Applications:
    - a. Joints in toilet room and bathroom counter tops.
    - b. Joints between plumbing fixtures and adjacent materials.
    - c. Joints between locker room lockers and adjacent materials.
    - d. Joints between food service equipment and surrounding construction.
    - e. Other interior joints in wet areas where needed to limit mold and mildew growth.
  - 2. Single Component Silicone Sealants:
    - a. Tremsil 200.
    - b. Or equal
- D. Concealed Metal Lap Sealant Joint [Type J]:
  - 1. Applications:
    - a. Concealed lap and hook joints in sheet metal flashing and trim.
  - 2. Single Component Non-Curing Sealants:
    - a. Tremco Butyl Sealant.
    - b. Or equal
- E. Concealed Bedding Sealant Joint [Type K]:
  - 1. Applications:
    - a. Bedding joints under metal thresholds and saddles.
    - b. Bedding joints between sheet metal flashing and other materials.
  - 2. Single Component Urethane Sealants:
    - a. Dymonic FC.
    - b. Dymonic.
    - c. Vulkem 116.
    - d. Or equal
  - 3. Single Component Silicone Sealants:
    - a. Proglaze.
    - b. Spectrem 2.
    - c. Spectrem 3.
    - d. Or equal
  - 4. Single Component Non-Curing Sealants:
    - a. Tremco Butyl Sealant.
    - b. Tremco Acoustical Sealant.
    - c. Or equal

END OF SECTION

## STEEL DOORS AND FRAMES

### SECTION 08100

#### PART 1 - GENERAL

##### 1.01 GENERAL PROVISIONS:

- A. The CONDITIONS OF THE CONTRACT and all Sections of Division 1 are hereby made a part of this section.

##### 1.02 DESCRIPTION OF WORK:

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this section. Extent of steel doors and frames required is indicated on drawings and in schedules.

- 1. Furnish and Install:

- a. Steel frames for hollow metal doors - exterior doors and frames shall be thermally broken.
    - b. Steel frames for wood doors - exterior doors and frames shall be thermally broken.
    - c. Steel sidelite, borrowed lite, and transom frames
    - d. Hollow metal doors

- 2. Install Only: Finish hardware for hollow metal doors as specified in Section 08710 Finish Hardware.

- B. Related work specified elsewhere:

- 1. SECTION 08210: WOOD DOORS
  - 2. SECTION 08710: FINISH HARDWARE
  - 3. SECTION 09900: PAINTING

##### 1.03 QUALITY ASSURANCE; SUBMITTALS:

- A. General: Comply with requirements of SECTION 01300 - SUBMITTALS, MEETINGS & RECORD DOCUMENTS and SECTION 01400 - QUALITY CONTROL SERVICES.

- B. Manufacturer: Provide steel doors and frames complying with these specifications from one of the following:

- 1. CECO
  - 2. Curries
  - 3. Steelcraft

- C. Supplier: A recognized hollow metal supplier, with in-house fabrication facilities, who has been furnishing doors and frames in the project's vicinity for a period of not less than five years.

D. Product Data: Submit four copies of manufacturers technical product data for each item. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and maintenance.

E. Door Schedule: Submit final door schedule in manufacturer's standard format and as outlined below. Coordinate doors, frames and related work to ensure proper size, thickness, hand, function, and fasteners.

1. **NOTE: Contractor shall make all submittals for finish hardware, doors, frames and related items simultaneously, only after proper review and coordination by own staff beforehand.**

2. Final Door Schedule Content: Based on doors and frames in drawings, organize door schedule to indicate complete designations of every item required for each door or opening. Include the following information:

- a. Type, style, hand, size and construction of each item.
- b. Anchors and fastenings to related work.
- c. Corner construction of welded and/or knocked down frames.
- d. Location of door and frame cross-referenced to indications on drawings both on floor plans and in hardware schedule.
- e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
- f. Mounting locations for hardware.
- g. Door construction and materials.
- h. Gage and finish of all materials.

3. Shop Drawings: Submit separate detail drawings, referenced to door schedule, showing size, hand, construction, fasteners, anchors and all other details pertinent to the fabrication of doors and frames for this project.

#### 1.04 APPROVAL OF SUBSTITUTIONS:

- A. Manufacturers and model numbers specified herein are to establish a standard of quality. If products other than those specifically identified herein are to be considered for this Project, they must be submitted for approval of the Architect not less than ten (10) calendar days prior to receipt of General Bids.
- B. Requests for approval of substitutions shall be in writing, accompanied by catalog cuts, technical information and physical samples.
- C. Approval of substitutions shall only be valid when issued by Architect to all bidders in the form of Addendum.

#### 1.05 REFERENCES:

- A. ANSI A115 Series: Standards for Steel Doors And Frames.
- B. NFPA 80, NFPA 101.

- C. Other applicable building and life safety codes.
  - D. Door and Hardware Institute: "Recommended Locations for Builder's Hardware.
  - E. ANSI A117.1: American National Standard Providing Accessibility and Usability for Physically Handicapped People.
  - F. Other applicable industry standards.
- 1.06 PRODUCT PACKAGING AND HANDLING:
- A. Tag each item or package separately, with identification related to final door schedule.
  - B. All doors shall be packaged in full cartons and securely banded.
  - C. Doors and frames shall be received by the contractor at the jobsite and handled in a manner so as not to be damaged. They shall be stored upright in a protected area on wood runners or skids and shall be covered with vented tarpaulins or plastic.
- 1.07 WARRANTY: Doors and frames specified for this Project shall be guaranteed against defects in material and workmanship for a period of one (1) year from date of Substantial Completion of Project.

## PART 2 - PRODUCTS

- 2.01 MATERIALS:
- A. Doors shall be manufactured from commercial quality cold-rolled steel sheets. Exterior doors shall be A60 hot-dipped galvanized.
  - B. Frames shall be manufactured from commercial quality cold-rolled steel sheets. Exterior frames shall be A60 hot-dipped galvanized.
  - C. Steel shall conform to ASTM standards A366 or A620 and A568 (uncoated), ASTM A526 or A642 and A525 (galvanized).
  - D. All doors and frames shall be chemically treated for paint adhesion and prime painted to meet performance requirements of ANSI A224.1.
- 2.02 DOOR FABRICATION:
- A. Interior doors shall be 1-3/4" thick, manufactured from two 18 gage steel sheets. A one piece resin-impregnated honeycomb core with sanded edges shall be securely bonded to both face sheets. Doors shall have mechanically interlocked vertical edges, flush face sheets, and hairline seam edges. The top and bottom of the door shall be closed flush by 16 gage steel channels (where concealed door bottoms are specified, bottom channel shall be reversed to allow insertion of door bottom into door web). At contractor option, in lieu of honeycomb cores, doors may be provided with a rigid polystyrene foam core, continuously bonded to the face sheets, and completely filling the door.
  - B. Exterior doors shall be 1-3/4" thick, manufactured from two 16 gage galvanized steel sheets. The interior of the doors shall be completely filled with a foamed-inplace polyurethane core,

chemically bonded to all interior surfaces. Doors shall have mechanically interlocked vertical edges, flush face sheets, and hairline seam edges. The top and bottom of the door shall be closed flush by 16 gage steel channels (where concealed door bottoms are specified, bottom channel shall be reversed to allow insertion of door bottom into door web).

- C. All doors shall be handed type with factory preparation for all concealed or mortised Finish Hardware scheduled. Door closer reinforcements shall be provided for all doors whether scheduled to received closer or not. Reinforce doors for all surface applied hardware.
- D. Non-handed doors, and/or filler plates for cutouts not required for scheduled hardware preparation shall NOT be acceptable.

#### 2.03 FRAME FABRICATION:

- A. General: Frames shall be knocked down and field assembled or welded type at contractor option.
- B. Standard knockdown or welded frames shall be manufactured form 16 gage steel sheets with 2" face and 5/8" integral stop. Jamb depth to be determined by wall thickness in accordance with the drawings. Supply appropriate anchors for wall construction.
- C. Drywall frames shall be manufactured form 16 gage steel sheets with 2" face and 5/8" integral stop and double back bend to grip the partition firmly without marring the wall surface. Jamb depth to be determined by wall thickness in accordance with the drawings. Provide adjustable plumb anchors to insure square and plumb installation. Supply standard floor anchors for bottom of each jamb.
- D. Prepare frames for all concealed or mortised hardware and reinforce for all surface applied hardware.
- E. Provide plaster guards for all hardware cutouts.
- F. Prepare frames to receive pneumatic type silencers: two for each pair frame, three for each single frame.
- G. Exterior frames shall include a thermal break.

#### 2.04 FIRE RATED ASSEMBLIES

- A. All labeled fire doors and frames shall be of a type tested in accordance with ANSI/UL-10b, ASTM E-152, NFPA-252, or UL-305, and shall provide the degree of fire protection, heat transmission, panic-loading capabilities, and/or smoke control as indicated on the label and required by the drawings.
- B. Labeled doors and frames shall bear the label of Underwriters Laboratories, Warnock Hersey, or Factory Mutual and shall meet all requirements of the labeling agencies current procedures and policies.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION



- A. Doors and frames shall be assembled, installed, and erected plumb and in true alignment and in conformance with manufacturer's recommendations and final approved shop drawings. Preparation for surface applied hardware shall be performed on the jobsite. Frames shall be rigid and securely anchored in place. Doors shall be installed in a manner to achieve functional operation and appearance.
- B. Install hardware in compliance with 08710 FINISH HARDWARE.

END OF SECTION

SECTION 08817

FIRE-RATED GLASS – FIREGLASS®20

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Fire-rated glazing materials installed as vision lights in windows.
  - 2. Fire-rated glazing materials installed in fire-rated doors.
- B. Related Sections include the following:
  - 1. Section 08210 “Wood Doors”.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- B. Consumer Product Safety Commission (CPSC):
  - 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- C. Glass Association of North America (GANA):
  - 1. GANA – Glazing Manual.
  - 2. FGMA – Sealant Manual.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 80: Fire Doors and Windows.
  - 2. NFPA 252 – Fire Tests of Door Assemblies.
- E. Underwriters Laboratories, Inc. (UL):
  - 1. UL 10B – Fire Tests of Door Assemblies.
  - 2. UL 10C – Positive Pressure Fire Tests of Door Assemblies.
- F. Standard Council of Canada:
  - 1. ULC Standard CAN4-S104: Fire Tests of Door Assemblies.
  - 2. CAN/ULC-S101M: Standard Methods of Fire Endurance Tests.

1.3 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass, fabricated glass or framing as defined in referenced glazing publications.

1.4 SUBMITTALS

FIRE RATED GLASS – FIREGLASS20®

## THE FRANCIS – PORTLAND, ME

- A. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.
- B. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.
- C. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- D. Samples (optional). For following products:
  - 1. Glass sample-as provided by manufacturer

### 1.5 QUALITY ASSURANCE

- A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.
- B. Fire-Rated Glass: Each lite shall bear permanent, nonremovable label of UL and/or WHI certifying it for use in tested and rated fire protective assemblies.
- C. Fire Protective Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152 and UL 10B, classified and labeled by UL and/or WHI or other certification agency acceptable to authorities having jurisdiction.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials.
- B. Deliver materials to specified destination in manufacturer's or distributor's packaging, undamaged, complete with installation instructions.
- C. Store off ground, under cover, protected from weather and construction activities.

### 1.7 WARRANTY

- A. Provide manufacturer's limited warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS- (ACCEPTABLE MANUFACTURERS/PRODUCTS)

- A. Glazing Material: Fireglass®20 as manufactured by J.R. Four Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065 (800-426-0279) fax (800-451-9857) e-mail [sales@fireglass.com](mailto:sales@fireglass.com), web site <http://www.fireglass.com>

FIRE RATED GLASS – FIREGLASS20®

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### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-rated tempered glass clear and wireless glazing material for use in impact safety-rated locations with fire rating requirements of 20 minutes without hose stream test; for use in interior and exterior applications.
- B. Passes positive pressure test standards UL 10C.

### 2.3 MATERIALS-GLASS

- A. Properties:
  - 1. Thickness: 1/4 inch.
  - 2. Weight: 3.0 lbs./sq. ft.
  - 3. Approximate Visible Transmission: 89 percent.
  - 4. Approximate Visible Reflection: 8 percent.
  - 5. Fire-rating: 20 minutes (WITHOUT HOSE STREAM TEST).
  - 6. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
- B. Labeling: Permanently label each piece of Fireglass®20 with the Fireglass®20 logo, UL logo and fire rating in sizes up to 6,396 sq. in.
- C. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with [NPFA 252] [UL 9, UL 10B and UL10C].
- D. Substitutions: No substitutions allowed.

### 2.4 GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.
- B. Setting Blocks: Neoprene, EPDM or hardwood; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
- C. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

### 2.5 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:

FIRE RATED GLASS – FIREGLASS20®

## THE FRANCIS – PORTLAND, ME

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.
3. Observable edge damage or face imperfections.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

### 3.2 INSTALLATION (GLAZING)

A. Comply with referenced GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.

B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

E. Place setting blocks located at quarter points of glass with edge block no more than 6-inches from corners.

F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

G. Place glazing tape on free perimeter of glazing in same manner described above.

H. Provide minimum edge clearance of  $>1/4$  inch ( $+1/8$  inch/ $-1/16$  inch) and a minimum edge cover of  $<3/8$  inch ( $+1/16$  inch/ $-1/16$  inch).

I. Install removable stop and secure without displacement of tape.

J. Install in vision panels in fire-rated windows to requirements of NFPA 80.

K. Install so that appropriate [UL] [Fireglass®20] markings remain permanently visible.

### 3.3 PROTECTION AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.

B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

END OF SECTION

FIRE RATED GLASS – FIREGLASS20®

Updated 2.23.16

08817 -- 4

**SECTION 08210**

**WOOD DOORS**

**PART 1 - GENERAL**

**1.01 GENERAL PROVISIONS:**

- A. The CONDITIONS OF THE CONTRACT and all Sections of Division 1 are hereby made a part of this section.

**1.02 DESCRIPTION OF WORK:**

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this section. Extent of wood doors required is indicated on drawings and in schedules.

- 1. Furnish and Install:

- a. Custom wood doors and entry systems.
- b. Related work specified elsewhere:

- 1. SECTION 08100: STEEL DOORS AND FRAMES
- 2. SECTION 08700: FINISH HARDWARE
- 3. SECTION 09900: PAINTING

**1.03 QUALITY ASSURANCE; SUBMITTALS:**

- A. General: Comply with requirements of SECTION 01300 - SUBMITTALS, MEETINGS & RECORD DOCUMENTS; SECTION 01400 - QUALITY CONTROL SERVICES.
- B. Supplier: A recognized wood door supplier, with in-house fabrication and warehousing facilities, who has been furnishing doors and frames in the project's vicinity for a period of not less than five years.
- C. Product Data: Submit four copies of manufacturers technical product data for each item. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and maintenance.
- D. Door Schedule: Submit final door schedule in manufacturer's standard format. Coordinate doors, frames and related work to ensure proper size, thickness, hand, function, and fasteners.
  - 1. **NOTE: Contractor shall make all submittals for finish hardware, doors, frames and related items simultaneously, only after proper review and coordination by own staff beforehand.**
  - 2. Shop Drawings: Submit separate detail drawings, referenced to door schedule, showing size, hand, construction, fasteners, elevation and all other details pertinent to the fabrication of doors and frames for this project.

1.04 APPROVAL OF SUBSTITUTIONS:

- A. Manufacturers and model numbers specified herein are to establish a standard of quality. If products other than those specifically identified herein are to be considered for this Project, they must be submitted for approval of the Architect not less than ten (10) calendar days prior to receipt of General Bids.
- B. Requests for approval of substitutions shall be in writing, accompanied by catalog cuts, technical information and physical samples.
- C. Approval of substitutions shall only be valid when issued by Architect to all bidders in the form of Addendum.

1.05 REFERENCES:

- A. Applicable AWI standards.
- B. NFPA 80, NFPA 101.
- C. Other applicable building and life safety codes.
- D. Door and Hardware Institute: "Recommended Locations for Builder's Hardware.
- E. ANSI A117.1: American National Standard Providing Accessibility and Usability for Physically Handicapped People.
- F. Other applicable industry standards.

1.06 PRODUCT PACKAGING AND HANDLING:

- A. Tag each item or package separately, with identification related to final door schedule.
- B. All doors shall be packaged in full cartons and securely banded.
- C. Doors and frames shall be received by the contractor at the jobsite and handled in a manner so as not to be damaged. They shall be stored upright in a protected area on wood runners or skids and shall be covered with vented tarpaulins or plastic.

1.07 WARRANTY: Doors and frames specified for this Project shall be guaranteed against defects in material and workmanship for a period of one (1) year from date of Substantial Completion of Project.

PART 2 - PRODUCTS

2.01 CUSTOM WOOD DOORS:

- A. Doors shall be 1-3/4" thick bonded to stiles and rails.

- B. Where glass lites are required, provide manufacturer's standard wood molding to match face veneer on non-fire rated doors, and standard steel molding on fire rated doors.
- C. Factory prepare doors to receive concealed or mortise hardware as specified in 08700 FINISH HARDWARE.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Doors and frames shall be assembled, installed, and erected plumb and in true alignment and in conformance with manufacturer's recommendations and final approved shop drawings. Preparation for surface applied hardware shall be performed on the jobsite. Frames shall be rigid and securely anchored in place. Doors shall be installed in a manner to achieve functional operation and appearance.
- B. Install hardware in compliance with 08700 FINISH HARDWARE.

END OF SECTION



SECTION 08710 – FINISH HARDWARE, LOW VOLTAGE WIRING, PROGRAMMING OF SYSTEMS

PART 1 –GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 DESCRIPTION OF WORK

- A. The work of this section includes, but is not limited to, the following:
  - 1. Providing hardware for all doors, except doors provided with their own hardware.
  - 2. Providing lock cylinders for all work requiring cylinders.
  - 3. Providing the services of a qualified hardware consultant to prepare detailed schedules of hardware required for the project.
  - 4. Provide all programming of key FOB system along with owner training.

1.03 RELATED WORK

- A. Carefully examine all of the Contract Documents for requirements which affect the work of this section. Other specifications sections which directly relate to the work of this section include, but are not limited to, the following:
  - 1. Section 08100 – Hollow Metal Doors and Frames; work requiring template coordination, metal astragals for fire-rated doors.
  - 2. Section 08210 – Wood Doors; work requiring template coordination, metal astragals for fire-rated doors.

1.04 INTENT

- A. A major intent of the work of this section is to provide hardware for every door in the project, except as indicated, so that each door functions correctly for its intended use. Provide only hardware that complies with applicable codes and requirements of authorities having jurisdiction including requirements for barrier-free accessibility.

1.05 QUALITY ASSURANCE

- A. Hardware supplier shall have in his employ one or more members of the Door and Hardware Institute to include at least one Certified Architectural Hardware Consultant in good standing, who shall be responsible for preparation of the Finish Hardware Schedule. This Consultant shall be acceptable to the Architect and is to ensure that the intent requirement of this specification is fulfilled, and certify that the work of this section meets or exceeds the requirements specified in this section and the requirements of authorities having jurisdiction.

- B. Hardware supplier shall warrant and guarantee, in writing, that hardware supplied is free of defective material and workmanship. Supplier shall further warrant and guarantee for a period of one year from Owner's Use and Occupancy that the hardware shall function in a satisfactory manner without binding, collapse, or dislodging of its parts, provide the installation is made to the manufacturer's recommendations.
- C. The hardware supplier shall repair or remedy, without charge, any defect of workmanship or material for which he is responsible hereunder.

#### 1.06 SUBMITTALS

- A. Submit the following in accordance with SECTION 01300-SUBMITTALS:
  - 1. Schedule: Submit to the Architect six (6) copies of the complete hardware schedule within the fourteen (14) days after receipt of contract award. Submit therewith complete catalog cuts and descriptive data of all products specifically scheduled therein. No materials shall be ordered or templates issued until the hardware schedule has been approved by the Architect. Form and detail of hardware schedule shall be in vertical format in conformance to the door and hardware industry standards. All hardware sets shall be clearly cross-referenced to the hardware set numbers listed in the specifications.
  - 2. Samples: If requested, submit to the Architect for approval, a complete line of samples as directed. Samples shall be plainly marked giving hardware number used in this specification, the manufacturer's numbers, types and sizes. The Architect will deliver approved samples to the project site to be stored. Samples will remain with the Architect until delivery of all hardware to the project is complete, after which time they will be turned over to the General Contractor for incorporation into the work.
  - 3. Keying System Submission: Before cylinders are ordered, submit a complete proposed keying system for approval. This should be done after a keying meeting has been held with the owner's representative.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of hardware shall be made to the project by the Hardware Supplier in accordance with the instructions of the General Contractor.
- B. The finish hardware shall be delivered to the jobsite and received there by the General Contractor. The General Contractor shall prepare a locked storage room with adequate shelving, for all hardware. The storage room shall be in a dry, secure area, and shall not include storage of other products by other trades.

- C. The General Contractor shall furnish the Hardware Supplier with receipts for all hardware and accessory items received, and shall send copies of these receipts to the Architect, if requested.

#### 1.08 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes. Provide all throws, projections, coatings, knurling, opening and closing forces, and other special functions required by State and Local Building Codes, and all applicable Handicap Code requirements.
- B. For fire rated openings, provide hardware complying with NFPA 80 and NFPA 101 without exception. Provide only hardware tested by UL for the type and size of door installed and fire resistance rating required.

#### 1.09 SPECIAL REQUIREMENTS

- A. Hardware Supplier shall determine conditions and materials of all doors and frames for proper application of hardware.
- B. The Hardware Schedule shall list the actual product series numbers. Bidders are required to follow the manufacturers' catalog requirement for the actual size of door closers, brackets and holders. All door opening sizes are as noted on the Door Schedule and all hardware shall be in strict accordance with requirements of height, width, and thickness.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Hinges	McKinney Stanley Ives	Scranton, PA New Britain, CT New Haven, CT
Locksets	Schlage (No substitutions)	Colorado Springs, CO
Exit Devices	Von Duprin (No substitutions)	Indianapolis, IN
Door Closers	LCN (No substitutions)	Princeton, IL
Door Stop	Glynn Johnson Ives Rockwood	Indianapolis, IN New Haven, CT Rockwood, PA
Push/Pulls	Rockwood Burns Ives	Rockwood, PA Erie, PA New Haven, CT
Protective Plates	Rockwood Burns Ives	Rockwood, PA Erie, PA New Haven, CT
Thresholds/ Weatherstripping/ Rain Drips	NGP Pemko Reese	Memphis, TN Memphis, TN Rosemount, MN
Silencers	Ives Glynn Johnson Rockwood	New Haven, CT Indianapolis, IN Rockwood, PA

2.02 MATERIALS AND QUALITY

- A. All hardware shall be of the best grade of solid metal entirely free from imperfections manufacturer and finish.
- B. Qualities, weights, and sizes given herein are the minimum that will be accepted. It is the responsibility of the Hardware Supplier to supply the specified size and weight of hardware and the proper function of hardware in each case and to provide UL approved hardware at all fire rated doors.

- C. Provide, as far as possible, locks of one lock manufacturer and hinges of one hinge manufacturer. Modifications to hardware that are necessary to conform to construction shown or specified shall be provided as required for the specified operation and functional features.

#### 2.03 HARDWARE DESIGNATIONS

- A. All items of hardware are referenced by manufacturer's names and numbers. The manufacturer's names and numbers are used to define the function, design, and the quality of the material to be supplied.

Substitution of products other than those listed shall be submitted to the Architect at least ten (10) days PRIOR to the bid date. The Architect shall be the sole judge of any proposed substitution.

#### 2.04 TEMPLATES

- A. Hardware supplier shall immediately, but not later than three (3) days after approval of his Schedule by the Architect, furnish the General Contractor with complete template information necessary for the fabrication of doors, frames, etc. No templates shall be furnished prior to the approval of the hardware schedule.

#### 2.05 HARDWARE FOR LABELED FIRE DOORS, EXIT DEVICES AND SMOKE DOORS

- A. Hardware shall conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Labeling and listing by UL Building Materials Directory, for class of door being used will be accepted as evidence of conformance to these requirements. Install minimum latch throw as specified on label of individual doors. Provide hardware listed by UL except where heavier materials, larger sizes, or better grades are specified herein under paragraph entitled "Hardware Sets". In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements. Specific hardware requirements of door or frame manufacturers which exceed sized or weights of hardware herein listed shall be provided with no additional charge.

#### 2.06 KEYING:

- A. All locks and cylinders shall be 6 pin tumbler key removable and interchangeable core cylinders keyed as required by the owners instruction and operated by one (1) Masterkey Group AA.
- B. It is required that the key systems have visual key control and that all keys and cylinders be stamped with the alphanumeric key symbol designated for each key change as recommended by the Nomenclature for Masterkey Systems established by the Door and Hardware Institute.

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- C. Provide each key removable core cylinder with a construction masterkey core of brass or plastic. The construction cores shall be used by the General Contractor throughout the construction period. One (1) week prior to acceptance of the building, or at the owners request, the successful hardware contractor shall visit the building and by use of a special control key, shall remove the brass or plastic construction cores from all cylinders and replace them with the permanent cores required with each cylinder.
- D. Provide a total of six (6) Masterkeys and one (1) special control key for removing the key removable core cylinder. Provide a total of six (6) construction masterkeys for the temporary cores.
- E. Provide a minimum of four (4) keys for each keyed different change.

### 2.07 FASTENERS

- A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation.
- B. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Furnish exposed screws to match the hardware finish, or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, except as otherwise indicated.
- C. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard manufactured units of the type specified are available with concealed fasteners. Do not use thru-bolts unless specifically approved by the Architect.
- D. All hardware shall be installed only with fasteners supplied by manufacturers of specific products.

### 2.08 PACKING AND MARKING

- A. All hardware shall have the required screws, bolts and fastenings necessary for proper installation and shall be wrapped in the same package as the hardware item for which it is intended and shall match finish of hardware with which to be used.
- B. Each package shall be clearly labeled indicating the portion of the work for which it is intended.

### 2.09 ENVIROMENTAL CONCERN FOR PACKGING

- A. The hardware shipped to the jobsite is to be packaged in biodegradable packs such as paper or cardboard boxes and wrapping. If non-biodegradable packing such as plastic, plastic bags or large amounts of Styrofoam is utilized, then the Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for recycling of the non-degradable packing.

2.10 FINISH HARDWARE DESCRIPTION

A. Hardware items shall conform to respective specifications and standards and to requirements specified herein.

B. MATERIALS AND FINISH MATERIALS AND FINISHES SHALL BE:

1. Interior Butts: US26D (BHMA 652)
2. Exterior Geared Hinges US28 (BHMA 628)
3. Door Closers: Sprayed to match hardware finish.
4. Exit Devices: US26D (BHMA 626)
5. Kick, Push Plates: US32D (BHMA 630)
6. All other hardware shall be: US26D (BHMA 626), or as scheduled.

C. HINGES

1. Number of hinges per door, two hinges for doors up to and including five feet in height and an additional hinge for each two and one half feet or fraction thereof.
2. Hinges shall be as follows:

Exterior	McKinney	TA2314	4 ½ x 4 ½ NRP
	Stanley	FBB191	4 ½ x 4 ½ NRP
Interior	McKinney	TA2714	4 ½ x 4 ½
	Stanley	FBB179	4 ½ x 4 ½
Elec	McKinney	TA2714-CC4	
	Stanley	CEFBB179	

D. DOOR CLOSERS:

1. Door closers shall have fully hydraulic, full rack and pinion action. Cylinder body shall be 1-1/2” in diameter, and double heat treated pinion shall be 11/16” in diameter.
2. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and hydraulic back-check.
4. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).

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5. Closer arms (and metal covers when specified) shall have a powder coating finish.
6. Provide drop, mounting plates, where required.
7. Do not locate closers on the side of doors facing corridors, passageways or similar type areas. Where it is necessary, due to certain conditions and approval of the Architect, to have closers in corridors, provide such closers with parallel or track type arms.
8. All door closers shall be adjusted by the installer in accordance with the manufacturer's templates and written instructions. Closers with parallel arms shall have back-check features adjusted prior to installation.
8. Closers shall conform to all applicable code requirements relative to setting closing speeds for closers and maximum pressure for operating interior and exterior doors.
9. Closers shall conform to all applicable code requirements relative to setting closing speeds for closers and maximum pressure for operating interior and exterior doors.

E. THRESHOLDS, WEATHERSTIP, SEAL:

1. Thresholds shall be as detailed and furnished on all doors where shown on drawings. Thresholds shall be aluminum unless otherwise indicated. Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants".
2. Weatherstripping shall be furnished on all exterior doors unless otherwise indicated.

Product	Pemko	Reese	NGP
Threshold	as detailed		
Brush Seal	45062AP	970	A626A
Auto. Door Bottom	430CR	330	420
Door Sweep	345AV	353	101AV
Set Astragals	351C x 351CP	95 x 95P	140 x 140P
Astragal	357SP	183S	139SP
Rain Drip	346C	R210A	16A

F. ROLLER BUMPERS:

1. Where required roller bumpers shall be installed where two doors open against each other and shall be equal to Rockwood 456.



PART 3—EXECUTION

3.01. INSPECTION

1. It shall be the general contractors responsibility to inspect all doors openings and doors to determine that each door and door frame has been properly prepared for the required hardware. If errors in dimensions or preparation are encountered, they are to be corrected by the responsible parties prior to the installation of hardware.

3.02 PREPARATION

1. All doors and frames, requiring field preparation for finish hardware, shall be carefully mortised, drilled for pilot holes, or tapped for machine screws for all items of finish hardware in accordance with the manufacturers templates and instructions.

3.03 INSTALLATION/ADJUSTMENT/LOCATION

1. All materials shall be installed in a workmanlike manner following the manufacture's recommended instructions.
2. Exit Devices shall be carefully installed so as to permit friction free operation of crossbar, touch bar, lever. Latching mechanism shall also operate freely without friction or binding.
3. Door Closers shall be installed in accordance with the manufacturer's instructions. Each door closer shall be carefully installed, on each door, at the degree of opening indicated on the hardware schedule. Arm position shall be shown on the instruction sheets and required by the finish hardware schedule.
4. The adjustments for all door closers shall be the installer's responsibility and these adjustments shall be made at the time of installation of the door closer. The closing speed and the latching speed valves, shall be adjusted individually to provide a smooth, continuous closing action without slamming. The delayed action feature or back check valve shall also be adjusted so as to permit the correct delayed action cycle or hydraulic back check valve shall also be adjusted so as the opening cycle. All valves must be properly adjusted at the time of installation. Each door closer has adjustable spring power capable of being adjusted, in the field from size 2 thru 6. It shall be the installers' responsibility to adjust the spring power for each door closer in exact accordance with the spring power adjustment chart illustrated in the door closer installation sheet packed with each door closed.
5. Installation of all other hardware, including locksets, push-pull latches, overhead holders, door stops, plates and other items, shall be carefully coordinated with the hardware schedule and the manufacturer's instruction sheets.

6. Locations for finish hardware shall be in accordance with dimensions listed in the pamphlet “Recommended locations for Builders’ Hardware” published by the Door and Hardware Institute.

#### 3.04 FIELD QUALITY CONTROL

1. Upon completion of the installation of the finish hardware, it shall be the responsibility of the finish hardware supplier to visit the project and to examine the hardware for each door on which he has provided hardware and to verify that all hardware is in proper working order. Should he find items of hardware not operating properly he should make a report, in writing, to the general contractor, advising him of the problem and the measures required to correct the problem.

#### 3.05 PROTECTION

1. All exposed portions of finish hardware shall be carefully protected, by use of cloth, adhesive backed paper or other materials, immediately after installation of the hardware item on the door. The finish shall remain protected until completion of the project. Prior to acceptance of the project by the Architect and owner, the general contractor shall remove the protective material exposing the finish hardware.

#### 3.06 CLEANING

1. It shall be the responsibility of the general contractor to clean all items of finish hardware and to remove any remaining pieces of protective materials and labels.

#### 3.07 INSTRUCTIONS AND TOOLS

1. It shall be the responsibility of the finish hardware supplier to provide installation and repair manuals and adjusting tools, wrenches, etc... for the following operating products.
  - a. Locksets (all types)
  - b. Exit Devices (all types)
  - c. Door Closers

## SECTION 08800

### GLAZING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Clear tempered glass.
  
- B. Related Sections:
  - 1. Section 08400 - Entrances and Storefronts: Glazed doors and storefronts.

##### 1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
  
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 2. ASTM C1036 - Standard Specification for Flat Glass.
  - 2. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
  - 3. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
  
- C. Consumer Product Safety Standards for Architectural Glazing. CPSC 16 CFR, Part 1201.
  
- D. Flat Glass Marketing Association (FGMA):
  - 1. FGMA - Glazing Manual and Glazing Sealing Systems Manual.

##### 1.3 SUBMITTALS

- A. Procedures for submittals.
  - 1. Product Data:
    - a. Glass: Structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
    - b. Glazing compound: Provide chemical, functional, and environmental characteristics, limitations, special application requirements.
  - 2. Samples:
    - a. Glazing: Submit one sample 12 x 12 inches (300 x 300 mm) in size of each type of glazing, illustrating tinting, and finish of glazing materials. Label each sample indicating kind, quality and manufacturer.

3. Assurance/Control Submittals:
  - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
  - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

#### 1.4 QUALITY ASSURANCE

- A. Identification: Each unit of tempered glass shall be permanently identified by the manufacturer. The identification shall be etched or ceramic fired on the glass and be visible when the unit is glazed.
- B. Perform Work in accordance with FGMA Glazing Manual.
- C. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect Products.

#### 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  1. Do not install glazing when ambient temperature is less than 40 degrees F.
  2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### 1.7 WARRANTY

- A. Procedures for closeout submittals.
- B. Special Warranty:
  1. Include coverage for cracking, breakage, and replacement of same.
    - a. Warranty Period: 1 year.
  2. Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
    - a. Warranty Period: 10 years.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
  1. Falconer Glass Industries.

2. Libbey-Owens-Ford Company, Toledo, OH (800) 526-6557.
3. PPG Industries, Pittsburgh, PA (412) 434-2858.
4. Viracon, Owatonna, MN (800) 533-2080.

C. Product options and substitutions. Substitutions: Permitted.

## 2.2 GLASS MATERIALS

- A. Glass Type 1 - Clear Tempered Insulated Glass Units, Low E: Double pane units of clear tempered glass.
  1. Glass Thickness, Inner: 5/16 inch.
  2. Glass Thickness, Outer: 5/16 inch.
  3. Unit Thickness: 1 inch (25 mm) thick units.
- B. Glass Type 2 - Clear Tempered Glass Units. Single pane units with clear tempered glass.
  1. Glass Thickness, Inner: 1/4 inch (6 mm).

## 2.3 GLAZING COMPOUNDS

- A. Polysulphide Sealant: Two component, chemical curing, non-sagging type; cured Shore A hardness of 15-25.
- B. Silicone Sealant: Single component, chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; cured Shore A hardness of 15-25.
  1. Color: Clear.
- C. Acrylic terpolymer compounded especially for glazing; non-hardening, non-staining, and non-bleeding.

## 2.4 GLAZING ACCESSORIES

- A. Setting Blocks: Resilient blocks of 70 to 90 Shore A durometer hardness; compatible with glazing sealant.
- B. Spacers: Resilient blocks of 40 to 50 Shore A durometer hardness; self adhesive on one side; compatible with glazing sealant.
- C. Filler Rods: Closed cell or jacketed foam rods of polyethylene, butyl, neoprene, polyurethane, or vinyl; compatible with glazing sealant.
- D. Joint Cleaners, Primers, and Sealers: As recommended by glazing sealant manufacturer.
- E. Gaskets: ASTM D2000, SBC 415 to 3BC 620; extruded or molded neoprene or EPDM, black.

- F. Mastic: Non-solvent type adhesive as recommended by mirrored glass manufacturer.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01700 - Execution Requirements: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify that openings for glazing are correctly sized and within tolerance.
  - 2. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.
- C. Report in writing to Architect prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

#### 3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

#### 3.3 GLAZING

- A. Install glazing from interior only. No exterior glazing permitted. No glazing removal permitted from exterior.
- B. Locate setting blocks at quarter points of sill; set in sealant if heel or toe bead is required.
- C. Install spacers inside and out except where preshimmed tape or glazing gaskets are to be used.
- D. Set each piece in a series to other pieces in pattern draw, bow, or other visually perceptible characteristics.
- E. Provide glazing sealants and gaskets as required for particular glazing application. Coordinate with other Sections for material compatibility.
- F. Gaskets:

1. Provide adequate anchorage, particularly for driven-in wedge gaskets.
  2. Miter and weld ends of channel gaskets at corners to provide continuous gaskets.
  3. Seal face gaskets at corners with sealant to close opening and prevent withdrawal of gaskets from corners.
- G. Do not leave voids in glazing channels except as specifically indicated or recommended by glass manufacturer. Force sealant into channel to eliminate voids. Tool exposed surfaces to slight wash away from joint. Trim and clean promptly.
- H. Do not allow sealant to close weeps of aluminum framing.
- I. Provide filler rod where sealants are used in the following locations:
1. Head and jamb channels.
  2. Colored glass over 75 united inches in size.
  3. Clear glass over 125 united inches in size.
- 3.4 CONSTRUCTION
- A. Interface with Other Work: Coordinate glazing with installation of entrances and storefronts specified in Section 08400.
- 3.5 FIELD QUALITY CONTROL
- A. Inspect preparation and installation of glass.
- 3.6 CLEANING
- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.
- 3.8 PROTECTION
- A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

**SECTION 09250**

**GYPSUM BOARD**

1. GENERAL

1.1 REFERENCES:

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.
- B. NOTE: Selection of Finish colors and patterns in overall color scheme to be made by Architect. Contractor to notify Architect prior to commencing Gypsum Board work, to allow adequate time for color selections, Owner's approval and material ordering lead time.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:

- A. Drywall installation as required by Drawings and noted in these Specifications.
- B. Taping and finishing all walls and ceilings, except where other kind of finish is specified.

2. PRODUCTS

2.1 NOTE: GWB types are shown as U.S.G. brand names "Sheetrock", "Firecode", "Firecode C", "M.R. Board" and "Shaftwall". Substitutions must have equal U.L. ratings. See Drawings for Specific assembly.

2.2 EXTERIOR & INTERIOR WALLS & CEILINGS: See rated & non rated assemblies and wall types on the drawings.

2.3 RESILIENT CHANNEL: USG-RC-1 See drawings for ceiling channels.

2.4 Minimum drywall thickness for walls or ceilings shall be 5/8 inch

2.5 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. Manufacturers of Grid Suspension Systems
  - 1. Approved Manufacturers:
    - a. Chicago Metallic Corp., or equal.
- B. General: Provide components complying with ASTM C754 for conditions indicated.
- C. Grid Suspension System for Interior Ceilings: ASTM C645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross furring members that interlock to form a modular supporting network.



- D. Wire for Hangers and Ties: ASTM A641, Class 1 Zinc Coating, Soft Temper, minimum 0.162 inch diameter.
- E. Hanger Rods: ASTM A510 mild steel and zinc coated or protected with rust-inhibitive paint. Diameter as indicated.
- F. Channels: Cold-rolled steel, 0.0538-inch-minimum thickness of base (uncoated) metal and 1/2-inch-wide flanges, and as follows:
  - 1. Carrying Channels: 2 inches deep, 590 lb. per 1,000 feet, unless otherwise indicated.
  - 2. Furring Channels: 3/4 inch deep, 300 lb. per 1,000 feet, unless otherwise indicated.
  - 3. Finish: G-60 hot-dip galvanized coating per ASTM A653 for framing for toilet rooms and where indicated.
    - a. Rust-inhibitive paint, unless otherwise indicated.

### 3. EXECUTION

- 3.1 THE DRYWALL CONTRACTOR shall inspect all areas affected by his work to ascertain that all work is complete and has been accepted. Defective installations shall be corrected before finished surfaces are painted or sprayed with acoustical material.
- 3.2 DRYWALL INSTALLATION. Install drywall as shown on plans, noted in the UL Specifications, and as set forth in U.S.G. Handbook. Installation of non-UL rated drywall assemblies on steel studs shall comply with the following minimum requirements:
  - A. Spacing for attachment members shall not exceed 24" o.c. for walls and 16" o.c. for ceilings. All drywall shall be screwed with approved drywall screws made specifically for the purpose and of length adequate for wall types. On walls, screws shall not be placed more than 16" apart for 16" o.c. framing or 12" apart for 24" o.c. framing. Screw all edges 12" o.c. maximum.
  - B. The drywall contractor may use a few drywall nails to temporarily secure a sheet of drywall before securing with drywall screws. In this event, the drywall nails must be countersunk prior to taping. Corner beads shall be used on all corners and casing beads used whenever Gypsum Board abuts dissimilar material. Caulking to also be applied at these junctions. At all party and unit/corridor walls, Gypsum Board to be set in caulking (for sound).
  - C. Drywall shall be laid vertically or horizontally. No tapered joints at floor base.
  - D. Note: Gypsum board to be installed behind all tubs and shower units which results in double gypsum board on some bathroom walls. See bathroom drawing sheet.
  - E. Provide 1/4" to 1/2" open joint base and where drywall meets wood ceilings at unit demising walls, exterior walls, and corridor walls for air sealant.
  - F. Ceiling suspension system:
    - 1. Space hangers not over 48 in. o.c. in direction of main runner channels, and within 6 in. of ends of main runner runs and of boundary walls, structural steel, partitions, and similar interruptions of ceiling continuity. Install additional hangers at ends of each suspension member and at ceiling equipment not separately suspended, 6 in. from

vertical surfaces. Do not splay wires more than 5 in. in a 4 ft. vertical drop. Wrap wire a minimum of three times horizontally, turning ends upward.

2. Attach hangers directly to ceiling structure, or to supplementary framing members supplied and installed under this section. Hangers may not be suspended from mechanical or electrical equipment such as ductwork, conduit or piping.
3. Install 1-1/2 in. main runner channels spaced not over 48 in. o.c. within 6 in. of wall. Position channels for proper ceiling height, level and secure, with hanger wire saddle-tied along channel. Provide 1 in. clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12 in., and secure each end with double-strand 18 ga. tie wire.
4. Erect 3/4 in. metal furring channels at right angles to main runner channels or main support members. Space furring not over 16 in. o.c., and within 6 in. of wall. Provide 1 in. clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double strand 18 ga. tie wire. At splices, next furring channels at least 8 double-strand 18 ga. tie wire.
5. At openings interrupting main or furring channels, install additional cross-reinforcing as required, to restore lateral stability of ceiling framing system.
6. Finished installations shall be level to within ¼ in. in 10 ft.

3.3 ON SURFACES TO BE PAINTED: tape and cement all joints and screw locations with three coats of compound, then sand to smooth finish, acceptable to paint.

3.4 DURING WORK PROGRESS, remove all excess materials and debris resulting from operations, which may disrupt the work of other trades and after completion leave the premises broom clean.

3.5 NOTE: All existing plaster to remain to be patched and prepared to receive paint.

END OF SECTION

SECTION 09300

TILE

1. GENERAL

1.1 REFERENCES

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.
- B. Cast-in-Place Concrete: Section 03300
- C. Joint Sealants: Section 07900
- D. Gypsum Drywall: Section 09250
- E. American National Standards Institute (ANSI)

1.2 DESCRIPTION OF WORK: Extent of Tile Work is shown on the drawings.

1.3 QUALITY ASSURANCE

- A. Tile materials and installation shall comply with recommendations of Tile Council of America Handbook for Tile Installation, and ANSI Standard Specification Series A108, A118, A136, and A137, as applicable.
- B. The use of asbestos shall not be permitted in any product specified in this Section.

1.4 SUBMITTALS

- A. Submittals under this Section shall include manufacturers' data and installation instructions on all specified products; manufacturer's standard color range; and full size tile of each type and color of tile specified.
- B. At job completion, supply two copies of manufacturers' maintenance instructions; and 1 percent minimum of all types and colors of material provided under this Section as replacement stock, neatly packaged and clearly labeled.

2. PRODUCTS

2.1 TILE – SEE DRAWINGS

- A. Provide all matching trim necessary for finished installation, including stretcher pieces, cove bases, square inside corners, bullnose trim at outer corners and where tilework projects from jambs.
- B. Where floor tile terminates against dissimilar flooring material, provide Schiene schluter strip.

- C. Colors to be chosen by Architect from manufacturer's full range of colors.

## 2.2 SETTING AND GROUTING MATERIALS

- A. Volatile Organic Compound (VOC) emissions from adhesives and sealants must not exceed VOC limits of South Coast Air Quality Management District Rule #1168 AND sealants used as fillers must meet the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51
- B. Factory-mixed materials shall be by Boiardi Elastiment, C-Cure, H. B. Fuller, Laticrete, L&M Surco, Upco, or other manufacturer approved by tile manufacturer. Setting bed, grout, and additive materials shall be by same manufacturer.
- C. Tile shall be thin-set, using one of following:
  - 1. Dry-set mortar: factory mixture of portland cement, sand, and water-retentive additives, mixed with water in field, complying with ANSI A118.1, as recommended by manufacturer for particular type of tile used.
  - 2. Latex-portland cement mortar: factory mixture of portland cement and sand, with powdered PVA polymer or liquid PVA, styrene butadiene, or acrylic latex admixture added in field, complying with ANSI A118.4.
- D. Grout tile with factory-formulated portland cement, dry-set, or latex portland cement grout (either acrylic or styrene butadiene powder or liquid additive), complying with ANSI 118.6. On-job sand-portland cement mixture may also be used, complying with ANSI A108.1. Color to be selected from manufacturer's standard range.

2.3 Concrete Sealer: Provide manufacturer's recommended sealer compatible with concrete floor.

## 3. EXECUTION

### 3.1 INSTALLATION

- A. Provide floor protection to existing buildings when renovating or adding on.
- B. Before beginning installation inspect surfaces to receive tile for excessive dampness, irregularity, loose material, oily or waxy areas impeding adhesion, or other conditions which would prevent proper installation. Verify that surfaces are flat to within 1/4 in. in 10 ft., with no vertical irregularities exceeding 1/16 in. high. Seal concrete floors if recommended or approved by the manufacturer. Broom clean substrate before beginning installation. Commencement of work constitutes acceptance of floor condition.
- C. Expansion joint location and construction shall conform to drawings and ANSI A108, Paragraph A-3.4, including requirement for joints over cold-pour, saw-cut, control, and structural joints. Sealant materials and installation procedures are specified in Section 07900, Joint Sealants.

- D. Mix dry-set and latex-portland cement mortars in accordance with manufacturer's instructions.
1. For dry-set mortars, add dry ingredients to water. Mix thoroughly and allow mortar to stand 15 minutes, then re-mix. Do not add water, additional mortar, or other ingredients after slaking period.
  2. For latex-portland cement mortars, use brand of pre-packed dry mortar mix specified by latex manufacturer. Add dry mortar to correct amount of latex, as specified by manufacturer, and mix thoroughly to obtain complete and visually uniform wetting of dry mortar mix. When directions require dilution of latex with water, this shall be done with adequate mixing before dry mortar mix is added. Slake for 15 minutes and re-mix before using.
  3. Spread mortar with notched trowel of type recommended by manufacturer. Setting compound shall be of such consistency that ridges formed by trowel shall not flow or slump. Cover surface uniformly without bare spots. Apply setting compound only to as much area as can be covered with tile before mortar skins over. Remove dried mortar, and apply new material. Protect mortar from foot traffic and dirt.
- E. Press individual tiles or tile sheets into mortar, maintaining accurate joint alignment and spacing. Beat in tile with rubber-faced block to obtain maximum contact between tile back and setting compound. Remove paper and glue from paper-mounted ceramic mosaics before mortar is firmly set, and align individual tiles. Immediately remove setting compound from faces or front edges of tiles.
- F. Center and balance tile areas. Smooth cut edges. Jagged or flaked edges or split tiles are prohibited. Cuts shall be no smaller than half size, located on outer edges of field. Make corners of all tile flush and level with corners of adjacent tile, with due allowance to tolerances for tile as specified in ANSI A137.1.
- G. Keep all joint lines straight and of even width, including miters. Finish floor and wall areas shall be flat and plumb, with no variations exceeding 1/4 in. in 10 ft. from required plane.
- H. Allow sufficient time for setting compound to cure before grouting, 48 hours minimum. Remove spacers or ropes from joints. Using a grout of type and mix specified under PRODUCTS, force maximum amount of grout into joints. Clean joints of cushion edge tile to depth of cushion.
- I. Fill joints of square-edge tile flush with surface. Fill all gaps and skips. Do not permit mortar to show through grouted joints. Finished grout shall be uniform in color, smooth and without voids, pinholes or low spots.
- J. After mortar joints have cured, clean unglazed tile with proprietary acidic preparation such as Sure-Klean Grout and Tile Cleaner, in strict accordance with manufacturer's instructions. Apply solutions to test patches before cleaning.

END OF SECTION

SECTION 09643

HARDWOOD FLOORING

1.01 SECTION INCLUDES

- A. Engineered Wood Flooring
- B. Maintenance materials.
- C. Finish moldings

1.02 RELATED SECTIONS

- A. Section: 03 10 00 - Concrete Forming
- B. Section: 03 30 00 - Cast-in-place Concrete
- C. Section: 06 10 00 - Rough Carpentry

1.03 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
  
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
  
- C. ASTM F710 - Practice for Preparing Concrete Floors. Concrete ph determination.

1.04 SUBMITTALS

- A. Submit product data in accordance with Section (01 30 00) (01 33 00), including manufacturer's installation and maintenance instructions.
  
- B. Submit three representative samples of the engineered hardwood flooring in the final color as selected by the owner or their representative.
  
- C. Shop Drawings: Show floor pattern layout.

1.05 QUALITY ASSURANCE

- A. Installer: Shall be experienced in the wood and/or vinyl tile flooring industry and shall have a minimum of five (5) years experience in the installation of similar products.

2.01 PRODUCTS

- A. Floor selection TBD

3.0 INSTALLATION

Install floors in accordance with manufacturer's recommendation

3.04 PROTECTION

- A. Protect finished floor from abuse by other trades using heavy Kraft paper or equivalent. Keep traffic out of spaces and areas where flooring is being installed until adhesive has set. Light foot traffic after 10-12 hours. Normal traffic after 24 hours.

3.05 CLEANING AND MAINTENANCE

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A. Prior to turning the floor over to the owner, it shall be thoroughly cleaned by sweeping, vacuuming or dust mopping to remove debris.

END OF SECTION

SECTION 09650

RESILIENT FLOORING

1. GENERAL:

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK

A. SCOPE: The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications.

1.3 SUBMITTALS

A. Submittals under this Section shall include:

1. Manufacturers' data and installation instructions on all specified products;
2. Color range;
3. Shop drawings indicating materials, pattern number, tile number, and manufacturer.

2. PRODUCTS:

2.1 VINYL COMPOSITION TILE: Shall be "Mannington Progressions" Premium Tile 12" x 12" 1/8" Gauge

2.2 ADHESIVES: shall be as recommended by the manufacturer

3. EXECUTION:

3.1 INSTALLATION shall be done by skilled craftsmen using the adhesives recommended by the manufacturer and in accordance with the manufacturer's instructions. The flooring contractor shall examine the subfloors and report all defects which have to be corrected before the application of flooring starts. Concrete floors shall be smooth, free of any grooves and depressions, and brushed clean of any foreign matter. Install all resilient flooring with joints tight, floor true, level and even with no bubbles, pops or other visible defects. Cut to and around all permanent fixtures keeping vinyl tight to fixtures. Vinyl also shall be installed under fixtures such as baseboard heating, and glued tight.

3.2 DURING WORK PROGRESS, remove all excess materials, extraneous mastic, and debris resulting from operations, which may disrupt the work of other trades. The Contractor shall be responsible for keeping the floors clean, unstained and undamaged until the final completion of the building.

END OF SECTION



SECTION 09680

CARPET

1. GENERAL

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK:

A. Installation of Carpeting as shown on plans or noted in these Specifications.

1.3 QUALITY ASSURANCE

A. Finished installation shall comply with fire test specified in applicable Building Code.

B. Architect/Engineer shall review first finished space for workmanship

1.4 SUBMITTALS

A. Submittals under this Section shall include:

1. Manufacturer's specifications and installation instructions on all specified products.

C. Provide written maintenance program.

2. PRODUCTS

2.1 CARPET: Stair runner to be provided by owner and installed by GC

2.2 PAD: Provide pad per carpet manufacturers recommendation for stair installation

2.3 SEAM ADHESIVE: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

3. EXECUTION:

3.1 JOB CONDITIONS:

A. Examine Subfloor for dampness, loose material, excessive irregularity, oily or waxy areas impeding adhesion, or other conditions which would prevent proper installation. Commencement of work constitutes acceptance of subfloor.

- B. Broom-clean or vacuum surfaces to receive carpet, before beginning installation.

### 3.2 INSTALLATION

- A. Field measure each space to receive carpet. Do not scale drawings.
- B. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including edgings and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- C. Seams shall be flat, free from puckering, without twists, free from frayed edges. Coat edges with seam adhesive at glue-down installation, hot-melt tape at cushion, and as recommended by manufacturer. Patterns at seams shall match exactly. Cut raw edges on a slight angle with surface yarns extending outward over backing material so that surface yarns mingle neatly at seams.
- E. Seams shall be in accordance with approved seaming shop drawings and samples. No seams will be accepted perpendicular to openings such as doors, stairs, and entries.
- G. Remove adhesive spots from carpet immediately with solvent. Trim loose pieces of face yarn with sharp scissors. Upon completion of installation, remove rubbish, selvages, wrapping paper, small scraps, etc., and vacuum with commercial-type vacuum cleaner. Remove soiling, by shampoo if necessary. Cover finished work with kraft paper or polyethylene until Substantial Completion.
- H. At completion of job, remove protective paper, vacuum or shampoo again if required.

END OF SECTION

SECTION 09900

PAINTING

1. GENERAL

1.1 DESCRIPTION OF WORK

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.
- B. The extent of work shall be as shown on Drawings and called for in these Specifications. Performance shall meet the requirements of these Specifications. The work covered by this section of Specifications consists of the following:
  - 1. Painting or staining all interior and exterior surfaces as called for in the Finish Schedule on Drawings or in these Specifications.
  - 2. Painting interior walls, door trim, window trim, etc.
  - 3. Staining and varnishing trim as called for on Drawings.
  - 4. Painting all exterior doors as specified.
  - 5. Painting and finishing any other work requiring finishing left unfinished by others.
  - 6. Walls painted accent as called for on Drawings.
  - 7. Frames and exterior doors.
  - 8. Interior wood floors.
- C. Volatile Organic Compound (VOC) emissions from paints & coatings must not exceed the VOC limits of Green Seal's Standards GS-11 requirements.
  - 1. Non-flat: 150 g/l
  - 2. Flat: 50 g/l

NOTE: All colors to be selected by Architect. The Contractor shall submit to the Architect, for approval, color samples of stain finishes, See general Note Section 09250.

1.2 SUBMITTALS

- A. Issue submittals in accordance with Section 01300, Submittals.
- B. Submit as follows:

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1. Manufacturer's data, application instructions, and color chips on all specified products.
2. Paint schedule covering all surfaces to be painted.
3. Contractor to provide 4' x 8' test panels in finished spaces for up to 3 trials for each required color selection. Test panel colors to be selected by Architect. Final color to be approved by Architect from test panels.
4. Provide as maintenance material, a minimum of one gallon of each type and color of paint used on job, in labeled and well-sealed containers, for future touch-up. Also provide typed list of each type and color of paint used on job, including name of distributor from whom paint may be obtained.

## 2. PRODUCTS

### 2.1 General

- A. Paint: Acceptable manufacturers, unless specific manufacturer is noted: California Products Corporation, Benjamin Moors, Pratt & Lambert, Sherwin-Williams, Tnemec.
- B. All products used shall be manufacturer's top quality product for each type of finish specified.

### 2.2 MATERIALS

- A. Where primer is called for, use primer recommended by manufacturer for particular combination of substrate and finish coat. Where painting over shop-applied primers, verify that finish paint proposed for field application is compatible with shop primers actually used.
- B. Exterior Doors: Three (3) coats exterior latex.
- C. All Gypsum & Plaster Walls and Ceilings to be painted: Primer - Benjamin Moore Vinyl Latex Primer Sealer.
- D. Finish-Walls - Benjamin Moore Moorcraft Latex Eggshell.
- E. Finish Ceiling – Flat Ceiling White Latex
- F. Interior exposed woodwork as noted on Drawings: One (1) coat Primer; two (2) finish coats Semigloss Latex.
- G. Wood Door Frames & Trim, & Miscellaneous interior wood trim: Benjamin Moore Wood Primer and two (2) coats Latex Semigloss.
- H. Exterior Trim – (2) coats latex exterior grade paint within 180 days of installation. Note: seal all cut edges.

- I. Existing hardwood floors sanded and coated with three (3) coats urethane.
- J. Exterior steel railings and fence, Sherwin Williams Alkyd Systems
- K. Exterior two (2) coats latex. Note: See drawings limited area.

### 3. EXECUTION

#### 3.1 JOB CONDITIONS

- A. Store materials in sealed containers. Provide a fire extinguisher in storage room. Remove flammable rags and waste from building at end of day.
- B. Do not perform exterior work in rain or when precipitation is forecast imminently; or in hot, dry, or windy weather which would cause finish to cure too rapidly, or be marred by windstorm dust; or at temperatures below 40 degrees F.
- C. Maintain temperature at interior locations between 50 and 75 degrees F, maximum 80 percent relative humidity, while paint is being applied. Provide adequate ventilation, by mechanical means if necessary, for drying of paint and prevention of condensation and mildew. Do not apply finish in areas in which dust is being generated.
- D. Protect finished surfaces and equipment not being painted with masking tape, canvas drop cloths, polyethylene sheets, etc. Items such as lighting switch covers, fixture canopies, and door handles shall be temporarily removed, carefully stored, and replaced after painting, or carefully covered during painting operations.

#### 3.2 PREPARATION

- A. Preparation of newly-installed materials to receive finish painting is specified under those Sections installing materials. This includes, but is not necessarily limited to: touch-up of damaged shop coats; taping, sealing and sanding of drywall; patching masonry; sanding finish wood; and cleaning off grease, oil, dirt, mildew, factory-applied protective coatings, and other foreign materials.
- B. At wood surfaces to be painted, scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried. Caulk all interplay between wood trim, door frames and base boards with gyp board.
- C. Before beginning work under this Section, verify that preparation of substrates under other Sections has been done as specified. Thoroughly remove water, dirt, and dust with clean cloths, brooms, or brushes.

#### 3.3 APPLICATION

- A. Apply all materials in accordance with the manufacturer's recommendations.
- B. Apply materials with suitable brushes, rollers, and spraying equipment. Keep application equipment clean, dry, and free from contaminants. Thoroughly stir materials before applying, and periodically during application.
- C. Rate and method of application and drying time between coats shall be strictly in accordance with manufacturer's recommendations.
- D. Prepare field test panels in accordance with paragraph 1.4-B.3 of this Section for each type and color of finish specified. Request review of first completed room, color scheme, special items, etc., which shall serve as project standard after approval.
- E. Touch-up shop applied primers before field painting.
- F. Do not apply first coat until surface is dry to touch. Moisture content of surface shall be within limitations recommended by paint manufacturer.
- G. Leave all parts of moldings and ornaments clean and true to detail, without excessive paint in corners and depressions. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping. Paint surfaces visible through grilles one coat flat black.
- H. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, and skipped or missed areas. Refinish whole wall if unacceptable finish is extensive or of such a nature that it cannot be repaired by normal touch-up.
- I. After completion of painting work, remove spilled or spattered paint. Touch-up and repair finishes damaged in any way by work under this Section. Protect finished surfaces.

### 3.4 Exterior

- A. Exterior and interior - Steel-Clad door: Two (2) coats exterior enamel over factory primer. Doors shall be laid flat if sprayed. Doors may be rolled or brushed in place, however with no visible brush marks, drips or imperfections.
- B. All exterior metal work (steel) to include railings, brackets and fence.
  - a. Alkyd Systems  
Gloss Finish
    - 1<sup>st</sup> Coat: S-W All surface Enamel Primer, A11w210
    - 2<sup>nd</sup> Coat: S-W All Surface Enamel, A11 Series
    - 3<sup>rd</sup> Coat: S-W All Surface Enamel, A11 Series  
(4 mils wet, 1.6 mils dry per coat)

- C. Wood trim two (2) coats acrylic latex.

### 3.5 Interior

- A. Interior Painting: Paint shall be applied in the following number of coats, primer and finish. Tint all primers to match finish color.
  - 1. One (1) fully applied finish coat of even coverage. NOTE: Contractor to adequately cover M.R. (Blueboard) or other colored drywall by primer or finish coat as necessary to eliminate any visible "bleed through".
  - 2. Drywall: All interior walls to receive paint: one (1) coat latex base primer-sealer, two (2) finish coats latex eggshell. Ceiling: One (1) coat primer and two (2) coats latex flat.
- B. Interior Window Sill, Door Frames & Trim, and Miscellaneous Interior Wood Trim- one (1) coat primer and two (2) coats finish for all soft wood. Contractor to verify with construction manager as to window type.
- C. Existing hardwood floors sanded and three (3) coats urethane.

NOTE: Existing hardware trim that has varnish finish to be cleaned.

END OF SECTION

**PAINT SCHEDULE**

DESCRIPTION			MANUFACTURER									
Type & Surface	Luster	No. of Coats	SHERWIN-WILLIAMS		PRATT & LAMBERT		BENJAMIN MOORE		MARTIN SENOUR		ICI PAINTS	
			Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)
1. Interior Ferrous Metal (Not Galvanized and Shop Primed)	Acrylic Latex Semi-Gloss	1	DTM Acrylic Primer / Finish (B66W1)	3.00	Suprime "3" Int/Ext Latex Metal Primer (Z/F1003)	1.25	Acrylic Metal Primer (M04) (As Required)	1.50	TPS Int/Ext Latex Primer	1.20	DEVFLEX DTM Primer & Flat Finish (4020PF)	2.00
		2	ProClassic Waterborne Acrylic Semi-Gloss (B31 Series)	1.30	Accolade Interior Semi-Gloss (Z/F4100 Series)	1.50	DTM Acrylic Semi Gloss Enamel (M29)	1.50	Platnum Interior Satin Gloss	1.30	DULUX ULTRA Semi-Gloss Acrylic Interior Wall & Trim Enamel (1407-XXXX )	1.50
2. Interior Ferrous Metal (Galvanized)  (Note: Spot prime as required)	Acrylic Latex Semi-Gloss	1	DTM Acrylic Primer / Finish (B66W1)	3.00	Suprime "3" Int/Ext Latex Metal Primer (Z1003)	1.25	Acrylic Metal Primer (M04) (As Required)	1.50	Super Tough Coat Latex Primer/Finish	1.25	DEVFLEX DTM Primer & Flat Finish (4020PF)	2.00
		2	ProClassic Waterborne Acrylic Semi-Gloss (B31 Series)	1.30	Accolade Interior Velvet (Z/F4000 Series)	1.50	DTM Acrylic Semi Gloss Enamel (M29)	1.50	Platinum Interior Eggshell	1.30	DULUX ULTRA Semi-Gloss Acrylic Interior Wall & Trim Enamel (1407-XXXX )	1.50
		2	ProClassic Waterborne Acrylic Semi-Gloss (B31 Series)	1.30	Accolade Interior Semi-Gloss (Z/F4100 Series)	1.50	DTM Acrylic Semi Gloss Enamel (M29)	1.50	Platnum Interior Satin Gloss	1.30	DULUX ULTRA Semi-Gloss Acrylic Interior Wall & Trim Enamel (1407-XXXX )	1.50
3. Interior Pipes, Ductwork, & Mechanical Equipment (Not Galvanized)	Acrylic Latex Eggshell	1	DTM Acrylic Primer / Finish (B66W1)	3.00	Suprime "3" Int/Ext Latex Metal Primer (Z1003)	1.25	Fresh Start All Purpose Primer (023)	1.20	Super Tough Coat Latex Primer/Finish	1.25	DEVFLEX DTM Primer & Flat Finish (4020PF)	2.00
		1	ProMar 200 Interior Latex Eg-Shel (B20W2200 Series)	1.50	Accolade Interior Velvet (Z/F4000 Series)	1.50	Super Spec Latex Eggshell Finish (274)	1.30	Platnum Interior Eggshell	1.30	ULTRA-HIDE 1412-XXXX Latex Eggshell Interior Wall & Trim Enamel (1412-XXXX)	1.30
4. Interior Pipes, Ductwork, & Mechanical Equipment (Galvanized)	Acrylic Latex Eggshell	1	DTM Acrylic Primer / Finish (B66W1)	3.00	Suprime "3" Int/Ext Latex Metal Primer (Z1003)	1.25	Fresh Start All Purpose Primer (023)	1.20	Super Tough Coat Latex Primer/Finish	1.25	DEVFLEX 4020PF DTM Primer & Flat Finish	2.00
		1	ProMar 200 Interior Latex Eg-Shel (B20W2200 Series)	1.50	Accolade Interior Velvet (Z/F4000 Series)	1.50	Super Spec Latex Eggshell Finish (274)	1.30	Platnum Interior Eggshell	1.30	ULTRA-HIDE 1412-XXXX Latex Eggshell Interior Wall & Trim Enamel	1.30



DESCRIPTION			MANUFACTURER									
Type & Surface	Luster	No. of Coats	SHERWIN-WILLIAMS		PRATT & LAMBERT		BENJAMIN MOORE		MARTIN SENOUR		ICI PAINTS	
			Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)
5. Interior Gypsum Board (New)	Acrylic Latex Eggshell	1	PrepRite 200 Latex Primer (B28W200)	1.10	Suprime "4" Interior Latex Wall Primer (Z1004)	1.50	Super Spec Latex Enamel Undercoater/Primer (253)	1.20	TPS Int/Ext Latex Primer	1.20	PREP & PRIME HI-HIDE Interior Water-Based Primer Sealer (1000-1200)	1.50
		2	ProMar 200 Interior Latex Eg-Shel (B20W2200 Series)	1.20	Accolade Interior Velvet (Z/F4000 Series)	1.50	Super Spec Latex Eggshell Finish (274)	1.30	Platnum Interior Eggshell	1.30	ULTRA-HIDE Latex Eggshell Interior Wall & Trim Enamel (1412-XXXX)	1.30
6. Interior Gypsum Board - Ceilings (New)	Acrylic Latex Flat	1	PrepRite 200 Latex Primer (B28W200)	1.10	Suprime "4" Interior Latex Wall Primer (Z1004)	1.50	Super Spec Latex Enamel Undercoater/Primer (253)	1.20			DULUX ULTRA Basecoat Interior Latex Wall Primer (1000-1200)	1.50
		2	ProMar 200 Interior Latex Flat (B30-200 Series)	1.30	Accolade Interior Acrylic Latex Flat (PZ/PF4600 Series)	1.60	Super Spec Latex Flat (275)	1.20			DULUX ULTRA Velvet Sheet Flat Latex Interior Wall & Trim Finish (1201-XXXX)	1.50
7. Interior Gypsum Board or Plaster (New)	Acrylic Latex Eggshell	1	<b>Harmony Interior Latex Primer (B11W900)</b>	<b>1.30</b>			Eco Spec Primer Sealer (231)	0.80			PREP & PRIME ODOR-LESS Interior Water-Based Primer Sealer (LM9116)	1.20
		2	<b>Harmony Interior Latex Eg-Shel (B9 Series)</b>	<b>1.60</b>			Eco Spec Eggshell Enamel (223)	1.40			LIFEMASTER 2000 Interior Eggshell (LM9300)	1.50
		2	<b>Duration Home Interior Satin (A97WQ8151)</b>	1.20	Accolade Interior Velvet (Z/F4000 Series)	1.50	Regal Matte Finish Latex (221)	1.30	Platnum Interior Eggshell	1.30	ULTRA-HIDE Latex Eggshell Interior Wall & Trim Enamel (1412-XXXX)	1.30
8. Interior Gypsum Board or Plaster (New or Previously Painted)	Acrylic Latex Satin	1	PrepRite Classic Interior Latex Primer (B28W101)	1.60	Suprime "12" Interior Alkyd Wall Primer (D/D1012)	1.50	Fresh Start All-Purpose Latex Primer (023)	1.10	TPS Interior Alkyd Undercoater	1.50	PREP & PRIME WALL & WOODWORK 100% Acrylic Interior Water-Based Primer Sealer (1020-1200)	1.10
		2	<b>Duration Home Interior Satin (A97WQ8151)</b>	1.20	Accolade Interior Velvet (Z/F4000 Series)	1.50	Regal Aqua Pearl (310)	1.30	Platnum Interior Eggshell	1.30	DULUX ULTRA Eggshell Acrylic Interior Wall & Trim Enamel (1403)	1.60

DESCRIPTION			MANUFACTURER									
Type & Surface	Luster	No. of Coats	SHERWIN-WILLIAMS		PRATT & LAMBERT		BENJAMIN MOORE		MARTIN SENOUR		ICI PAINTS	
			Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)
9. Interior Gypsum Board or Plaster	Epoxy Satin Eggshell	1	PrepRite 200 Interior Latex Primer (B28W200)	1.10	Suprime "1" 100% Acrylic Multi-Purpose Primer (Z1001)	1.50	Super Spec Latex Vapor Barrier Primer Sealer (260)	1.00	TPS Int/Ext Latex Primer	1.20	PREP & PRIME GRIPPER Multi-Purpose Water-Based Primer Sealer (3210-1200)	1.90
		2	Water Based Catalyzed Epoxy (B70-200 Series)	2.50 - 3.00	Tech-Gard Waterborne Epoxy (Z/F5300 Series)	2.00	M43/M44 Waterborne Epoxy	1.50	Super Tough Coat Water-Based Epoxy	2.00	TRU-GLAZE Waterborne Acrylic Epoxy (4418-XXXX)	2.00 - 2.50
10. Plaster (New)	Acrylic Latex Eggshell	1	PrepRite ProBlock Int/Ext Latex Primer Sealer (B51W20)	1.40	Suprime "12" Interior Alkyd Wall Primer (D/D1012)	1.50	Super Spec Latex En. Under. & Primer Sealer (253)	1.10			PREP & PRIME GRIPPER Multi-Purpose Water-Based Primer Sealer (3210-1200)	1.90
		2	ProMar 200 Interior Latex Eg-Shel (B20W2200 Series)	1.20	Accolade Interior Velvet (Z/F4000 Series)	1.50	Super Spec Latex Eggshell Finish (274)	1.30	Platnum Interior Eggshell	1.30	ULTRA-HIDE Latex Eggshell Interior Wall & Trim Enamel (1412-XXXX)	1.30
11. Interior Concrete Masonry Units Walls or Concrete Walls/Ceilings	Acrylic Latex Semi-Gloss	2	PrepRite Block Filler Int/Ext Latex (B25W25)	8.00	Pro-Hide Silver Block Filler (Z8465)	12.00	Super Craft Latex Block Filler (285)	8.10	Pro Line Premium Block Filler	9.00	PREP & PRIME Block Filler Water-Based (3010-1200)	8.00
		1	ProMar 200 Interior Latex S.G. (B31W2200 Series)	1.50	Accolade Interior Semi-Gloss (Z/F4100 Series)	1.50	Super Spec Latx Semi-Gloss Enamel (276)	1.20	Platnum Interior Satin Gloss	1.30	DULUX ULTRA Semi-Gloss Acrylic Interior Wall & Trim Enamel (1407-XXXX)	1.50
12. Interior Concrete Masonry Units Walls or Concrete Walls/Ceilings (Except Interior Pools)	Epoxy Eggshell	2	Water Based Catalyzed Epoxy (B70-200 Series)	2.50 - 3.00	Tech-Gard Waterborne Epoxy (Z/F5300 Series)	2.00	M43/M44 Waterborne Epoxy	1.50	Super Tough Coat Water-Based Epoxy	2.00	TRU-GLAZE-WB 4406 Semi-Gloss or 4408 Gloss Waterborne Epoxy	3.0 - 5.0
13. Interior Wood	Acrylic Latex Semi-Gloss	1	PrepRite ProBlock Int/Ext Latex Primer Sealer (B51W20)	1.40	Suprime "1" 100% Acrylic Multi-Purpose Primer (Z1001)	1.25	Fresh Start All Purpose Primer (023)	1.20	TPS Int/Ext Latex Primer	1.20	PREP & PRIME WALL & WOODWORK 100% Acrylic Interior Water-Based Primer Sealer (1020-1200)	1.10
		2	ProClassic Waterborne Acrylic Semi-Gloss (B31 Series)	1.30	Accolade Interior Semi-Gloss (Z/F4100 Series)	1.50	Waterborne Satin Impervo (314)	1.40	Platnum Interior Satin Gloss	1.30	DULUX ULTRA Semi-Gloss Acrylic Interior Wall & Trim Enamel (1407-XXXX)	1.50

DESCRIPTION			MANUFACTURER									
Type & Surface	Luster	No. of Coats	SHERWIN-WILLIAMS		PRATT & LAMBERT		BENJAMIN MOORE		MARTIN SENOUR		ICI PAINTS	
			Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)	Products	Dry Mil Thickness (Per Coat)
14. Interior Wood	Natural Finish Satin Stain	1	Wood Classics Interior Oil Stain (A48-200 Series)	Nominal	Tonetic Oil Wood Stain	Nominal	Benwood Interior Wood Stain (234)	Nominal	MS Interior Wood Stain	Nominal	WOODPRIDE Interior Wood Finishing Stain (1700-XXXX)	Nominal
		2	Wood Classics Waterbourne Polyurethane Varnish (A68 Series)	1.00	Varmor Clear Urethane Finish (R10,11)	0.75	Benwood Polyurethane Low Luster (C435)	1.00	AstroVar Polyurethane - Satin	1.00	WOODPRIDE Interior Waterborne Aquacrylic Varnish (1802-0000)	1.00
15. Exterior Wood  Note: Prime knots with oil based primer.	Acrylic Solid Stain	1	WoodScapes House Stain Exterior Acrylic Solid Color (A15 Series)	1.30	STAINShield Solid Hide Oil Primer (S/D2570)	2.30	Moorwood 100% Acrylic Latex Solid Siding Stain (N089)	Minimal	Great Outdoors Solid Latex Stain	2.00	WOODPRIDE Exterior Waterborne Solid Color Stain (2600-XXXX)	1.30
		1	WoodScapes House Stain Exterior Acrylic Solid Color (A15 Series)	1.30	STAINShield Solid Hide Latex Rustic Stain - 100% Acrylic (Z/F 1300 Series)	2.00	Moorwood 100% Acrylic Latex Solid Siding Stain (N089)	Minimal	Great Outdoors Solid Latex Stain	2.00	WOODPRIDE Exterior Waterborne Solid Color Stain (2600-XXXX)	1.30
16. Exterior Wood	Spar Varnish Natural Stain	1			Tonetic Oil Wood Stain	Nominal			MS Interior Wood Stain	Nominal		
		3	Helmsman Spar Varnish	1.20	Vitralite UVA Spar Varnish (R7)	1.20	Impervo 440 Spar Varnish	1.20	MS Marine Spar Varnish	1.20	Old Masters Spar-Marine Varnish	2.00
17. Exterior Ferrous Metal (Not Galvanized)	Alkyd Gloss or Semi-Gloss	1	Kem Kromik Universal Metal Primer (B50Z Series)	3.00	Suprime "9" Int/Ext Alkyd Metal Primer (Z1009)	1.25	Alkyd Metal Primer (M06)	2.00	Tough Coat Universal Alkyd Primer	1.25	DEVGUARD T&S Multi-Purpose Metal Primer (4160-XXXX)	2.00
		2	Industrial Enamel (B54Z Series)	3.00	Effecto Enamel (S/D1100 Series)	1.25	Rapid Dry Gloss Enamel (CM20)	2.00	Super Tough Coat Alkyd Enamel	1.50	DEVGUARD Alkyd Industrial Gloss Enamel (4308-XXXX)	2.00
18. Exterior Galvanized Ferrous Metal & Ductwork (Galvanized)	Acrylic Gloss Enamel	1	DTM Acrylic Primer / Finish (B66W1)	3.00	Enducryl Acrylic Prime or Finish (Z190)	2.50	Alkyd Metal Primer (M04)	2.50			DEVFLEX DTM Primer & Flat Finish (4020PF)	2.00
		2	DTM Acrylic Gloss Coat (B66-100)	3.00	Enducryl DTM Gloss Acrylic Maintenance Enamel (Z2900 Series)	2.00	DTM Acrylic Gloss Enamel (M28)	2.50			DEVFLEX High Performance Waterborne Acrylic Semi-Gloss Enamel (4216-XXXX)	3.00

SECTION 10800

TOILET AND BATH ACCESSORIES

1. GENERAL:

1.1 REFERENCES: Drawings and general provisions of Contract, including General Conditions and Division 1 specifications, apply to work in this section.

1.2 DESCRIPTION OF WORK: The extent of work shall be as shown on Drawings and called for in these Specifications. The work under this section of Specifications includes furnishing and installing the items listed as indicated on Drawings.

2. PRODUCTS:

2.1 Grohe Essentials Cube Robe Hook model 40 511 000

2.2 Grohe 24" towel holder 40 366 000

2.3 Grohe Toilet paper holder with cover 40 367 000

2.4 GRAB BARS: Stainless steel, 1 ¼ " diameter, Watermark Designs GB2x series polished Chrome grab bars- sizes as indicated in drawings.

**NOTE:** Blocking for all accessories and grab bars must be provided. See Section 06100 - Rough Carpentry.

**NOTE:** The contractor shall submit shop drawings on every item specified in this section. There shall be no substitutions without a written explanation from the subcontractor that the specified item is equal with the item specified by the architect. All substitutions shall be approved by the Architect and the Owner.

3. EXECUTION:

3.1 All work shall be done by experienced craftsmen in first-class manner and high-grade finish.

3.2 All installations shall be in accordance with layout shown on plans and in strict conformity with the manufacturer's recommendations and secured into blocking or other framing with screws of adequate length and size to properly support accessories. Grab bars must be able to sustain a 300# direct load pulling down or out on it.

**END OF SECTION**

**SECTION 14210**  
**ELECTRIC TRACTION ELEVATORS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes: Electric Traction Elevators.
- B. Products Supplied But Not Installed Under this Section:
  - 1. Hoist Beam
  - 2. Pit Ladder
  - 3. Inserts mounted in block walls for rail attachments
- C. Work Supplied Under Other Sections:
  - 1. Temporary lighting, including temporary lighting in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.
  - 2. Hoistway ventilation shall be in accordance with local and national building code requirements.
  - 3. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction and final layouts.
  - 4. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.
  - 5. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.
  - 6. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.
  - 7. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.
  - 8. Access Doors: As required for access to governor. Access door shall be self-closing, self-locking if necessary and operable from the inside without a key.
- D. Related sections:
  - 1. Section 015000 - Temporary Facilities and Controls
  - 2. Section 033000 - Cast-in-Place Concrete:
  - 3. Section 042000 - Unit Masonry
  - 4. Section 055000 - Metal Fabrications
  - 5. Section 071600 - Cementitious Waterproofing
  - 6. Section 230000 - Heating, Ventilating, and Air Conditioning
  - 7. Section 260000 - Electrical
  - 8. Section 263000 - Electric Power Generating and Storing Equipment
  - 9. Section 273000 - Voice Communications
  - 10. Section 283100 - Fire Detection and Alarm
  - 11. Section 310000 - Earthwork
- E. Industry and government standards:
  - 1. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
  - 2. ADAAG - Accessibility Guidelines for Buildings and Facilities
  - 3. ANSI/NFPA 70, National Electrical Code
  - 4. ANSI/NFPA 80, Standard for Fire Doors and Fire Windows
  - 5. ASME/ANSI A17.1, Safety Code for Elevators and Escalators.

**1.02 DESCRIPTION OF ELEVATOR**

- A. Elevator Equipment: KONE EcoSpace™ gearless traction elevator or equal.  
This specification is based upon a Kone Elevator but contractors are encouraged to submit or equals. All proposals for alternate elevators will be considered. The Owners are open to proposals without finished cabs. GC will carry allowance to custom build cabs.
- B. Equipment Control: KCM831
- C. Drive: **Non-Regenerative**
- D. Quantity of Elevators: **1**

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- E. Landings: **4**
- F. Openings: **4** Front Openings, **0** Back Openings
- G. Travel: **37'-0"**
- H. Rated Capacity: **2500 lbs (1134 kg)**
- I. Rated Speed: **200 fpm**
- J. Clear Inside Dimensions (W x D): **6'-8" x 4'-3"**
- K. Cab Height: **8'**
- L. Clear height under suspended ceiling: **7'-7"**
- M. Entrance Width & Type: **3'-6" & Right Opening**
- N. Entrance Height: **7'**
- O. Main Power Supply: **208** Volts + 5%, three-phase
- P. Operation: **Simplex**
- Q. Machine Location: Inside the hoistway mounted on car guide rail
- R. Control Space Location: **Integral Closet at top landing.**
- S. Elevator Equipment shall conform to the requirements of seismic zone: **Non-Seismic**
- T. Maintenance Service Period: **12 Months**

### 1.03 PERFORMANCE REQUIREMENTS

- A. Car Performance
  1. Car Speed  $\pm$  5% of contract speed under any loading condition or direction of travel.
  2. Car Capacity: Safely lower, stop and hold (per code) up to 125% of rated load.
- B. System Performance
  1. Vertical Vibration (maximum): 25 mg
  2. Horizontal Vibration (maximum): 25 mg
  3. Jerk Rate (maximum): 3.3 ft/sec<sup>3</sup>
  4. Acceleration (maximum) 1.3 ft/sec<sup>2</sup>
  5. In Car Noise: = 55 dB(A)
  6. Leveling Accuracy:  $\pm$ 0.2 inches
  7. Starts per hour (maximum): 120

### 1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature for each proposed system.
  1. Cab design, dimensions and layout.
  2. Layout, finishes, and accessories and available options.
  3. Controls, signals and operating system.
  4. Color selection charts for cab and entrances.
- B. Shop Drawings:
  1. Clearances and travel of car.
  2. Clear inside hoistway and pit dimensions.
  3. Location and layout of equipment and signals.
  4. Car, guide rails, buffers and other components in hoistway.
  5. Maximum rail bracket spacing.
  6. Maximum loads imposed on building structure.
  7. Hoist beam requirements.
  8. Location and sizes of access doors.
  9. Location and details of hoistway door and frames.

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10. Electrical characteristics and connection requirements.
- C. Operation and maintenance data:
  1. Provide manufacturer's standard maintenance and operation manual.
- D. Diagnostic Tools
  1. Prior to seeking final acceptance for the completed project as specified by the Contract Documents, the Elevator Contractor shall deliver to the Owner any specialized tool(s) that may be required to perform diagnostic evaluations, adjustments, and/or parametric software changes and/or test and inspections on any piece of control or monitoring equipment installed. This shall include any specialized tool(s) required for monitoring, inspection and/or maintenance where the means of suspension other than conventional wire ropes are furnished and installed by the Elevator Contractor. Any and all such tool(s) shall become property of the Owner. Any diagnostic tool provided to the Owner by the Elevator Contractor shall be configured to perform all levels of diagnostics, systems adjustment and parametric software changes which are available to the Elevator Contractor. In those cases where diagnostic tools provided to the Owner require periodic recalibration/or re-initiation, the Elevator Contractor shall perform such tasks at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the completed project. During those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation, or repair, the Elevator Contractor shall provide a temporary replacement for the tool at no additional cost to the Owner. The Elevator Contractor shall deliver to the Owner, printed instructions for the proper use of any tool that may be necessary to perform diagnostic evaluations, system adjustment, and/or parametric software changes on any unit of microprocessor-based elevator control equipment and means of suspension other than standard elevator steel cables furnished and install by the Elevator Contractor. Accompanying the printed instructions shall be any and all access codes, password, or other proprietary information that is necessary to interface with the microprocessor-control equipment.

### 1.05 QUALITY ASSURANCE

- A. Manufacturer: Minimum of fifteen years experience in the fabrication, installation and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.
- B. Installer: The equipment manufacturer shall install the elevator.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.

### 1.06 DELIVERY, STORAGE AND HANDLING

- A. If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible to provide a safe, dry, and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.
- B. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

### 1.07 WARRANTY

- A. Provide manufacturer warranty for a period of one year. The warranty period is to begin upon Substantial Completion of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

### 1.08 MAINTENANCE SERVICE

- A. The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of **12 Months** after date of substantial completion. Replacement parts shall be produced by the original equipment manufacturer.
- B. Maintenance service be performed during regular working hours of regular working days and shall include **emergency 24-hour call back service**.
- C. Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.

## PART 2 PRODUCTS

## 2.01 MANUFACTURER

- A. Provide AC gearless machine room-less elevator systems subject to compliance with the design and performance requirements of this specification. Elevator manufacturers may include but are not limited to one of the following:
  - 1. Basis of Design: EcoSpace™ traction elevators by KONE, Inc. (www.kone.com).
  - 2. Other acceptable machine room-less products: manufacturer with minimum 15 years experience in manufacturing, installing, and servicing elevators of the type required for the project.

## 2.02 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

- A. Controller: Provide microcomputer based control system to perform all of the functions.
  - 1. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
  - 2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed and physically segregated from the rest of the controller.
  - 3. Provide a serial cardrack and main CPU board containing a non-erasable EPROM and operating system firmware.
  - 4. Variable field parameters and adjustments shall be contained in a non-volatile memory module.
- B. Drive: Provide Variable Voltage Variable Frequency AC drive system to develop high starting torque with low starting current.
- C. Controller Location: Locate controller(s) in an integral cabinet adjacent to the entrance frame at the top landing of the elevator.

## 2.03 EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the car guide rail at the top of the hoistway.
- B. Governor: Friction type over-speed governor rated for the duty of the elevator specified.
- C. Buffers, Car and Counterweight: **Polyurethane buffer.**
- D. Hoistway Operating Devices:
  - 1. Emergency stop switch in the pit
  - 2. Terminal stopping switches.
  - 3. Emergency stop switch on the machine
- E. Positioning System: System consisting of magnets and proximity switches.
- F. Guide Rails and Attachments: Steel rails with brackets and fasteners.

## 2.04 EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Entrances
  - 1. Sills: extruded.
  - 2. Doors: Hollow metal construction with vertical internal channel reinforcements.
  - 3. Fire Rating: Entrance and doors shall be UL fire-rated for 1-1/2 hour.
  - 4. Entrance Finish: Painted.
  - 5. Entrance Markings Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

## 2.05 EQUIPMENT: CAR COMPONENTS

- A. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- B. Platform: Platform shall be per manufacturers standard.
- C. Car Guides: Provide guide-shoes mounted to top and bottom of both car and counterweight frame. Each guide-shoe assembly shall be arranged to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Load weighing device shall be strain gauge type mounted to dead-end hitch attached atop the hoistway guide-rail.



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- E. Steel Cab (Glass Series)
  - 1. Panels: Non-removable vertical panels, Colored glass with aluminum frame selected from standard manufacturer's catalog of choices.
  - 2. Car Front Finish: Painted.
  - 3. Car Door Finish: Painted.
  - 4. Ceiling:
    - a. **Rectangle LED Down Light Drop Ceiling - LF-98:** Satin Finished Stainless Steel three panel suspended ceiling with **two** holes per panel for Rectangular LED lights.
  - 5. Handrail:
    - a. **Custom Round - satin stainless steel - 2 in..** Rails to be located on **Back Wall** of car enclosure.
  - 6. Flooring: By others. (Not to exceed 2sqft & 1/2" finished depth.)
  - 7. Threshold: Aluminum
  - 8. **Protective pad hooks and quilted fire retardant protective pads: Pad to be hung from suspended ceiling**
- F. Emergency Car Signals
  - 1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
  - 2. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
  - 3. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- G. Ventilation: **No fan.**

### 2.06 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation.
  - 1. Flush Car operating panel shall contain a bank of round, mechanical, illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection, and exhaust fan. Buttons have **white** illumination (halo). All buttons to have raised text and Braille marking on left hand side. The car operating display panel shall be **white** Scrolling DOT-matrix. All texts, when illuminated, shall be **white**. The car operating panel shall have a brushed stainless steel finish.
  - 2. Additional features of car operating panel shall include:
    - a. Car Position Indicator within operating panel (**white**).
    - b. Elevator Data Plate marked with elevator capacity and car number on car top.
    - c. Help buttons with raised markings.
    - d. In car stop switch per local code.
    - e. Firefighter's hat.
    - f. Firefighter's Phase II Key-switch.
    - g. Call Cancel Button.
    - h. Pre-programmed integrated ADA phone (complete description of krms features included as standard)
    - i. Help Button/Communicator. Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
    - j. Firefighter's Phase II emergency in-car operating instructions.
- B. Hall Fixtures: Wall mounted hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Wall mounted hall fixtures shall have a brushed stainless steel finish.
  - 1. Hall fixtures shall feature round, mechanical, buttons in applied mount face frame. Hall fixtures shall correspond to options available from that landing. Buttons shall be in a vertically mounted fixture. Hall fixtures shall not be jamb-mounted. Hall lanterns shall feature **white** illumination.
- C. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound. The chime will sound once for up and twice for down.

### 2.07 EQUIPMENT: ELEVATOR OPERATION AND CONTROLLER

- A. Elevator Operation
  - 1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

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2. Zoned Car Parking.
  3. Relative System Response Dispatching.
- B. Standard Operating Features to include:
1. Full Collective Operation
  2. Fan and Light Control.
  3. Load Weighing Bypass.
  4. Ascending Car Uncontrolled Movement Protection
  5. Top of Car Inspection Station.
- C. Additional Operating Features to include:
- D. Elevator Control System for Inspections and Emergency
1. Provide devices within controller to run the elevator in inspection operation.
  2. Provide devices on car top to run the elevator in inspection operation.
  3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
  4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
  5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
  6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
  7. Provide the means for the control to reset elevator earthquake operation.

### 2.08 EQUIPMENT: DOOR OPERATOR AND CONTROL

- A. Door Operator: A closed loop permanent magnet VVVF high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro-mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by local code. Battery powered lowering in emergency to be provided.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Door hangers and tracks shall be provided for each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed-for-life bearings.
- E. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- B. Do not proceed with work until unsatisfactory conditions are corrected.
- C. Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- D. Prior to start of Work, verify projections greater than 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.
- E. Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete

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sill support shall not be required.

- F. Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- G. Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including Sleeves and penetrations.
- H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

### 3.02 PREPARATION

- A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

### 3.03 INSTALLATION

- A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.
- B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.
- C. All hoistway frames shall be securely fastened to fixing angles mounted in the hoistway. Coordinate installation of sills and frames with other trades.
- D. Lubricate operating system components in accordance with manufacturer recommendations.
- E. Perform final adjustments, and necessary service prior to substantial completion.

### 3.04 CONSTRUCTION

- A. Interface with Other Work:
  - 1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.
  - 2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.
    - a. Ensure adequate support for entrance attachment points at all landings.
    - b. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.
    - c. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.
    - d. Coordinate interface of elevators and fire alarm system.
    - e. Coordinate interface of dedicated telephone line.

### 3.05 TESTING AND INSPECTIONS

- A. Perform recommended and required testing in accordance with authority having jurisdiction.
- B. Obtain required permits and provide originals to Owner's Representative.

### 3.06 DEMONSTRATION

- A. Prior to substantial completion, instruct Owner's Representative on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures.

### END OF SECTION

## SECTION 260000 - GENERAL ELECTRICAL REQUIREMENTS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Basic Electrical Requirements specifically applicable to Divisions 26, 27 and 28 Sections.

#### 1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. ANSI C2 - National Electrical Safety Code.
- C. ANSI/NFPA 101 - Life Safety Code.

#### 1.03 RELATED REQUIREMENTS

- A. Conditions of the Contract and Division 1 - General Requirements, apply to all work, including work of this Division. Examine all contract documents for requirements affecting this work.

#### 1.04 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.
- C. Mark dimensions and values in units to match those specified.
- D. Provide fixture schedule, lighting drawings, panelboard schedules and single line or risers diagram(s) to supplier for assistance in pricing as applicable. Contractor shall receive one set of black line drawings for reproduction from the engineer for this purpose.

#### 1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable local, State and Federal Building Code for the State of Maine.
- B. Electrical: Conform to NFPA 70, NFPA72, NFPA 99, NFPA 101, ANSI C2, 2 FM, UL, and applicable ASTM and ANSI Standards.
- C. Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim shall be recognized for extra compensation due to failure of contractor to familiarize himself/herself with the conditions and extent of proposed work.
- D. Obtain permits and request inspections by local authority having jurisdiction.

#### 1.06 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Engineer before proceeding.

#### 1.08 TEMPORARY LIGHT AND POWER

- A. Temporary light and power shall be installed and maintained by the Electrical Contractor for use by all trades for the duration of construction complete with all wiring, switches, protective devices and similar equipment as may be required. Arrangement for the temporary service with the Power Company is the responsibility of the Electrical Contractor. Power bills will be paid by the General Contractor. Provide 120/208 volt or 120/240 volt 100 ampere, drop box similar to standard CMP detail 980-31.1.4. Provide 15-20 watt self ballasted compact fluorescent, lamps with plastic "cages" as needed. or 4 foot twin lamp (T8) fluorescent tamper-proof, gasketed and water-tight as required.

#### 1.09 CONTRACT DRAWINGS AND SPECIFICATIONS

- A. It is to be understood that drawings accompanying these specifications are intended to show general arrangement and extent of work to be done, but exact location and arrangement of all components shall be determined as work progresses. Anything shown on the drawings and not specifically mentioned in specifications or vice versa shall be considered as required in both.
- B. Locations of equipment, and materials, etc., as given on drawings are approximate unless dimensioned. It shall be understood they are subject to such modifications as may be found necessary or desirable at time of installation in order to meet any structural conditions. Such changes shall be made by the contractor without extra charges.
- C. Because of small scale drawings, all required offsets, etc., as may be required to clear work of other Contractors, may not be shown. Contractor, however, shall provide all necessary offsets, etc., as required to complete the installation of their work and not conflict with that of others.
- D. It is the intention that wiring systems shall be complete and fully operational. The contractor shall identify system components during the bid process that clearly constitute conditions that would cause the system to be incomplete. Clarification: The remedy to these discrepancies shall be communicated by the engineer to all bidders or included as an addenda.

#### 1.10 MATERIALS AND LABOR

- A. Bidders for this work shall carefully examine the Plans and Specifications, as the Contractor shall be required to furnish all materials and labor necessary to deliver to the Owner a complete system installed in full accordance with Local State and Federal laws. The system shall be furnished as specified, tested, and turned over to the Owner in perfect operating condition.

- B. All materials shall be new and of best quality of their respective kinds. Workmanship in all respects shall be of highest grade and all construction shall be done according to best practices of the trade. Materials shall be warrantied directly by the manufacturer.
- C. Contractor shall provide, when required for review of Engineer, labeled samples of any material or equipment specified herein or proposed to be used on this project.
- D. Where words "furnish", "provide" or "install" are mentioned, either singly or in combination, these words are hereby interpreted to mean "furnish and install" or "provide and install," including all materials complete with all connections, supplemental devices, accessories and appurtenances, unless specifically otherwise noted. These words are likewise hereby interpreted as being prefixed to all materials, equipment, and apparatus hereinafter mentioned, either in abbreviated or schedule information.

#### 1.11 PROTECTION OF WORK AND MATERIALS

- A. Contractors shall be responsible for the care and protection of all materials delivered and labor performed until the completion of the work.
- B. Cap all uncompleted lines, raceways, and ducts until ready for final connections, or future work as indicated.
- C. All portions of the work liable to damage by weather or by those engaged on the project, must be securely protected by temporary, but substantial covering which must be maintained in position until Engineer authorizes removal.

#### 1.12 REPLACEMENTS

- A. In the event of damage to any equipment or materials, immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Owner.

#### 1.13 SAFETY REGULATIONS

- A. All work to be performed and/or installed shall conform to all requirements of the Occupational Safety and Health Act (OSHA) of 1970 and all Amendments thereto.

#### 1.14 INSURANCE

- A. The Contractor shall purchase and maintain all Workmen's Compensation Insurance, Public Liability and Property Damage Insurance during the progress of the work and until completion and acceptance of the entire project by the Owner.

#### 1.15 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.

- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work using persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and physical distortion or disfigurement.

#### 1.16 SCHEDULE OF MATERIALS AND EQUIPMENT

- A. As soon as practicable, and before commencement of installation of any material or equipment, a complete schedule of materials and equipment proposed for installation shall be submitted for review. Schedule shall also include a list of all proposed subcontractors. Partial or incomplete lists will not be considered. Any materials, fixtures, and equipment not conforming to specifications may be rejected. Also see Section 01300, Submittals.
- B. Orders for purchase of any devices, material, conduit, etc., or other equipment shall not be placed until this schedule is reviewed.

#### 1.17 UNDERWRITER'S APPROVALS

- A. All electrical materials and equipment shall bear label of Underwriter's Laboratories, shall be listed by them in their list of electrical fittings and shall be approved by them for purpose for which they are to be used, unless materials and equipment are of a type for which Underwriter's Laboratories does not list or provide label service.

#### 1.18 SUBSTITUTIONS

- A. Where the specifications allow the substitution of a product for that which has been specified, said substitution must be reviewed by the Engineer and shall be equivalent in all respects to that which is specified. The Engineer's decision shall be obtained on all questions as follows, and his/her judgment shall be final and binding on all parties.
- B. Reference in the specifications or on the drawings to any product, material, fixture, form or type of construction, etc., by proprietary name, manufacturer, make or catalog number, shall be interpreted as establishing a standard of quality or design and shall not be construed as limiting competition. The Contractor may, at his/her option, use any fully equivalent substitute provided written review by the Engineer is first obtained indicating acceptance of the equality of the substitute preferred.
- C. For materials or equipment which are supplied with integral or factory applied finish, the colors of same shall be considered in evaluating substitutions.
- D. For the purpose of avoiding conflicts with other trades, contracts, and adjoining work where more than one (1) article, device, material, fixture, form or type of construction, etc., is

referred to by proprietary name, manufacturer, make or catalog number, the first named shall be used as the basis of design and details. The cost of any changes of approved equivalent item shall be borne by the Contractor requesting such change.

#### 1.19 RECORD DRAWINGS

- A. During construction, the Contractor shall keep an accurate record of all deviations to the installation of the work as indicated on the drawings. Upon completion of the work, the Contractor shall furnish a copy of this record to the Engineer, on a black line of the original which will be available from the Engineer. Submit record drawings before requesting final payment.

#### 1.20 MANUFACTURER'S REPRESENTATIVE

- A. At appropriate times, or as directed by the Engineer, provide the services of a competent factory trained Engineer or Technician of the particular manufacturer of equipment or item involved, to inspect, adjust, and place in proper operating condition any and all such items of manufacture. No additional compensation shall be allowed Contractors for such service.

#### 1.21 MANUFACTURERS' INSTRUCTIONS, AND OPERATION AND MAINTENANCE DATA

- A. Provide for each item of equipment or apparatus furnished, a complete set of printed instructions obtained from the manufacturer covering proper operation, care, lubrication, cleaning, servicing, adjustment, etc., together with any special safety instructions.
- B. Manufacturers' data shall further include performance data (time current curves, where applicable), complete parts lists, recommended spare parts lists, and wiring diagrams.
- C. Data shall be arranged in complete sets, properly indexed and marked.
- D. Data shall include complete set of shop drawings.
- E. Material shall first be submitted in preliminary fashion for review by Engineer. After approval, Contractor shall submit two (2) copies in bound volumes to the Engineer for distribution.
- F. Provide contacts for service agencies for all major system components.

#### 1.22 GUARANTEES

- A. An item becomes "defective" when it ceases to conform to this Contract Document. Guarantees beginning on the date of issuance of the Owner's final payment, or certificate of substantial completion, with Owner taking occupancy or beneficial use thereafter.
- B. Upon completion of the work and before applying for final payment, furnish a written guarantee, stating that the work complies with the provisions of codes listed herein and the local enforcing authorities, and that it will be free from defects of material and workmanship for the required guarantee period. Guarantee shall further state that the Contractor will, at his own expense, repair and/or replace any of his material and work which may become defective



during the time of guarantee, together with other work damaged as a consequence of such defects. All manufacturers written warranties shall apply to materials. Warranties other than that of the manufacturer are not acceptable.

- C. The guarantee period shall be one (1) year except when longer periods are indicated for specific equipment.
- D. All materials in Division 26 where a written warranty is published shall require the warranty to be offered by the product manufacturer.

#### 1.23 EXISTING UTILITIES AND EQUIPMENT

- A. Extreme care shall be taken to protect existing utilities and equipment above and below grade and in all other locations. Information contained on drawings is not guaranteed as to location, invert, etc. but represent the best information available as to the location of underground and concealed utilities and equipment. The Contractor shall be responsible for the replacement of all damaged or broken utilities or equipment due to their work or operations.

#### 1.24 ENERGIZING EQUIPMENT

- A. Obtain Owner's written approval before energizing any equipment.

### PART 2 PRODUCTS

Not used.

### PART 3 EXECUTION

#### 3.01 CONNECTION TO EQUIPMENT

- A. The Contractor shall be responsible for proper wiring and raceway connections to equipment, make sure of alignment, both initially and under operating conditions, and provide proper supports, brackets, means of expansion, etc., to make sure that no excessive stresses are applied to equipment. Raceways shall be run to the equipment and alignment checked before final bolting and fastening.
- B. At the request of the Engineer, dismantle equipment connections to demonstrate proper installation and make such corrections necessary without additional compensation for disassembly, re-connection, or the required corrective work.
- C. Equipment shall be installed in such a manner as to permit disconnecting for service and repairs without the necessity of rigging.

#### 3.02 CLOSING IN UNINSPECTED WORK

- A. General: Do not cover up or enclose work until it has been properly and completely inspected and approved. Engineer may waive this requirement by written permission.
- B. Noncompliance: Should any of the work be covered up or enclosed prior to all required

inspections and approvals, uncover the work as required, and after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Engineer and at no additional cost to the Owner.

### 3.03 CLEANING OF SYSTEMS

- A All wiring systems shall be thoroughly cleaned prior to initial operation and in accordance with manufacturer's instructions for equipment to be furnished and/or installed.
- B Furnish all detergents, solvents, cleaning compounds, tools, etc., required in connection with cleaning operations.
- C Thoroughly clean all exposed portions of all equipment, remove all labels, and wipe clean with a damp rag.

### 3.04 TESTING, BALANCING, AND ADJUSTING

- A Electrical loads shall be balanced on all phase legs to a tolerance of plus or minus 10 percent. Include testing circuits for shorts to ground. Measure grounding system resistance. Correct all deficiencies. Provide all test equipment.

### 3.05 INSTRUCTIONS

- A On completion of the job, Contractor shall provide competent technicians to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed 2 hours and be performed in a minimum of one interval. The time of instruction shall be arranged with the Owner. The Electrical subcontractor shall be present and participate in the Owner's instruction.

### 3.06 FIRESTOPPING

- A Firestopping shall be performed in accordance with Specification Section "Firestopping". All penetrations of fire-rated assemblies including walls and floors by electrical system components (conduits, cables, etc.) shall be firestopped as specified. Coordinate size, location and type of sleeves as required by firestopping systems.

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

## SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. General Cable Technologies Corporation.
  - 2. Southwire Incorporated.
  - 3. The Okonite Company.
- B. Aluminum and Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.
- D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for Metal Clad cable, Type MC or SO cable.

#### 2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. AFC Cable Systems, Inc.

2. Gardner Bender.
3. Hubbell Power Systems, Inc.
4. Ideal Industries, Inc.
5. IlSCO; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. O-Z/Gedney; a brand of the EGS Electrical Group.
8. 3M; Electrical Markets Division.
9. Tyco Electronics.

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

### 2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. All conductor sizes shown on drawings are for copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Feeders: Type THHN-2-THWN-2, single conductors in raceway.
- B. Exposed Branch Circuits, Including in Crawlspace: Type THHN-2-THWN-2, single conductors in raceway.
- C. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Metal Clad Cable, Type MC.
- D. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Complete raceway installation between conductor and cable termination points according to Section "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL.
- B. Make splices, terminations, and taps that are compatible with conductor material.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### 3.5 IDENTIFICATION

- A. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### 3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
- B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

## SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes: Grounding systems and equipment.
- B. Section includes grounding systems and equipment, plus the following special applications:
  - 1. Underground distribution grounding.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
  7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

## 2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

## 2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.
1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches (1200 mm) long.
  2. Backfill Material: Electrode manufacturers recommended material.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
1. Bury at least 24 inches (600 mm) below grade.
  2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  - 1. Install bus on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
  - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.
- D. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

### 3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

### 3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.



2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
- E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

### 3.5 LABELING

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.

### 3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
  - D. Prepare test and inspection reports.
  - E. Report measured ground resistances that exceed the following values:
    1. Power and Lighting Equipment or System with Capacity of 500 kVA and less: 10 ohms.
  - F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

## SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits, tubing, and fittings.
  - 2. Boxes, enclosures, and cabinets.

#### 1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For raceways, and fittings, floor boxes, hinged-cover enclosures, and cabinets.

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. EMT: Comply with ANSI C80.3 and UL 797.
- D. FMC: Comply with UL 1; zinc-coated steel or aluminum.
- E. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  - 1. Fittings for EMT:
    - a. Material: Steel or die cast.

- b. Type: Setscrew.
- G. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Metal Floor Boxes:
  - 1. Material: Cast metal.
  - 2. Type: Fully adjustable.
  - 3. Shape: Rectangular.
  - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- J. Gangable boxes are allowed.
- K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

## PART 3 - EXECUTION

### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed Conduit: GRC.
  - 2. Concealed Conduit, Aboveground: GRC.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC.
  - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed: EMT.
  - 2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  - 4. Damp or Wet Locations: GRC.
  - 5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  - 2. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
  - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

### 3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- G. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- H. Stub-ups to Above Recessed Ceilings:
  - 1. Use EMT for raceways.
  - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- L. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- M. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- N. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- O. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- P. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
- Q. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- R. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- S. Locate boxes so that cover or plate will not span different building finishes.

- T. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- V. Set metal floor boxes level and flush with finished floor surface.

### 3.3 INSTALLATION OF ELECTRICAL BOXES IN FIRE RATED WALLS

- A. Outlet boxes on opposite sides of the wall shall be separated as follows:
  - 1. By a horizontal distance of not less than 24 inches (610 mm);
  - 2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose fill, rockwool or slag mineral wool insulation.
  - 3. By protecting both outlet boxes by listed putty pads, 3M Catalog # MPP+ or equal.
- B. Boxes exceeding 16 sq. in. (103 sq. cm) must be protected by listed putty pads, 3M Catalog # MPP+ or equal.

END OF SECTION 260533

## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Underground-line warning tape.
  - 5. Warning labels and signs.
  - 6. Instruction signs.
  - 7. Equipment identification labels.
  - 8. Miscellaneous identification products.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

#### 1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.



- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

### 2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an white field.
  - 2. Legend: Indicate voltage.
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.

### 2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Colors for Cables Carrying Circuits at 600 V and Less:
  - 1. Black letters on an white field.
  - 2. Legend: Indicate voltage.
- C. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.
- E. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

### 2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- C. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.
- D. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

### 2.4 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
  - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
  - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
  - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
  - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
  - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE.
  - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE.

### 2.5 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

## 2.6 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

## 2.7 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

C. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

## 2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.

### 3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 30-foot (10-m) maximum intervals.
- B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded feeder and service conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
- C. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.
- E. Control-Circuit Conductor Termination Identification: For identification at terminations provide self-adhesive vinyl labels with the conductor designation.

- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.
1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
  2. Identify system voltage with black letters on an orange background.
  3. Apply to exterior of door, cover, or other access.
  4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
    - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Enclosed switches.
- e. Enclosed circuit breakers.
- f. Enclosed controllers.
- g. Variable-speed controllers.
- h. Push-button stations.
- i. Contactors.
- j. Remote-controlled switches, dimmer modules, and control devices.

END OF SECTION 260553

## SECTION 260924 - LIGHTING CONTROL DEVICES

### PART 1 – GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Wall box mounted, wall/corner mounted, and ceiling mounted occupancy sensors including dual technology, ultrasonic, and passive infrared technologies. This includes self contained PIR sensors as well as low voltage sensors that work with Switchpacks.

##### B. Related Sections:

1. Section 265100 – Interior Lighting.

#### 1.2 REFERENCES

##### A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)

1. C62.41-1991 – Recommended Practice for Surge Voltages in Low Voltage AC Power Circuits.

##### B. ASTM International (ASTM)

1. D4674 -02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.

##### C. National Electrical Manufacturers Association (NEMA)

1. WD1 (R2005) - General Color Requirements for Wiring Devices.

##### D. Underwriters Laboratories, Inc. (UL):

1. 94 – Flammability Rating
2. 916 – Energy Management Equipment.
3. 508 (2005) - Standard for Industrial Control Equipment.
4. 244A – Appliance Controls

#### 1.3 SYSTEM DESCRIPTION

##### A. Permanently installed

1. Wall switch occupancy sensors
2. Ceiling mounted occupancy sensors

#### 1.4 SUBMITTALS

##### A. Submit under provisions of Section 013300.

##### B. Specification Conformance Document: Indicate whether the submitted equipment:

1. Meets specification exactly as stated.
2. Meets specification via an alternate means and indicate the specific methodology used.

##### C. Shop Drawings; include:

1. Load schedule indicating actual connected load, load type, and voltage per circuit, circuits and their respective control zones, circuits that are on emergency, and capacity, phase, and corresponding circuit numbers.
2. Schematic of system.
3. Lighting plan clearly marking product type, location and orientation of each sensor.

##### D. Product Data: Catalog specification sheets with performance specifications demonstrating compliance with specified requirements.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer: Minimum 20 years' experience in manufacture of occupancy sensor lighting controls.
- B. Manufacturer's Quality System: Registered to ISO 9001:2000 Quality Standards, including in-house engineering for product design activities.
- C. Occupancy Sensing Lighting Controls:
  - 1. Listed by UL specifically for the required loads. Provide evidence of compliance upon request.
- D. Installer Qualifications: Installer shall be one who is experienced in performing the work of this section, and who has specialized in installation of work similar to that required for this project.
- E. Source Limitations: To assure compatibility, obtain occupancy sensors from a single source with complete responsibility over all lighting controls, including accessory products. The use of subcontracted component assemblers is not acceptable.

## 1.6 PROJECT CONDITIONS

- A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
  - 1. Ambient temperature: 0° to 40° C (32° to 104° F).
  - 2. Relative humidity: Maximum 90 percent, non-condensing.
  - 3. Occupancy Sensors must be protected from dust during installation.

## 1.7 WARRANTY

- A. Provide manufacturer's 5-year parts warranty.

## 1.8 MAINTENANCE

- A. Make ordering of new equipment for expansions, replacements, and spare parts available to end user.
- B. Make new replacement parts available for minimum of ten years from date of manufacture.
- C. Provide factory direct technical support.

## PART 2- PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Eaton Lighting Systems (formerly Cooper Controls)
- B. Substitutions: Allowed under provisions of Division 1.

### 2.2 SENSOR PERFORMANCE REQUIREMENTS

- A. Sensing mechanism:
  - 1. Infrared: Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
  - 2. Dual technology:
    - a. Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
    - b. Utilize an operating frequency of 32 kHz or 40 kHz that shall be crystal controlled to operate within plus or minus 0.005% tolerance.
    - c. Incorporate Doppler shift ultrasonic and passive infrared motion detection technologies. Products that react to noise or ambient sound shall not be



considered.

- B. Power failure memory:
  - 1. Controls incorporate non-volatile memory. Should power be interrupted and subsequently restored, settings and parameters saved in protected memory shall not be lost.
- C. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.
- D. Products tested in identical manner, complaint to NEMA WD 7 -2011 Occupancy Motion Sensors Standards.
- E. Sensor shall have time delays from 10 to 30 min.
- F. When specified, sensors shall automatically adjust time delay and sensitivity settings.
- G. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
- H. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
- I. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed, and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

### 2.3 LINE VOLTAGE CEILING MOUNTED OCCUPANCY SENSORS

- A. Product: OAC-DT-2000-MV, OAC-DT-2000-DMV
- B. Provide all necessary mounting hardware and instructions.
- C. Capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet
- D. Shall accommodate loads from 0-800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180 degree coverage capability.
- E. Shall be able to have their visible plastic parts replaced, for color changes in the field, without removing the body of the control from the wall and without requiring special tools.
- F. Shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.
- G. Shall have no leakage current to load, in manual or in Auto/Off Mode for safety purposes and shall have voltage drop protection.
- H. Where specified, dual relay sensors shall offer daylighting foot-candle adjustment control for either or both relays.

### 2.4 OCCUPANCY WALL SWITCHES

- A. Product: OSW-P-0451-MV-\*, ONW-P-1001-MV-\*, ONW-P-1001-347-\*, ONW-P-1001-DMV-\*, ONW-P-1001-D347-\*, ONW-P-1001-SP-\*, ONW-P-1001-RR7-\*
- B. Capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet
- C. Shall accommodate loads from 0-800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180 degree coverage capability.
- D. Shall be able to have their visible plastic parts replaced, for color changes in the field, without removing the body of the control from the wall and without requiring special tools.
- E. Shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.
- F. Shall have no leakage current to load, in manual or in Auto/Off Mode for safety purposes and shall have voltage drop protection.

- G. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from Automatic On to Manual On.
- H. Where specified, dual relay sensors shall offer daylighting footcandle adjustment control for either or both relays.

## 2.5 SOURCE QUALITY CONTROL

- A. Perform full-function testing on 100% of all system components and panel assemblies at the factory.

## PART 3- EXECUTION

### 3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's installation instructions.
- B. Provide complete installation of system in accordance with Contract Documents.
- C. Provide equipment at locations and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.

### 3.2 TESTING

- A. Upon completion of all wiring and after all fixtures are installed and lamped, a representative shall check the installation prior to energizing the system. Each installed occupancy sensor shall be tested in the Test Mode to see that lights turn OFF and on based on occupancy.
- B. At the time testing, the owner's representative shall be thoroughly instructed in the proper operation of the system.

END OF SECTION

## SECTION 261900 - SUPPORTING DEVICES

### PART 1 GENERAL

#### 1.01 WORK INCLUDED

- A. Conduit and equipment supports.
- B. Fastening hardware.

#### 1.02 RELATED WORK

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

### PART 2 PRODUCTS

#### 2.01 MATERIAL

- A. Support Channel: Galvanized or painted steel.
- B. Hardware: Corrosion resistant.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using pre-cast insert system, expansion anchors, beam clamps.
- C. Anchors and Fasteners
  - 1) Concrete Structural Elements: Use pre-cast insert system, expansion anchors, powder actuated anchors and preset inserts.
  - 2) Steel Structural Elements: Use beam clamps, steel ramset fasteners, and welded fasteners.
  - 3) Concrete Surfaces: Use self-drilling anchors and expansion anchors.
  - 4) Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
  - 5) Solid Masonry Walls: Use expansion anchors and preset inserts.
  - 6) Sheet Metal: Use sheet metal screws.
  - 7) Wood Elements: Use wood screws.
- D. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- E. Do not use power-actuated anchors.
- F. Do not drill structural steel members.

- G. Fabricate supports or trapeze hangers from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- H. In wet locations install free-standing electrical equipment on concrete pads.
- I. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.

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

## SECTION 262713 - ELECTRICITY METERING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes equipment for electricity metering by utility company.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Receive, store, and handle modular meter center according to NECA 400.

#### 1.6 COORDINATION

- A. Electrical Service Connections: Coordinate with utility companies and components they furnish as follows:
  1. Comply with requirements of utilities providing electrical power services.
  2. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

### PART 2 - PRODUCTS

#### 2.1 EQUIPMENT FOR ELECTRICITY METERING BY UTILITY COMPANY

- A. Meters will be furnished by utility company.

- B. Modular Meter Center: Factory-coordinated assembly of a main service disconnect device, wireways, tenant meter socket modules, and tenant feeder circuit breakers arranged in adjacent vertical sections. Assembly shall be complete with interconnecting buses and other features as specified below.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
    - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
    - c. Siemens Energy & Automation, Inc.
    - d. Square D; a brand of Schneider Electric.
  2. Comply with requirements of utility company for meter center.
  3. Housing: NEMA 250, Type 3R enclosure.
  4. Minimum Short-Circuit Rating: 42,000 A symmetrical at rated voltage.
  5. Main Disconnect Device: Circuit breaker, series-combination rated for use with downstream feeder and branch circuit breakers.
  6. Tenant Feeder Circuit Breakers: Series-combination-rated molded-case units, rated to protect circuit breakers in downstream tenant and house load centers that have 10,000A interrupting capacity.
    - a. Identification: Complying with requirements in Section 260553 "Identification for Electrical Systems" with legend identifying tenant's address.
    - b. Physical Protection: Tamper resistant, with hasp for padlock.
  7. Meter Socket: Rating coordinated with indicated tenant feeder circuit rating.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Comply with equipment installation requirements in NECA 1.
- B. Install meters furnished by utility company. Install raceways and equipment according to utility company's written requirements. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

#### 3.2 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
  1. Series Combination Warning Label: Self-adhesive type, with text as required by NFPA 70.
  2. Equipment Identification Labels: Adhesive film labels with clear protective overlay.

END OF SECTION 262713

## SECTION 262726 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Receptacles, receptacles with integral USB, GFCI, and associated device plates.
  - 2. Weather-resistant receptacles.
  - 3. Snap switches and wall-box dimmers.
  - 4. Cord and plug sets.

#### 1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- C. UTP: Unshielded twisted pair.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
  - 2. Cord and Plug Sets: Match equipment requirements.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
  - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  - 3. Leviton Mfg. Company Inc. (Leviton).
  - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

### 2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

### 2.3 STRAIGHT-BLADE RECEPTACLES

- A. Tamper-Resistant Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.
- B. Weather-Resistant and Tamper-Resistant Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section, when installed in wet and damp locations.
- C. Telephone Outlet:
  - 1. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 6. Comply with UL 1863.



D. Combination TV and Telephone Outlet:

1. Description: Single RJ-45 jack for 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 6. Comply with UL 1863.

2.4 STRAIGHT-BLADE USB RECEPTACLES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell catalog number WSBUSB2X2 or comparable product by one of the following:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Leviton Mfg. Company Inc. (Leviton).
3. Pass & Seymour/Legrand (Pass & Seymour).

2.5 GFCI RECEPTACLES

A. General Description:

1. Tamper resistant Straight blade, feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A.

2.6 CORD AND PLUG SETS

A. Description:

1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.7 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

2.8 WALL-BOX DIMMERS

A. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.

## 2.9 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

## 2.10 FINISHES

- A. Device Color:
  - 1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
- D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

### 3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

### 3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

- A. Test straight-blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).
- B. Wiring device will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 262726

## SECTION 264700

### PANELBOARDS

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Service and distribution panelboards.

##### 1.02 RELATED WORK

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

##### 1.03 REFERENCES

- A. NECA (National Electrical Contractors Assoc.) "Standard of Installation".
- B. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.
- C. NEMA AB 1 - Molded Case Circuit Breakers.
- D. NEMA KS 1 - Enclosed Switches.
- E. NEMA PB 1 - Panelboards.
- F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- G. NEMA PB 1.2 - Application Guide for Ground-Fault Protective Devices for Equipment.
- H. NFPA 70 - National Electrical Code.

##### 1.04 SUBMITTALS

- A. Submit shop drawings for equipment and component devices.
- B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

##### 1.05 SPARE PARTS

- A. Keys: Furnish 4 each to Owner.

## PART 2 PRODUCTS

### 2.01 PANELBOARDS

#### A. Main and Distribution Panelboards

1. Panelboards: NEMA PB 1; circuit breaker type – bolt on.
2. Enclosure: NEMA PB 1; Type 1.
3. Provide cabinet front with concealed trim clamps, screw cover, and hinged door with flush lock. Finish in manufacturer's standard gray enamel.
4. Provide panelboards with aluminum bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.
5. Minimum Integrated Short Circuit Rating: Short circuit rating for LP panels shall be 22,000 AIC. Main Service Circuit Breaker 100,000 AIC or as noted on drawings.
6. Molded Case Circuit Breakers: NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
7. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1 FS W-C-375; provide circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
8. Current Limiting Molded Case Circuit Breakers; NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.
9. Provide circuit breaker accessory trip units and auxiliary contacts as indicated.
10. Install the quantity of corrosion inhibiting compound recommended by manufacturer in all wireways and device enclosures. This includes PVC enclosures where device terminals are exposed to the atmosphere.

#### Branch Circuit Panelboards

1. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type. FS W-P-115; Type I, Class 1.
2. Enclosure: NEMA PB 1; Type 1.
3. Cabinet Size: 6 inches deep; 20 inches wide for 240 volt and less panelboards.
4. Provide surface cabinet front with concealed trip clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.
5. Provide panelboards with aluminum bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.
6. Minimum Integrated Short Circuit Rating: 22,000 amperes rms symmetrical for 208 volt panelboards or as shown on Drawings.
7. Molded Case Circuit Breakers: NEMA AB 1 FS W-C- 375; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.
8. Current Limiting Molded Case Circuit Breakers: NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.
9. Provide circuit breaker accessory trip units and auxiliary contacts as indicated.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.
- B. Height: 6 feet to top of panelboard maximum.
- C. Provide filler plates for unused spaces in panelboards.
- D. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads. Label Panels per Section 261950.
- E. Provide 6 – 1” EMT conduits from recessed panelboards to accessible point above the ceiling wherever possible.

### 3.02 FIELD QUALITY CONTROL

- A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

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

## SECTION 265100 - INTERIOR LIGHTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Interior lighting fixtures, LEDs and drivers.
  - 2. Emergency lighting units.
  - 3. Exit signs.
  - 4. Lighting fixture supports.

#### 1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color-rendering index.
- C. Lumen: Measured output of lamp and luminaire, or both.
- D. Luminaire: Complete lighting fixture, including ballast housing if provided.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
  - 1. Physical description of lighting fixture including dimensions.
  - 2. Emergency lighting units including battery and charger.
  - 3. Energy-efficiency data.
  - 4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
  - 5. Lamp data including dimensions, color temperature and power consumption
  - 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
    - a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.



- b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Installation instructions.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps: 10 of each type and rating installed. Furnish at least one of each type.
  - 2. Plastic Diffusers and Lenses: One of each type and rating installed. Furnish at least one of each type.
  - 3. Ballasts: 2 of each type and rating installed. Furnish at least one of each type.
  - 4. Globes and Guards: 1 of each type and rating installed. Furnish at least one of each type.

#### 1.7 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

#### 1.8 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

## 2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- E. Diffusers and Globes:
  - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    - a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
    - b. UV stabilized.
  - 2. Glass: Annealed crystal glass unless otherwise indicated.

## 2.3 LEDs:

- 1. The light source of the luminaires shall consist of LED arrays or bars. If required, the LED arrays or bars shall be removable.
- 2. The LEDs shall be either white or RGB, according to the light fixture schedule and Drawings. For luminaires specified with white light, it is not acceptable to provide RGB LEDs mixed to produce white light.
- 3. Refer to the light fixture schedule and Drawings for the specified correlated color temperature (CCT) of each luminaire.
- 4. Individual LEDs shall be binned by manufacturer to comply with ANSI C78.377.
- 5. The LEDs shall be manufactured by Cree, Philips, Toshiba, Osram, Samsung, or Nichia, unless otherwise noted.

## 2.4 DRIVERS:

- 1. The driver or power supply for the luminaire shall be modular and replaceable.
- 2. The rated life of the driver shall match the rated life of the LEDs and luminaire.
- 3. In general, the drive current rating of the driver shall be minimized, while still maintaining the required lumen output, to improve luminaire efficiency and life.
- 4. The driver shall meet the emission standards of IEC EN-61000-6-3 at a minimum. For healthcare or other applications with EMI sensitive equipment, provide drivers that meet more stringent standards as required.

## 2.5 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
  - 1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
  - 2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
    - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

## 2.6 EMERGENCY LIGHTING UNITS

- A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.
  - 1. Battery: Sealed, maintenance-free, lead-acid type.
  - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
  - 3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
  - 4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
  - 5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Lighting fixtures:
  - 1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
  - 2. Install lamps in each luminaire.

- B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.
- C. Suspended Lighting Fixture Support:
  - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
  - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
  - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
  - 4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.
- D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### 3.2 IDENTIFICATION

- A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### 3.3 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

### 3.4 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.

END OF SECTION 265100

## SECTION 271100 - COMMUNICATIONS EQUIPMENT ROOM FITTINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Telecommunications mounting elements.
- 2. Telecommunications equipment racks.
- 3. Grounding.

- B. Related Requirements:

- 1. Section 271500 "Communications Horizontal Cabling" for voice and data cabling associated with system panels and devices.

#### 1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. LAN: Local area network.
- C. RCDD: Registered Communications Distribution Designer.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks.
- 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

- 1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings an RCDD.

2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

## PART 2 - PRODUCTS

### 2.1 EQUIPMENT FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Belden Inc.
2. Cooper B-Line.
3. Emerson Network Power Connectivity Solutions.
4. Hubbell Premise Wiring.
5. Leviton Commercial Networks Division.
6. Middle Atlantic Products, Inc.
7. Ortronics, Inc.
8. Panduit Corp.
9. Siemon Co. (The).
10. Tyco Electronics Corporation; AMP Products.

- B. General Frame Requirements:

1. Distribution Frames: Freestanding and wall-mounting, modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.
2. Module Dimension: Width compatible with EIA 310-D standard, 19-inch (480-mm) panel mounting.
3. Finish: Manufacturer's standard, baked-polyester powder coat.

- C. Floor-Mounted Racks: Modular-type, steel construction.

1. Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug, and a power strip.
2. Baked-polyester powder coat finish.

- D. Cable Management for Equipment Frames:

1. Metal, with integral wire retaining fingers.
2. Baked-polyester powder coat finish.
3. Vertical cable management panels shall have front and rear channels, with covers.
4. Provide horizontal crossover cable manager at the top of each relay rack, with a minimum height of two rack units each.

## 2.2 POWER STRIPS

### A. Power Strips: Comply with UL 1363.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Rack mounting.
3. Six 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R receptacles.
4. LED indicator lights for power and protection status.
5. LED indicator lights for reverse polarity and open outlet ground.
6. Circuit Breaker and Thermal Fusing: When protection is lost, circuit opens and cannot be reset.
7. Circuit Breaker and Thermal Fusing: Unit continues to supply power if protection is lost.
8. Close-coupled, direct plug-in line cord.
9. Rocker-type on-off switch, illuminated when in on position.
10. Peak Single-Impulse Surge Current Rating: 33 kA per phase.
11. Protection modes shall be line to neutral, line to ground, and neutral to ground. UL 1449 clamping voltage for all three modes shall be not more than 330 V.

## 2.3 GROUNDING

### A. Comply with requirements in Section "Grounding and Bonding" for grounding conductors and connectors.

### B. Telecommunications Main Bus Bar:

1. Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
2. Ground Bus Bar: Copper, minimum 1/4 inch thick by 4 inches wide (6 mm thick by 100 mm wide) with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart.
3. Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

### C. Comply with J-STD-607-A.

## 2.4 LABELING

### A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. Comply with NECA 1.

#### B. Comply with BICSI TDMM for layout and installation of communications equipment rooms.

- C. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- D. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.
  - 1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
  - 2. Record agreements reached in meetings and distribute them to other participants.
  - 3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
  - 4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
- E. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

### 3.2 FIRESTOPPING

- A. Comply with TIA-569-B, Annex A, "Firestopping."
- B. Comply with BICSI TDMM, "Firestopping Systems" Article.

### 3.3 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with J-STD-607-A.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
  - 1. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

### 3.4 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements in Section "Identification for Electrical Systems."



B. Labels shall be preprinted or computer-printed type.

END OF SECTION 271100

## SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. UTP cabling.
  - 2. Coaxial Cable
  - 3. Cable connecting hardware, patch panels, and cross-connects.
  - 4. Telecommunications outlet/connectors.
  - 5. Cabling system identification products.

#### 1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- C. EMI: Electromagnetic interference.
- D. IDC: Insulation displacement connector.
- E. LAN: Local area network.
- F. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.
- G. RCDD: Registered Communications Distribution Designer.
- H. UTP: Unshielded twisted pair.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate layout and installation of telecommunications cabling with Owner's telecommunications and LAN equipment and service suppliers.
- B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

## 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Patch-Panel Units: One of each type.
  - 2. Connecting Blocks: One of each type.
  - 3. Device Plates: One of each type.

## 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
  - 1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings an RCDD.
  - 2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
  - 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
  - 1. Test each pair of UTP cable for open and short circuits.

## PART 2 - PRODUCTS

### 2.1 HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the

communications equipment room. This cabling and its connecting hardware are called a "permanent link," a term that is used in the testing protocols.

1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
  2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
  3. Bridged taps and splices shall not be installed in the horizontal cabling.
- B. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1 when tested according to test procedures of this standard.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 50 or less.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Grounding: Comply with J-STD-607-A.

## 2.3 UTP CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ADC.
  2. Belden Inc.
  3. Berk-Tek; a Nexans company.
  4. CommScope, Inc.
  5. Draka Cableteq USA.
  6. Genesis Cable Products; Honeywell International, Inc.
  7. Mohawk; a division of Belden Networking, Inc.
  8. Superior Essex Inc.
  9. SYSTIMAX Solutions; a CommScope, Inc. brand.
  10. 3M Communication Markets Division.
  11. Tyco Electronics Corporation; AMP Products.
- B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.
1. Comply with ICEA S-90-661 for mechanical properties.

2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 5e.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
  - a. Communications, General Purpose: Type CM or CMG.
  - b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
  - c. Communications, Riser Rated: Type CMR, complying with UL 1666.
  - d. Communications, Limited Purpose: Type CMX.
  - e. Multipurpose: Type MP or MPG.
  - f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
  - g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

## 2.4 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. ADC.
  2. American Technology Systems Industries, Inc.
  3. Belden Inc.
  4. Dynacom Inc.
  5. Hubbell Premise Wiring.
  6. Leviton Commercial Networks Division.
  7. Molex Premise Networks; a division of Molex, Inc.
  8. Panduit Corp.
  9. Siemon Co. (The).
  10. Tyco Electronics Corporation; AMP Products.
- B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Connecting Blocks: 110-style IDC for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.
- D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
- E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
- F. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
  1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 5e performance. Patch cords shall have latch guards to protect against snagging.

## 2.5 COAXIAL CABLE

- A. The drop cable shall be plenum rated RG-6U with 100% shielding. The cable shall be West Penn Wire 25841, or approved equal.

## 2.6 TELECOMMUNICATIONS OUTLET/CONNECTORS

- A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.
- B. Workstation Outlets: Port-connector assemblies, with quantities shown on drawings, mounted in single faceplate.
  - 1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
  - 2. For use with snap-in jacks accommodating any combination of UTP.
  - 3. Legend: Machine printed, in the field, using adhesive-tape label.
  - 4. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

## 2.7 GROUNDING

- A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
- B. Comply with J-STD-607-A.

## 2.8 IDENTIFICATION PRODUCTS

- A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Comply with requirements in Section 260553 "Identification for Electrical Systems."

## PART 3 - EXECUTION

### 3.1 WIRING METHODS

- A. Install cables in pathways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal pathways and cables except in unfinished spaces.
  - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
- B. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures:

1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
2. Install lacing bars and distribution spools.
3. Install conductors parallel with or at right angles to sides and back of enclosure.

### 3.2 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
9. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.
2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Group connecting hardware for cables into separate logical fields.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

### 3.3 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-B, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.



### 3.4 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with J-STD-607-A.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

### 3.5 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section "Identification for Electrical Systems."
- B. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- C. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.
- D. Cable and Wire Identification:
  - 1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
  - 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
  - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
  - 4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
    - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
    - b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- E. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
    1. Cables use flexible vinyl or polyester that flex as cables are bent.

### 3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
  2. Visually confirm Category 5e, marking of outlets, cover plates, outlet/connectors, and patch panels.
  3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
- B. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 271500

## SECTION 275223 - AID CALL SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes visual/tone aid-call system.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

### PART 2 - PRODUCTS

#### 2.1 VISUAL/TONE AID-CALL SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Aiphone Co., Ltd.
2. Alpha Communications.
3. Cornell Communications, Inc.
4. GE Security, Sound and Communications.
5. Intego Systems, Inc.
6. Intercall Systems, Inc.
7. Jeron Electronic Systems, Inc.
8. Rauland-Borg Corporation.
9. SimplexGrinnell LP.
10. TekTone Sound & Signal Mfg., Inc.

- B. Operational Requirements:

1. Patient Station Call: Lights a steady call-placed lamp on the station, steady lamps in the zone light and corridor dome light associated with the patient's room, and steady lamps at the central annunciator and other system display devices and displays message on master and staff/duty stations. At the same time, it sounds a programmed tone at intervals, at the respective annunciator and master and staff/duty stations. Legends at the central annunciator and master station identify the calling station.
2. Pull-Cord-Call Station Call: Flashes a call-placed lamp on the station and distinctive-color lamps in the zone light and corridor dome light and at the central annunciator and

staff/duty stations. At the same time, it sounds a programmed tone at intervals, at the central annunciator.

C. Central Annunciator:

1. Lamp type.
2. Lamp Legends: Machine lettered and legible from a distance of at least 48 inches (1200 mm) when a call is present. Legend shall identify initiating station and priority of call.
3. Power-on Indicator: Digital, or push-to-test switch.
4. Audible Signal: Electronic tone.

D. Central Equipment Cabinet:

1. Lockable metal.
2. Houses power supplies, controls, terminal strips, and other components.
3. Power-on indicator lamp.

## 2.2 SYSTEM COMPONENTS

A. Emergency-Call Station: Locking-type push button, labeled "Push to Call Help"; reset trigger to release push button and cancel call; and call-placed lamp, mounted in a single faceplate.

B. Pull-Cord-Call Station:

1. Pull-Down Switch: Lever-locking type, labeled "Pull Down to Call Help."
2. Reset trigger.
3. Call-placed lamp.
4. Water-resistant construction.

C. Station Faceplates:

1. Stainless steel, a minimum of 0.0375 inch (0.95 mm) thick.
2. Finish: Brushed.
3. Machine-engraved labeling identifies indicator lamps and controls.

D. Station Faceplates:

1. High-impact plastic.
2. Color: White.
3. Molded or machine-engraved labeling identifies indicator lamps and controls.

E. Corridor Dome Lights and Zone Lights:

1. Three-lamp signal lights.
2. Lamps: Front replaceable without tools, low voltage with rated life of 7500 hours. Barriers are such that only one color is displayed at a time.
3. Lenses: Heat-resistant, shatterproof, translucent polymer that will not deform, discolor, or craze when exposed to hospital cleaning agents.
4. Filters: Two per unit, amber and red.

F. Cable:

1. Conductors: Jacketed single and multiple, twisted-pair copper cables.
  2. Sizes and Types: As recommended by equipment manufacturer.
  3. Cable for Use in Plenums: Listed and labeled for plenum installation.
- G. Grounding Components: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install cables without damaging conductors, shield, or jacket.
- B. Do not bend cables, while handling or installing, to radii smaller than as recommended by manufacturer.
- C. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
1. Pull cables simultaneously if more than one is being installed in same raceway.
  2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
  3. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips, that will not damage media or raceway.
- D. Install exposed raceways and cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed so as not to damage cables. Secure cable at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, or fittings.
- E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- F. Separation of Wires: Separate speaker/microphone, line-level, speaker-level, and power-wiring runs. Run in separate raceways or, if exposed or in same enclosure, provide 12-inch (300-mm) minimum separation between conductors to speaker/microphones and adjacent parallel power and telephone wiring. Provide separation as recommended by equipment manufacturer for other conductors.
- G. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Install terminal cabinets where there are splices, taps, or terminations for eight or more conductors.
- H. Impedance and Level Matching: Carefully match input and output impedances and signal levels at signal interfaces. Provide matching networks if required.

- I. Identification of Conductors and Cables: Comply with requirements in Section 271500 "Communications Horizontal Cabling" for cable administration, cable schedule, and cable and wire identification.
- J. Equipment Identification:
  - 1. Comply with requirements in Section 260553 "Identification for Electrical Systems" for equipment labels and signs and labeling installation requirements.
  - 2. Label stations, controls, and indications using approved consistent nomenclature.

### 3.2 GROUNDING

- A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other signal impairments.
- B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding except at connection to main building ground bus.
- C. Grounding Provisions: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

### 3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel and caregiver staff to adjust, operate, and maintain aid-call equipment.

END OF SECTION 275223

## SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Fire-alarm control unit.
  2. Manual fire-alarm boxes.
  3. System smoke detectors.
  4. Heat detectors.
  5. Notification appliances.
  6. Remote annunciator.
  7. Addressable interface device.
  8. Digital alarm communicator transmitter.

#### 1.2 SYSTEM DESCRIPTION

- A. Noncoded, addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.
1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
  2. Include voltage drop calculations for notification appliance circuits.
  3. Include battery-size calculations.
  4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
  5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
  6. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
  - 1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
  - 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
  - 3. Record copy of site-specific software.
  - 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
    - a. Frequency of testing of installed components.
    - b. Frequency of inspection of installed components.
    - c. Requirements and recommendations related to results of maintenance.
    - d. Manufacturer's user training manuals.
  - 5. Manufacturer's required maintenance related to system warranty requirements.
  - 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
- B. Software and Firmware Operational Documentation:
  - 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
- C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.



## 1.7 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
  - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AMSECO - a Potter brand; Potter Electric Signal Company.
  - 2. Bosch Security Systems.
  - 3. Commercial Products Group/CPG Life Safety Signals.
  - 4. Faraday; Siemens Building Technologies, Inc.
  - 5. Federal Signal Corporation.
  - 6. Fire Control Instruments, Inc.; a Honeywell company.
  - 7. Fire Lite Alarms; a Honeywell company.
  - 8. GAMEWELL; a Honeywell company.
  - 9. GE Infrastructure; a unit of General Electric Company.
  - 10. Gentex Corporation.
  - 11. Harrington Signal, Inc.
  - 12. NOTIFIER; a Honeywell company.
  - 13. Siemens Building Technologies, Inc.; Fire Safety Division.
  - 14. Silent Knight; a Honeywell company.
  - 15. SimplexGrinnell LP; a Tyco International company.

### 2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
  - 1. Manual stations.
  - 2. Heat detectors.
  - 3. Smoke detectors.
  - 4. Duct smoke detectors.
  - 5. Automatic sprinkler system water flow.

- B. Fire-alarm signal shall initiate the following actions:
  1. Continuously operate alarm-notification appliances.
  2. Identify alarm at the fire-alarm control unit and remote annunciators.
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  5. Record events in the system memory.
  6. Actuate Fire/Smoke Dampers associated with duct smoke detectors.
  
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
  1. Valve supervisory switch.
  
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
  1. Open circuits, shorts, and grounds in designated circuits.
  2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
  3. Loss of primary power at fire-alarm control unit.
  4. Ground or a single break in fire-alarm control unit internal circuits.
  5. Abnormal ac voltage at fire-alarm control unit.
  6. Break in standby battery circuitry.
  7. Failure of battery charging.
  8. Abnormal position of any switch at fire-alarm control unit or annunciator.
  
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators.

## 2.3 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:
  1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
    - a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
    - b. Include a real-time clock for time annotation of events on the event recorder and printer.
  2. Addressable control circuits for operation of mechanical equipment.
  
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
  1. Annunciator and Display: Liquid-crystal type, 3 line(s) of 80 characters, minimum.

2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

C. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class A.

- a. Initiating Device Circuits: Style D.
- b. Notification Appliance Circuits: Style Z.
- c. Signaling Line Circuits: Style 6.
- d. Install no more than 50 addressable devices on each signaling line circuit.

- D. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.

- E. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

- F. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, and supervisory signals shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

- G. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead calcium.

- H. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

## 2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

## 2.5 SYSTEM SMOKE DETECTORS

### A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be four-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

### B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).

### C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions were applied.
6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

## 2.6 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
  - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.7 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
  - 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
- C. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
  - 1. Rated Light Output:
    - a. 15/30/75/110 cd, selectable in the field.
  - 2. Mounting: Wall mounted unless otherwise indicated.
  - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
  - 4. Flashing shall be in a temporal pattern, synchronized with other units.
  - 5. Strobe Leads: Factory connected to screw terminals.
  - 6. Mounting Faceplate: Factory finished, red.

## 2.8 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
  - 1. Mounting: Flush cabinet, NEMA 250, Type 1.

- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

## 2.9 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall or operate Fire/Smoke damper.

## 2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture one telephone line and dial a preset number for a remote central station. When contact is made with central station, signals shall be transmitted. If service on line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
  - 1. Verification that both telephone lines are available.
  - 2. Programming device.
  - 3. LED display.
  - 4. Manual test report function and manual transmission clear indication.
  - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
  - 1. Address of the alarm-initiating device.
  - 2. Address of the supervisory signal.
  - 3. Address of the trouble-initiating device.
  - 4. Loss of ac supply or loss of power.
  - 5. Low battery.
  - 6. Abnormal test signal.
  - 7. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Install wall-mounted equipment, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- D. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- E. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- F. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

### 3.2 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section "Door Hardware." Connect hardware and devices to fire-alarm system.
  - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Alarm-initiating connection to elevator recall system and components.
  - 2. Supervisory connections at valve supervisory switches.
  - 3. Supervisory connections at elevator shunt trip breaker.

### 3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

### 3.4 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

### 3.5 FIELD QUALITY CONTROL

#### A. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.
  - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
  - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

- B. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

- C. Fire-alarm system will be considered defective if it does not pass tests and inspections.

- D. Prepare test and inspection reports.

- E. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

- F. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

END OF SECTION 283111



## SECTION 283113 – AREA OF REFUGE COMMUNICATION SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Furnish, install, and wire all equipment associated with the installation of an Audio-Visual Rescue Assistance Signal System to comply with ADA requirements. This work shall include a main annunciator panel, remote call stations, power supply, outlet boxes, cables and wiring as shown on the drawings and as specified herein.

#### 1.2 SUBMITTALS

- A. General: Data sheets on all equipment being provided as well recommended cable types. Internal control cabinet drawings showing internal block diagram connections shall be provided. Wiring diagrams showing typical field wiring connections as well as single line floor plan indicating equipment locations as well as cable routings and quantities.
- B. Product Data: Submit product data, including manufacturer's (Spec- Data) product sheet, for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage and accessories. Include cabling diagrams, wiring diagrams, station installation details, and equipment cabinet details.
- D. Quality Assurance Submittals: Submit the following:
  - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics.
  - 2. Manufacturer's Instructions: Manufacturer's installation instructions.
  - 3. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- E. Closeout Submittals: Submit the following:
  - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance. Include troubleshooting guide, wiring terminal identification and equipment parts list.

2. Warranty: Warranty documents specified herein.

F. Project Closeout

3. A one-year maintenance contract offering continued factory authorized service of this system shall be provided as part of this contract. Built drawings that include changes to wiring, wiring designations, junction box labeling and other pertinent information shall be supplied upon completion of the project.
4. The contractor shall furnish manufacturer's manuals of the completed system including individual specifications sheets, schematics, inter-panel and intra-panel wiring diagrams.
  - a. All information necessary for the proper maintenance and operation of the system must be included.
  - b. Provide four copies.
5. As built drawings that include changes to wiring, wiring designations, junction box labeling, and other pertinent information shall be supplied upon completion of the project.
6. Provide a minimum of two (2) hours of in-service training with the system.
  - a. These sessions shall be broken into segments that will facilitate the training of the system users in operating station equipment.
  - b. Operating manuals and user's guides shall be provided at the time of training.

1.3 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1. Warranty Period: [Specify term.] years commencing on the Date of Substantial Completion.
2. All materials and installation shall be guaranteed to be free of defects in material and workmanship for one year after final acceptance of installation and tests.

## PART 2 - PRODUCTS

### 2.1 RESCUE ASSISTANCE-VISUAL EQUIPMENT

#### A. Manufacturer: Cornell Communications, Inc.

1. Contact: 7915 N 81st St., Milwaukee, WI 53223-3830; Telephone: 800- 558-8957; (414) 351-4660; Fax: (414) 351-4657.

### 2.2 PRODUCT SUBSTITUTIONS

#### A. Substitutions: Permitted.

### 2.3 CORNELL 4200 RESCUE ASSISTANCE-AUDIO/VISUAL SYSTEM AND COMPONENTS

#### A. Equipment

1. This system shall consist of multiple remote call stations, which will share a common annunciator panel and optional access to a public telephone system for external alarm notification.

#### B. Annunciator

1. The annunciator panel shall be a CORNELL Model A42XX, with capacity for (XX) zones, surface mounted at the Main Fire Department Entrance to the building.
2. Verify location with the Local Fire Marshal and the Architect.
3. An alternate action switch with internal LED indicator shall be included for each zone.
4. A yellow LED light on the zone switch shall illuminate and the alarm shall emit a repeating sound if the supervised wiring is faulted.
5. An audible alarm shall be mounted on the annunciator panel, which will emit a minimum sound level of 90 db at 30 cm when a remote station calls.
6. Depressing the zone switch will answer a zone and open the intercom line to the zone.
7. The front panel shall have silk-screened zone designations and operating directions as well as zone designation strips.
8. The power supply shall be a 120 volt emergency battery backup, CORNELL model B-5243A or P-512243A.
9. The TAK-4200 telephone access kit will place a call to a designated location via a dedicated public telephone line to notify them of the alarm.

C. Remote Call Stations

1. The remote call station shall be CORNELL Model 4201B/V or 4201B/VM, vandal resistant with one momentary switch with LED and loudspeaker.
2. The station shall have hands free voice communication with the annunciator.
3. The station shall have silk-screened operating instructions.
4. The station shall be flush wall mounted on a 2-gang stainless steel plate with a 48" maximum mounting height for forward reach, and a 54" maximum for side reach..

2.4 SOURCE QUALITY

- A. Source Quality: Obtain rescue assistance equipment and system from a single manufacturer.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.3 INSTALLATION

A. Cabling Requirements

1. Wiring from the annunciator to the call station shall be CORNELL CB-4200 custom cable.
2. Wiring from the annunciator to the power supply shall be 18- gauge, 2 conductor.
3. Verify cable types with the Rescue Assistance System Manufacturer.

4. The optional telephone access kit requires a 120V AC outlet and dedicated external telephone line.

B. Rescue Assistance Signal System - Audio/Visual Installation

1. Complete system shall be installed in strict accordance with manufacturer's recommendations.
2. Wiring shall be installed in raceways throughout the building.

3.4 FIELD QUALITY REQUIREMENTS

A. Site Tests (Post Installation Testing): Checkout final connections to the system shall be made by a factory technician authorized by the manufacturer of the products installed.

1. Factory authorized technicians shall demonstrate operation of the complete system and each major component to the staff.
2. System field wiring diagrams shall be provided to this subcontractor by the system prior to installation.

B. Inspection: Perform a complete functional test of the system upon completion of the installation and instruct the staff in the operation and maintenance of the system.

3.5 CLEANING

A. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION 283113



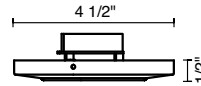
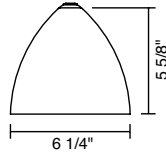
Job Name:

Contact:

Ordering Code:

Fixture Type:

# Cleo Ceiling Mount



### Description

Cleo is a high-gloss handblown, clear crystal glass. It features an internal light-proof lacquering for an Alpine white or tuxedo black exterior and hand coated with real gold or silver leaf flake interior. Cleo transports you to the time of the Pharaohs with a warm gold glow or shimmering cool silver from a 6.3" glass opening. The perfection of its elegant appearance allows for a design for the ages. The metal canopy and stem is available in bronze, polished chrome, and matte chrome plating.

### Tech Specs

3 year limited fixture warranty on model 102  
1 year limited fixture warranty on model 100

### Listings

- ETLus Listed to UL1598 (suitable for dry locations only)
- cETL Listed to CSA C22.2 #250.0
- Made in the USA - meets the requirements of the Buy American provision within the ARRA

### LED Performance

**LED:** Nichia 219B  
**DUV** +/- .002  
**CCT:** 3000k (113 lm)  
**CRI:** 83 typ  
**LIFE:** based on IESNA - LM80 - 2008, 70% of initial lumens after 60,300 hours.  
 3 year limited fixture warranty



LM-79



### Ordering Codes

Follow the steps to specify your fixture,

example:

1 Light Source	2 Shade Color	3 Finish	4 Mounting Option
<b>100</b> low voltage round canopy <b>102</b> LED round canopy	<b>730</b> white with gold inner <b>731</b> white with silver inner <b>732</b> black with gold inner <b>733</b> black with silver inner	<b>bz</b> bronze <b>ch</b> chrome <b>mc</b> matte chrome	<b>CM</b> 4" Ceiling Canopy



Job Name:

Contact:

Ordering Code:

Fixture Type:



**730** white with gold inner

**731** white with silver inner

**732** black with gold inner

**733** black with silver inner

**low voltage round canopy**

**100 - XXX**

- 120V AC, 50/60Hz input
- 11.7V AC output
- 49W, 50VA (max 50W lamp)
- GY6.35 socket
- Dimmable (Trailing Edge ELV)
- Mount to 3 1/2" - 4" round J-Box
- Suitable for dry locations only
- Short circuit protection
- Overload protection
- Thermal protection

**LED round canopy**

**102 - XXX**

- 100-277VAC, 50/60Hz input
- 4W, 7.5VA
- Suitable for dry locations only
- Mount to 3 1/2" - 4" round J-Box
- Short circuit protection
- Thermal protection

## SPEC SHEET



### Agnes Large Pendant

Item # ARN 5352MBK

Designer: AERIN

O/A Height: 50.5"

Fixture Height: 13.5"

Min. Custom Height: 21"

Width: 21"

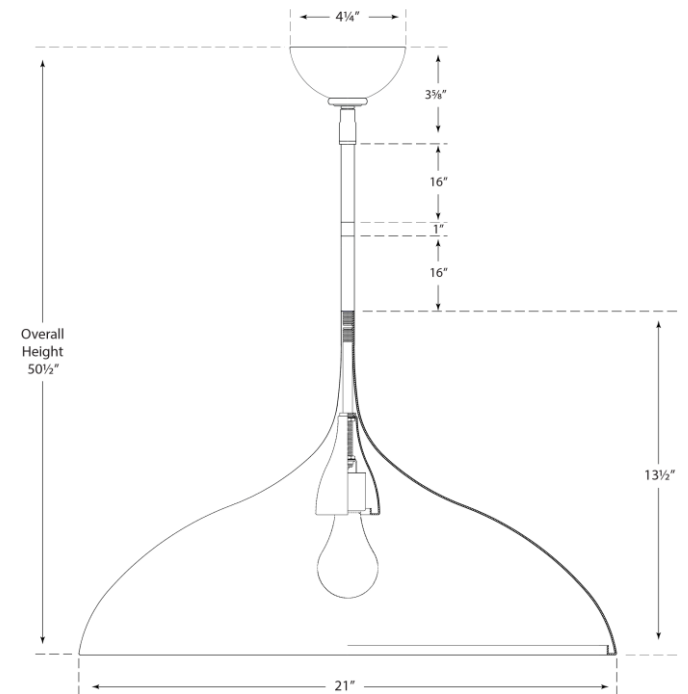
Canopy: 4.25" Round

Finishes: BSL, G, MBK, PW

Socket: Keyless

Wattage: 75 A

Note: Cannot be Modified in the Field



**circa** LIGHTING®



Home / Lighting / Etch Mini Pendant Black



# ETCH MINI PENDANT BLACK

\$175.00

Qty:

Add to Bag

[Assist me](#) | [Add to wishlis](#)

Crafted from brass, miniaturised and given a new Satin Nickel silver finish that enhances sculptural form with reflectivity.

## Dimensions & Specification

### Technical Specification

Product type : Lighting  
Product family : Etch  
Product SKU : ETSM01BLKUL  
Launched :  
Colours :  Black

### Dimensions

Height(inches) : 5.90  
Width(inches) : 5.90  
Weight : 0.88 lbs

## Trade & Press Downloads

Share This:

### Returns For This Item

Return within 14 days

See our [Delivery & Returns policy](#)

**ARCHIE CHANDELIER**PRODUCT ID **8510-OB****DIMENSIONAL INFORMATION**

HEIGHT	35"
LENGTH	-
ADA COMPLIANT	No
CHAIN LENGTH	54"
STEM KIT	N/A
CANOPY/BACKPLATE	6"
WIDTH	-
DIAMETER	30"
MINIMUM HEIGHT	-
MAXIMUM HEIGHT	-
EXTENSION	-

**LAMPING INFORMATION**

(10) 40 WATT MAX 120 VAC	
BULB INCLUDED	Yes
SOCKET TYPE	E12 Candelabra Base And Bulb

**SHADE INFORMATION**

SHADE TOP	N/A
SHADE BOTTOM	N/A
SHADE HEIGHT	N/A
SHADE ATTACHMENT	N/A
SHADE MATERIAL	N/A
SHADE COLOR	N/A

**SHIPPING INFORMATION**

CARTON LENGTH	-
CARTON WIDTH	-
CARTON HEIGHT	-
GROSS WEIGHT	0 lbs.
SHIPPING METHOD	UPS
QUANTITY PER CARTON	1

**AVAILABLE FINISHES**

AGED BRASS (AGB), **OLD BRONZE (OB)**, POLISHED NICKEL (PN)

**JOB/LOCATION****QUANTITY****NOTES**

Hudson Valley Lighting, Inc. | 106 Pierces Road, PO Box 10775, Newburgh, NY 12552 | [www.hudsonvalleylighting.com](http://www.hudsonvalleylighting.com)



# ODYSSEY



## F4297

### INTERIOR HANGING

Hand-Worked Wrought Iron

Plated Smoked Glass

Carbide Black and Polished Nickel Finish

35.5"W 38.5"H 87.75"max HT

Canopy: 7"W 0.75"D

5-60W Med Base

Shown with optional 60W LB-60 Early Electric Lamps.

### Optional Lamp Information:

LB-60-T10-12 (Twelve-pack 60W Med-Base Early electric Lamps)

LB-6W-5.5-12 (Twelve-pack 6W Med base Early Electric LED Lamps, 400 lm 2200K 120V)

LB-60-6 (Six-pack 60W Med-Base Early electric Lamps)

LB-6W-6 (Six-pack 6W Med base Early Electric LED Lamps 400 lm 2200K 120V)



## TROY LIGHTING

Est. 1963

14508 Nelson Avenue, City of Industry, CA, USA (91744) Phone: 626-336-4511 Fax: 626-330-4266 [www.troy-lighting.com](http://www.troy-lighting.com)

# ODYSSEY



## F4295

### INTERIOR HANGING

Hand-Worked Wrought Iron

Plated Smoked Glass

Carbide Black and Polished Nickel Finish

24"W 29"H 78.25"max HT

Canopy: 6"W 0.75"D

4-60W Med Base

Shown with optional 60W LB-60 Early Electric Lamps.

### Optional Lamp Information:

LB-60-T10-12 (Twelve-pack 60W Med-Base Early electric Lamps)

LB-6W-5.5-12 (Twelve-pack 6W Med base Early Electric LED Lamps, 400 lm 2200K 120V)

LB-60-6 (Six-pack 60W Med-Base Early electric Lamps)

LB-6W-6 (Six-pack 6W Med base Early Electric LED Lamps 400 lm 2200K 120V)



## TROY LIGHTING

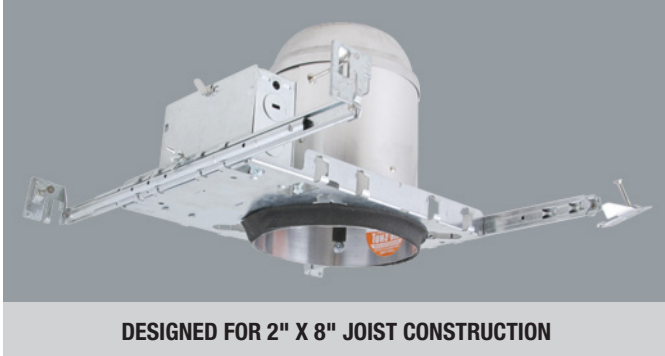
Est. 1963

14508 Nelson Avenue, City of Industry, CA, USA (91744) Phone: 626-336-4511 Fax: 626-330-4266 [www.troy-lighting.com](http://www.troy-lighting.com)

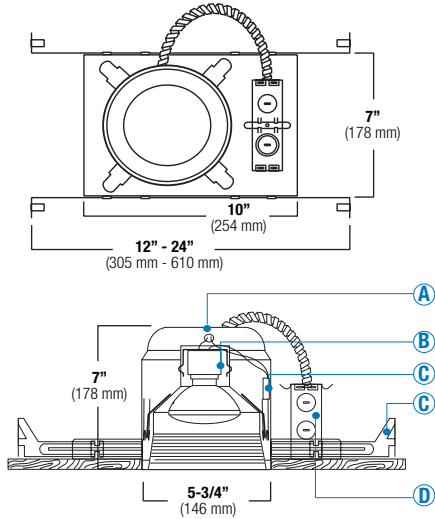
# B51C

## 5" Universal IC Housing

LAMP WATTAGE: (1) MAXIMUM 75W R/PAR30, 60W A19, 65W BR30



DESIGNED FOR 2" X 8" JOIST CONSTRUCTION



Catalog Number:

Project Name:

Type:

Note:



### DESCRIPTION

New construction, thermally protected, IC rated specification grade recessed housing. Accommodates up to 75W PAR30, R30 lamps, 60W A19 lamps and 65W BR30 lamps. Furnished with preinstalled adjustable bar hangers. Junction box is provided with four 1/2" KOs, one 3/4" KO and four Romex knockouts with strain relief.

### SPECIFICATION

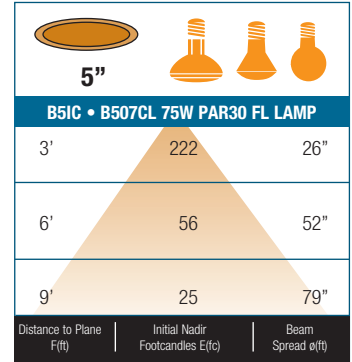
**A. HOUSING** - Die-formed all aluminum construction for maximum heat dissipation and rust protection. Adjusts vertically in plaster frame to accommodate 1/2" to 1-3/8" ceiling.

**B. SOCKET** - Medium base screw shell porcelain socket snaps into trim to allow usage of different lamp types, as well as proper and consistent lamp positioning.

**C. BAR HANGERS** - Preinstalled bar hangers allow housing to be positioned and locked at any point within a 24" joist span. They can be positioned on either the long or short axis of the housing and can be shortened for 12" joists. They contain a double-headed real nail for 20° downward angle for better contact, and the 90° pivoting mounting plate makes installation fast and accurate. Bar hangers can fit onto T-Bar spline with additional slots and holes for special mounting methods if necessary.

**D. JUNCTION BOX** - UL and ETL listed for through-branch circuit wiring and has four 1/2" KOs, one 3/4" KO and four Romex knockouts with true pry-out slots and strain clamps.

**E. THERMAL PROTECTION** - Standard thermal protection device guards against improper installation, overlamping and misuse of insulation material.



BEAM DIA. MEASURED AT 50% OF NADIR F.C.

### FEATURES

- Thermally Protected IC housing.
- Wire through junction box.
- Preinstalled adjustable bar hanger.
- Dependable, favorable design and effortless installation.
- 7" height allows use in 2" x 8" joist construction.
- Special screw on the frame locks bar hangers in place which prevents the housing from any movement once installed.
- Preinstalled socket cap provides electrical contact protection against dust, paint and over spray.

### OPTIONS

#### AIR-SHUT

- Gasket to prevent air flow from heated or air conditioned spaces.
- Meets all national air flow requirements.

#### UL AND C-UL/ETL AND C-ETL LISTED

- For Damp location
- For Feed-through wiring
- For Direct contact with insulation

ITEM SELECTOR: (Please check the boxes below for the option desired)

TYPE	AIR-SHUT	OPTION	TRIM TYPE	BAFFLE	REFLECTOR	TRIM/RING	GLASS	
B51C	<input type="checkbox"/> AT	<input type="checkbox"/> (W) With quick connects	<input type="checkbox"/> B530 <input type="checkbox"/> B507 <input type="checkbox"/> B563 <input type="checkbox"/> B502 <input type="checkbox"/> B520 <input type="checkbox"/> B573 <input type="checkbox"/> B504 <input type="checkbox"/> B501 <input type="checkbox"/> B505 <input type="checkbox"/> B535 <input type="checkbox"/> B536	<input type="checkbox"/> B541 <input type="checkbox"/> B542 <input type="checkbox"/> B504L <input type="checkbox"/> B501L <input type="checkbox"/> B505L	<input type="checkbox"/> W <input type="checkbox"/> P <input type="checkbox"/> SN <input type="checkbox"/> CP <input type="checkbox"/> BZ	<input type="checkbox"/> CL <input type="checkbox"/> RG <input type="checkbox"/> W <input type="checkbox"/> MB <input type="checkbox"/> BZ <input type="checkbox"/> CP <input type="checkbox"/> SN <input type="checkbox"/> SHZ	<input checked="" type="checkbox"/> WH <input type="checkbox"/> BK <input type="checkbox"/> SN <input type="checkbox"/> CP <input type="checkbox"/> CH <input type="checkbox"/> PB <input type="checkbox"/> BZ	<input type="checkbox"/> Green <input type="checkbox"/> Yellow <input type="checkbox"/> Pink <input type="checkbox"/> Brown <input type="checkbox"/> Navy Blue <input type="checkbox"/> Orange <input type="checkbox"/> Blue <input type="checkbox"/> White <input type="checkbox"/> Red

### Specifications:

B51C

AIR-SHUT      OPTION      TRIM TYPE      BAFFLE      REFLECTOR      TRIM/RING      GLASS

BAFFLE	REFLECTOR	TRIM/RING
W White	CL Chrome	WH White
P Black	RG Gold	BK Black
SN Satin Nickel	W White	SN Satin Nickel
CP Copper	MB Black	CP Copper
BZ Bronze	BZ Bronze	CH Chrome
	CP Copper	PB Polish Brass
	SN Satin Nickel	BZ Bronze
	SHZ Satin Haze	

Sample of Catalog Number: B51C-AT-W-B530-W-WH

\*For custom baffle, reflector, trim ring, glass color and lens options, please consult factory.



Submittal form is available @ [www.iuseelite.com](http://www.iuseelite.com)  
Tel: 323-888-1973 • Fax: 323-888-1977

Specifications and Dimensions subject to change without notice.

REV: ELITE LIGHTING-SPEC-06-29-2011

# 5" Incandescent Trims

( LAMP WATTAGE: 75W R/PAR30, 60W A19, 65W BR30 )

Catalog Number:

Project Name:

Type:

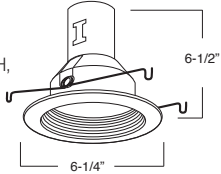
Note:



**B530CP-CP  
STEPPED BAFFLE**



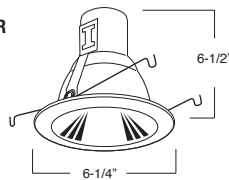
**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, SN-SN, W-WH, P-WH, P-BK, BZ-BZ



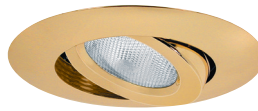
**B507RG-WH  
REFLECTOR**



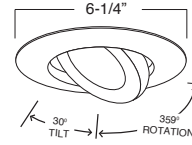
**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, W-WH, RG-WH, MB-WH, CL-WH, MB-BK, RG-PB, CL-CH



**B563PB  
PAR30 GIMBAL TRIM**



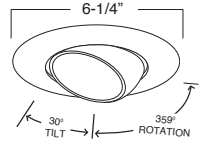
**TRIM/RING FINISH:**  
WH, BK, SN, CP, CH, PB, BZ



**B502SN  
EYEBALL**



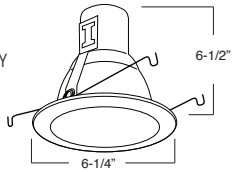
**TRIM/RING FINISH:**  
WH, BK, SN, CP, CH, PB, BZ



**B520-NAVY BLUE  
GLASS TRIM**



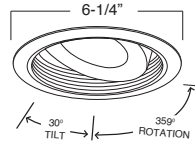
**GLASS FINISH:**  
GREEN, YELLOW, PINK, BROWN, NAVY BLUE, ORANGE, WHITE, RED



**B573W-WH  
PAR30 BAFFLE W/ GIMBAL RING**



**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, SN-SN, W-WH, P-WH, P-BK

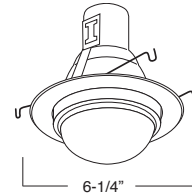


**B504WH  
SHOWER TRIM**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WH, BK, SN, CP, CH, BZ

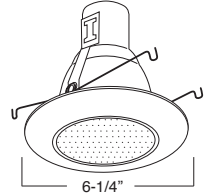


**B501CP  
METAL ALBALITE LENS**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WH, BK, SN, CP, CH, BZ

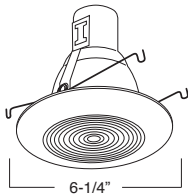


**B505SN  
METAL FRESNEL LENS**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WH, BK, SN, CP, CH, BZ

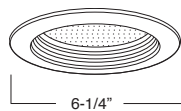


**B535P-WH  
BAFFLE WITH ALBALITE LENS**



FOR WET LOCATION

**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, SN-SN, W-WH, P-WH, P-BK

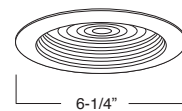


**B536W-WH  
BAFFLE WITH FRESNEL LENS**



FOR WET LOCATION

**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, SN-SN, W-WH, P-WH, P-BK

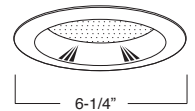


**B541RG-WH  
REFLECTOR WITH ALBALITE LENS**



FOR WET LOCATION

**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, W-WH, RG-WH, MB-BK, CL-WH, MB-BK, RG-PB, CL-CH

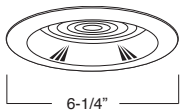


**B542CL-WH  
REFLECTOR WITH FRESNEL LENS**



FOR WET LOCATION

**AVAILABLE COLOR COMBINATIONS:**  
CP-CP, W-WH, RG-WH, MB-BK, CL-WH, MB-BK, RG-PB, CL-CH

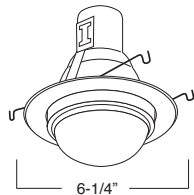


**B504L  
PLASTIC SHOWER TRIM**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WHITE PLASTIC

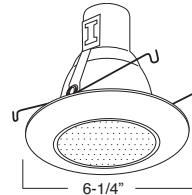


**B501L  
PLASTIC ALBALITE LENS**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WHITE PLASTIC

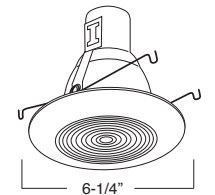


**B505L  
PLASTIC FRESNEL LENS**



FOR WET LOCATION

**TRIM/RING FINISH:**  
WHITE PLASTIC



# REJUVENATION

Lighting & House Parts



## Cypress Small Sconce

Item #A9563

<http://www.rejuvenation.com/s/ih9g>

Specification	Detail
Item #	A9563-BD

Width

5"

Height

9.75"

Projection

10" - 13"

Number of Sockets

1

Wattage

40W incandescent bulb

UL Location Rating

Dry

Backplate Diameter

5"

**Price as shown: \$249.00**



# SCHOOLHOUSE

## ELECTRIC & SUPPLY CO.



### Cylinder Sconce

\$119.00 Each

Made of solid handspun brass, this refined wall fixture offers a luxe spin on the ubiquitous bare bulb sconce. Its unassuming design is perfect for use in multiples around the perimeter of a room, spanning the length of a hallway or in rows surrounding a vanity mirror for an even, flattering illumination.

The eased-edge socket cup houses a durable porcelain socket suited for the fixture's main feature - a bulb of your choosing. Select from simple frosted orbs, chic metallic tips or nostalgic exposed filaments.

Like all of our fixtures and shades, the Cylinder Sconce features handcrafted materials that are custom built in our Portland factory to exacting specifications. A Schoolhouse Electric Original.

Select Finish

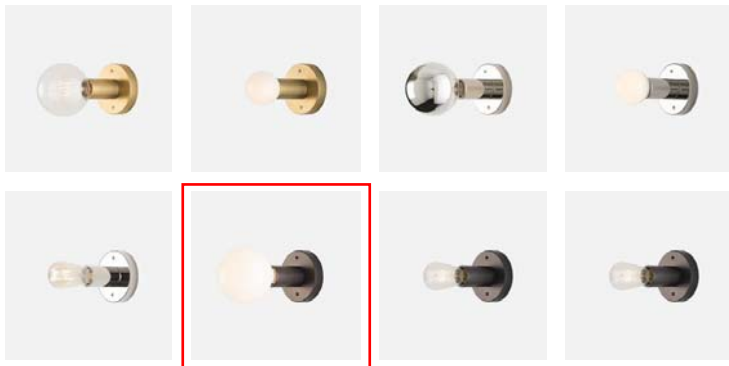
Select Switch

None

Quantity

1

Fixture price does not include bulb(s).



#### PRODUCT DETAIL

**Canopy width:** 5" Dia

**Fixture dimensions:** 4.5" Projection

**Max wattage:** 100

**Product origin:** USA

**Suitable for damp locations:** Yes

**UL listed:** Yes

#### INSPIRATION

Spring '16 Catalog  
Fall '15 Catalog  
Spring '15 Catalog  
Fall '14 Catalog  
Spring '14 Catalog

#### CUSTOMER SERVICE

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Your email



# Beat Wall Sconce

By Tom Dixon

LUMENS<sup>®</sup>  
LIGHT AND LIVING

Call Us 877.445.4486

## Details

- Designed by Tom Dixon in 2015
- Finish: Matte Black
- Interior Color: Hammered Brass
- Material: Hand-spun Brass Shade
- Adjustable shade swings laterally
- Brass switch
- Non-dimmable with LED lamps
- On-Off Switch Wallplate Rotary Dimmer
- UL Listed
- Made In UK

## Dimensions

**Fixture:** Width 11.81", Height 15.75", Depth 8.66", Weight 5.51 Lbs.

## Lighting

- One 25 Watt (212 Lumens) 120 Volt E12 Candelabra Base Incandescent Lamp(s) (Not Included)

## Additional Details

### Product URL:

<http://www.lumens.com/beat-wall-sconce-by-tom-dixon-TDXP92978.html>

**Rating:** UL Listed



22.5 / 9"



### Notes:

**Product ID:** TDXP92978

**Prepared by:**

**Prepared for:**

**Project:**

**Room:**

**Placement:**

**Approval:**

