Project Manual

CRESWELL HIGH SCHOOL
CTE BUILDING
INTERIOR IMPROVEMENT

Creswell School District 40
Creswell, Oregon



Issue Date:
November 18th, 2026

DOCUMENT 00 01 01
TITLE PAGE

PROJECT MANUAL:
Creswell High School CTE Building Interior Improvement
Creswell School District 40
Creswell, Oregon



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DATE: November 18th, 2026

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END OF DOCUMENT 00 01 01

Creswell High School CTE Building Interior Improvement

November 18th, 2026

The following is a list of all Divisions, Sections, and Drawings which are included in the Project Manual

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Project consists of alterations to existing metal building for CTE interior build-out. Work includes concrete, sheet metal framing, openings, finishes, and design-build mechanical, electrical, plumbing, fire sprinklers and fire alarm.

1. Project Location: 33390 Niblock Ln Creswell, OR 97426.

B. Architect Identification: The Contract Documents, dated November 18, 2026, were prepared for Project by GMA Architects, 860 W Park St Ste 300, Eugene, OR 97401.

C. Project Manager:

1.3 CONTRACT

A. Project will be constructed under a general construction contract.

1. AIA Form A101-2017.

1.4 WORK SEQUENCE

A. Do not commence Work until after execution of Agreement and receipt of Notice-to-Proceed from Owner.

B. Perform work in order to achieve Substantial Completion by July 31, 2027.

C. Achieve Final Completion within seven (7) days following the date of Substantial Completion.

1.5 USE OF PREMISES

A. Work Area Access: Site will be occupied during work. Access to the work area will be available on a weekday basis from approximately 7:00 am to 4:00 pm. Coordinate all other work hour schedules with Owner so as not to interfere with Owner's use of the building.

B. Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public, subject to approval by a District Safety Specialist.

C. Site Access: Maintain drives, building entrances, and exits clear and protected at all times to Owner's, employees, and public access and for use by emergency personnel. Do not use these areas for parking or storage. Schedule deliveries to minimize space and time requirements for storage of materials at site.

D. Parking: Contractor may use existing parking areas as indicated on Drawings.

E. Contractor Staging Areas: Limit staging to areas indicated on Drawings.

F. Construction Operations: Limited to areas indicated on Drawings.

1.6 WORK UNDER SEPARATE CONTRACTS

A. Separate Contract: Owner may award a separate contract for performance of certain construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.7 FUTURE WORK

A. Future Contract: Owner may award a separate contract for additional work to be performed at the site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

1.8 PRODUCTS ORDERED IN ADVANCE

A. General: Owner has negotiated Purchase Orders with suppliers of material and equipment to be incorporated into the Work. Owner has assigned these Purchase Orders to Contractor. Costs for receiving, handling, storage if required, and installation of material and equipment are included in the Contract Sum.

1. Contractor's responsibilities are the same as if Contractor had negotiated Purchase Orders, including responsibility to renegotiate purchase and to execute final Purchase-Order agreements.
2. The Schedule of Products Ordered in Advance is included at the end of this Section.

1.9 OWNER-FURNISHED PRODUCTS

1. As noted.

1.10 MISCELLANEOUS PROVISIONS

A. BACKGROUND/FINGERPRINTING

1. Individuals with whom the District contracts with, or any employee, agent, subcontractor or provider who will have direct, unsupervised contact with students, shall be required to submit a Creswell School District 40 Volunteer Background check and undergo a state nationwide fingerprinting and criminal history records check, in accordance with the provisions of ORS 326.603 and ORS 326.607. Individuals or Proposer, and not the District, shall be responsible for the fees associated with fingerprinting and the criminal history records check, not to exceed the actual costs (ODE $70.00 and outside fingerprinting vendor $12.50). Individuals contracting with the District will be required to fill out and submit a background check.

Note*:* If an employee, agent or subcontractor of a contractor has been previously fingerprinted at another school district, there are forms (provided by the District) to replace part of this process and no fees are incurred.

B. SEXUAL CONDUCT, SEXUAL HARASSMENT & CHILD ABUSE OF STUDENTS IS STRICTLY PROHIBITED
   1. Contractors, their employees, and sub-contractors must report suspected sexual conduct, harassment or abuse immediately to the District.

C. DRUG AND ALCOHOL POLICY
   1. The possession, use, or distribution of illicit drugs and alcohol on school premises is prohibited. Prescription medications brought to the project site shall be in the original container bearing the name of the drug, the name of the physician and the prescribed dosage.

D. USE OF TOBACCO PRODUCTS
   1. Smoking and the other use of tobacco products is prohibited on all school district property pursuant to OAR 581-021-0110.

E. SAFETY REQUIREMENTS
   1. Safety must not be sacrificed for the sake of productivity or expedience. Safety of students, staff, and the public is critical. Take all reasonable precautions to prevent endangerment or injury. Advise and coordinate operations with the school office.
   2. All contractors who perform work on District property, and their employees, are expected to know the District's expectations for safe work and to adhere to those expectations.
   3. Contractors are to adhere to the regulations of Oregon OSHA for all projects within the School District.

F. GENERAL SAFE WORK PRACTICES
   1. Students, public and school staff shall not be put at risk by the activities of contractors or their employees.
   2. Safe vehicle operation rules are to be followed at all times. These include positioning vehicles to minimize the necessity of backing and providing a "spotter", someone who will make sure that people do not run into the path of a vehicle when driving on a playground or field that is occupied by students.
   3. Tools shall never be left out when an unsecured work area is vacated.
   4. Ladders and scaffolding will be taken down when an unsecured work area is vacated.
   5. Open holes and other tripping hazards shall be fenced or barricaded when an unsecured work area is vacated.
   6. Operations resulting in vapors, emissions or flying objects shall be conducted in such a way as to prevent exposure to any unprotected parties or property.
   7. "Secured Work Area" is defined as an area having a perimeter cyclone fence at least 6 feet in height, with gates, which close and lock so that no casual entrance is possible by unauthorized adults or children.
   8. Contractor to follow all OR-OSHA rules for Confined Spaces, where applicable.

G. COMMUNICATIONS REGARDING UNSAFE PRACTICES
   1. Upon perceiving a problem, the District will immediately communicate the concern to the Contractor or Contractor's representative on the work site.

2. If agreement on correction of unsafe conditions cannot be reached, the concerns of the District shall prevail and safety concerns shall be addressed in accordance with the District requirements.

H. ELECTRICAL PANELS - LOCKOUT/TAGOUT

1. Contractor shall implement a Lockout/Tag-out program for his employees who take equipment out of service or place equipment back into service. Contractor shall review the District's Energy Control Program prior to commencing work. Rules applying to this procedure are Oregon Occupational Safety and Health Code OAR 437, Division 2, Subdivision J, General Environmental Controls Lockout/Tag-out (1919.147), or latest edition.

I. ARC FLASH – ELECTRICAL SAFETY

1. Contractor shall comply with NFPA 70E (Electrical Safety in the Workplace), current edition. Contractor shall comply with Oregon OSHA 1910.137 (Personal Protective Equipment). The Contractor shall review with the School District Project Manager the 'Creswell School District Electrical Safety Program' before any work commences. The Contractor shall comply with all 'Arc Flash' and 'Electrical Safety' protocols referenced in any and all NFPA, OSHA, OROSHA, NEC, NESC, UL, IBC, IFC and ANSI documents (current editions).

J. POTENTIALLY HAZARDOUS PRODUCTS

1. The District attempts to maintain a safe and healthy environment for students and staff. The Contractor is therefore required to follow District guidelines controlling the use of potentially hazardous products and to use these products in a safe manner. Guidelines include the use of materials (adhesives, coatings, carpeting, etc.) which are known to emit little or no airborne pollutants where possible, unless otherwise specified.
2. MSDS information is required for all potentially hazardous products. The Project Manager and a District Safety Specialist will review these and determine what, if any, mitigation procedures will be required.
3. Contractor is to maintain and post copies of all MSDS information at the project site and adhere to the required controls.
4. Contractor is to ensure that access to work area by students and teachers is restricted. The District will provide signage appropriate for this purpose. The Contractor is to construct and maintain appropriate barriers. This shall include provision of physical separation barriers between "construction" and "occupied" spaces.
5. Contractor to adopt means of maintaining the construction space in negative air pressure in relation to occupied spaces.
6. Where there is a new or existing ventilation system in an affected space, the system shall be adjusted to provide the maximum amount of outside air possible with the system.
7. Efforts shall be made to install and operate new ventilation systems as soon in the construction process as practical.

K. ASBESTOS CONTAINING MATERIALS WARNING

1. The Contractor shall not, in any way, disturb materials which are known to contain asbestos, assumed to contain asbestos, or otherwise have not been tested and confirmed to be asbestos free.
2. Where access to concealed spaces is required, or it is necessary to disturb building materials such as for drilling of holes, cutting, etc., notify the Owner so that proper investigation and/or removal procedures are followed.

3. Prior to commencing Work, the Contractor shall meet with the District Safety Specialist and review the Owner's Asbestos Management Plan for the locations of asbestos-containing materials and/or materials assumed to contain asbestos. After reviewing the Owner's Asbestos Management Plan, the Contractor is required to sign Form 01 11 00A, Asbestos-containing Materials Notification Statement, provided at the end of this Section.
4. Contractor must not install any asbestos-containing materials when performing the Work of this project. At the completion of the Work, Contractor will be required to furnish a statement stating that no asbestos-containing materials were installed during the course of the Work. Refer to Sample Form 01 11 00B at the end of this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - SCHEDULE OF PRODUCTS ORDERED IN ADVANCE

PART 5 - ASBESTOS FORMS

Form 01 11 00A

ASBESTOS-CONTAINING MATERIALS NOTIFICATION STATEMENT
FOR CONTRACTORS

This form must be completed and signed by the Contractor prior to beginning work in any Creswell School District 40 building.

The presence of known and assumed asbestos containing materials is documented in the AHERA Management Plan for each building. Copies of the AHERA Management Plan are available in the main office of each building and in the Facilities Management Office at 998 West A Street, Creswell, OR 97426. The District Asbestos Specialist must be informed of the Contractor's activities in each building prior to the start of work so that the Contractor can be informed on how to use the AHERA Management Plan and to determine if any asbestos-containing materials are likely to be impacted by the work of the Contractor.

The Contractor is responsible for notifying all employees and subcontractors of the presence of asbestos in the building. The Contractor shall not disturb known or assumed asbestos-containing materials. If the Contractor discovers suspected asbestos-containing materials that have not been identified, the Contractor must stop any work impacting the suspected materials and notify the District Asbestos Specialist so that the material can be sampled. Any asbestos-containing materials that must be removed to allow the Contractor to complete the Contractor's work will be removed by the District under separate contract. If the Contractor disturbs asbestos-containing materials, the Contractor will be responsible for the cost of the cleanup and decontamination..

I _____, Representing _____,
(Print Name of Representative) (Business Name)

have been notified of the location of the AHERA Management Plan and agree to avoid impacting all known or assumed asbestos-containing materials in the performance of the Work.

_____ _____
Signature of Representative Date

_____
Work Site

Form 01 11 00B

The Environmental Protection Agency (AHERA) rules require the School District obtain a signed statement from the site superintendent responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector signs a statement that no ACBM was specified as a building material in any construction document for the building, or, to the best of his or her knowledge, no asbestos-containing building material (ACBM) was used as a building material in the building.

ASBESTOS EXCLUSIONARY STATEMENT

CRESWELL SCHOOL DISTRICT40

Creswell High School CTE Building Interior Improvements
(Name of Project)

We the undersigned, (Name of Company), hereby warrant that to the best of our knowledge allmaterials furnished for the above referenced project contain 0% asbestos.

_____
(Name ofConstruction Company)

_____
(Signature and Date)

_____
(Printed Name)

_____
(Job Title)

END OF SECTION 01 11 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 0 Document 00 52 13 “Form of Agreement” for monetary values of established Unit Prices and Alternates.
2. Division 0 Document 00 72 13 “General Conditions” for additional requirements for Changes in the Work, Contract Sum, and Contract Time.
3. Division 1 Section 00 73 00 “Supplementary Conditions” for allowable percentages for Contractors’ Overhead and Profit.
4. Division 1 Section 01 33 00“Submittal Procedures” for Schedule of Values requirements.
5. Division 1 Section 01 60 00 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.
6. Division 1 Section 01 78 39 “Project Record Documents” documentation requirements.

1.3 MINOR CHANGES IN THE WORK

A. Architect, with the concurrence of the Owner, will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 CONSTRUCTION CHANGE DIRECTIVE

A. Architect or Owner may issue a Construction Change Directive on form included at end of Part 3.

1. Change Request contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
2. When signed by the Owner, instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Proceed Order.

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

C. Authorization Required: When a Change Request is approved and signed by the Owner, it becomes a Proceed Order authorizing the change requested. Do not proceed with any change without the Owner's signature.

D. Owner-Initiated Change Requests: Architect will issue a Change Request, which will include a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Change Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Change Request after receipt of Change Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

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

E. Contractor-Initiated Requests: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.

1. Changes requested by the Contractor will be authorized only by signature of the Owner on the prescribed. Do not proceed with any changes without this authorization.
2. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
3. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
5. Include costs of labor, supervision, overhead, and profit directly attributable to the change.
6. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

7. Comply with requirements in Division 1 Section 01 60 00 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Change Request, and at intervals to be determined, Architect will collect Change Requests and issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

CRESWELL SCHOOL DISTRICT 40
ONE TEAM, ONE DREAM

CRESWELL SCHOOL DISTRICT 40
Facilities Management

CONSTRUCTION CHANGE DIRECTIVE CCD# _____

Project: _____ Date: _____

Project Number: _____

Contractor: _____

You are authorized to immediately proceed with the revision(s) described below. Please submit proposed cost/time adjustments to the contract as soon as possible with back-up for Architect/Owner review, negotiation and/or acceptance.

This CCD is not authorized unless signed and dated by the parties noted below.

Owner Representative: _____ Date: _____

Architect: _____ Date: _____

Contractor: _____ Date: _____

END OF SECTION 01 25 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section 01 25 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 1 Section 01 23 00 "Alternates" for administrative requirements governing use of Alternates.
3. Division 1 Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.
4. Division 1 Section 01 77 00 “Closeout Procedures” for final Application for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.
c. Contractor's Construction Schedule.

2. Submit the Schedule of Values to Architect and Owner at earliest possible date but no later than seven days before the date scheduled for submittal of initial Application for Payment.

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

1. Identification: Include the following Project identification on the Schedule of Values:

    a. Project name and location.
    b. Name of Architect.
    c. Architect's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders issued before last day of construction period covered by application.
3. Transmittal: Submit 2 signed and notarized original copy of each Application for Payment to Architect by a method ensuring receipt within 24 hours.

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

1. List of subcontractors.
2. Schedule of Values (draft submitted previously).
3. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (based Architect’s list or required submittals).
7. List of Contractor's staff assignments.
8. Initial progress report.
9. Report of preconstruction conference.

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

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

F. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout procedures (See itemized list in Section 01 77 00 “Closeout Procedures”).
2. Updated final statement, accounting for final changes to the Contract Sum.
3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
5. AIA Document G707, "Consent of Surety to Final Payment."

6. Evidence that claims have been settled.
7. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Administrative and supervisory personnel.
   2. Project meetings.

B. Related Sections include the following:
   1. Division 1 Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
   2. Division 1 Section 01 73 00 "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   3. Division 1 Section 01 77 00 "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

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

   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

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

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

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

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

1.4 SUBMITTALS

A. Key Personnel Names: Within 15 days of Notice-to-Proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including pager, cell, and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.5 PROJECT MEETINGS

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

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Schedule meeting dates and times with Owner and Architect.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, within three days of receiving them from the Architect meeting.

B. Preconstruction Conference: Owner’s Project Manager will schedule a preconstruction conference before starting construction, no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Owner's Project Manager, Architect, and their consultants, as required; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following (see sample agenda at the end of Part 3):

    a. Introduction of persons present.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long-lead items.
    e. Designation of key personnel and their duties.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for requests for interpretations (RFIs).
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Communications.
    l. Role of District's Project Manager.
    m. Submittal procedures, including MSDS information.
    n. Energy design requirements.
    o. Preparation of Record Documents.
    p. Use of the premises and existing building.
    q. Work hours and restrictions.
    r. Owner's occupancy requirements.
    s. Responsibility for temporary facilities and controls.
    t. Construction waste management and recycling.
    u. Parking availability.
    v. Office, work, and storage areas.
    w. Equipment deliveries and priorities.
    x. Safety and first aid.
    y. Security.
    z. Progress cleaning.

3. Minutes: Record and distribute meeting minutes to attendees within three days of meeting.
4. Statements made by the Contracting Agency's representative at the pre-construction conference are not binding upon the Contracting Agency unless confirmed by Written Addendum.

C. Preinstallation Conferences: When required by individual specification sections, conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise

Architect and Owner's Project Manager a minimum of four days prior to scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract documents.
    b. Related requests for interpretations (RFIs).
    c. Related Change Orders.
    d. Purchases.
    e. Deliveries.
    f. Submittals.
    g. Possible conflicts.
    h. Compatibility problems.
    i. Time schedules.
    j. Weather limitations.
    k. Manufacturer's written recommendations.
    l. Warranty requirements.
    m. Compatibility of materials.
    n. Acceptability of substrates.
    o. Space and access limitations.
    p. Regulations of authorities having jurisdiction.
    q. Testing and inspecting requirements.
    r. Installation procedures.
    s. Coordination with other work.
    t. Required performance results.
    u. Protection of adjacent work.

3. Contractor to record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Distribute minutes of the meeting to each party present and to parties who should have been present, within three working days.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

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

a. Contractor's Construction Schedule: Review progress since the last meeting. Provide in a format no larger than 11x17" and discuss a 3 week look-ahead schedule. The look-ahead schedule is required to be directly from the Project Master Schedule and to only show 3 weeks of work. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

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

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) Requests for interpretations (RFIs).
16) Status of proposal requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

3. Minutes: Record and distribute meeting minutes to attendees within three days of meeting.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, Information Submittals, Delegated Design and other submittals.

B. Related Sections include the following:

1. Division 1 Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. Division 1 Section 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
3. Division 1 Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
4. Division 1 Section 01 40 00 "Quality Requirements" for submitting test and inspection reports and for mockup requirements, if any.
5. Division 1 Section 01 77 00 "Closeout Procedures" for submitting warranties.
6. Division 1 Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Division 1 Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
8. Divisions 2 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

B. Submittals Schedule: Comply with requirements in Division 1 Section 01 32 00 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

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

1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

D. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, if received from sources other than Contractor without prior consent.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Submittal and transmittal distribution record.
k. Remarks.
l. Signature of transmitter.

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

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked “Reviewed” by Architect.

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

I. Use for Construction: Use only final submittals with mark indicating “Reviewed” by Architect.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

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

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

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Compliance with specified referenced standards.
    j. Testing by recognized testing agency.
    k. Application of testing agency labels and seals.
    l. Notation of coordination requirements.
    m. MSDS information, where applicable.

4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit the number required by the Contractor plus four (4) copies of Product Data, unless otherwise indicated. Architect will return two copies to Contractor and one to Owner. Mark up and retain one returned copy as a Project Record Document.

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

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

    a. Dimensions.
    b. Identification of products.
    c. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    d. Schedules.
    e. Design calculations.
    f. Compliance with specified standards.
    g. Notation of coordination requirements.
    h. Notation of dimensions established by field measurement.
    i. Relationship to adjoining construction clearly indicated.
    j. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
3. Number of Copies: Submit four opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Architect will retain two **c**opies, including one for the Owner's Project Manager; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

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

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

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

    c. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section 01 40 00 "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 1 Section 01 31 00 "Project Management and Coordination."

C. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section 01 32 00 "Construction Progress Documentation."

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

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

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on

evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section 01 40 00 "Quality Requirements."

M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section 01 78 23 "Operation and Maintenance Data."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

T. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

2.3 DELEGATED DESIGN

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

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

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

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

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

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:

1. Division 1 Section 01 32 00 "Construction Progress Documentation" for developing a schedule of required tests and inspections.
2. Divisions 2 through 49 Sections for specific test and inspection requirements.

1.3 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

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

1.4 SUBMITTALS

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

B. Reports: Prepare and submit certified written reports that include the following:

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

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

1.5 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made by Owner.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section 01 33 00 "Submittal Procedures."

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

E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

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

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

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

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

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

1.6 SPECIAL TESTS AND INSPECTIONS

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

No Special Inspections required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

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

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

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

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

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

END OF SECTION 01 40 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section 01 11 00 "Summary of Work" for limitations on utility interruptions and other work restrictions.
2. Division 1 Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 1 Section 01 73 00 "Execution Requirements" for progress cleaning requirements.
4. Divisions 2 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

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

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

1.7 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts**,** with 1-5/8-inch- (42-mm-) OD top rails.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.

C. Lumber and Plywood: Comply with requirements in Division 6

D. Gypsum Board: Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

2.2 TEMPORARY FACILITIES

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

B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack board.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

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

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

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

3.2 TEMPORARY UTILITY INSTALLATION

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

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

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

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

C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

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

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

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

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

1. Connect temporary service to Owner's existing power source, as directed by Owner.

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

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install lighting for Project identification sign.

J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install two telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Architect's office.
e. Engineers' offices.
f. Owner's office.
g. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas **as** indicated on Drawings.

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

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

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

D. Parking: Arrange for temporary parking areas for construction personnel.

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

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Identification and Temporary Signs: Provide Project identification and other signs as indicated on Drawings. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section 01 77 00 "Execution Requirements" for progress cleaning requirements.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 1 Section 01 11 00 "Summary of Work."

B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 2 Section "Site Clearing", and requirements of authority having jurisdiction.

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

D. Tree and Plant Protection: Comply with requirements specified in Division 2 Section "Tree Protection and Trimming."

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

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

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

G. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

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

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

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
2. Insulate partitions to provide noise protection to occupied areas.
3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
4. Protect air-handling equipment.
5. Weather strip openings.
6. Provide walk-off mats at each entrance through temporary partition.

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

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

3.5 OPERATION, TERMINATION, AND REMOVAL

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

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

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

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

END OF SECTION 01 50 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section 01 23 00 "Alternates" for products selected under an alternate.
2. Division 1 Section 01 77 00 "Closeout Procedures" for submitting warranties for Contract closeout.
3. Divisions 2 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

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

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

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Substitution Requests: Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period, in compliance with this Section.

B. After execution of Agreement, the Owner may, at the Owner’s option, consider formal requests from the Contractor for substitution of products for those specified. One or more of the following conditions must be documented:

1. Compliance with final interpretation of code requirements or insurance regulations which require that the use of a substituted Product.
2. Unavailability of a specified Product through no fault of the Contractor.

3. Inability of specified Product to perform properly of fit in designated place.
4. Manufacturer's or Fabricator's refusal or inability of certify or guarantee performance of a specified Product in the application intended.

C. A Substitution Request constitutes a representation that the Bidder/Contractor:

1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified Product.
2. Will provide the same warranty for the Substituted Product as for the specified Product.
3. Will coordinate installation and make changes to the Work which may be required for the Work to be completed with no additional cost to the Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse the Owner for review or redesign services associated with re-approval by authorities.

D. Substitutions will not be considered when they are indicated or implied on Shop Drawings or Product Data Submittals, without separate request on the form provided, or when acceptance will require revision to the Contract Documents.

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

1. Substitution Request Form: Use form provided at end of Section.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified material or product cannot be provided.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Provide MSDS information to confirm that the product is no more harmful that he products specified.
    f. Samples, where applicable or requested.
    g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    i. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

j. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.
b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
9. Provide bonded and insured off-site storage and protection when site does not permit on-site storage and protection.

1.7 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Submittal Time: Comply with requirements in Division 1 Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS (Not Used)
PART 3 – EXECUTION (Not Used)

SUBSTITUTION REQUEST FORM

TO: GMA Architects
860 W Park St Ste 300
Eugene, OR 97401

DEADLINE: 7 Days Prior to Bid Date

PROJECT: Creswell High School CTE Building Interior Improvements
Creswell School District 40

SPECIFIED ITEM: _____ _____ _____
Section No. Paragraph Description

The Undersigned requests consideration of the following substitution:

_____

The Undersigned states that the following paragraphs are true, except where noted otherwise:

1. The function, appearance and quality of the proposed substitution are equivalent or superior to the specified item;
2. The proposed substitution does not affect dimensions shown on the Drawings;
3. The Undersigned will pay for changes to the building design, including engineering and design services, detailing and construction costs caused by the requested substitution;
4. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements;
5. Maintenance and service parts will be locally available for the proposed substitution;
6. The Undersigned has attached data concerning the proposed substitution, including: Manufacturers product description, specifications, drawings, photographs, performance and test data, adequate for evaluation of the request, with applicable portions of the data clearly indicated. Attachments also include description of changes to Contract Documents which the proposed substitution will require for its proper installation.

Submitted by: _____ Signature: _____ Firm: _____ Address:_____ _____ Date: _____ Tel: _____ Fax: _____ Attachments: _____	For use by Architect: ☐ Approved ☐ Approved as noted. ☐ Not Approved ☐ Received too late By: _____ Date: _____ _____ For use by Creswell School District Project Manager: ☐ Approved ☐ Approved as noted. ☐ Not Approved ☐ Received too late By: _____ Date: _____

END OF SECTION 01 60 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 1 Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Division 1 Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

B. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

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

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

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

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. PROCEEDING WITH THE WORK INDICATES ACCEPTANCE OF SURFACES AND CONDITIONS.

3.2 PREPARATION

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

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

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Owner's Project Manager promptly.
   1. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

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

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

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Owner's Project Manager.

3.4 FIELD ENGINEERING

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

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

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

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

3.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of seven feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated. Bring any conflicts to the Architect for review.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

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

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

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

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

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints where possible. Obtain Architect and Owner's Project Manager approval for all questionable conditions.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to applicable regulations.

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

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

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

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials

specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

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

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

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

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

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

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

3.8 STARTING AND ADJUSTING

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

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

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

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Division 1 Section 01 31 00 – “Project Management and Coordination” for pre-construction and pre-installation conferences.
2. Division 2 Section "Selective Demolition" for demolition of selected portions of the building.
3. Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

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

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a written request describing procedures prior to the time cutting and patching will be performed, requesting approval to proceed, for cutting or alteration which affects:
1. Structural integrity of any element of Project.
2. Integrity of weather-exposed or moisture-resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of site-exposed elements.
5. Work of Owner or separate contractor.

B. Include the following information:
1. Identification of Project and CIP number
2. Location and description of the affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.
5. Alternatives to cutting and patching.
6. Effect on work of Owner or separate contractor.
7. Written permission of affected separate contractor, if any.

8. date and time work will be executed.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
   1. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
   2. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety**.**

B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.6 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

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

   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

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

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

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

3.3 PERFORMANCE

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

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

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

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

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

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

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

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

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

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

PART 1 - GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   5. Mechanical and electrical equipment.

E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 73 00 - Execution Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building

materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
      c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
      d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity

and cost.

4. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
5. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

C. Recycling Incentive Programs:

1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

C. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

END OF SECTION 01 74 19

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 1 Section 01 29 00 "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 1 Section 01 73 00 "Execution Requirements" for progress cleaning of Project site.
3. Division 1 Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Division 1 Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
5. Divisions 2 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Owner’s Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit the following completed forms, items and documents:
    a. AIA Document G706 Contractor’s Affidavit of Payment of Debts and Claims.
    b. AIA Document G706A Contractor’s Affidavit of Release of Liens.
    c. AIA Document G707 Consent of Surety Company to Final Payment.
    d. Operation and Maintenance Manuals
    e. Warranties and Bonds. Submit original documents, including Contractor’s General Warranty,
    f. Record Documents.
    g. Keys.
    h. Testing and Start-Up records.

i. Affidavit of Prevailing Wages paid.
j. Complete list of Contractor and all Subcontractors with address, phone numbers, and work
k. Asbestos-Containing Materials Statement (Form 01100B).
l. Proof of final acceptance and compliance from governing authorities having jurisdiction.
m. Certificate of insurance evidencing continuation of liability coverage including coverage for completed operations until the expiration of the specified warranty periods.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Owner's Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Cost of additional re-inspections by Architect and Owner's Project manager will be deducted from Final Payment to the Contractor.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 10 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

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

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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

PART 2 - PRODUCTS

MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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

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

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.

l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to unusual operating conditions.

o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, material, finishes, systems, and equipment.

B. Related Sections include the following:

1. Division 1 Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section 01 77 00 "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 1 Section 01 78 39 "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 2 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 15 working days before requesting inspection for Final Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 2 hard copies and one electronic copy of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. List of all subcontractors and material suppliers, including names, addresses and phone numbers.
5. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

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

2.2 MANUALS, GENERAL

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

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

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

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

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

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

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include a Table of Contents for each volume with a list of products and major components of equipment included in the section on the face of each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

    If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual,

insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

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

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

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

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

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

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

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

2.4 OPERATION MANUALS

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

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.

License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

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

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

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

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

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

2.5 PRODUCT MAINTENANCE MANUAL

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

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

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

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.

5. Reordering information for specially manufactured products.

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

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

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

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

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

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

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

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

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

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

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

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

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

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

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

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

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

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

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

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

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
3. Electronic Copy: Provide a single PDF file with bookmarks matching tabbed sections in Binders.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a

tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

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

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

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 1 Section 01 78 39 "Project Record Documents."

G. Comply with Division 1 Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

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

B. Related Sections include the following:
1. Division 1 Section 01 77 00 "Closeout Procedures" for general closeout procedures.
2. Division 1 Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 2 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:
   a. Final Submittal: Submit one set of marked-up Record Prints (not “Job Shack” set).

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record

data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

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

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

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
3. Identification: As follows:

a. Project name.

b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect and Owner's Project Manager.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

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

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

END OF SECTION 01 78 39

PART 1 - GENERAL

1.1 EXTENT OF WORK

A. Perform demolition required for completion of new work as indicated in Drawings and Specifications. Remove existing construction at areas shown for new work. Remove loose material caused by or remaining from demolition work.

1.2 ALTERATIONS TO EXISTING CONSTRUCTION

A. Remove portions of existing work only as required to install new materials as indicated in Drawings and Specifications. Repair or replace those portions of existing work outside of new work damaged as result of new work. Repairs or replacement work shall reinstate damaged areas to match original conditions.

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

A. Coordinate work with Utility companies, Municipal and State agencies as required.
B. Comply with applicable jurisdictional standards, including but not limited to:
   1. Occupational Safety and Health Administration (OSHA)
   2. Oregon Occupational and Health Administration (OR-OSHA)
   3. National Emission Standards for Hazardous Air Pollutants (NESHAPS)
   4. National Institute for Occupational Safety and Health (NIOSH)
   5. Department of Environmental Quality (DEQ)
   6. Lane Regional Air Pollution Authority (LRAPA)
C. Comply with Oregon Administrative Rules (OAR) Chapter 437, for hazardous material communication procedures. Post Material Data Safety Sheets (MSDS) on site in conspicuous location.
D. Dispose of materials contaminated with lead, asbestos, mercury, and other heavy metals according to Federal, State and Local jurisdictional regulations.

1.5 CODES AND STANDARDS

A. Conform with applicable portions of adopted Codes within the jurisdiction of the work.

1.6 PERMITS

A. Obtain and pay for necessary permits and inspections required by local and state authorities having jurisdiction. Make such tests as may be required by law.

1.7 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Submit demolition and removal procedures and action plans.

1.8 ENVIRONMENTAL CONDITIONS

A. Conduct demolition to minimize interference with adjacent building areas.
B. Provide, erect, and maintain temporary barriers and safety devices to ensure protection including ground protection to prevent soil contamination.

1.9 COORDINATION

A. Coordinate with other trades affecting or affected by Work of Section.
B. Coordinate demolition with Owner's Representative.

1.10 PROTECTION

A. Protect portions of existing building and facilities against damage and discoloration.
B. Protect active utilities and maintain in continuous operation.
C. Provide barriers as required to protect public from areas under demolition.

PART 2 - PRODUCTS

2.1 SALVAGE

A. All salvage, except items specifically noted, becomes property of Contractor. Salvage may be reused on Work if so specified or scheduled or if Architect judges it equal to new products specified, with the appropriate adjustment in contract sum. Remove material from site.

PART 3 - EXECUTION

3.1 REVIEW OF EXISTING CONDITIONS

A. Visit project site and review existing conditions before commencing Work.

3.2 PREPARATION

A. Erect and maintain temporary barriers to prevent spread of dust, fumes, noise, and smoke.
B. Protect existing items that are not indicated to be altered.

3.3 DEMOLITION

A. Demolish in orderly and careful manner.
B. Protect existing work to remain.
C. Except where noted otherwise, immediately remove demolished material from site.
D. Remove materials to be reinstalled or retained in manner to prevent damage.
E. Remove, store, and protect for reinstallation materials and equipment listed on the drawings accordingly.
F. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
G. Remove demolished materials from site as work progresses.
H. Do not burn or bury materials on site.
I. Leave areas of work in clean condition.

3.4 CLEANING AND REPAIRING

A. Do not allow debris to accumulate in building or on site - haul away from site as soon as removed and dispose of at Contractor's expense.
B. Clean, repair, touch up, or replace when directed, adjacent surfaces which have been soiled, discolored, or damaged by work of Section.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
   2. Openings for other work.
   3. Form accessories.
   4. Form stripping.

B. Related Requirements:
   1. Section 03 20 00 - Concrete Reinforcing.
   2. Section 03 30 00 - Cast-In-Place Concrete.
   3. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.2 REFERENCE STANDARDS

A. Reference Standards: Current edition at date of Bid.
B. American Concrete Institute (ACI):
   1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; current edition.
   2. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; current edition.
   3. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; current edition.
   4. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute; current edition.
C. American Society for Testing and Materials (ASTM) International:
   1. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers; current edition.

1.3 DESIGN REQUIREMENTS

A. Formwork Design, Structural Stability, and Sufficiency: Conform to ACI 318 Chapter 6, and ACI 347R.
   1. Design, engineer, and construct formwork, shoring, reshoring, and bracing to withstand construction loads, continuous loads, and lateral pressure.
   2. Design formwork to withstand pressure resulting from placement and vibration, while maintaining specified tolerances.
   3. Design for special vertical and horizontal loads conforming to ACI 347R Section 2.2.

B. Exposed to View Concrete: Conform to ACI 301 Chapter 6 and ACI 347R for Architectural Concrete, except non-public utility areas.

1.4 SUBMITTALS

A. Product Data: Provide data on void form materials and installation requirements.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
   1. Exposed Concrete Surfaces: Show the general construction of forms including jointing, formed joints or reveals, form tie locations, and pattern of form placement, and other items that affect the exposed concrete visually.
   2. Formwork Facing Materials: Data on form facing materials proposed for smooth-form finish.
   3. Show vertical and horizontal special loads: Conform to ACI 347, Section 2.2. Include camber diagrams.
   4. For Architectural concrete at exposed finished surfaces, include means to prevent leakage of concrete from forms.

C. Delegated Design Data: As required by authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

1.7 PROJECT CONDITIONS

A. Foundation Concrete in Neat Excavations: As accepted by Architect where following conditions are met.
   1. Excavations of foundation trench walls are determined as stable by Geotechnical Engineer.
   2. Excavations are clean, neatly excavated, and accurately located.
   3. Excavation expose bearing soils as approved by Geotechnical Engineer.
   4. Foundation is over-excavated and additional concrete placed beyond detailed design profiles and dimensions.

1.8 COORDINATION

A. Coordinate with Section 03 30 00 and 03 21 00 for placement of rebar and concrete.
B. Embedded Items: Where items, such as embedded plates, reglets, anchors, fastenings, conduit, piping, and other items are supplied by other trades and specified elsewhere in the Contract Documents, coordinate and obtain approval of their placement in the forms prior to placing any concrete.

1.9 ALTERNATES

A. Refer to Section 01 23 00 for possible effect upon Work of this Section.

PART 2 – PRODUCTS

2.1 FORMWORK – GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
C. Chamfer outside corners of beams, joists, columns, and walls.
D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
E. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.2 WOOD FORM MATERIALS

A. Exterior and Interior Concealed Work: APA, PS-1 B-B Plyform Structural I, Exterior, 4 by 8 foot panels, minimum 5/8 inch thick.

B. Exterior and Interior Exposed Work: APA, PS-1 High Density Overlay (HDO) Plyform, Structural I & II, Exterior, High Density 60-60 surfacing material APA PS1 and Form V345, 4 foot by 8 foot panels, minimum 3/4 inch thick and as sufficient to support concrete at rate poured.

2.3 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gauge matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces. Accepted in lieu of wood forms.
B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces

2.4 FORMWORK ACCESSORIES

A. Form Ties - Exposed Concrete Locations:
   1. Fiberglass Ties: Glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   2. Color: Gray.

B. Form Ties - Concealed Concrete Locations:
   1. Snap Ties: Burke Penta-Tie specified for type and quality.
      a. 1 inch diameter by 1 inch deep snap-tie with flattened break-offs and plastic cone.
      b. High strength, non-corrosive, non-staining finish.
      c. One inch minimum break-back below concrete surface.
      d. Wire snap-ties strength and length as required for conditions of installation.
      e. Water seals to inhibit flow of water along tie shaft and to block against leakage.
      f. Products

1) Meadow Burke, Penta-Tie
2) Dayton/Richmond

2. Concrete Plugs: Meadow Burke BA Snaplug, specified for type and quality.
   a. Cones: Burke BA Standard or accepted plastic cone standard with form tie manufacturer's system.
   b. Reveal Type: At exposed Architectural Concrete.
   c. Flush Type: At concealed concrete.
   d. Plug Adhesive: Waterproof neoprene adhesive, as instructed by manufacturer.
   e. Products:
      1) Burke, Snaplug Bonder
3. Flush Filling and Sacking of Cone Holes: Architectural Concrete surface achieved by filling cone holes with stiff sand/cement mix, accepted in lieu of plugs.

C. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied. Use of diesel as form release agent is prohibited.
D. Filler Strips for Chamfered Corners: Rigid plastic type; 1/2 x 1/2 inch size; maximum possible lengths.
E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
F. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 ERECTION – FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
D. Align joints and make watertight. Keep form joints to a minimum.
E. Obtain approval before framing openings in structural members that are not indicated on drawings.
F. Coordinate this section with other sections of work that require attachment of components to formwork.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.
B. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
C. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
D. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.
B. Clean formed cavities of debris prior to placing concrete.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.8 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

PART I – GENERAL

1.1 SECTION INCLUDES
- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 RELATED SECTIONS
- A. Section 03 30 00 – Concrete

1.3 REFERENCES
- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International
- B. ACI SP-66 & ACI 315 Detailing Manual; American Concrete Institute International;
- C. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement;
- D. ASTM A 615/A 61 SM - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- F. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute

1.4 QUALITY ASSURANCE
- A. Perform work of Section in accordance with ACI 301.

1.5 ALTERNATES
- A. Refer to Section 01 23 00 for possible effect upon Work of this Section.

PART 2 – PRODUCTS

2.1 REINFORCEMENT
- A. Reinforcing Steel: ASTM A 615/A 61 SM Grade 60 (420).
  1. Plain billet-steel bars.
  2. Unfinished.
- B. Reinforcement Accessories:
  1. Tie Wire: Annealed, minimum 16 gage.
  2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
- C. Weldable bar #4 through #8 per ASTM A706, Grade 60.

2.2 FABRICATION
- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.

PART 3 – EXECUTION

3.1 PLACEMENT
- A. Place, support and secure reinforcement against displacement.
- B. Maintain 1½ inches concrete cover around reinforcing, with minimum 3 inches when placed against earth; 2 inches when concrete exposed to weather.
- C. Conform to OSSC and ACI 301 for concrete cover over reinforcement.

D. Splices - maintain lap minimum of 48 bar diameters, for tension and other bar placements.

E. Field bending of bent bars requires approval by Architect.

END OF SECTION 03 20 00

PART 1- GENERAL

1.1 SUMMARY

a. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 DEFINITIONS

a. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.
B. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Steel reinforcement and accessories.
   4. Curing compounds.
   5. Vapor retarders.
   6. Joint-filler strips.
C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

PART 2- PRODUCTS

2.1 MATERIALS

A. Formwork: Furnish formwork and form accessories according to ACI 301.
B. Steel Reinforcement
   1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
C. Concrete Materials
   1. Portland Cement: ASTM C 150, I or II or I/II.
   2. Fly Ash: ASTM C618.
   3. Ground Granulated Blast Furnace Slag: ASTM C989, Grade 100 or 120.
   4. Normal Weight Aggregate: ASTM C 33, uniformly graded, with the following maximum nominal size:
   5. Foundations: 1 1/2-inch

6. Slabs-on-Grade: 1 inch
7. Water: Complying with ASTM C 94.

D. Admixtures
1. Air-Entraining Admixture: ASTM C 260.
2. Water-Reducing Admixture: ASTM C 494, Type A.
3. High Range, Water-Reducing Admixture: ASTM C 494, Type F.
4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
5. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

E. Vapor Retarder: Multi-ply reinforced polyethylene sheet, ASTM E 1745, Class C, not less than 7.8 mils thick; or polyethylene sheet, ASTM D 4397, not less than 10 mils thick.
1. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a No. 4 sieve and 10 to 30 percent passing a No. 100 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

F. Joint Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

G. Curing Materials
1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
2. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf.
3. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap polyethylene sheet.
4. Water: Potable.
5. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
6. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.2 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301. Mixture designs shall comply with the requirements of the structural drawings.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
1. Fly Ash: 25 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

2.3 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
2. Provide batch ticket for each batch discharged and used in the work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water in the batch from the plant and the remaining water that may be added at the site, if any. Record approximate location of final deposit in structure.

2. FABRICATING REINFORCEMENT
   A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Formwork: Design, erect, shore, brace, and maintain formwork, according to ACI 301.

B. Embedded Items: Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

C. Vapor Retarder: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
   2. Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

D. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

E. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.
   1. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   2. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
   3. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

F. Tolerances: Comply with ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”

3.2 CONCRETE PLACEMENT

A. Comply with ACI 304R for measuring, mixing, transporting, and placing concrete.

B. Do not add water to concrete during delivery or during placement.

1. Subject to Architect's approval, water may be added at Project site before test sampling and placing concrete, only to the amount listed on the batch ticket, subject to limitations of ACI 301.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints. Deposit concrete to avoid segregation.
   1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   2. Do not use vibrators to transport concrete inside forms.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

E. Cold-Weather Placement: Comply with ACI 306.1.

F. Hot-Weather Placement: Comply with ACI 301.

3.3 FINISHING FORMED SURFACES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.4 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open textured surface plane before excess moisture or bleedwater appears on the surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finish, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

E. Trowel finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
   1. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

3.5 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.6 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with water continuous water-fog spray Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
5. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.7 LIQUID FLOOR TREATMENTS

A. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.8 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least **one** month(s). Do not fill joints until construction traffic has permanently ceased.
B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
   7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Tests and Inspections: As indicated on the structural drawings.
D. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
H. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.11 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Shop-fabricated steel and aluminum items.
- B. Ships ladders.
- C. Steel shapes and sections.
- D. Plates, angles, rod & bolts.
- E. Epoxy and expansion anchors.

1.2 ABBREVIATIONS
- A. AISC: American Institute of Steel Construction; 400 N. Michigan Ave., 8th Floor, Chicago, IL 60611, (312)670-2400.
- B. ANSI: American National Standards Institute; 1430 Broadway; New York, NY 10018, (212) 354-3300.
- C. ASTM: American Society for Testing and Materials; 100 Barr Harbor Dr., West Conshohocken, PA 19428 (610) 832-9500.

1.3 COORDINATION
- A. Coordinate with other trades affecting or affected by work of this section.

1.4 SHOP DRAWINGS
- A. Submit in accordance with Section 01 30 00.
- B. Show each piece referenced to a plan location diagram, locations, critical dimensions, required clearances, construction details, installation methods including splices, attachments, and anchors.

1.5 PRODUCT DELIVERY
- A. Include all required Bolts and other Fastening Devices.

1.6 PRODUCT STORAGE & HANDLING
- A. Store Fabricated steel above ground on Platforms, Skids, or other approved supports.
- B. Store other Materials in weather-tight and dry locations.
- C. Store packaged Materials in original unbroken Containers.
- D. Protect against damage and discoloration.

1.7 FIELD MEASUREMENTS
- A. Verify prior to fabrication.
- B. If field measurements differ slightly from Drawing dimensions modify Work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

1.8 ALTERNATES
- A. Refer to Section 01 23 00 for possible effect upon Work of this Section.

PART 1 - PRODUCTS

1.1 MATERIALS - STEEL
- A. Manufacturing Standard: ASTM A513
  1. Channels, Plates, Bars and Misc. Shapes: ASTM A36
  2. Steel Angles: ASTM A36
  3. Pipes: ASTM A53

4. Wide Flange and Tee Sections: ASTM A992
5. Moment Frame Column Base Plates: A572 Grade 50
6. Welded Steel Bar Grating: ASTM A-1011
7. HSS sections – ASTM A500 GR. B; Steel Pipe – ASTM A53 GR. B
8. Cold Formed Steel: To conform with AISI S100 and the material strengths and sizes specified on the plans

1.9 MATERIALS – ALUMINUM

B. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
C. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
D. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.
E. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.
F. Bolts, Nuts, and Washers: Stainless steel.
G. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

1.2 THREADED FASTENERS & ANCHOR BOLTS (if required)

A. Manufacturing Standards:
B. High Strength Bolts: ASTM A325-N (Snug Tight UON)
C. Bolts & Nuts, Threaded Rods: ASTM A 307, Grade A
D. Anchor Bolts: ASTM F1554 GR55 (Weldable)
E. Plain Washers: ANSI Standard B 27.2
F. Epoxy Anchors: Hilti HIT-RE 500 SD epoxy adhesive with stainless steel threaded rod or approved
G. Expansion Anchors: Hilti stainless steel Kwik Bolt TZ or approved

1.3 WELDING ELECTRODES

A. Manufacturing Standard: ASTM A-233, Series E-70 (FEXX+70ksi)
B. See Structural Drawings for additional requirements at Moment Frame Connections

1.4 SHOP TREATMENT (if required)

A. Rust-Inhibiting Primer: Zinc-rich., 3 mil coating, minimum.
B. Galvanize exposed steel.
C. Manufacturer: Contractor's choice.

1.5 FASTENERS

A. 8d: .131”x2 ½”; 10d: .148”x3”; 16d: .162”x3½”
B. Wood Screws: Simpson Strong-Tie SD or SDS (or equivalent); Screws shall comply with ASTM B695 Class 55 if in contact with pressure treated wood or exposed to weather.
C. Lag Bolts (or Lag Screws): ANSI/ASME Standard B18.2.1; hot dip galvanize if exposed to weather.

1.6 ANCHORS

A. Prefabricated anchors are to be Simpson Strong-Tie or equal.
B. Size: ½” or 5/8” anchors per ASTM A307; ¾” or larger per ASTM F1554.
C. Threaded rods: ASTM A36.
D. Expansion Bolts: Concrete: Simpson Strong-Tie Strong Bolt 2 (or equal for cracked and uncracked concrete); Masonry: Simpson Strong-Tie Wedge Anchors or equal. Install per ICC report.

E. PAF's (Power Actuated Fasteners): ITW Ramset 1500 Series (ICC ESR-1799) or equal.
F. Epoxy: Concrete: Simpson Strong-Tie SET-XP Epoxy (or equal for cracked or uncracked concrete); Masonry: Simpson Strong-Tie SET Epoxy. Install per ICC report.

1.7 STEEL PIPE HANDRAILS

A. General: Fabricate pipe handrails to comply with requirements indicated for dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage.
B. Interconnect handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, weld all around and grind smooth.
C. Form changes in directions of railing members as follows:
   1. by use of welding prefabricated steel elbow fittings.
   2. By bending, of radius indicated.
   3. By mitering at elbow bends.
D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
E. Returns: Return ends to adjacent wall or nearest vertical support unless otherwise indicated on drawings.
F. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is ¼ inch or less.
G. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4 inches high x ¼ inch steel bar welded to each railing post.
H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of guardrails and handrails to other work. Furnish inserts and other anchorage devices for connecting guardrails and handrails to concrete or masonry work.
I. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fills to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

1.8 SAFETY GUARDRAIL, GR-1

A. General: Fabricate heavy duty channel safety guardrail, corrosion resistance aluminum pipe 1 5/8" diameter, with 21" high welded mid rail, 42" height AFF. Comply with requirements indicated for dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage.
B. Materials:
   1. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221, Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.

2. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

C. Finish: Mill finishes, as extruded, match finish to access ladder, AL-1.

D. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms.

E. Brackets, Flanges, Fittings, and Anchors:

1. Provide self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces. Furnish inserts and other anchorage devices for connecting guardrails to concrete or masonry work.

1.9 FINISHES – STEEL

A. Prime paint all steel items.

1. Exceptions: Galvanize steel lintels supporting masonry veneer and other items indicated on Drawings.
2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

PART 2 - EXECUTION

2.1 EXISTING CONDITIONS

A. Prior to starting work, notify general contractor about defects requiring correction.

B. Do not start work until conditions are satisfactory.

2.2 PROTECTING WORK OF OTHER SECTIONS

A. Protect against damage and discoloration.

2.3 INSTALLATION

A. Follow approved Shop Drawings.

B. Install plumb and level.

C. At Unistrut P1000 and Drape Rail, install per manufacturer's and GE Drawings.

2.4 PRODUCT CLEANING AND REPAIRING

A. Remove debris from project site upon work completion or sooner if directed.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. Aluminum access ladders.
2.

1.2 REFERENCE STANDARDS

B. A. AA – Aluminum Association.

C. B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

D. C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. D. OSHA 1910.27 – Fixed Ladders.

1.3 SUBMITTALS

F. A. Submit under provisions of Section 01 30 00.

G. B. Product Data: Manufacturer's data sheets on each product.

H. C. Shop Drawings:

1. 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
2. 2. Provide templates for anchors and bolts specified for installation under other Sections.
3. 3. Provide reaction loads for each hanger and bracket.

I. D. Qualification Data:

1. 1. Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.

J. E. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors.

K. F. Verification Samples: For each finish specified, two samples, minimum size 6 inches (150 mm) square, represent actual product color.

1.4 QUALITY ASSURANCE

L. A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.

1. 1. Record of successful in-service performance.
2. 2. Sufficient production capacity to produce required units.
3. 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.

M. B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.

N. C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.6 DELIVERY, STORAGE, AND HANDLING

O. A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

P. A. Field Measurements: Verify dimensions by field measurement before fabrication.

1. 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.
2.

1.8 WARRANTY

Q. A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.

1. 1. Defects in materials and workmanship.
2. 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
3. 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.

R. B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. A. O'Keeffe's, Inc., Web: http://www.okeeffes.com.

B. B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 FIXED ACCESS LADDER, AL-1

A. Standard Duty Channel Rail.

1. Model 500 as manufactured by O'Keeffe's Inc

2.3 FINISHES

A. A. Mill finish. As extruded.

2.4 MATERIALS

A. A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

B. B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

PART 3 - EXECUTION

3.1 EXAMINATION

A. A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.

B. B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
C. C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.2 INSTALLATION

A. A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.3 PROTECTION

A. A. Protect installed products until completion of project.
B. B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Section specifies wood blocking, framing, sheathing, furring, nailers, rough hardware, and light wood construction.

1.2 RELATED SECTIONS

A. Fiber Cement Siding – Section 07 46 46.

1.3 PRODUCT DELIVERY, STORAGE & HANDLING

A. Protect lumber and other products from dampness both during and after delivery at site.
B. Pile lumber to provide air circulation around surfaces of each piece.
C. Stack plywood and other board products to prevent warping.
D. Locate stacks on well-drained areas, supported at least 6 inches above grade and cover with to protect lumber from moisture.

1.4 REFERENCES

A. WCLIB - West Coast Lumber Inspection Bureau
B. WWPA - Western Wood Products Association

1.5 ALTERNATES

A. Refer to Section 01 23 00 for possible effect upon Work of Section.

PART 2 – PRODUCTS

2.1 LUMBER

A. Provide dimensional lumber of grades indicated according to American Lumber Standards Committee National Grading Rule provisions of grading agency indicated.
    1. Douglas Fir, 19% Maximum Moisture Content when installed.
B. Studs, Joists, and Plates
    1. No. 2 grade, S-Dry
C. Plates, Blocks, Light Framing and Misc.
    1. No. 2, S-Dry
D. Furring, blocking, nailers and similar items 2 inches nominal and narrower No. 2 grade; and, members 46 inches and wider nominal, Number 1 Grade.
E. Preservative Treated Lumber:
    1. No. 2 grade
    2. Hem-fir WCLIB, or WWPA
F. Moisture Content
    1. At time of delivery and maintained at site
    2. Boards and lumber 2 inches and less in thickness: 19 percent or less
    3. Lumber over 2 inches thick: 25 percent or less

2.2 PRESERVATIVE TREATMENT

A. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominalthickness or less, unless otherwise indicated.
B. Application: Treat unless otherwise indicated:
    1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates installed over concrete slabs.

2.3 QUALITY ASSURANCE

A. Identify lumber with grade stamp of agency certified by Board of Review of American Lumber Standards committee in conformance with Product Standard PS-20.
B. Identify sheathing with grade stamp in conformance with PS 1-95.

2.4 GLASS-MAT FACED GYPSUM SHEATHING

A. Thickness: As indicated on Drawings.
   1. Edges: Square.
   2. Surfacing: Coated glass mat on face, back, and long edges.
   3. Acceptable Products:
   4. DensGlass Gold, Georgia-Pacific Gypsum, or approved.

2.5 CONNECTORS, FASTENERS AND ACCESSORIES

A. Nails and Spikes: Sizes and types as required suiting application. Common wire nails unless shown otherwise on Drawings. Refer to nailing schedule for connections not shown on Drawings.
B. Sheathing Nails: 10d, electroplate galvanized common (0.148 inches diameter) or hot-dipped galvanized box (.128 inches diameter) wire nails. Length as required for minimum 1-5/8 inches penetration into framing members.
C. Self-drilling Wood Screws: ¼ inch diameter: Simpson Strong Drive S-Series Wood Screw, length as noted, or approved. Simpson SD1.25 wood screws or approved where noted on drawings for strap and clip installations.
D. Staples: 16 gage, 7/16 crown galvanized staples having a minimum penetration of 1inch into wood decking. Use of staples is limited to applications shown on Drawings.
E. Bolt, Nuts, Washers, Lags, and Screws: Medium carbon steel; galvanized at exterior locations; self-tapping wood screws; sizes as scheduled or shown on Drawings. Cap nuts at exposed installations.
F. Framing Anchors: Simpson Strong-Tie Co., Silver Metal Products, or approved. Sizes and types as shown.
G. Compression (Drive) Pins: Size, type for intended use; Hilti DX series with washer or approved.
H. Building Paper: 100 percent Spunbonded olefin polyethylene sheet; Tyvek by DuPont Company, or approved.
I. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 1½ inches long, 8d and deformed or annular ring shank

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
B. Do not notch, bore or cut structural members for pipes, ducts, conduits or other reasons except as shown on Drawings or as approved by Architect.

C. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
D. Attach rough carpentry work securely to substrate by anchoring and fastening as indicated, comply with the following:
   1. Published requirements of metal framing anchor manufacturer.
   2. Nailing Schedule - refer to last page of Section
   3. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill if required. Replace or repair split or damaged blocking or framing, whether new or existing, if split, broken, or damaged by nailing or other connections made under Section at no additional cost to Owner.
E. Use hot-dip galvanized where exposed to weather or in-ground contact and for nailing to preservative treated lumber

3.2 WOOD FRAMING INSTALLATION - GENERAL.

A. Framing Standard: Comply with AFPA "Manual for Wood Frame Construction," unless otherwise indicated.
B. Install framing connectors per manufacturer's instructions and requirement to achieve full capacity without adversely affecting existing construction.

3.3 GENERAL BLOCKING

A. Install blocking as shown on Drawings and as required to support items of finish, and to cut off concealed draft openings, vertical and horizontal, between ceiling and floor.
B. Fire-stop blocking to be two inches nominal thickness by width of opening being blocked. Install at:
   1. Stud walls at ceilings and floors and at 10-foot maximum intervals.
   2. Intersections of vertical and horizontal cavities such as soffits, drop ceiling cove ceilings.
   3. Openings around vents, pipes and ducts at penetrations of ceilings and floors.

3.4 PRESERVATIVE TREATMENT

A. Treat wood in contact with concrete or masonry, and as indicated.
B. Treat cut ends and holes through treated framing.
C. Flood area with preservative at remaining dry rot repair areas prior to enclosing or covering incidental decay.

3.5 CLEANING

A. Upon completion of work of Section, promptly remove working area scraps, debris and surplus material of Section

3.6 NAILING SCHEDULE

A. Unless otherwise indicated on Drawings or required by OSSC, provide at least the following nailing with common nails:

Block to joist bearing:	Two 10d toenailed each side
Blocking to joist or stud:	Two 10d toenailed each side
One inch brace to stud:	Two 8d toenailed
Two inch brace to stud:	Two 16d face nailed

Bridging to joist:	Two 8d toenailed
Built-up beams:	16d @ 12inches on center, staggered
To support:	Two 16d toenailed each side
At laps (12inches minimum):	Four16d face nailed
Multiple joists:	16d @ 12inches on center, staggered
Joists to sill or girder:	Three 8d toenailed
Studs toenailed to plate:	Four 8d
Studs nailed together:	16d @ 12inches on center staggered
Plates:	1/4-inch nom. diameter drive pins @ 16inches on center
Upper to Lower:	16d @ 12inches on center staggered
At splices:	Two16d face nailed
Plate lap at corners:	Two16d face nailed

Box nails - increase to next larger size or increased quantity by 20%.

3.7 INSPECTION

A. Provide notice to Architect or Engineer 48 hours prior to installation of metal straps on roof and framing clips in concealed spaces.
B. Allow Architect or Engineer to observe installed items prior to concealment.

END OF SECTION 06 10 00

SECTION 06 20 00
FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. A. Work Includes: Provide and install interior finish carpentry items as shown on Drawings and as specified, including:

B. A. Interior running trims and molding, including shaped trims or assemblies for:

1. 1. Wood Base.

C. B. Work Specified Elsewhere:

1. Section 06 10 00 – Rough Carpentry.
2. Section 06 41 00 – Casework.
3. Section 07 90 00 – Interior Joint Sealants.
4. Section 08 14 00 – Wood Doors.
5. Section 08 71 00 – Door Hardware.
6. Section 08 80 00 – Glass and Glazing.
7. Section 09 91 00 – Painting.

1.2 SUBMITTALS

A. A. Comply with provisions of Section 01330 – SUBMITTAL PROCEDURES.

B. B. Submit manufacturer's literature describing products.

C. C. Shop Drawings for running trim and moldings:

1. Comply with Woodwork Institute (WI) standards for Millwork Shop Drawings.
2. Show installation and anchorage details.
3. Show all details full size.

D. D. Samples:

1. Trims: 3-each; 12-inch length of each type with specified finish.

E. E. Certificates: Prior to delivery to Project site, submit WI compliance certificate certifying Shop Drawings and products furnished for Project meet requirements of specified grades.

1.3 QUALITY ASSURANCE

F. A. Fabricator Qualifications:

1. Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. 2. Shop is a certified participant in AWI's Quality Certification

G. B. Installer Qualifications: Certified participant in AWI's Quality Certification Program.

H. C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and solid hardwoods visually matching Work specified in other Sections as accepted by the Architect.

I. D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

J. 3. Provide AWI Quality Certification Program certificates indicating that woodwork, including installation, complies with requirements of grades specified.

K. E. Visual Matching of Wood Finishes:

L. 1. It is the intent of the Contract Documents to visually match existing building standard wood veneer finishes

M. 2. Visual matching shall be to "match existing building standard" unless otherwise noted. Application of wood veneers and finishing materials and methods may vary per the specified standards of the referenced Sections.

N. 3. Contractor shall coordinate submittal of veneer samples for the referenced sections to facilitate review by the Architect to verify acceptable visual matching without affecting the Project Schedule.

1.3 DELIVERY, STORAGE, AND HANDLING

A. A. Comply with requirements of Section 01600 – PRODUCT REQUIREMENTS.

B. B. Deliver finish carpentry items to Job Site only after proper facilities are available for handling, storing, and protecting items: receiving areas are broom cleaned: exterior openings are closed up; wet work and mechan¬ical and electrical rough-ins are completed.

C. C. Provide temporary protective covers for items during delivery, install¬ation, and until Final Acceptance of Project.

1.4 PROJECT CONDITIONS

A. A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.5 COORDINATION

A. A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in Section 09110 – Metal Support Systems to ensure that casework can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. A. General Requirements:

1. Material Grades: Provide AWI Premium grade unless otherwise noted.
2. Lumber and plywood shall be kiln-dried to equilibrium moisture content suitable for fabrication in shop and suitable for use intended.

3. Use only adhesive materials free of urea-formaldehyde.
4. Provide products fabricated and treated as required for International Building Code (IBC) fire-resistive standards.

2.2 DIMENSIONAL LUMBER AND TRIMS

A. A. Solid Hardwood: Provide solid trims as shown on Drawings and as required for assemblies, trim and molding profiles and veneer wood fabrications as shown on Drawings, including:

1. Grade: AWI Premium.

B. 2. Species for transparent finish: Cherry, as required to match specified wood veneer finishes.

1. 3. Species for opaque (painted) finish: Any closed-grain hardwood.

2. 4. Fabrication:

a. Sizes: Provide solid stock dimensional lumber fabricated to sizes and profiles as shown on drawings.

b. Cut: Match specified cut for veneer to the greatest extent practical.

c. Figure: Match specified figure for veneer to the greatest extent practical.

d. For trim items wider than available lumber, use veneered construction. Do not glue for width.

e. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. 5. Interior Work Factory Finishing: Clear, transparent finish equal to NWWDA Catalyzed Polyurethane (Finish 5) or AWI TR-6.

a. Back-paint panels.

D. B. Softwood Lumber: Use the following only at concealed or semi-concealed locations. At semi-concealed locations, finish exposed edges as shown on Drawings, including finishes to match veneer and black paint finishes.

1. 1. Softwood: Douglas Fir, custom grade.

2.3 WALL PROTECTION PANELS, WP-2

A. Occur where indicated on Drawings as shop wall protection

1. Grade: BCX, exposure 1
   a. AWI Fabrication Grade: Economy
2. Species: Softwood, or Southern Yellow Pine, or Douglas Fir.
3. Sanding: Factory machine-sanded smooth on the face side (B-Grade Face).
4. Thickness: 1/2-inch nominal.
5. Panel Dimensions: 48 inches wide by 96 inches long.
   a. Layout panels horizontally, as indicated on Drawings. Orient panels B-face exposed to the room and stamped C-face to the substrate.
   b. Expansion Gaps:
      1) Provide continuous 1/8" expansion gap at panel horizontal butt joints
      2) Prior to mounting, paint 4" min wide strip on wall substrate directly behind all planned panel butt joints.
6. Finish: continuous double-coat application of scratch-resistant waterborne polyurethane or clear commercial varnish. See COLOR SCHEDULE, SHEET A600

B. Accessories & Trim:
1. Edge Trim: provide anodized aluminum J-trim, coordinates with thickness of plywood panel.

2.4 MISCELLANEOUS MATERIALS

A. A. Miscellaneous Wood Products: Comply with the following:
1. 1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
2. 3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
3. 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
4. 5. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. B. Fasteners:
1. 1. Typical Unfinished Bolts, Lag Bolts (Lag Screws), Nuts, and Washers: Low carbon steel standard fasteners, externally and internally threaded, ASTM A 307, malleable washers.
2. 2. Nails, Typical Interior: Common wire, galvanized: typical.
3. 3. Exposed Nails and Fastenings for Exterior Use: Aluminum or stainless steel.

C. C. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

D. 1. Wood Glues: 30 g/L.

E. 2. Contact Adhesive: 250 g/L.

2.8 FABRICATION

F. A. Preparations
1. 1. Verify dimensions of receiving spaces at job site.
2. 2. Verify details and dimensions of equipment and fixtures integral with finish carpentry for proper fit and accurate alignment.
3. 3. Coordinate details with other work supporting, adjoining, or fastening to finish carpentry.

G. B. General:

H. 1. Fabricate in accordance with WI Premium grade specifications unless otherwise noted.

I. 2. Shop fabricate and assemble complete work in complete units insofar as dimensions permit shipment and installation.

J. 3. Kerf backs of solid members more than 5 inches wide or more than 1 inch nominal thickness.

K. 4. Conceal nailing where possible and set nail heads for putty on exposed portions.

L. 5. Thoroughly hand sand wood surfaces. Take care that cross sanding is removed by final sanding in direction of grain; ease "knife-edge" corners by sanding. Wood surface shall be free from dust, glue, stains, and other foreign matter and in proper condition to receive finish.

M. 6. Perform corrective measures necessitated by non conformance with standards. The Owner's opinion will govern discrepancies.

2.5 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

A. A. Grade: Premium.

B. B. Wood Species and Cut: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise shown on Drawings.

C. C. For trim items wider than available lumber, use veneered construction. Do not glue for width.

D. D. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

E. E. Assemble Work in the shop except where limitations of access to place of installation require field assembly.

F. F. Assemble moldings in plan to maximum extent possible. Miter corners in plan and prepare for field assembly with bolted fittings designed to pull connections together.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. A. Examine areas scheduled to receive finish carpentry for conditions that will adversely affect installation.

B. B. Do not install finish carpentry items before unsatisfactory conditions have been corrected.

3.2 INSTALLATION

C. A. Install finish carpentry in accordance with final shop drawings.

D. B. Set work square, level and plumb with edges scribed accurately and secure In place with fastenings, clips, braces, anchors, shims, and blocks. Provide mitered and scribed inside and outside corner joints for exposed-to-view materials.

E. C. Coordinate finish carpentry items with metal backing specified in Section 09110 – Metal Support Systems for the proper placement and installation of items fastening to them.

F. 1. Anchor woodwork to metal backing or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

G. D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

H. 1. Fill gaps, if any, between exposed-to-view edges of trim assemblies and face-of-wall with plastic wood filler, sand smooth, and finish same as wood trim assembly.

I. 2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

J. E. Thoroughly hand sand wood surfaces.

K. 1. Take care that cross sanding is removed by final sanding in direction of grain; ease "knife-edge" corners by sanding.

L. 2. Wood surfaces shall be free from dust, glue, stains, and other foreign matter and in proper condition to receive finish.

3.2 CLEANING AND ADJUSTING

A. A. Comply with requirements of Section 01740 CLEANING.

B. B. Remove damaged, soiled, or otherwise disfigured portions and replace with new prior to Final Acceptance.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Custom casework, countertops, shelving, and accessories.

1.2 RELATED SECTIONS

A. Section 06 61 16 "Solid Surfacing Fabrications"
B. Division 22 "Plumbing" Sections

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. Except as herein modified, Material and Workmanship Grades shall be as defined in 1994 edition of Architectural Woodwork Quality Standards published by American Woodwork Institute, hereinafter referred to as AWL; 1952 Isaac Newton Sq.; Reston, VA 20190; (703) 733-0600. Standards may be obtained from Institute.

1.5 DEFINITIONS

A. Exposed Surfaces:
   1. Surfaces visible when drawers and doors are closed.
   2. Cabinet bottoms, if any, 42 inches or more above floor.
   3. Cabinet tops, if any, less than 72 inches above floor. Sloped cabinet tops at any height.
B. Semi-exposed Surfaces:
   1. Surfaces which become visible after drawers and doors are opened, including backs of Doors.
   2. Cabinet bottoms, if any, more than 30 inches *but* less than 42 inches above floor.
   3. Cabinet tops, if any, between 72 and 78 inches above floor.
   4. Concealed Surfaces: Surfaces not normally visible after installation.
   5. Cabinet bottoms, if any, less than 30 inches above floor.
   6. Cabinet tops, if any, 78 inches or more above floor.
   7. Web frames, dust panels, stretchers, blocking, and backs behind drawers.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Shop Drawings
   1. Show locations, arrangements, shapes, dimensions, joint details, and other pertinent items.
   2. Show connections to adjacent work, and complete assembly, whether or not Materials are furnished by mill.
   3. Include Manufacturer’s descriptive literature for specialty items. Identify material grades, workmanship grades, wood species, and finishes
C. Samples
   1. Submit for review and acceptance 2 samples of each color of plastic laminate proposed for use.

1.7 PRODUCT DELIVERY, STORAGE & HANDLING

A. Do not deliver products to jobsite until notified by General Contractor that Project is conditioned and prepared to handle and store products without damage or discoloration.
B. Protect against damage and discoloration.

1.8 TEMPERATURE & HUMIDITY

A. Where casework or shelving are located, maintain minimum temperature of 55 F and relative humidity between 25% and 55%.

1.9 ILLUMINATION

A. Perform no work under less than 30 ft. candles of light measured 3 ft. above floor.

1.10 FIELD MEASUREMENTS

A. Verify installation dimensions prior to fabrication. If field measurements differ slightly from drawing dimensions modify work as required for accurate fit. If measurements differ substantially, notify Architect prior to fabrication.

PART 2 - PRODUCTS

2.1 SOFTWOOD LUMBER

A. Species: Douglas Fir
B. Grain: Mixed
C. Surface Texture: Smooth

2.2 PLYWOOD

A. Manufacturing Standard: U.S. Product Standard PS-1
    1. Types:
        a. At Wet and Countertop Locations: Marine-grade, Moisture resistant cores, Exposure 1
        b. Elsewhere: Exposure 2
    2. Species: As scheduled where exposed
    3. Cut: Rotary

2.3 PARTICLEBOARD

A. Manufacturer & Brand: Weyerhaueser Timblend, Champion Novaply,Willamette Industries Duraflake, or approved.
B. Minimum Density:45 pcf
C. Maximum Moisture Content: 8%
D. Maximum Urea Formaldehyde Resin Emission: 1.8 ug/ml per National Particleboard Association Standard NPA 5-82

2.4 CASEWORK INTERIOR LINER

A. Material: Melamine Low Pressure Laminate
B. Type: Thermal-pressed
C. Color: Off-white
D. Extent of Work: Cover Semi-exposed casework and shelving surfaces.

2.5 PLASTIC LAMINATE FACING

A. Material: High pressure type conforming to NEMA LD1
B. Thickness (& NEMA Type):

1. Exposed vertical surfaces including door and drawer fronts and backs: 0.028 inch (GP 28)
2. Semi-exposed surfaces: 0.02 inch (CL 20)

C. Color & Pattern:
1. PL-2, Vertical Surface: As selected by Architect, see COLOR SCHEDULE SHEET A600

2.6 COUNTERTOPS

A. Solid Laminated Surfacing: custom quality hardwood; maple, plain sawn, exposed edge grain; laminated with waterproof adhesives; thickness as recommended by fabricator; suitable for transparent finish
B. Plastic Laminate Countertops: medium density fiberboard substrate covered with HPDL conventionally fabricated and self-edge banded.
C. Moisture Resistant Countertop Core:
1. Provide for countertops subject to moisture conditions, such as those with sink cutouts:
a. Plywood: APA PSI-95, Marine Grade a-a or A-b
D. Color & Pattern:
1. PL-1, horizontal surface: As selected by Architect, see COLOR SCHEDULE SHEET A600

2.7 EDGE BANDING

A. Material: Polyvinyl Chloride (PVC) Nominal Thickness: 3 mm.
B. Color: Match adjacent facing material
C. Extent of work: Except where hardwood trim is shown on drawings, provide over all exposed plywood and particle board edges, including door and drawer edges.

2.8 HARDBOARD

A. Manufacturer & Brand: Masonite Pressed wood, Forest Fiber Temper-Treated, or approved equal.
B. Type: Tempered
C. Color: Dark Brown

2.9 FINISH HARDWARE

A. Case-mounted adjustable shelf supports:
1. Manufacturer: Knape & Vogt, or approved.
2. Standards Model: 255
3. Supports Model: 256
4. Material: Steel
5. Finish: Zinc
B. Extension drawer slides:
1. Manufacturer: Accuride, or approved.
2. Model:
a. Drawers less than 8 inches high:3832
b. Drawers 8 inches and higher:4034
3. Extent of Work: Provide on all drawers.
C. Door Hinges:
1. Manufacturer: Blum, or approved.
2. Type: Concealed, self—closing, and satisfying conditions of use.
3. Opening Angle: 120°, 170° at ADA sink cabinet
4. Finish: Nickel-plated
D. Drawer & Door Pulls:
1. Wire Pulls, match (E) building standard.
E. Cabinet and Drawer Locks

1. Key Lock National or equal, where indicated on drawings.

F. File Drawer File Hangers
   1. On File Drawers provide integral steel file hanger edges for hanging file folders.

G. Countertop Supports
   1. Manufacturer: Haefele, or approved.
   2. Model: Work Surface Bracket
   3. Size: 18L x 18H unless noted otherwise in the Drawings.
   4. Thickness: 1/8”
   5. Finish: Epoxy-coated White

H. Concealed Countertop Supports
   1. Manufacturer: The Original Granite Bracket
   2. Model: Free Hanging Shelf Bracket
   3. Size: 24” Length
   4. Thickness: 1/2”
   5. Material: Steel
   6. Finish: Black (Standard)

2.10 FABRICATION - GENERAL

A. AWl Fabrication Style: Flush Overlay
B. AWl Fabrication Grade, unless other requirements are specified herein: Custom
C. All Shelves adjustable, unless otherwise shown on drawings.
D. Verify dimensions of Sinks and other Items to be built into cases and counters.
E. Assemble at mill where feasible.
F. Conceal end grain in exposed and semi-exposed surfaces.
G. Assemble cases with adhesive.
H. Use concealed fastenings wherever possible. Use screws and bolts where required for strength and rigidity

2.11 FABRICATION - CABINETS AND HARDWARE

A. Install finish hardware specified herein and in Section 08 71 00 "Door Hardware" at Mill. Machine-sand exposed and semi-exposed wood surfaces.
B. Materials, unless elsewhere specifically noted otherwise:
   1. Exposed surfaces: Plastic laminate faced
   2. Semi-exposed surfaces
      a. Backside of doors & drawer fronts: Match adjacent exposed surfaces
      b. Door & drawer face edges: Edge banding
      c. Elsewhere: Casework interior liner
C. Shelving & Countertops:
   1. Material: Plywood
   2. Thickness:
      a. Spans up to 36 inches: ¾ inch
      b. Spans between 36 & 48 inches: 1 inch
      c. Shelves routed to receive dividers: 1 inch
D. Doors: ¾ inch thick particleboard
E. Concealed Casework Backs: ¼ inch thick cabinet interior liner faced toward cabinet interior
F. Drawer Bottoms: ¼ inch thick cabinet interior liner faced upward
G. All Other Case Construction Materials: ¾ inch thick particleboard.
H. Adjustable Shelf Hardware:

1. Install shelf bracket standard full height of space where adjustable shelves are shown; recess flush into cabinet standard.
2. Drawer Slides & Locks:
   a. Follow manufacturer's instructions.

I. Sink Cabinets:
1. Hold bottom shelf and any intermediate shelves, ¾ inch back from rear face of door to provide open space for ventilation.

J. Door & Drawer Face Silencers:
1. Provide felt or rubber silencers where necessary to prevent noisy door-to-frame and drawer-to-frame contact.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS

A. Verify that surfaces to receive casework and shelving are straight, plumb, true, solid, rigid, and otherwise properly prepared.
B. Prior to starting work, notify General Contractor about defects requiring correction.
C. Do not start work until conditions are satisfactory.

3.2 COORDINATION

A. Coordinate with other trades affecting or affected by work of this Section.

3.3 PROTECTION

A. Protect against damage and discoloration caused by work of this Section.

3.4 INSTALLATION

A. Miter Corners, and bevel-cut and glue Joints.
B. Where rubber base is scheduled, provide continuous wood backing in toespace of in-line base cabinets.
C. Secure work in place, plumb, square, true, level, and without distortion; level where necessary with concealed shims.
D. Secure work to backing with countersunk screws.
E. Accurately scribe faceplates, filler strips, and trim strips to adjacent surface irregularities. Install with finish nails, set for puttying, except where screws are required.
F. Ease sharp external corners prior to finishing

3.5 ADJUSTMENTS

A. Adjust moving parts to operate satisfactorily at time of Project Substantial Completion and during Warranty Period.
B. Adjust each door and drawer front for square and fit at final installation.
C. Contractor shall inspect every plastic laminate edge to make sure that it is not sharp.

3.6 PRODUCT CLEANING & REPAIRING

A. Including work of other trades, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section.
B. Leave wood surfaces ready for finishing specified in other Sections.
C. Remove debris from project site upon work completion, or sooner if directed

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Fiberglass reinforced plastic FRP wall and ceiling panels.

1.2 REFERENCE STANDARDS

A. ASTM International (ASTM) (www.astm.org):

1. ASTM D 2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
2. ASTM D 5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
3. ASTM D 5420 – Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
4. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

B. FM Global (FM) (www.fmglobal.com):

1. ANSI FM Approval 4880 – Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior; Wall Systems.

C. UL (www.ul.com):

1. UL 2818 – GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings.

1.3 PREINSTALLATION MEETINGS

A. Convene pre-installation meeting 1 week before start of Work of this Section.

B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, installer, and manufacturer's representative.

C. Review the Following:

1. Materials.
2. Preparation.
3. Installation.
4. Field quality control.
5. Adjusting.
6. Cleaning.
7. Protection.
8. Coordination with other Work.

1.4 SUBMITTALS

A. Comply with Division 01.

B. Product Data: Submit manufacturer's product data for each type of product required.

C. Samples: Submit manufacturer's selection and verification samples for finish, colors, patterns, and textures.

1. Submit 2 samples of each type of panel, trim, and fastener.

D. Certificates: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

E. Test and Evaluation Reports: Submit reports showing compliance with specified performance characteristics and physical properties.

F. Manufacturer's Instructions: Submit manufacturer's installation and storage instructions.

G. Environmental Certifications: Submit certificates for GREENGUARD Indoor Air Quality and Children & Schools Certification.

H. Manufacturer's Project References: Submit manufacturer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels furnished.

I. Installer's Project References: Submit installer's list of successfully completed FRP panel projects, including project name and location, name of architect, and type and quantity of FRP panels installed.

J. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning and repairing instructions.

K. Warranty Documentation: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of FRP panels of similar type to that specified.

B. Installer's Qualifications:

1. Installer regularly engaged, for a minimum of 5 years, in installation of FRP panels of similar type to that specified.

2. Employ persons trained for installation of FRP panels.

C. Surface-Burning Characteristics: Determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction.

1. Flame-Spread Index: 25 Class A

2. Smoke-Developed Index: 450.

D. FM Approved: Crane Composites "Glasbord FXE".

E. Meets USDA/FSIS requirements.

F. Environmental Certification: GREENGUARD Certification UL 2818.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery 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 at temperature and humidity conditions in accordance with manufacturer's instructions.
4. Store materials on flat, level surface, raised above floor, with adequate support to prevent sagging.
5. Store materials out of direct sunlight.
6. Protect materials and finish during storage, handling, and installation to prevent damage.

1.7 AMBIENT CONDITIONS

A. Do Not Begin Installation Until:

1. Residual moisture from plaster, concrete, or terrazzo has dissipated.

B. During installation and within 48 hours before installation, maintain ambient temperature and relative humidity within limits required by type of FRP panel adhesive used and adhesive manufacturer's instructions.

1.8 WARRANTY

A. Warranty Period: 1 year from date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Crane Composites, Inc. or Approved

B. Substitutions: Comply with Division 01.

C. Single Source: Provide FRP panels and accessories from single manufacturer.

2.2 FRP PANELS, FRP-1

A. Fiberglass Reinforced Plastic Panels: Crane Composites "Glasbord FSI".

1. Class A.
2. Use: Walls and ceilings.
3. Surface Finish: Smooth.
4. Scratch Resistance, ASTM D 2583, Barcol Hardness: 50.
5. Abrasion Resistance, Taber Abrasion Test, CS-17 abrasive wheels with 1,000 g weight: Weight loss after 25 cycles of no more than 0.038 percent.

6. Impact Strength, ASTM D 5420: 11 in-lbs (0.59 J), showing no visible damage on finish side.

B. Panel Low-Emitting Materials: Comply with testing and product requirements of California Department of Health Services standards for Volatile Organic Emissions.

C. Panel Surface Protection: "Surfaseal" molecularly-bonded surface protection film for impact, abrasion, and scratch resistance.

D. Panel Color: White 85, SEE COLOR SCHEDULE, SHEET A600

E. Panel Dimensions:

1. Nominal Thickness: 0.075 inch (1.9 mm).

2. Wall Panel Size: 4 feet by 8 feet

2.3 ACCESSORIES

A. Stainless Steel outside corners, seam sealant at butt joints and inside corners.

B. Panel Adhesive: As recommended by FRP panel manufacturer for required substrates.

C. Panel Seam Sealant: Bright white, 2-part urethane sealant, as recommended by FRP panel manufacturer.

1. VOC Content: 0.0 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive FRP panels.

B. Examine Substrate Surfaces to Determine:

1. Corners: Plumb and straight.

2. Surfaces: Smooth, sound, and uniform.

3. Nails or Screw Fasteners: Countersunk.

4. Joints and Cracks: Filled flush and smooth with adjoining surfaces.

C. Notify Architect of conditions that would adversely affect installation or subsequent use.

D. Do not begin preparation or installation until unacceptable conditions are corrected.

3.2 PREPARATION

A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust, or other contaminates.

B. Acclimate FRP panels by unpacking and placing in installation space a minimum of 24 hours before installation.

C. Lay out FRP panels before beginning installation.

1. Locate panel joints to provide equal panel widths at ends of walls.

2. Locate panel joints to provide trimmed panels at corners a minimum of 12 inches (300 mm) wide.

3.3 INSTALLATION

A. Install FRP panels in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install FRP panels plumb, level, square, flat, and in proper alignment.

C. Install FRP panels to be water resistant and washable.

D. Install FRP panels with manufacturer's recommended gap for panel field and corner joints.

E. Fasteners:

1. Use fasteners in accordance with manufacturer's instructions to install FRP panels securely to supports.

2. Pre-drill fastener holes in FRP panels, 1/8 inch (3.2 mm) greater in diameter than fasteners.

F. Adhesive:

1. Install FRP panels in full spread of adhesive.

2. Follow adhesive manufacturer's instructions for application of adhesive.

G. Install trim accessories with adhesive and nails or staples.

1. Do not fasten through FRP panels.

H. Sealant:

1. Remove excess sealant and smears as FRP panels are installed.

2. Clean in accordance with sealant manufacturer's instructions.

I. Tolerances: Install FRP panels within manufacturer's installation tolerances.

3.4 ADJUSTING

A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

B. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Architect.

3.5 CLEANING

A. Clean FRP panels promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that could damage finish.

3.6 PROTECTION

A. Protect installed FRP panels and finish surfaces from damage during construction.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Sealant for weathersealing applications.

1.2 REFERENCES
- A. ASTM C790, ASTM C804, ASTM C920

1.3 SUBMITTALS
- A. Furnish manufacturer's literature for each product. Indicate on literature intended location of use.
- B. Samples of manufacturer's standard color options.

1.4 QUALITY ASSURANCE
- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions

1.5 WARRANTY
- A. Provide two-year warranty under provisions of Section 01 78 36.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air and watertight seal, and exhibit loss of adhesion or cohesion, or do not cure.

1.6 ALTERNATES
- A. Refer to Section 01 23 00 for possible effect upon Work of Section.

PART 2 – PRODUCTS

2.1 SILICONE SEALANT
- A. Manufacturing standard: ASTM C-834, One-part, low-modulus silicone sealant – DOWSIL 791, or approved
- B. Color: As selected by Architect to match adjoining finish.

2.2 ACCESSORIES
- A. Bond Breaker Tape as recommended by sealant manufacturer.
- B. Backer Rod: Compressible rod stock of expanded, extruded polyethylene.

PART 3 – EXECUTION

3.1 INSTALLATION
- A. Install in accordance with manufacturer's instructions.
- B. Install sealant free of air pockets, ridges and sags. Tool joints to drain.
- C. Protect installed sealant until cured. Clean adjacent surfaces.

END OF SECTION 07 90 00

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Hollow metal doors and frames.

1.2 RELATED SECTIONS

A. Section 08 71 00 "Door Hardware"
B. Section 09 90 00 "Painting"
C. Section 13 49 00 "Radiation Protection"

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. SDI Standards
   1. SDI-108-2010 Recommended Selection and Usage Guide for Standard Steel Doors
   2. SDI-111-2009 Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components
   3. SDI-112-2008 Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames
   4. SDI-117-2009 Manufacturing Tolerances for Standard Steel Doors and Frames
   5. SDI-118-2012 Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements
   6. SDI-124-2011 Maintenance of Standard Steel Doors and Frames
B. ANSI Standards
   1. ANSI/UL 10B-2009 Fire Tests of Door Assemblies
   2. ANSI/UL 10C-2009 Positive Pressure Fire Tests of Door Assemblies
   3. ANSI/UL 1784-2009 Air Leakage Test of Door Assemblies
   4. ANSI/NFPA 80-2010 Standard for Fire Doors and Other Opening Protectives
   5. ANSI/NFPA 252-2012 Fire Tests of Door Assemblies
   6. ANSI/SDI A250.3 2007 (R2011) Test Procedure and Acceptance Criteria for Factory Applied Finish for Steel Doors and Frames
   7. ANSI/SDI A250.4-20011 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings
   8. ANSI/SDI A250.6-2003 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames
   9. ANSI/SDI A250.7-1997 (R2002) Nomenclature for Standard Steel Doors and Steel Frames
   10. ANSI/SDI A250.10-1998 (R2011) Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
   11. ANSI/SDI A250.11-2012 Recommended Erection Instructions for Steel Frames
   12. ANSI/BHMA A156.115-2006 American National Standard for Hardware Preparations in Steel Doors and Steel Frames
C. ASTM Standards
   1. ASTM A1008-2012 Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

2. ASTM A568-2011 Standard Specification for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
3. ASTM A1011-2012 Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
4. ASTM A653-2011 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
5. ASTM A879-2012 Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
6. ASTM A924-2010 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

D. ADA, The Americans with Disabilities Act - Title III - Public Accommodations
E. ANSI-A117.1-1992 American National Standards Institute - Accessible and Usable Buildings and Facilities
F. WHI - Warnock Hersey International, Division of Inchcape Testing Services
G. State and Local codes including Authority Having Jurisdiction.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Shop Drawings: Indicate door and frame elevations and sections, materials, gages and finishes,fabrication and erection details, locations of finish hardware by dimension and locations/details of openings. Do not proceed with fabrication until details are approved.
C. Certification of Compliance: Submit information necessary to indicate compliance to specifications.

1.6 QUALITY ASSURANCE

A. Certification of label construction: For components exceeding Underwriters Laboratories, Inc. (UL)- furnish inspection certificate stating that component construction conforms to UL rating requirements only if Architect is aware of limitation and has allowed the non-labeled unit.
B. Hollow metal supplier shall be a qualified direct distributor of products to be furnished. In addition the distributor shall have in their regular employment an A.H.C./C.D.C. or person of equivalent experience available at reasonable times to consult with the Architect/Contractor and/or Owner regarding matters affecting door and frame openings.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver doors and frames cardboard wrapped, crated, palletized or otherwise protected during transit and site storage.
B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and accepted by Architect. Otherwise, remove and replace damaged items.
C. Store doors and frames at the building site in dry, secure location.
   1. Place units on minimum 4 inches high wood blocking.
   2. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber.
   3. If cardboard wrapper/packaging on door becomes wet, remove packaging materials immediately.
   4. Provide ¼ inch spaces between stacked doors to promote air circulation.

1.8 SEQUENCING AND SCHEDULING

A. Deliver doors and frames to jobsite in timely manner.

1.9 WARRANTY

A. Supply hollow metal doors and frames with one (1) year warranty against defects in materials and workmanship.
B. Warranty commences with substantial completion of Project.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All steels used to manufacture doors, frames, anchors, and accessories shall meet at least one or more of the following requirements:
   1. Cold rolled steel shall conform to ASTM designations A1008, “Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability” and A568, “Standard Specification for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.”

2.2 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco or Curries: www.assaabloydss.com.
   2. De La Fontaine Inc.: www.delafontaine.com.
   3. Republic Doors: www.republicdoor.com.
   4. Steelcraft, an Allegion brand: www.allegion.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ICC A117.1 and ADA Standards.
   2. Door Thickness: 1-3/4 inch.
   3. Door Top Closures: Flush with top of faces and edges.
   4. Door Edge Profile: Beveled on both edges.
   5. Door Texture: Smooth faces.
   6. Exterior Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   7. Interior Glazed Lights: Non-removable stops on secure side; sizes and configurations as indicated on drawings.
   8. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   9. Provisions for Persons with Disabilities: Fabricate location of jamb stops to accommodate complete closing of door by automatic door closer without exceeding maximum allowable pressure of 5 to 8.5 pounds.
   10. Electrical Boxes: Provide at door and frames receiving magnetic security monitors, specified in Section 087100 or Division 28 Electronic Safety and Security.
   11. Galvanizing for Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness

12. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.4 STEEL DOORS

A. Exterior Door – Opaque, Max U-Value= 0.370:
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless. 16 gauge minimum thickness.
   2. Core: Polyurethane. Kraft paper honeycomb cores are not accepted.
   3. Vertical Edge Reinforcement: One piece, continuously arc welded full length to face sheets.
      a. Lock Channel: Full height, 14 gauge steel, beveled 1/8 inch in 2 inch.
      b. Hinge Channel: Full height 12 gauge steel extruded to 7 gauge equivalent, formed and tapered for hinges.
      c. Top and Bottom Channel: 16 gauge steel with flush channel filler cap to close top rail opening. Snap in caps are not accepted.
   4. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
   5. Insulating Value: U-value of 0.37 or less, when tested in accordance with ASTM C1363.
   6. Weatherstripping: Separate, see Section 08 71 00.

B. Interior Doors, Fire-Rated:
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless. 16 gauge minimum thickness.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
      a. Rate of Temperature Rise Across Door Thickness: 250 degrees F.
      b. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
      c. Attach fire rating label to each fire rated unit.
   3. Core: Mineral board.
   4. Thickness: 1-3/4 inch.
   5. Glazing: Fire rated safety glass as specified in Section 08 80 00.
   6. Vertical Edge Reinforcement: One piece, continuously arc welded full length to face sheets.
      a. Lock Channel: Full height, 14 gauge steel, beveled 1/8 inch in 2 inch.
      b. Hinge Channel: Full height 12 gauge steel extruded to 7 gauge equivalent, formed and tapered for hinges.
   7. Top and Bottom Channel: 16 gauge steel with flush channel filler cap to close top rail opening.
      a. Snap in caps are not accepted.

2.5 HOLLOW STEEL FRAMES

A. Continuously Welded Construction:
   1. 14 gage cold rolled steel

2. The joints between all elements of the head and jamb profiles, i.e., soffit, stops, rabbets, faces and returns, shall be completely arc welded. Faces and returns may be arc welded either internally or externally, all other frame elements shall be welded internally. Faces and returns shall be ground and finished smooth with no visible seam. The joint at other frame elements shall appear as a hairline seam on the external side. Face joints at meeting mullions or between mullions and other frame members shall be completely externally welded on the faces only, welds shall be ground and finished smooth. The meeting joints of other mullion profile elements are not welded.
3. Welded frames shall be provided with a temporary spreader bar for shipping and handling purposes only. This temporary spreader bar shall be removed and a setting spreader, supplied by the installer, shall be used for installation of the frame. See ANSI/SDI A250.11, “Recommended Erection Instructions for Steel Frames” for details.

B. Anchors:
1. Provide frames, other than slip-on drywall type with a minimum of three anchors per jamb suitable for the adjoining wall construction. Provide anchors of not less than 0.042" (1.0 mm) in thickness or 0.167" (4.2 mm) diameter wire. Frames OVER 7'6" (2286 mm) shall be provided with an additional anchor per jamb.

C. Lead-lined frames:
1. Refer to Section 13 49 00 "Radiation Protection" for additional requirements.
2. Lead Lining: per Physicist Report.

2.6 HARDWARE PREPARATION

A. Preparation shall be in accordance with A115 standards and ANSI/SDI A250.6, “Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.”

2.7 FINISHING

A. Prime finish: Doors and frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install steel frames and doors in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
1. Follow manufacturer's instructions and Contract Documents.

3.3 SETTING FRAMES

A. Frames shall be installed plumb, level, rigid and in true alignment as recommended in ANSI/SDI A250.11, “Recommended Erection Instructions for Steel Frames” and A115.IG, “Installation Guide for Doors and Hardware”. All frames other than slip-on types shall be fastened to the adjacent structure so as to retain their position and stability. Drywall slip-on

frames shall be installed in prepared wall openings in accordance with manufacturer's instructions.

B. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.
C. Set anchors for frames as work progresses. Install anchors at hinge and strike levels.
D. Use temporary setting spreaders. Use intermediate spreaders to maintain proper door clearances.

3.4 TOLERANCES

A. Clearances Between Door and Frame: As indicated in ANSI/SDI A250.8 (SDI-100).
B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.
C. Clearance between Meeting Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
D. Clearance between Door and Stop: 1/16 inch.
E. Clearance between the Face of the Door and the Stop: 1/16 inch.

3.5 ADJUSTMENT AND CLEANING

A. Adjust for smooth and balanced door movement.
B. Remove dirt and excess sealants, mortar or glazing compounds from exposed surfaces.
C. Fill dents, holes, and sand smooth to flush with adjacent surfaces - Reprime/paint to match finish.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Flush, solid-core doors

1.2 RELATED SECTIONS
- A. 08 71 00 Door Hardware
- B. 13 49 00 Radiation Protection

1.3 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 QUALITY ASSURANCE & REFERENCES
- A. Company specializing in wood door fabrication
- B. Windows and Door Manufacturers Association (WDMA)
- C. ANSI/NWWDA I.S. 1A SERIES, latest edition, Industry Standard for flush wood doors.
- D. AWI – Architectural Woodwork Institute.

1.5 SUBMITTALS
- A. Submit under provisions of Section 01 33 00
- B. Provide sufficient detail to show full compliance with specification:
- C. Fabrication drawings with dimensions and details for solid core doors, veneer and hardware preparation.

1.6 WARRANTY
- A. Provide 'Interior Use - Life of Installation" warranty against manufacturing defects, warp, and delamination.
- B. Include repair or replacement in Warranty

1.7 DELIVERY, STORAGE & HANDLING
- A. Package doors with slip sheets, poly-wrapped, or in individual cartons
- B. Comply with requirements of AWI section 1300-G-23 and NWWDA I.S. 1A. Protect from moisture with confined area.

PART 2 - PRODUCTS

2.1 WOOD DOORS
- A. Solid, non-rated, 1¾ inch lumber core, AWI section 1300, PC-5, Plain sliced, wood veneer, with factory finished, clear coat, species and color selected by Architect. Edge band with face material.
- B. Top and bottom rails minimum of 2¼ inches before trimming.
- C. Light Frames: Flush Rectangular Beads same species as door face veneers
- D. Glazing: Clear Tempered Glazing

2.2 PREPARATION
- A. Bevel door stiles 1/8 inch in 2 inches and undersize doors ¼ inch in width to allow free swing and no hinge bind.

2.3 MANUFACTURERS

A. Western Oregon Door, Vancouver Door, or approved

PART 3 - EXECUTION

3.1 GENERAL

A. Install in framed openings and maintain operating clearances and tolerances.
B. Verify Finish Hardware in accordance with approved hardware schedule and approved Shop Drawings.
C. Install hardware and accessories and make adjustments at completion of finish painting.
D. Make final adjustments for proper door operation, smooth and balanced door movement.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Interior MDF Doors

1.2 REFERENCES
- A. National Fire Protection Association (NFPA):
  1. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.
  2. NFPA 80: Standard Methods for builders' hardware to be used in fire rated swing doors.
- B. Underwriters Laboratories, Inc. (UL):
  1. UL10B: Standard for Fire Tests of Door Assemblies (Note: Neutral pressure testing standard).
  2. UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies.
  3. GREEN GUARD: CA 01350, Indoor Air Quality (IAQ) Testing

1.3 DESIGN REQUIREMENTS
- A. Fire-Rated Door Assemblies: Fire door assemblies shall meet or exceed fire-protection ratings indicated when tested in accordance with NFPA 252 & UL 10B

1.4 SUBMITTALS
- A. Submit under provisions of Section 01 33 00 – Submittals.
- B. Product Data: Submit door manufacturer current product literature, including installation instruction.
- C. Samples: Provide finish samples for all products.
- D. Quality Assurance Submittals
  1. Manufacturer Instructions: Provide manufacturer's written installation instructions.
- E. Closeout Submittals: Refer to Section 01 70 00 – Contract Close out

1.5 DELIVERY, STORAGE AND HANDLING
- A. Deliver doors, materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store doors as recommended by manufacturer.

1.6 WARRANTY
- A. Manufacturer's Standard Warranty: Assemblies will be free from defects in materials and workmanship from the date of manufacture for the time periods indicated below:
  1. Door Unit: 5 years.
  2. Door Frames: 1 year.
  3. Factory Prefinish: 1 year.

PART 2 - PRODUCTS

2.1 SUPPLIER
- A. Approved: Mid-Valley Glass & Millwork, Eugene, Oregon.

2.2 MANUFACTURER
- A. Basis of Design: Doors are based on JELD-WEN Molded Interior Doors.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 - Product Options & Substitutions.

2.3 DOORS
- A. Door Style:
  1. Door Type: All panel.

2. Door Shape: Squared Top.
3. Surface Finish: Smooth
    a. Panels and Sticking Profile: Refer to Door Type Drawing.

B. Core and Frame:
1. Solid core with MDF frame.
    a. Thickness: Refer to Door Schedule.
    b. Fire Rating: Refer to Door Schedule.

C. Finish: Factory Pre-primed. See Color Schedule 09 00 00.

2.4 PREHUNG DOOR FRAMES

A. Profile:
1. System 01, Single Door, unless otherwise noted.
2. As indicated on Drawings, see schedules.

B. Jambs:
1. Jamb Width: As indicated on Drawings for wall assemblies as noted.
2. Jamb Type: Flat
3. Jamb Species: Finger-Jointed Pine.

C. Hardware: Refer to Section 08 71 00 – Door Hardware & Section 08 73 01 Hardware Types.

PART 3 - EXECUTION

3.1 GENERAL

A. Install doors in accordance with manufacturer's installation guidelines and recommendations.

3.2 EXAMINATION

A. Inspect door prior to installation.
B. Inspect rough opening for compliance with door manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

3.3 PREPARATION

A. Prepare door for installation in accordance with manufacturer's recommendations.
B. Trim bottom of jamb sides to achieve desired distance between door bottom and finished floor height.

3.4 DOOR INSTALLATION

A. Place door unit into opening and level hinge side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
B. Level latch side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
C. Verify spacing between jamb and door is uniform on all sides. Adjust as necessary.
D. Shim top of jamb in center of opening and fasten with nail.
E. Re-check for square, level and even spacing around door. Nail securely in place through stop, jamb, shims and into studs every 12 inches.
F. Set nails.
G. Install trim on both sides using nails every 12 to 16 inches.

3.5 SCHEDULES

1. Refer to Door & Hardware Schedules.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Access doors and panels.

1.2 RELATED SECTIONS
- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 60 – Gypsum Board & Wall Framing

1.3 SUBMITTALS
- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.4 QUALITY ASSURANCE
- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

1.5 DELIVERY, STORAGE, AND HANDLING
- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.6 WARRANTY
- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five (5) years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
- A. Babcock-Davis.
  1. Website: www.babcock-davis.com.
- B. J.L. Industries (JL)
  1. Website: www.jlindustries.com.
- C. Karp Associates, Inc
  1. Website: www.karpinc.com.
- D. Larsen's Manufacturing Co.
  1. Website: www.larsensmfg.com.
- E. Nystrom, Inc.
  1. Website: www.nystrom.com.
- F. The Williams Bros Corp.
  1. Website: www.wbdoors.com.
- G. Substitution Requests: Submit for approval under provisions of Section 01 25 00 – Product Options.

2.2 ACCESS DOORS

A. Wall Access Doors: Non-rated factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
   1. Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
   2. Style: Exposed frame with door surface flush with frame surface. (Double door where indicated)
      a. In Gypsum Board: Use drywall bead type frame.
   3. Door Style: Single thickness with rolled or turned in edges.
   4. Frames: 16 gauge, 0.0598 inch, minimum.
   5. Single Thickness Steel Door Panels: 1/16 inch, minimum.
   6. Insulation: Non-combustible mineral or glass fiber.
   7. Steel Finish: Primed.
   8. Hardware:
      a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
      b. Latch/Lock: Cylinder lock operated cam latch, two keys for each unit.
         1) Mortise cylinder and core specified in Section 08 71 00.
      c. Number of Locks/Latches Required: As recommended by the manufacturer for the size of the unit.
      d. Inside Latch Release: Mechanism that allows the panel to be opened from the inside.
      e. Gasketing: Extruded neoprene, around the perimeter of the door panel.

B. Ceiling Access Doors: Non Rated Ceiling Access Doors.
   1. Size: Manufacturer's standard size of 24 inch by 24 inch or 22 inch by 30 inch, for access and maintenance, except as otherwise shown on Drawings.
   2. Door: 16 gauge galvanized steel, recess to accept 5/8 inch drywall inset.
   3. Frame: 16 gauge galvanized steel.
   4. Gasketing: Flame retardant polyurethane.
   5. Latch/Lock: [Screwdriver] Key operated cam lock with interior release.
   6. Hinge: Concealed pivot with controlled action device.
   7. Finish: Manufacturer's shop primer.

2.3 FABRICATION

A. Fabricate units on continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces.
B. Provide attachment devices and fasteners of the type required to secure access doors to the types of support shown.
C. Touch up shop primer and prepare for field paint finish coat.

2.4 FINISH

A. Field paint to match wall or ceiling surfaces as specified in Section 09 90 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
   1. Test units for proper function and adjust until proper operation is achieved.
   2. Repair finishes damaged during installation.
   3. Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING

A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed storefront, with vision glass.
2. Aluminum doors and frames.
3. Weatherstripping.
4. Perimeter sealant.
5. Structural design of storefront system.

B. Related Requirements:

1. Section 07 92 00 - Joint Sealers: Perimeter sealant and back-up materials.
2. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.2 REFERENCE STANDARDS

A. Reference Standards: Current edition at date of Bid.

B. American Architectural Manufacturers Association (AAMA):

1. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; American Architectural Manufacturers Association; 2012.
2. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2009 (part of AAMA 501).
3. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.

C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2011.

D. American Society for Testing and Materials (ASTM) International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
4. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
5. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

6. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
7. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

E. National Fenestration Rating Council (NFRC):

1. NFRC 100 - Procedure for Determining Fenestration Product U-Factors.
2. NFRC 200 - Procedures for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittances at Normal Incidence.
3. NFRC 500 - Procedure for Determining the Condensation Resistance of Fenestration Products.

F. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.4 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, None - N/A internal drainage details.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, anchorage details, affected related Work, expansion and contraction joint location and details, and field welding required.

C. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

E. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.

F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

G. Report of field testing for water leakage.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.

B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum 3 years of documented experience.

C. Field-verify rough openings with shop drawings before fabrication.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

C. Protect from damage during storage and subsequent handling during installation.

1.7 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

A. Manufacturer: Standard 5 years, non-prorated, full replacement value, full system labor and materials Warranty. Include glass, coatings, and hardware.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Storefront

1. Basis of Design: Kawneer, www.kawneer.com. See below under description of products.
2. Product: Trifab VG 451 Framing System.
3. Vertical Mullion Dimension: 2 inches wide by 4 ½” inches deep.
4. Finish: Kawneer Permaflour Architectural Coating, Black color.
    a. Factory-finish all surfaces that will be exposed in completed assemblies.

B. Other Acceptable Manufacturers: The following manufacturers and products may be accepted based upon ability to meet or exceed specified requirements. Request approval prior bid showing products submitted can meet specified U-Value using specified glass.

1. Arcadia Inc. www.aracadiainc.com.
2. United States Aluminum Corp: www.usalum.com.
3. Oldcastle Building Envelope: www.oldcastlebe.com.

C. Substitutions: See Section 01 60 00.

2.2 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Glazing Rabbet: For 1 inch insulating glazing.
2. Glazing Position: Centered (front to back).
3. Air Infiltration Test Pressure Differential: 6.24 psf.
4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
10. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.

B. Performance Requirements:

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    a. Design Wind Loads: Comply with requirements of ASCE 7.
    b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8.00 lbf/sq ft.
3. Air Leakage: Maximum of 0.06 cu ft/min/sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 pounds per square foot pressure differential across assembly.
4. Overall U-value Including Glazing: 0.37 Btu/(hr sq ft deg F), maximum.
5. Water Leakage: None, when measured in accordance with ASTM E331 at specified pressure differential.

6. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and inner sheet of infill panel and heel bead of glazing compound.
7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
8. Storefront Framing Reinforcement:
    a. Provide necessary engineering to comply with building codes, load restriction, and deflection criteria for use of sun shade on storefront system.
    b. Provide the necessary reinforcement in storefront system to support sun screen.

2.3 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
    1. Glazing stops: Applied.
B. Glazing: As specified in Section 08 80 00.
C. Swing Doors: Glazed aluminum, see door types and schedule, sheet A600.
    1. Glazing: Same as adjacent aluminum-framed storefront glazing, except for safety glazing requirements.
    2. Finish Hardware: As specified in Section 08 71 00. Includes but not limited to:
        a. Locksets
        b. Hinges
        c. Door closers
        d. Pulls and push plates
        e. Threshold
    3. Barrier Free Design: Make provision for automatic door openers and pull not exceeding 5 to 8 pound resistance.
    4. Finish: High performance organic coating meeting AAMA 2605. Color as selected by Architect from manufacturer’s full range.
    5. Basis of Design: Kawneer North America, 500 Tuffline Entrances.
    6. Other Approved Manufacturers/Products:
        a. Efco, Series D518 Durastile Heavy Duty.
        b. Oldcastle, Rugged Stile.
D. Operable Sash (OV-1) Aluminum project-out awning; finished to match storefront; turn handle latch with manufacturer's standard insect screen.
    1. Manufacturer standard unis, complying with AAMA/WDMA/CSA 101/I.S.2/A440, with self-flashing mounting fins, and as follows:

a. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.090-inch thickness at any location for main frame and sash members.

b. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

2. Window Type: Awning.

3. Minimum Performance Class: AW.

4. Minimum Performance Grade: 90.

5. Thermal Performance: Maximum U value of 0.45 for the complete glazed assemblies including glazing when tested in accordance with NFRC 100 requirements, using glass which matches the glass to be used in the project.

6. Glazing: Same as adjacent aluminum-framed storefront glazing, except for safety glazing requirements.

7. Insect Screen:

a. Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

b. Screens: 14/18 mesh, steel strands.

8. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

9. Hardware:

a. Operating Arms: Four-bar, stainless steel.

b. Locking Handles: Cam type, bronze alloy.

c. Limiting Device: Stainless steel, key release, limiting device set at 4 inch clear opening.

10. Finish: To match storefront.

11. Basis of Design: Kawneer 8225TL Isolock Window.

12. Other Approved Manufacturers/Products:

a. Efco, 2700.

b. Oldcastle, Signature Series 12PF.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

C. Fasteners: Stainless steel.

D. Joint Sealant:

1. Perimeter Sealant: Type Silicone specified in Section 07 92 00.

2. Factory installed storefront system internal component: Manufacturer's recommended sealant.

E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

F. Glazing Accessories: As specified in Section 08 80 00.

G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.6 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Other Door Hardware: As specified in Section 08 71 00.

C. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

2.7 FABRICATION

A. Mechanically fasten framing members by means of extruded aluminum shear blocks attached to vertical mullions. Screw splines are not acceptable.

B. Cut and fit stick members under shop conditions and tolerances.

C. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

D. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

E. Prepare components to receive anchor devices. Fabricate anchors.

F. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

G. Arrange fasteners and attachments to conceal from view.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work, and are in accordance with accepted shop drawings.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

D. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface, and are in accordance with accepted shop drawings.

E. Verify that aluminum storefront installation to be in accordance with pertinent codes and regulations, Contract Documents, approved Shop Drawings, and manufacturer's instructions.

F. Verify rough openings are fully flashed watertight, and are ready to accept fenestration assemblies. Verify that sill flashing pans are in-place and properly situated for proper interface with storefront assembly.

3.2 INSTALLATION

A. Install in accordance with Contract Documents, References, Codes, and manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and continuity of seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Install operating sash.

K. Set thresholds in bed of sealant and secure.

L. Install perimeter sealant in accordance with Section 07 92 00.

1. Ensure substrates are clean, dry, and of sufficient size for the proper bond and performance of sealant.

2. Double Weather Seal: Apply sealants, backer rods and precompressed foam for water and weather tight installation, at joints, intersections, and perimeters to surrounding construction.

3. Interior Air/Moisture Seal: Ensure interior perimeter of fenestration assemblies have continuous and complete air seals. The complete interior air seal is critical for water penetration resistance.

4. Seal frames to surrounding construction. Remove excess materials as work proceeds to leave exposed surfaces and joints clean and smooth.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

N. Protect finished surfaces as necessary to prevent damage during progress of the Work.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2 and shall not evidence water penetration.

1. Perform a minimum of two tests in areas as directed by Architect.

2. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage during subsequent construction.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Hardware for doors.

1.2 RELATED SECTIONS
- A. 08 14 00 "Wood Doors".

1.3 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES
- A. ADA - Americans with Disabilities Act, Accessibility Guidelines for Buildings and Facilities.
- B. NWWDA Industry - Quality Standards.

1.5 SUBMITTALS
- A. Submit under provisions of Section 01 33 00 "Submittals".
- B. Shop Drawings: Indicate locations and mounting heights of each type of hardware.
- C. Submit manufacturer's parts lists, and templates.
- D. Submit all door Hardware in one submittal, even if from multiple subcontractors.

1.6 QUALITY ASSURANCE
- A. Perform work in accordance with the following requirements:
  1. ADA - Accessibility Guidelines for Buildings and Facilities.

1.7 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing the Products of Section with minimum three years documented experience.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with three years documented experience.

1.8 REGULATORY REQUIREMENTS
- A. Conform to applicable code for requirements applicable to doors and frames.

1.9 DELIVERY, STORAGE AND HANDLING
- A. Deliver, store, protect and handle products to site per Manufacturer's requirements.
- B. Package hardware items individually; label and identify each package with door opening code matching hardware schedule.

1.10 COORDINATION
- A. Coordinate work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

1.11 MAINTENANCE MATERIALS
- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

A. Auto Door operator: LCN with Push Button Actuators
B. Electric Strike: Hes
C. Locksets: Schlage ND Series
D. Electronic Locksets: Schlage CO-100 Series
E. Butts: Ives, Stanley, McKinney
F. Closers: LCN
G. Stops: Trimco
H. Kickplates, Protection Plates: Trimco, Rockwood
I. Overhead Door Holders/Stops: Glynn-Johnson
J. Gasketing: Pemko
K. Door Silencers:Trimco
L. Automatic Door Bottoms: Pemko

2.2 KEYING

A. CONTRACTOR TO CREATE SCHEDULE - Coordinate with Owner/Tenant.

2.3 HARDWARE FINISH

A. Match existing building standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions.
B. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions.
B. Use templates provided by hardware item manufacturer.
C. Mounting heights for hardware from finished floor to center line of hardware item:
    1. Latch sets: 40-5/16 inches or to match existing frame.

3.3 ADJUSTING

A. Adjust work.
B. Adjust hardware for smooth operation.
C. Install hardware and accessories and make adjustments at completion of finish painting.
D. Make final adjustments for proper door operation, smooth and balanced door movement.

3.4 PROTECTION OF FINISHED WORK

A. Protect finished Work.
B. Protect hardware from adjacent work.

END OF SECTION

MANUFACTURER LIST

SEL – SELECT
CAM – CAMDEN
GLY – GLYNN JOHNSON
PHI – PRECISION
LCN – LCN
SCH – SCHLAGE
PEM – PEMKO
VD – VON DUPRIN
IVE – IVES
MCK – MCKINNEY
HES – HES
ALV – AIR LOUVERS
RIX – RIXSON
ARI – ARITECH

HARDWARE SCHEDULE

HARDWARE SET 1, CLASSROOM W/ PANIC: DOOR 105A, 109A, 113A

3 HINGES
1 RIM EXIT DEVICE
1 CLASSROOM MORTISE LOCKSET, LEVER HANDLES, LOCK STATUS VISUAL INDICATOR
1 SMOKE SEAL
1 CLOSER

HARDWARE SET 2, CLASSROOM SECURITY: DOOR 102A, 103A, 115A

3 HINGES
1 CLASSROOM SECURITY LOCKSET, LEVER HANDLES, LOCK STATUS VISUAL INDICATOR
1 SMOKE SEAL
1 CLOSER

HARDWARE SET 3, PASSAGE: DOOR 102B

3 HINGES
1 PASSAGE MORTISE LEVERSET
1 SMOKE SEAL

HARDWARE SET 4, STOREROOM: DOOR 102S, 103S, 115S, 118A, 121A, 122A, 123A, 124A

3 HINGES
1 STOREROOM MORTISE LOCKSET, LEVER HANDLES
1 SMOKE SEAL
1 KICKPLATE

HARDWARE SET 5, STOREROOM PAIR: DOOR 111A, 124B

6 HINGES
1 STOREROOM FUNCTION LOCKSET, LEVER HANDLES
1 MANUAL FLUSH BOLT, INACTIVE LEAF
1 SMOKE SEAL
2 KICKPLATE

HARDWARE SET 6, OCCUPANCY INDICATOR: DOOR 116A, 116B, 116C, 116D, 116F, 116G

3 HINGES
1 PRIVACY MORTISE LOCKSET W/ ROSE INDICATOR
1 SMOKE SEAL
1 KICKPLATE

HARDWARE SET 7, EXTERIOR FENCE GATE:

1 CHAINLINK FENCE SWING GATE KEYED LOCK KIT
OTHER HARDWARE PROVIDED BY MANUFACTURER, SEE ALSO CHAIN LINK FENCES AND GATES 32 31 13

HARDWARE SET 8, TEACHER STORAGE DUTCH DOOR: DOOR 106A, 107A, 110A

3 HINGES
1 STOREROOM MORTISE LOCKSET, LOWER LEAF
1 DEADBOLT, UPPER LEAF
1 DUTCH DOOR BOLT
1 KICKPLATE

Notes

1. All doors keyed to owner requirements.

PART 1 - GENERAL

1.1 SUMMARY
- A. Section includes:
  1. Glass products including:
     a. Tempered glass
     b. Fire-rated glass
     c. Laminated glass
     d. Mirror glass
     e. Glazing accessories

1.2 RELATED SECTIONS
- A. 08 12 13 "Hollow Metal Doors and Frames"
- B. 08 14 00 "Wood Doors"

1.3 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 SUBMITTALS
- A. Submit under provisions of Section 01 33 00 "Submittals".
- B. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- C. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- D. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
- E. Warranty: Submit manufacturer's standard warranty. Include labor and materials to repair or replace defective materials.

1.5 QUALITY ASSURANCE
- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Glazing Publications:
  1. GANA Publications: GANA's 'Glazing Manual.' and 'Laminated Glass Design Guide.'

PART 2 - PRODUCTS

2.1 INSULATED GLASS
- A. Insulated glazing units. 1-inch nominal unit thickness with air or argon.
- B. Provide hermetically sealed units with dehydrated airspace, dual sealed with primary seal of polyisobutylene (PIB), or thermo plastic spacer (TPS) and a secondary seal of silicone
- C. Solar Control Low-E Insulating-Glass Units, Solarban 60, or approved.
- D. Safety glazing or tempered where indicated on Drawings and Schedules.

2.2 INTERIOR GLAZING
- A. Applications:

1. Interior glazing as indicated in Drawings.

B. Glass:
   1. Heat-Treated Glass Products: Heat-strengthened, tempered glass, ASTM C 1048.
   2. Fire-Protection-Rated Glazing: Fire-resistance-rating as required by AHJ, ASTM E119 or UL 263.
   3. Laminated Glass Products: Laminated with interlayer thickness as needed to comply with requirements, ASTM C1172.

C. Glazing Accessories: As specified in "Glazing Accessories" article below.

2.3 GLAZING ACCESSORIES

A. Aluminum Tracks: surface mount black anodized aluminum u-channel 0.506” open width and 0.553” height, compatible with 1/2 glass panels, comply or exceed ASTM B 221, anodized finish AAMA 611 class I. Tracks shall match existing clinic standards and integrate with the overall half wall glazing system design.

B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half height of glazing stop x thickness to suit application, self-adhesive on one face.

D. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.

E. Dense and Soft Compression Gaskets: Neoprene, EPDM, and Silicone, as recommended by manufacturer.

F. Elastomeric and silicone glazing sealants: compatible with adjacent materials and applications indicated.

G. Compressible filler rods as required.

H. Other miscellaneous accessories as required by glazing assemblies indicated in Drawings.

PART 2 - EXECUTION

2.1 INSTALLATION

A. Inspect framing and report unsatisfactory conditions in writing.

B. Comply with GANA "Glazing Manual" and manufacturer’s instructions and recommendations. Use manufacturer's recommended accessories.

C. Install glass with uniformity of pattern, draw, bow and roller marks.

D. Set mirror in Mirror adhesive per manufacturer’s instructions; use clips at bottom and top; add sealant at mirror exposed edges. Ease mirror edges.

E. Remove and replace damaged glass and glazing. Wash, polish and protect all glass supplied under this section.

F. Clean glass as recommended in writing by glazing manufacturer.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes, but is not limited to, the following:
   1. Gypsum board and accessories.
   2. Metal studs and furring.
   3. Sound-rated construction and accessories.
   4. Gypsum board finishing.
   5. Trim and accessories.

1.2 RELATED SECTIONS

A. 09 91 00 "Painting"

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions with Project conditions and materials clearly identified or detailed for each required system.

1.5 SYSTEM REQUIREMENTS

A. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
   1. Gypsum board partitions:
      a. Standard systems: Maximum deflection of l/240 of partition height.
      b. Systems to receive water resistant gypsum board or backer board: Maximum deflection of l/360 of partition height.
   2. Interior suspended ceilings and soffits: Maximum deflection of l/360 of distance between supports.

B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.

C. Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

1.6 QUALITY ASSURANCE

A. Reference Standards:
   1. Applicable requirements of ASTM C754 for installation of steel framing.
   2. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board", except for more stringent requirements of manufacturer.
   3. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver material to site promptly, without undue exposure to weather, in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

B. Storage:
1. Store above ground in dry, ventilated space.
2. Protect materials from soiling, rusting and damage.
3. Store board to be directly applied to masonry walls at 70° degrees F for 24 hours prior to installation.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:
1. Do not install gypsum board when ambient temperature is below 40° degrees F.

1.9 CONSTRUCTION WASTE DISPOSAL

A. Recycle:
1. Separate clean waste drywall pieces from contaimants for landfilling or reuse. Working with local waste hauler and local drywall manufacturer, provide proper storage of waste for pickup and return. Protect scraps material from moisture and contamination.

1.10 PREINSTALLATION MEETING

A. Sound Flanking Path
1. Contractor shall schedule a meeting to observe framing prior to installing gypsum board and acoustic insulation for the purpose of identifying sound flanking paths in the construction.
2. Schedule Meeting immeadeatly before or after Progress Meeting.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Gypsum Board and Accessories: Listed products establish standard of quality and are manufactured by United States Gypsum Company, or equal.
1. United States manufactured only.

B. Steel Framing and Furring: Commercial grade, contractor choice.

2.2 BOARD MATERIALS

A. Gypsum Board:
1. ASTM C36, Type X fire-resistant.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated.
4. Acceptable products:
   a. Typical partitions and ceilings: Equivalent to Sheetrock Brand SW, Firecode or Firecode "C" Gypsum Panels by USG.

B. Water-Resistant Gypsum Board:
1. ASTM C630, regular type except where Type X fire-resistant type is indicated or required to meet UL assembly types.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated.

4. Acceptable products: Equivalent to Sheetrock Brand W/R, W/R Firecode "C" or W/R Firecode Type X Gypsum Panels by USG or equal.

2.3 METAL FRAMING AND FURRING MATERIALS

A. Metal Studs, Joists and Runners:
   1. ASTM C645, "C" or C-H shape; gage:
      a. Provide as indicated or specified. Provide heavier gage if required.
      b. At door and other openings, provide 2 - studs at each jamb.
      c. Provide runner gage as recommended by stud manufacturer.
   2. Depth of sections: As indicated or required.
   3. Corrosion protection: G40 hot-dip galvanized coating per ASTM A525.

2.4 ACCESSORIES

A. Metal Trim for Gypsum Board:
   1. Conform to profile and dimensions indicated.
   2. Material for interior Work: Galvanized steel, 26 gage minimum.
   3. Corner beads: Equivalent to Dur-A-Bead No. 103 by USG.
   4. Casing beads: Equivalent to 701-B by USG.
   5. Control joints:
      a. Roll-formed zinc with perforated flanges.
      b. Size: 1-3/4 inch wide, with ¼ inch wide center channel.
      c. Provide with removable tape strip over channel.
      d. Acceptable product: Equivalent to No. 093 by USG.

B. Backer Plates:
   1. Steel, galvanized; 6 inches wide x 20 gage minimum x lengths to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.
   2. Elimination of backer plates or direct attachment of accessories or equipment to studs will not be allowed.

C. Adhesives and Joint Treatment Materials: Adhesives and Joint Treatment Materials:
   1. Conform to requirements of ASTM C475.
   2. Joint compounds:
      a. Drying-type (ready-mixed): Equivalent to SHEETROCK Taping Joint Compound and Topping Joint Compound, or SHEETROCK All Purpose Joint Compound by USG. **(No "Lite" Compounds)** Setting (chemically-hardening) type: Equivalent to SHEETROCK Setting-Type Joint Compound by USG.
   3. Primer-Surfacer, TUFF-HIDE™: Finish Level 4 (GA-214/ASTM C-840) drywall surface with vinyl acrylic latex-based coating to achieve Level 5 gypsum board finish.
   4. Laminating adhesive for direct application: Special adhesive or joint compound specifically recommended for laminating gypsum boards and for adhering gypsum boards to solid substrates.
   5. Reinforcing joint tape:
      a. ASTM C475, 2 inch nominal width.

D. Gypsum Board Screws: Self-drilling, self-tapping steel screws.
   1. For steel framing less than 0.03 inch thick: Comply with ASTM C1002.
   2. For steel framing from 0.033 inch thick to 0.112 inch thick: Comply with ASTM C954.
   3. Provide Type S or Type S-12 screws.

E. Backer Board Accessories: Provide accessories and corrosion-resistant-coated steel screws as recommended by backer board manufacturer and required for complete installation.

F. Acoustical Sealant: Equivalent to Acoustical Sealant by USG.

G. Sound Attenuation Blankets:
   1. Mineral fiber, conforming to ASTM C665, Type I.
   2. Surface burning characteristics per ASTM E84:
      a. Flame spread: 15 or less.
      b. Smoke developed: 0.
   3. Thicknesses: As indicated.
   4. Acceptable products and manufacturers: Equivalent to Thermafiber Sound Attenuation Fire Blankets SAFB by USG; EcoBatts by Knauf; EcoTouch by Owens Corning; or equal.
H. USG Tuff Hide Primer-Surfacer
I. Flush Panel Steel Access Doors:
   1. Type: Milcor DW or equal.
   2. Material: 16-gauge steel frame with 14-gauge door panel. Galvanized steel drywall bead.
   3. Hinge: Double-acting concealed spring type, 175 degree opening.
   4. Lock: Flush, screwdriver-operated with steel cam.
   5. Factory Finish: Baked-on electrostatic powder.
J. Miscellaneous Accessories: Provide as required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install in accordance with reference standards and manufacturer's instructions.
B. Tolerances:
   1. Do not exceed 1/8 inch in 8'-0" variation from plumb or level in exposed lines of surface, except at joints between gypsum board units.
   2. Do not exceed 1/16 inch variation between planes of abutting edges or ends.
   3. Shim as required to comply with specified tolerances.
C. Install framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.
D. Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, heavy trim, grab bars, toilet accessories, furnishings or similar construction.

3.3 BOARD INSTALLATION

A. Single Layer Gypsum Board on Metal Studs:
   1. Loosely butt gypsum board joints together and neatly fit.
   2. Do not place butt ends against tapered edges.
   3. Maximum allowable gap at end joints: 1/8 inch.
   4. Stagger joints on opposite sides of partitions.
   5. Apply ceiling boards first where gypsum board ceilings and wall occur.
   6. Cut openings in gypsum board to fit electrical outlets, plumbing, light fixtures and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
   7. Screw board in place securely with screws spaced according to manufacturer's recommendations.

B. Single Layer Gypsum Board on Furring:
   1. Apply gypsum board with long dimension at right angles to furring channel.
   2. Center end joints over channel web; stagger end joints from those in adjacent rows of board.
   3. Fasten boards to furring channels with screws spaced according to manufacturer's recommendations.
C. Water-Resistant Gypsum Board:
   1. Complete plumbing rough-in before gypsum board panels are erected.
   2. Separate gypsum panels from rough-in and fixtures by 1/4 inch space.
   3. Install water-resistant board horizontally.

3.4 SOUND-RATED CONSTRUCTION

A. Insulation:
   1. Install sound attenuation blankets in sound-rated partitions and ceilings where indicated.
   2. Completely fill space between studs and framing to full height of wall or full area of ceiling.
   3. Fit carefully behind electrical outlets and other Work penetrating sound-rated construction.
   4. If wall is rated fit around putty pads installed on electrical boxes.
B. Gypsum Board:
   1. Install gypsum board same as for interior partitions and ceilings.
   2. Coordinate with installation of perimeter sealants.
C. Acoustical Sealant:
   1. At walls provide continuous beads of acoustic sealant at juncture of faces of runners with floor and ceiling construction and wherever gypsum board abuts dissimilar materials, prior to installation.
   2. At ceilings provide continuous beads of sealant wherever gypsum board abuts dissimilar materials.
   3. Provide continuous bead of sealant behind face of control joints prior to installation of accessories.
   4. After installation of gypsum board base layers, cut face layer sheets ½ inch less than floor-to-ceiling height and position with 1/4 inch open space between gypsum board and floor, ceiling and dissimilar vertical construction. Fill 1/4 inch open space with continuous sealant beads after installation of face layer.
   5. At openings and cutouts, fill open spaces between gypsum board and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of sealant.
   6. Seal sides and backs of electrical boxes to completely close off openings and joints.
D. Sound Flanking Paths:
   1. Where sound-rated partition walls intersect non-rated gypsum board partition walls, extend sound-rated construction to completely close sound flanking paths through non-rated construction.
   2. Seal joints between face layers at vertical interior angles of intersecting partitions.

3.5 ACCESSORY INSTALLATION

A. Trim:
   1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
   2. Install metal corner beads at external corners.

3. Install metal casing bead trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.

B. Control Joints:
1. Install control joints at junction of gypsum board with walls or partitions of other finish material.
2. Where gypsum board is vertically continuous, as at stairwells, provide horizontal control joints at each floor level.

3.6 FINISHING

A. Provide levels of gypsum board finish for locations as follows, in accordance with Gypsum Association GA 214, "Recommended Specification: Levels of Gypsum Board Finish".
1. Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
2. Level 2: Gypsum board substrate at tile, except remove tool marks and ridges.
3. Level 3: Gypsum board surfaces, where textured finishes will be used or heavy vinyl wall papering (High-build Primer required Coat primer).
4. Level 4: Gypsum board surfaces, except where another finish level is indicated (High-build Primer required or USG First Coat primer).
5. Level 5: Gypsum board surfaces requiring extra smooth surface for critical light, where indicated using Primer-Surfacer, TUFF-HIDE.
a. Surface Preparation: Complete gypsum board surface to Level 4 before applying Primer-Surfacer, TUFF-HIDE.
b. Primer-Surfacer, TUFF-HIDE Application: Machine apply with airless sprayer in conformance with USG application instructions to a wet film thickness of 15 to 20 mils (9-12 mils dry film thickness). Surfaced may be painted after overnight drying.

B. Water-Resistant Gypsum Board: Treat fastener heads and joints with setting-type joint compound.
1. Do not crown joints or leave excess compound on panels.
2. Remove tool marks and ridges.
3. For fastener heads to be covered with tile, apply one coat of joint compound.

C. Joint Compound:
1. After skim coat sets, apply finish coat of compound feathering 3 to 4 inches beyond tape edges.
2. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
3. Allow joint compound to completely set before applying veneer plaster finish.

D. Trim:
1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
2. Install metal corner beads at external corners.
3. Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi-exposed, and where gypsum base terminates against dissimilar material.

E. Control Joints: Install where indicated and specified.

F. Special Trim and Reveal Joints: Install as indicated on Drawings and in accordance with manufacturer's instructions.

3.7 PATCHING EXISTING WALLS (RUBBER BASE)

A. Where new or replacement wall base is scheduled on existing walls patch existing wall to achieve uniform finish surface.

3.8 ADJUSTING

A. Correct damage and defects which may telegraph through finish Work.
B. Leave Work smooth and uniform.

3.9 LABELS

A. Label fire restistive rating of wall in 6” high letters above ceiling at 4’-0” intervals.
B. i.e., “ONE-HOUR SMOKE BARRIER” or “ONE-HOUR FIRE WALL”.

3.10 SCHEDULE OF FINISHES

A. Unseen areas above ceiling: Level 1.
B. Walls and Ceilings: Level 4

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Suspension System Framing and Furring for Gypsum Board Assemblies
   2. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.2 RELATED SECTIONS

1. Section 09 21 60 "Gypsum Board and Framing"
2. Section 09 51 00 "Acoustical Panel Ceilings"

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM A 1008 Standard specification for the Steel, Sheet, Cold Rolled Carbon, Structural, High Strength Low-Alloy and High Strength Low Alloy with Improved Formability
   2. ASTM A 641 Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire.
   3. ASTM C 635 Standard Specification for Metal Suspension Systems
   4. ASTM C 645-09 - Standard Specification for Nonstructural Steel Framing Members
   5. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
   6. ASTM C841 Standard Specification for Installation of Interior Lathing and Furring
   7. ASTM C842 Standard Specification for Application of Interior Gypsum Plaster
   8. ASTM C 847 - Standard Specification for Metal Lath
   9. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
   10. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster (Plaster and Stucco Accessories)
   11. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Material
   12. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
B. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
C. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
D. International Code Council Evaluation Service Report ESR-1289 for Drywall Grid

1.5 SUBMITTALS

A. Refer to Section 01 33 00 "Submittals".
B. Product Data: Submit manufacturer's technical literature.
C. Samples: 8 inch long samples of suspension system components, including main runner, cross tees and angle molding.
D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility: To ensure proper interface, all drywall furring components shall be produced or supplied by a single manufacturer.
B. All accessory components from other manufacturers shall conform to ASTM standards.
C. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which drywall ceilings function as a fire protective membrane and tested per ASTM E 119. Installation in accordance with the UL Design being referenced.
D. Coordination of Work:
    1. Coordinate drywall furring work with installers of related work including, but not limited to acoustical ceilings, building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
    2. All work above the ceiling line should be completed prior to installing the drywall sheet goods.
    3. There should be no materials resting against or wrapped around the suspension system, hanger wires or ties.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

1.8 WARRANTY

A. Suspensions System: Submit a written limited warranty executed by the manufacturer, agreeing to repair or replace grid components that are supplied with a hot-dipped galvanized coating or aluminum base material. Failures include, but are not limited to:
    1. The occurrence of 50% red rust as defined by ASTM B 117 test procedures as a result of defects in materials or factory workmanship.
B. Warranty Period:
    1. Grid: Ten years from date of installation.
    2. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Suspension Systems: Armstrong World Industries, Inc.

2.2 SUSPENSION SYSTEMS

A. Components:
    1. All main beams and cross tees shall be commercial quality hot-dipped galvanized steel
    2. Main Beam: Shall be double-web construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (per ASTM A653).
        a. HD8906 - 12ft HD Drywall Main Beam 1-11/16 inch web height, 1-1/2 inch flange

3. Primary Cross Tees: Shall be double-web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (minimum G40 or G90 per ASTM A653)
    a. Web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange
4. Wall angle molding shall be hot dipped galvanized (minimum G40 per ASTM A653):
    a. Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g.
5. Hanger wire: Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three times the design load, but not less than 12-gauge.
6. Clips: as required for a complete system, refer to Drawings and manufacturer's instructions.
7. Accessories: as required for a complete system, refer to Drawings and manufacturer's instructions.
8. Screws for wallboard application shall be bugle head screws in accordance with thickness of material used.
9. Metal Trim:
    a. Corner bead: Minimum #26 gauge, zinc alloy or plastic square edge type with expanded flanges.
    b. Casing bead: Minimum #24 gauge, zinc alloy or plastic square edge type with expanded flanges.
    c. Control Joints: Minimum #26 gauge, roll-formed zinc alloy, extruded aluminum or plastic with expanded flanges.
    d. Special Trim Shapes: As detailed on plans, extruded aluminum with acrylic coating by Fry Reglet or approved equal.
    e. Metal Lath: 3.4 lbs/square yard, galvanized 3/8 inch diamond mesh or flat rib lath; security lath for applications requiring high degree of security.

B. Structural Classification:
1. Main Beam shall be heavy duty per ASTM C 635.
2. Classification can require wires to be closer together for additional loading when used to support double layer gypsum, verticals, slopes, domes, half barrels, circles, soffits, canopies, and step conditions which call for loading or unusual designs and shapes in drywall construction. Using cross tees in the construction of circles, barrels, etc. is common in order to hold the radius.
3. Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of 1/360 of the span.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install suspension system and panels in accordance with the manufacturer's instructions, in compliance with ASTM installation standard, and with applicable codes as required by the authorities having jurisdiction.
B. The Armstrong Drywall Grid System can be installed in interior or exterior applications.
C. To secure to metal clips, concrete inserts, steel bar joist or steel deck, use power actuated fastener, or insert. Coordinate placement for hanger wire spaced as required for expected ceiling loads and layout.

D. Install hanger wire as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Provide additional wires at light fixtures, grilles, and access doors where necessary. A pigtail knot shall be used with three tight wraps at top and bottom fastening locations.
E. Add additional wire as needed when using compatible clips and accessories.
F. Control Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
G. Expansion Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
H. Main beams shall be suspended from the overhead construction with hanger wire, spaced as required for expected ceiling loads, along the length of the main beams.
I. Install cross tees at on center spacing as specified by the drywall manufacturer. Typical drywall cross tee spacing:
    1. 16 inches on center with 5/8 or 1/2 inch gypsum board
    2. 24 inches on center with 5/8 inch gypsum board
J. Other items such as wood, sheet metal, or plastic panels should be screwed to comply with deflection limit equivalent to that of the ceiling installation.
K. Use channel molding or angle molding to interface with Drywall Grid System to provide perimeter attachment or to obtain drop soffits, verticals, slopes, etc.
L. To suspend a second ceiling beneath a new or existing drywall ceiling, without breaching the integrity of the upper ceiling, use the Drywall Clip. To form a transition from a drywall ceiling to an acoustical ceiling, use the Drywall Transition Clips spaced as required for expected loads.
M. For light fixtures use secondary framing cross tees as required to frame opening.
N. Single cross tees in a route hole to be secured by 7/16 inch framing screw or alternative methods.
O. Install main beams and cross tees at the on center spacing required for ceiling loading, and location of in-ceiling services.
P. Additional bracing as required by Code.

END OF SECTION

PART 1PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tile for floor applications.
   2. Tile for wall applications.
   3. Ceramic accessories.
   4. Ceramic trim.
   5. Non-ceramic trim.

B. Related Requirements:
   1. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

1.2 REFERENCE STANDARDS

A. Reference Standards: Current edition at date of Bid.

B. American National Standard:
   1. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile - Version; 2013.1.

C. American Society for Testing and Materials (ASTM) International:
   1. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
   2. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2011.

D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation - Version; 2013.1.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.4 SUBMITTALS

A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

D. Mock Up
   1. Mock-ups: Construct mock-ups to verify selections made under submittals and to set quality standards for materials and execution in accordance with Section 01 45 00 Quality Control for mock-ups and as follows:
      a. Construct typical assembly, 4’x4’, incorporating substrate materials, tile installation as indicated and adjacent materials including trims.

1.6 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction: Provide flooring materials with the following values as determined by testing according to ANSI 137.1 DCOF Standard:
   1. On wet interior surface to be walked on when wet:
      a. On level surface: DCOF > 0.42.
      b. On incline surface: DCOF > 0.45.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

A. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.9 COORDINATION

A. Coordinate with Section 03 30 00 for sloping of concrete slab to floor drains or concrete depression for tile setting beds.
B. Coordinate with Division/Section 22 for plumbing penetrations and installations.

1.10 EXTRA MATERIALS

A. Submit extra materials to Owner. Obtain Owner's signed receipt from authorized representative.
B. Provide minimum one full carton for each tile type, color and size. Label containers to show manufacturer/product and where used.
C. Tile Penetrating Sealer: Minimum one gallon in manufacturer's container, unopened, clearly labeled with manufacturer's logo and instructions for use.
D. Maintenance Cleaning Agent: 5 gallons in manufacturer's unopened container, clearly labeled with manufacturer's logo and instructions for use.

1.11 WARRANTY

A. Systems Warranty: Manufacturer’s 10 year Systems Warranty for mortars and grouts.

PART 2 PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
   1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
   2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

2.2 PRODUCT, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements.
B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
D. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE

A. WALL TILE, WT-1
   1. Daltile Ceramic Tile
   2. Location And Height: As Indicated in Drawings
   3. Finish: See Color Schedule, SHEET A600
   4. Grout: See Color Schedule, SHEET A600
B. WALL TILE, WT-2
   1. Daltile Ceramic Tile
   2. Location And Height: As Indicated in Drawings
   3. Finish: See Color Schedule, SHEET A600
   4. Grout: See Color Schedule, SHEET A600

2.4 TRIM AND ACCESSORIES

A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
B. Ceramic Trim: base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Inside Corners: Jointed.
      b. Floor to Wall Joints: 6” Tile base, typ uon.
   2. Manufacturers: Same as for tile.
C. Trim: As indicated, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Open edges of wall tile.
      b. Open edges of floor tile.
      c. Wall corners, outside and inside.
      d. Transition between floor finishes of different heights.
      e. Floor to wall joints.
      f. Borders and other trim as indicated on drawings.
   2. Manufacturer:
      a. Schluter-Systems: www.schluter.com.
   3. Slope transition to lower surface conforming to ADA requirement:
      a. Hard surface transitions: Schlüter-Schiene (Solid stainless steel).
      b. Carpet transitions: Schlüter-Reno-TK (Solid stainless steel).
      c. Level transition, expansion joints and control joints:
      d. Edge protection: Schlüter SCHIENE-M
      e. Inside corner wall to wall and wall to floor transition: Schlüter DILEX-EKE.
      f. Floor expansion joints: Schlüter-DILEX-KS
      g. End conditions: Schlüter Dilex-BWA
      h. Over expansion joints: Schlüter Dilex-BWS
      i. Metal edge trim (Type 1): Schlüter, Schiene, EB finish (Brushed stainless steel)

j. Metal edge trim (Type 2): Schlüter, Quadec, EB finish (Brushed stainless steel)
k. Cove trim: Schlüter, Dilex AHK, ACGB finish (Brushed chrome)
l. Tile to tile outside corner trim: Schlüter, Rondec, EB finish (Brushed stainless steel) with end caps
m. Substitutions: See Section 01 25 00 .

D. Interior expansion joints, joint sealant, and backer material:
1. Conform to TCNA, EJ171. Match colors and textures of grout (sanded and unsanded).
2. Joint Sealants: Silicone sealant and backer as specified Section 07 90 00 – Joint Protection.

2.5 SETTING MATERIALS

A. Provide setting materials made by the same manufacturer as grout.
B. Latex-Portland Cement Mortar Bond Coat (Thinset): ANSI A118.4.
1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
2. Products:
a. Bostik Tile-Mate 760 with Hydroment 447 Flex-A-Lastic Mortar Admixture; www.bostik.com.
b. Custom, MegaLite Modified Thin-Set Mortar; www.custombuidingproducts.com..
c. LATICRETE International, Inc.; LATICRETE 254 Platinum: www.laticrete.com.
d. Mapei; KERABOND Dry Set Mortar with MAPEI 300 KERALASTIC Liquid Polymer Additive, www.mapei.com.
e. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 GROUTS

A. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Where indicated.
2. Products:
a. Bostik Inc.; EzPoxy 100% Solids Commercial Epoxy, Colored Epoxy Setting and Grout System: www.bostik-us.com.
b. Custom, CEG-Lite 100% Solid Commercial Epoxy Grout (water cleanup); www.custombuildingproducts.com.
c. LATICRETE International, Inc.; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com.
d. Mapei, Heavy Commercial and Industrial, Kerapoxy IEG; www.mapei.com.
e. Substitutions: See Section 01 60 00 - Product Requirements.
f. Finish: As selected from manufacturer's standard.

B. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Between tile and plumbing fixtures.

C. Tile and Grout Cleaner: For stained tile and grout. A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
1. Manufacturer/Product: Aqua Mix, Heavy Duty Tile & Grout Cleaner.
2. Substitutions: See Section 01 25 00.

D. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. VOC Requirements: Meet the VOC requirements of South Coast Air Quality Management District, SCAQMD, Rule 1113.

2. Composition: Water-based formula.
3. Products:
   a. Aqua Mix Inc., Sealer's Choice Gold, water-based penetrating sealer (47 g/l).
   b. Custom Building Products, TileLab Grout & Tile Sealer (33 g/l.
   c. TEC Guard All – Invisible Penetrating Sealer.
   d. Substitutions: See Section 01 25 00 .

2.7 ACCESSORY MATERIALS

A. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

PART 3 PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
   1. Moisture Emission Rate: Not greater than 3 lb per 1000 sq ft per 24 hours, test in accordance with ASTM F1869.
   2. Alkalinity (pH): Verify pH range of 5 to 9, test in accordance with ASTM F710.
E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Protect surrounding work from damage.
B. Vacuum clean surfaces and damp clean.
C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
B. Lay tile to pattern indicated. Maintain pattern continuous around corners and wall ends. Do not interrupt tile pattern through openings.
C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
E. Form internal angles coved and external angles bullnosed.
F. Install ceramic accessories rigidly in prepared openings.
G. Install non-ceramic trim in accordance with manufacturer's instructions.
H. Sound tile after setting. Replace hollow sounding units.
I. Keep control and expansion joints free of mortar, grout, and adhesive.
J. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
N. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
O. Apply grout sealer to grout after approval by Owner.

3.4 INSTALLATION – FLOORS, SHOWERS - THIN-SET METHODS

A. Over interior wood substrates, install in accordance with TCNA Method F144-09, Fiber cement underlayment thin set.
B. Shower: B421-09 Bonded Waterproof Membrane

3.5 INSTALLATION - WALL TILE

A. Over cementitious backer units install in accordance with TCNA (HB) Method W245-09,Water Resistant Gypsum Backer Board

3.6 EXPANSION JOINTS AND JOINT SEALANTS

A. Conform to TCNA EJ171 for expansion joint, isolation joint, perimeter joint construction joint, contraction joint, and generic movement joint systems, and provisions of Contract Documents.
B. Install joint sealant and backer rod or bond breaker tape conforming to TCNA EJ171 guidelines.
C. Install continuous control joint around floor perimeters between tile at floor and wall and where tilework abuts other restraining surfaces as necessary to allow independent differential expansion and contraction between floor and wall planes.
D. Install continuous control joint at inside corners of tile faced abutting walls to allow independent differential movement between wall planes.
E. Install sealant at joints at built-in plumbing fixture perimeters of meeting tile.
F. Seal around pipes and other penetrations through tile.
G. Provide expansion/control joints where indicated on Drawings, and as follows:
    1. Interior: 20 feet to 25 feet in each direction.
    2. Exterior: 8 feet to 12 feet in each direction.
    3. Interior tilework exposed to direct sunlight or moisture: 8 feet to 12 feet in each direction.

3.7 CLEANING

A. Clean tile and grout surfaces.

3.8 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Acoustical ceiling panels.
   2. Exposed grid suspension system.
   3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.2 RELATED SECTIONS

A. Section 09 21 60 "Gypsum Board and Framing"

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
   2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process; 2020.
   3. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
   4. ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
   5. ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
   6. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
   7. ASTM E1264 Standard Classification for Acoustical Ceiling Products; 2019.
   8. ASTM E1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2021a.
   9. ASTM E1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers; 1998A, reapproved 2017.
B. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"
C. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
D. International Code Council-Evaluation Services - Evaluation Report, ESR-1308, Fire- and Nonfire-Resistance-Rated Suspended Ceiling Framing Systems
E. ASCE 7 Standard - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
F. CISCA Seismic Zones 3 & 4 - Ceilings and Interior Systems Construction Association Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies

1.5 SYSTEM DESCRIPTION

A. Seismic Loads: Design and size components to withstand seismic loads for design category applicable to location of work in accordance with building, fire, and life-safety codes and authorities having jurisdiction.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with or supported by the ceilings.
D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
    1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
        a. Flame Spread: 25 or less
        b. Smoke Developed: 50 or less

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
B. Before installing acoustical ceiling units, permit them to reach room temperature and stable moisture content.
C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
    1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
    2. Grid System: Rusting and manufacturer's defects
    3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
B. Warranty Period, Humiguard:
    1. Acoustical panels: Ten (10) years from date of substantial completion.
    2. Grid: Ten (10) years from date of substantial completion.

3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

C. Warranty shall not deprive Owner of rights under other provisions of Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of Contract Documents.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Package with protective covering for storage and identified with appropriate labels.
   1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
   2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:
   1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING PANEL, ACT-1

A. Armstrong World Industries, or approved, see color schedule SHEET A600
   1. Product Substitutions shall meet or exceed standards of acceptable product, refer to Section 01 25 00 "Product Options and Substitutions"
   2. Minimum acoustical ceiling tile weight to be 1lb per SF.

2.3 METAL SUSPENSION SYSTEMS

A. Non-gasketed Grid
   1. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
      a. Basis-of-Design Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries.
      b. Structural Classification: ASTM C635 Heavy Duty
      c. Color: White, to match the actual color of the selected ceiling tile, unless noted otherwise.
      d. Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.
      e. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least times three design load, but not less than 12 gauge.
      f. Edge Moldings and Trim: 7800 - 12ft Wall Molding, by Armstrong World Industries.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION

A. Install suspension system and panels according to manufacturer's instructions, in compliance with ASTM installation standard, and with applicable codes as required by the authorities having jurisdiction.
B. Fasteners/Upper Attachment: Attach hanger wire directly tied to structure, or with proper fasteners (such as galvanized steel clips) sized and spaced to carry expected ceiling load. A pigtail knot with three tight wraps shall be used at all wire supporting locations and at top and bottom fastening conditions.
C. Use additional hanger wire at all perimeter locations, as required.
D. Provide additional components, as necessary, to frame openings for light fixtures, access doors, sprinkler systems, etc. Coordinate support framing with other trades.
E. Install access doors per manufacturer's instructions.
F. Main beams shall be suspended from the overhead construction with hanger wire, spaced as required along the length of the main beams for interior applications, exterior applications, or wind load applications.
G. Install cross tees spaced as required for interior applications, exterior applications, or wind load applications.
H. Expansion Joints: Provide expansion joints where shown on Drawings.
I. Control Joints: Install as shown on Drawings, provide discontinuous laps over joints. Do not bridge joints.
J. Seismic Separation Joints: Install per manufacturer’s instructions in compliance with authorities having jurisdiction.
K. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
L. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 COORDINATION

A. Coordinate with other Sections affected by or affecting work under this Section.
B. Verify that layout of hangers will not interfere with other work.
C. Verify that layout of ceiling grid will not interfere with equipment service access. Perform site visit to coordinate layout prior to installation.
D. Verify location and layout of extruded aluminum perimeter trim will not interfere with other work. Perform site visit to coordinate layout prior to installation.

3.5 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

1. Ceiling Touch-Up Paint: Use Armstrong "global white" latex paint to hide minor scratches and nicks in the surface and to cover field tegularized edges that are exposed to view.

C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Resilient tile flooring
B. Resilient Wall Base.
C. Adhesives, Fillers, and Installation Accessories.

1.2 RELATED SECTIONS

A. Section 09 21 60 "Gypsum Board and Framing"
B. Section 09 00 00 - Color Schedule
C. Section 09 30 13 – Tiling

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. Comply with the current provisions of the following Codes and Standards.
   1. Federal Specifications: L-F- 475A(3) Floor Covering Vinyl, Surface (Tile and Roll)
   2. ASTM D 570 Test Method for Water Absorption of Plastics.
   3. ASTM D 638 Test Method for Tensile Properties of Plastics.
   4. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Samples: NO FULL CHAINS _ DESIGNATED PRODUCTS ONLY. Three pieces of items indicated in Contract; Clearly mark samples showing manufacturer's name and product identification.
C. Manufacturer's technical literature, installation instructions, and maintenance instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store all materials off the floor in an acclimatized, weather-tight space.
B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
C. Protect roll materials from damage by storing on end.

1.7 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
B. Owner will remove portions of base to ensure proper installation. Contractor to advise at early install so issues are discovered prior to completion of entire project.

1.8 QUALITY ASSURANCE

A. Contractor specializing in tile installation, with minimum of five (5) years experience. Submit documentation, if requested.

1.9 MAINTENANCE

A. Extra Materials: Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Resilient Base: Furnish quality of full-size units equal to 5.0 percent of amount installed for roll-stock and pre-manufactured corners.

1.10 WARRANTY

A. Manufacturer's standard 5 year defect and wear warranty including labor costs for first 3 years and material costs for full 5 years.

1.11 EXTRA STOCK

A. Maintenance Materials: Obtain written receipt when delivered to Owner's Representative. Vinyl Composition Tile: Furnish one carton for each color specified plus one additional carton for each additional 5,000 sf of each color.

PART 2 - PRODUCTS

2.1 RESILIENT BASE, WB-1

A. Resilient Wall Base: Flexco Wall Base, 4'' high continuous roll, or approved.
   1. Color: see COLOR SCHEDULE, SHEET A600

2.2 RESILIENT MATERIALS

A. Transition Strip/ Reducers, TS-1
   1. Mannington Commercial Fusion Transition Strip/reducers, or approved.
   2. Color: see COLOR SCHEDULE, SHEET A600
B. Resilient edging and transitions - from resilient base manufacturer, manufacturer listed "Rolling Transitions" only rubber or vinyl installed between resilient floor and dissimilar materials. Thickness, type and color as selected from submittal.
C. Fillers and Levelers: Floor filling and leveling materials shall be as recommended by the flooring material manufacturers, for the job conditions.
D. Other Conditions: Suitable for purpose, ADA compliant rolling type as instructed by manufacturer and as accepted by Architect.

2.3 ACCESSORY MATERIALS

A. Architect will select products from manufacturer's standard range of materials. More than one color of material may be selected.
B. Accessory materials necessary for proper installation and for problem areas as recommended or specified in manufacturer's published specifications and installation instructions.
C. Adhesive and Primer: Low odor-producing and approved by manufacturer of floor covering and wall base. Alkali and moisture-resistant, suitable for installation requirements.

PART 3 - EXECUTION

1.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturers free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
B. Verify that floor surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Verify that concrete slabs comply with ASTM F710 and the following:
      a. Substrates are dry and free of curing compounds, sealers, hardeners and other materials that are incompatible with adhesives bond.
      b. Adhesion Tests: Perform testing by Owner's special inspector to verity acceptable substrate conditions, conforming to manufacturer's Warranty provisions, prior to installing work of this Section.
         1) Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
         2) Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

a)Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
a) Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

1.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
B. Prohibit traffic until filler is cured.

1.3 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install in accordance with manufacturer's instructions.
C. Spread only enough adhesive to permit installation of materials before initial set.
D. Fit joints tightly.
E. Set flooring in place, press with heavy roller to attain full adhesion.
F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

1.4 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
C. Install base on solid backing. Bond tightly to wall and floor surfaces.

1.5 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

1.6 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cementitious Wood Fiber Plank Acoustical Wall System and Installation Components.

1.2 REFERENCES

A. Test Methods:
   1. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   2. ASTM E 84/CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.
   4. NFPA 265 (UBC 8-2) Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls

1.3 SUBMITTALS

A. General: Submit according to Section 01 33 00 “Submittal Procedures.”
B. Product Data: Submit manufacturer’s technical data for panel core material, fabric covering, surface covering, and accessories as required.
C. Samples:
   1. Panel Core: Minimum 8 inch x 8 inch sample of panel core material.
   2. Surface Covering: Minimum 3 inch x 3 inch samples of manufacturer’s standard finishes for co-polymer surface covering.
   3. Submit Fabric Sample: 8 inch x 8 inch sample.
D. Certifications: Manufacturer’s certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry Factory Mutual Laboratory classification of NRC.
E. Shop Drawings: Submit shop drawings confirming required dimensions and fasteners for proper installation at each site location. Indicate name of school, specific wall location, and locations of existing items.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver panels to project site in original, unopened packages and store in fully enclosed space, protected against damage from moisture, direct sunlight, and surface contamination.
B. Store panels on flat, stable, dry surface. Do not store on edge.
C. Install panels at room temperature and with stabilized moisture content.
D. Handle panels carefully to avoid damaging edges.

1.5 PROJECT CONDITIONS

A. Suited to environmental conditions as required by manufacturer for successful installation.

1.6 WARRANTY

A. Manufacturer: Submit warranty executed by manufacturer, agreeing to repair or replace acoustical panels that fail due to manufacturer's defects in material or

workmanship.

1. Warranty Period: Three (3) years from date of Substantial Completion.

B. Installer: Submit warranty executed by contractor, agreeing to repair or replace acoustical panel that fail due to installation defects.

1. Warranty Period: One (1) year from date of Substantial Completion.

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide panel core material and fabric surface covering from single source manufacturers as indicated for each material.

B. Installer Qualifications: Minimum three (3) years demonstrated installation experience of fabric-covered acoustical panels. Provide documentation substantiating experience prior to commencement of work.

C. Fire Performance Characteristics: Identify with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84, Class A with Flame Spread Rating of 25 or less.

D. Coordination of Work: Coordinate acoustical wall work with other Owner-designated contractors, if any.

PART 2 – PRODUCTS

2.1 ACOUSTICAL WALL PANEL, WP-1

A. Acoustical Wall Panel:

1. Armstrong Tectum, direct attach, 2” thick, C40, color: see FINISH SCHEDULE, SHEET A600
2. Install Tectum® Direct-Attached Panels in accordance manufacturer’s installation instructions.

B. Accessories:

1. Fabric Adhesive: Non-staining, non-pigmented adhesive as recommended by fabric manufacturer.
2. Fasteners: Provide Fasteners as follows per existing substrate. See Drawings for fastener spacing – verify with manufacturer recommendations.
   a. Panel Anchors: Rotofast “Standard Anchors,” or approved.
      1) Gypsum Wallboard: Provide self-drilling, zinc-coated wall anchors and #8 screws compatible with panel anchor as recommended by manufacturer, Simpson “Sure Wall,” “HWA,” or approved. Do not exceed allowable load capacities for wall anchors.
      2) Wood: Provide screws compatible with panel anchor as recommended by manufacturer.
3. Spot Adhesive: Liquid Nails PL200, Chemrex 200, or approved.
   a. Approved locations only.
4. Field verify existing substrate prior to installation. Notify Architect if conditions do not suit specified anchors.

2.2 ACOUSTICAL WALL PANEL FABRICATION

A. Fabrication:

1. AWP-1: Apply fabric cover directly over face and edges of panel and return approximately 2-inches on to back of panel to provide full finished edge. Attach fabric

facing to cores to produce installed panels free from waves, wrinkles, sags, blisters, seams, and adhesive.

2. Provide fully tailored corners.
3. Provide factory-manufactured notches and edges, unless otherwise noted on Drawings. Coordinate with existing items and clearance requirements for electrical devices – provide 2-inch minimum clearance from devices. Verify factory requirements for notch sizes, coordinate with Architect.
4. Where adhesive fasteners are required, provide chemically hardened resin spots at panel back.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect installation areas to ensure that areas are suited to commencement of work. Wall surface must be dry and free from dirt, grease, loose paint, or any foreign matter that interferes with fasteners. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of conditions.

3.2 PREPARATION

A. Measure each wall area and establish layout of acoustical units - coordinate panel layout with existing conditions and mechanical and electrical fixtures.

3.3 INSTALLATION

A. Secure panels per manufacturer's recommendations with fasteners as approved for existing substrate. Where fastening adhesive is used, secure panels for tight fit until adhesive cures. Comply with working-time requirements for adhesives.
B. Install panels level and plumb, parallel to existing surfaces for optimal appearance. Align edges with other panels and fit adjoining work accurately at borders and penetrations.
   1. Maximum gap between existing substrate and panels: 1/16 inch
C. Fabric cover shall not show signs of concealed fasteners or penetrations as required for installation.
D. Where field cutting of panels is approved, perform work in neat and orderly manner.
E. Re-apply fabric cover directly over face and edges of panel and return approximately 2 inches on to back of panel to provide full finished edge. Attach fabric facing to cores to produce installed panels free from waves, wrinkles, sags, blisters, seams, and adhesive.

3.4 ADJUSTING AND CLEANING

A. Clean panels upon completion of installation to remove dust or foreign materials using manufacturer accepted method. Lightly stretch fabric to remove wrinkles.
B. Remove traces of adhesive and construction waste from existing surfaces. Patch existing surfaces as required by Work.
C. Replace damaged and broken panels.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Painting & Coating Systems
   2. Mixing & Tints
   3. Accessories

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 CODES AND STANDARDS

A. Comply with the "Painting Specification Guide" published by the Painting and Decorating Contractors of America (PDCA).

1.4 TESTS

A. When requested by Architect, furnish one-quart test sample selected at random from sealed containers of material stored at site or source of supply. Owner pays for testing except as otherwise specified.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Submit 5 x 8 inch brushout samples for approval, accurately matching color specified by Architect. Final coats must match approved samples. Submit duplicate listing of products used in work. Include product name, number, manufacturer, and distributor.

1.6 PROJECT STANDARD

A. Architect will approve 100 square foot mockup to become project standard. Paint and finish in accordance with construction documents. When satisfactory, Architect and Owner will accept installation and workmanship as project standard. Work not meeting quality of project standard will be rejected.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver painting materials in unopened containers with labels legible and intact. Store only acceptable project materials on project site, as required to prevent damage, within manufacturer’s acceptable temperature range. Safeguard against fire. Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.

1.8 LIGHTING REQUIREMENTS

A. **Provide 80 foot** candle minimum lighting level on each surface during paint application.

PART 2 - PRODUCTS

2.1 MATERIAL QUALITY

A. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturer. Material not displaying manufacturer's identification as a standard, best grade, product will not be acceptable.

B. Paint manufacturers:

1. Materials, paint numbers, and trade names specified are used to indicate type and quality of materials required.
2. No claim by contractor concerning unsuitability of any material specified or the contractor's ability to produce first class work with same, will be entertained unless such claim is made in writing to the project manager prior to start of work.

2.2 PAINT SYSTEMS

A. Products cited as quality of product, standard reference

1. **PS-1** - Interior Gypsum Wallboard
   a. 1st Coat: Primer Rhodda Roseal Interior latex primer
   b. 2nd Coat: Rhodda interior, satin finish

2. **PS-2** - Interior Hollow Steel, typical
   a. 1st Coat: Rodda PrimeSolution First Coat Interior/Exterior Bonding Primer 501601
   b. 2nd Coat: Metal Paint, DTM Acrylic, Semi-Gloss
   c. (3.2 – 4.5 mils wet, 1.4 – 1.8 mils dry per coat)

3. **PS-3** - CMU
   a. 1st Coat: SW PrepRite BlockFiller, or approved
   b. 2nd Coat: SW Exterior Low Luster House Paint or approved

4. **PS-4** - Exposed Interior Structural Steel
   a. 1st Coat: Rodda Paint P-80 Quick Drying Metal Primer, Red Oxide, 7981.
   b. 2nd Coat: Rodda Paint PROTECH Metal Master DTM Acrylic Enamel, Semi-Gloss, 458703
   c. (4.5–8.5 mils wet / 1.5–3.0 mils dry per coat.)

2.3 MIXING AND TINTS

A. Deliver painting materials already mixed to job site. Accomplish job mixing and tinting only when acceptable to Architect. Mix only in mixing pails of nonferrous or oxide resistant materials. Use tinting colors recommended by manufacturer for specific type of finish specified.

2.4 ACCESSORIES

A. Coating Application Accessories:

1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 - EXECUTION

3.1 GENERAL

A. Except as specified herein for specific finish types, materials shall be of indicated quality.
B. Materials for each general purpose to be of same manufacturer.
C. Do not use materials of different manufacturer over one another, except for shop prime coats applied under other sections of specifications.
D. Painting materials including but not limited to linseed oil, shellac and turpentine shall be pure, of highest quality, and bear identifying label.

3.2 ENVIRONMENTAL CONDITIONS

A. Do no work if dust or insects present in sufficient quantity to impair the finish. Do no work in rain or where rain may damage finish. Do no work when air temperature or surface of substrate is below 50^0F. Maintain environmental conditions within limits recommended by manufacturer for optimal results.

3.3 PROTECTION OF OTHER SURFACES

A. Provide drop cloths, barricades or other forms of protection necessary to safeguard the work of other trades as required to preserve painted work free from damage.
B. Post signs immediately following application of paint.

3.4 CONDITION OF SURFACES

A. Inspect surfaces to be finished and report unsatisfactory conditions to Mechanical Prime Contractor.
B. Prepare surfaces per manufacturer’s specifications. Prime bare patches.
C. Do not proceed with work until such unsatisfactory conditions have been repaired.
D. Install no finishes on surfaces where moisture affect is critical until tested and determined to be within limits acceptable to paint manufacturer and good trade practice.
E. Commencing work on a surface denotes acceptance and responsibility for resulting finish.

3.5 APPLICATION

A. Spray, Brush or roller-apply per manufacturer's application specification.
B. The number of coats specified is minimum that should be applied; provide additional coats as required to cover.
C. Vary each coat slightly in color tint, and have each coat approved before next coat is applied.
D. Comply with recommendations of product manufacturer for drying time between succeeding coats.
E. Finish pigmented or clear coats shall be smooth, free of brush marks, streaks, laps or pile up of paint, or skipped or missed areas.
F. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
G. Runs on face not permitted.
H. The word "Exposed" shall be defined as being exposed to either casual view or the elements, or both.
I. Surfaces to be covered by transparent finishes shall be undamaged, clean, and free from stains and similar foreign materials.
J. Coat six surfaces of each beam or board.
K. Coat interior of borings, sawcuts, and other field dressings prior to installation.

3.6 SURFACES NOT TO BE PAINTED

A. Items with a complete factory finish except as otherwise specified.
B. Nonferrous materials except as otherwise specified.
C. Finish hardware not factory primed or galvanized.
D. Exposed surfaces specified to receive no finish.
E. Surfaces to be covered by other materials or permanently enclosed, unless noted otherwise.

3.7 PATCHING

A. Provide coating necessary to present a final finished appearance.

3.8 CLEANING AND REPAIRING

A. Upon completion of the work remove all debris from site.
B. Clean, repair and touch-up, or replace when directed, materials which have been soiled, discolored, or damaged by work of this section.
C. Remove paint spots, spills and similar evidence of work without harm to the affected surface.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Room and door signs.
   2. Interior directional and informational signs.
   3. Luminous egress path marking and other "glow-in-the-dark" signs.
   4. Emergency evacuation maps.
   5. Building identification signs.
   6. Plaque.
   7. Traffic signs.

B. Related Requirements:
   1. Division 22 Mechanical Electrical and Plumbing.
   2. Division 26 Electrical.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include published literature to describe manufactured products and components. Include installation instructions where applicable.

C. Shop Drawings: Show layout, dimensions, letter font and style, materials, finishes, mounting details, anchoring methods, support systems, components, fittings, and parts required for complete installation.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.5 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 - PRODUCTS

2.1 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Sign Type: Match existing building standards

PART 3- EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install neatly, with horizontal edges level.
C. Locate signs where indicated:
D. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
E. If no location is indicated obtain Owner's instructions.
F. Protect from damage until Substantial Completion; repair or replace damage items.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall Protection
   2. Corner Guards

1.2 RELATED SECTIONS

A. Section 09 65 13 "Resilient Base and Accessories"
B. Section 09 91 00 "Painting"

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 REFERENCES

A. National codes IBC and NFPA Life Safety
B. American Society for Testing and Materials (ASTM)
C. Underwriters Laboratories (UL)
D. NAAMM “Metal Finishes Manual”

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 "Submittals".
B. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
C. Shop drawings showing locations, extent and installation details of corner guards. Show methods of attachment to adjoining construction.
D. Submit the following samples, as proposed for this work, for verification of color, texture, pattern and end cap attachment and alignment.
   1. 12" long sample of each model specified including end cap and mounting hardware.
E. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
F. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.6 QUALITY ASSURANCE

A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.
B. Manufacturer’s qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.
C. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA, and Life Safety.
D. Fire performance characteristics:
   1. Provide engineered PETG wall protection system components with UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class 1 characteristics listed below:
      a. Flame spread: 25 or less
      b. Smoke developed: 450 or less

E. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.
F. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
G. Color match: Provide wall protection components that are color matched in accordance with the following:
   1. Delta Ecmc difference of no greater than 1.0 using the CIELab color space.
H. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.7 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F and a maximum of 100°F should be maintained. Store materials flat.

1.8 PROJECT CONDITIONS
A. Materials must be acclimated in an environment of 65°-75°F for at least 24 hours prior to beginning the installation.
B. Installation areas must be enclosed and weatherproofed before installation commences.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS
A. Construction Specialties, Inc., or equal.

2.2 ACROVYN CORNER GUARDS, CG-1
A. Materials: Acrovyn 4000 surface mounted guards with snap-on cover.
B. Basis-of-Design: Model SM-20AN 90° surface mounted corner guard
   1. Legs: 2" (76mm)
   2. Cover: ¼" radiused
   3. Retainer: Extruded Aluminum, 6063-T6 alloy, .063" thickness. Minimum strength and durability per ASTM B221.
   4. For end wall applications, provide model SM-25AN. Provide color-matched end caps for partial and full-height applications.
   5. Finish: see FINISH SCHEDULE, A600
C. Fasteners to be non-corrosive and compatible with aluminum retainers. All necessary fasteners supplied by manufacturer as appropriate for wall construction.
D. Height noted on Drawings. Mount directly above Wall Base.

2.3 FABRICATION
A. Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish, and member sizes.
B. Preassemble components in shop as much as possible to minimize field assembly.
C. Fabricate components with wood joints lightly chamfered. Provide surfaces free of chipping, dents, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

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. Do not proceed until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrate.

3.2 PREPARATION

A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris, and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
B. Protection: Take necessary steps to prevent damage to material during installation as required in manufacturer’s installation instructions.

3.3 INSTALLATION

A. Install work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware, and locating components firmly into position, level and plumb.
B. Temperature at time of installation must be between 65°-75°F and be maintained for at least 48 hours after the installation.
C. Adjust installed end caps as necessary to ensure tight seams.

3.4 CLEANING

A. Immediately upon completion of installation, clean vinyl covers and accessories in accordance with manufacturer’s recommended cleaning method.
B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Toilet accessories and their associated fasteners and hardware.

1.2 QUALITY ASSURANCE

A. Furnish inserts and anchoring devices which must be set in concrete or built into masonry. Coordinate delivery with other Work to avoid delay.
B. Coordinate accessory locations with other Work to avoid interference and to assure proper operation and servicing of accessory units.
C. Provide all accessories manufactured by the same company.

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00, Submittal Procedures:
   1. Catalog data.
   2. Manufacturer's installation instructions.

PART 2 – PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01 25 00, Substitution Procedures.

2.2 MATERIALS, GENERAL

A. Use stainless steel complying with ANSI Type 302/304, with polished No. 4 finish, 22 gage (0.34 inch) minimum, unless otherwise indicated.
B. Use leaded and unleaded brass, flat products, complying with FS QQ-B-613; rods, shapes, forgings and flat products with finished edges, FS QQ-B-62.
C. Use commercial quality, cold rolled, sheet steel complying with ASTM A366, 20 gage (0.040 inch) minimum, unless otherwise indicated. Provide surface preparation and metal pretreatment as required for applied finish.
D. Use galvanized steel sheet complying with ASTM A527, G60.
E. Use base metal with nickel and chromium electrodeposited in compliance with ASTM B456, Type SC2.
F. Use galvanized steel mounting devices complying with ASTM A153, hot dip galvanized after fabrication.
G. Use screws, bolts, and other devices of same materials as accessory unit or of galvanized steel where concealed.
H. Shower Enclosure: Fiber reinforced composite, two layers, polyester core.

2.3 MANUFACTURERS

A. Bradley Corporation, Bobrick Washroom Equipment Co., Specialties Inc. (ASII), Georgia Pacific, Truebro. Products specified are referenced to Bobrick model numbers unless noted otherwise.
B. Truebro Lav Guard Insulation Kits

2.4 PRODUCTS

A. 1 ½" Diameter Stainless steel grab bar with snap flange cover, Straight (G.B.): Bobrick Series B-6806.
B. Toilet Paper Dispensers (T.P.D.):BOBRICK, B-2888 Surface-Mounted Toilet Tissue Dispenser, Satin Finish, Two Roll
C. Undersink Pipe Insulation (S.P.I.): Trubro Lav Guard 2 Insulation Kit for undersink pipes, stops, and traps. (One per sink with exposed undersink piping)
D. Surface Mounted Seat-Cover Dispenser (S.C.D.): BOBRICK, B-221 Surface-Mounted Seat Cover Dispenser, Satin Finish
E. Wall Hook: Bobrick B6777 Towel Pin. Provide (2) in each restroom and changing room. Install (1) at ADA compliant mounting height. Coordinate locations with Owner.
F. Paper Towel Dispenser: BOBRICK, B-3974 Recessed Paper Towel Dispenser and Waste Receptacle, Satin Finish, 12-Gallon Waste
G. Soap Dispenser: BOBRICK, B-2013 Surface-Mounted automatic foam Soap Dispenser, Satin Finish 34 fl oz
H. Sanitary Napkin Disposal: BOBRICK, B-254 Surface-Mounted Sanitary Napkin Disposal, Satin Finish, 1.3-Gallon
I. Mirror: BOBRICK, B-2908 Series Welded-Frame Tempered Glass Mirror, Satin Finish

2.5 FABRICATION

A. Only an unobtrusive stamped logo of the manufacturer is permitted on exposed faces of the units. In an unexposed location, place the manufacturer's name and product model number.
B. Fabricate units with welded and ground joints and edges rolled. Hang doors with continuous
stainless steel piano hinges. Provide for concealed anchorage wherever possible.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with approved manufacturer's installation instructions.
B. Securely attach each accessory, level and plumb, at locations shown on the Drawings and at heights, spacing, and load resistance required by ADAAG (Americans with Disabilities Act Accessibility Guidelines.
C. Use fasteners that are appropriate for surfaces where accessories are to be mounted.
D. Use concealed fasteners wherever possible.

3.2 CLEANING

A. Clean surfaces in compliance with manufacturer's instructions.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior manual roller shades

1.2 RELATED REQUIREMENTS

A. Section 26 27 26 Wiring Devices: Finish requirements for wall controls specified in this section.

1.3 REFERENCE STANDARDS

A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

C. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

D. WCMA A100.1 - Safety of Corded Window Covering Products; Window Covering Manufacturers Association, (ANSI/WCMA A101.1).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

1. Do not fabricate shades until field dimensions for each opening have been taken.

2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.

D. Window Treatment Schedule: For all roller shades.

1. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.

F. Selection Samples: Include fabric samples in full range of available colors and patterns and color selections for metal finishes.

1. Fabric selection samples are only required if fabric different than that specified is proposed.

G. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

1. Mark face of material to indicate interior face.

H. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

I. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.

J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

1. Indicate methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

K. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company trained and certified by the manufacturer, specializing in performing work of this type with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening using same room designations indicated on Drawings and in the Window Treatment Schedule.

B. Do not deliver shades to the project site until all concrete, masonry, and other wet work has been completed and is dry.

C. Handle and store shades in accordance with manufacturer's recommendations.

1.8 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Install shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Requirements, for additional warranty requirements.

B. Provide manufacturer's warranty from the Date of Substantial Completion, covering the following:

1. Shade Hardware: 25 years.

2. Fabric: 25 years.

3. Aluminum and Steel Coatings: Five years.

4. Installation: One year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Roller Shades:

1. Match existing building standards.

B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 SHADE FABRIC

1. Shades:

a. Match existing building standards.

2.3 ROLLER SHADES

A. General:

1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.

2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Interior Roller Shades - Manual:

1. Locations: As indicated on Drawings.

2. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.

a. Drop Position: Regular roll.

b. Mounting: Outside (face of jambs).

c. Size: As indicated on drawings.

d. Fabric: As indicated under Shade Fabric article.

3. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.

4. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.

a. Material: Extruded aluminum or steel, with wall thickness and material selected by manufacturer.

b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.

c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.

1) Provide removeable/replaceable spline mounting without having to remove roller shade from shade brackets.

2) Double sided pressure sensitive adhesive tape is not acceptable.

5. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
6. Manual Operation:
    a. Clutch Operator Location: As identified on Shop Drawings.
    b. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
    c. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pounds minimum breaking strength. Provide upper and lower limit stops.
    d. Chain Retainer:
        1) Chain tensioning device complying with WCMA A100.1.
        2) Manufacturer's standard clip.
7. Accessories:
    a. Fascia: L shaped aluminum extrusion to conceal shade roller and hardware.
        1) Color: Match storefront finish.
    b. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.4 FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Fabricate shades to fit openings within specified tolerances.

C. Dimensions - Outside Mounting: Extend blind to center of jambs and to stop flush with top of sill.

D. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design.

E. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Battens shall be roll-formed stainless steel or tempered steel, as recommended by manufacturer.

F. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment acceptable to Architect. Furnish battens in place of plain seams when the width, height or weight of the shade exceeds manufacturer's standards.

G. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
    1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
    2. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.

H. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. Start of installation shall be considered acceptance of substrates.

3.2 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

3.3 INSTALLATION

A. Install level, plumb, square and true in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Installation Tolerances:

C. Maximum Offset From Level: 1/16 inch.

D. Replace blinds that exceed specified dimensional tolerances at no extra cost to Owner.

E. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric.

F. Adjust and balance roller shades to operate smoothly, easily, safely and free from binding or malfunction throughout entire operational range.

3.4 SYSTEM STARTUP

A. Motorized Shade System: Provide services of a manufacturer’s authorized representative to perform system startup

3.5 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

3.6 CLOSEOUT ACTIVITES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

D. Training: Train Owner's personnel on operation and maintenance of system.

E. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

F. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.7 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 DESIGN BUILD

A. The work of this section shall be implemented under a "Design-Build" agreement with the Fire Protection Subcontractor.

1.2 SCOPE OF WORK

A. Provide and install complete operational, fully integrated extension to existing fire protection system in complete compliance with design drawings and approval of regulatory authorities having jurisdiction.

1.3 DESCRIPTION OF SYSTEM

A. The extent of the fire protection system includes all fire protection pipe and fittings and sprinkler heads.

1.4 GUARANTEE

A. Provide a two-year guarantee on the materials and equipment that comprise this system. Contractor shall pay for all maintenance and repairs required during this period of time.

1.5 CODES AND STANDARDS

A. Conform with all applicable portions of latest adopted edition of the State Building and Plumbing Codes, Factory Material Requirements, ASME Standards, UL Requirements, and NFPA Requirements.

B. Install in conformance with NFPA-Standard 13, 24 and the requirements of the Oregon State Fire Marshal's office.

1.6 SUBMITTALS

A. Shop Drawings

1. Upon award of contract and within 20 days thereof, Contractor shall prepare a complete set of 1/8 inch scale working drawings showing location and manufacturer's model number of all piping and equipment. Submit four sets to Architect and Fire Marshall for review and final approval. Final approval must be received from Owner's insurers, Fire Marshall and Architect prior to starting of any work.

B. Manufacturer's Literature and Instructions

1. Submit in accordance with Section 01 33 00.

C. Project Record Drawings

1. Submit in accordance with Project Record Documents, Section 01781.

D. Operation and Maintenance Manual

1. Submit in accordance with Operation and Maintenance Data, Section 01770.

1.7 COORDINATION

A. Coordinate completely all portions of the work of this section with the work of all other sections.

B. When conflict arises, bring to attention of Architect immediately in writing with proposed solutions. Where necessary to reroute or reconfigure work of this section to achieve compatibility with design intent, do so without additional cost to Owner.

PART 2 - PRODUCTS

2.1 FIRE SPRINKLER HEADS

A. Semi recessed pendent standard brass, chrome finished head with adjustable cup escutcheon. Quick Response. Star, Grinnell, Reliable or equal.

PART 3 - EXECUTION

3.1 SYSTEM LAYOUT

A. Conceal all piping within structure at all areas with finished ceilings. All areas with finished ceilings shall have heads centered within ½ of the ceiling tile. Contractor's submittal shall include a head placement location drawing developed from the architectural floor plan and reflected ceiling drawings illustrating head placements with respect to all ceiling appurtenances.

B. Piping shall not interfere with lifting ceiling tiles for ceiling plenum maintenance.

3.2 CUTTING AND PATCHING

A. Obtain approval of Architect prior to any cutting and patching. Perform cutting and patching as necessary to install required assemblies and components.

3.3 VERIFICATION OF CONDITIONS

A. Inspection at completion of work and again before end of year's guarantee. Repair any leaks as required.

3.4 COVERING OF UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and approved. 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 repairs and replacements with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

3.5 ADJUSTMENTS

A. Adjust components and items of assemblies to operate satisfactorily at time of Substantial Completion Review and during guarantee period.

3.6 CLEANING

A. Do not touch adjacent finishes after handling pipe without cleaning hands or wearing gloves.

B. Prior to acceptance of the buildings, thoroughly clean all exposed portions of the fire protection installation, removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END SECTION

PART 1 - GENERAL

1.1 CONTRACT DOCUMENTS

A. The instructions to Bidders, Conditions of the Contract, and General Requirements are part of this specification and apply to work in this Division.

1.2 DESIGN BUILD

A. The work of this section will be implemented under an "Open Bid" agreement with the Project General Contractor.

1.3 PERMITS

A. Secure and pay for necessary permits beyond those outlined in the General Conditions, arrange for required inspections, and deliver a Certificate of Final Inspection to the Owner upon completion of work.

1.4 SCOPE OF WORK

A. Provide a complete, operational, fully integrated mechanical system in compliance with drawings and regulatory authorities having jurisdiction.
B. Provide packaged gas heating / electric cooling units to serve Heating, Ventilating, and Air conditioning requirements for occupied spaces as indicated.
C. Provide multi-poise supply air discharge indoor gas furnace, DX cooling fan coil units with economizer section and outdoor DX air condition condensing unit for occupied spaces as indicated.
D. Provide inline cabinet exhaust fan mounted above ceiling for public restrooms as indicated.
E. Shop area classrooms are to be provided with Code required industrial ventilation systems as required for specific functions (dust collection, carbon monoxide, welding) for future to be determined by the users. See notes on HVAC Schematic Drawing set.

1.5 GUARANTEE

A. Provide a two-year guarantee on the materials and equipment that comprise this system. Contractor shall pay for all maintenance and repairs required during this period of time.

1.6 CODES AND STANDARDS

A. Conform to applicable codes, laws, ordinances, rules and regulations. Notify the Architect of differences and discrepancies to code requirements prior to starting work.

1.7 SUBMITTALS

A. Proposed equipment and materials data sheets, including manufacturer’s literature and installation / operation / maintenance instructions.
B. Project Record Drawings
   1. Submit in accordance with Division 01 General Requirements.
C. Operation and Maintenance Manual
   1. Submit in accordance with Division 01 General Requirements..

1.8 COORDINATION

A. Coordinate work of this section with the work of other sections and trades.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Refer to Schedules on drawings.

2.3 DUCTWORK

A. Square/Rectangular: Galvanized Steel, ASTM A527, G-60.
   1. Fabricate in accordance with SMACNA HVAC Duct Construction Standards.
   2. Seal seams, joints and connections in compliance with Section 603.9 of the Oregon Mechanical Specialty Code.
   3. Interior lined with R-8 minimum insulation, pre-formed by manufacturer.
   4. Provide 1" internal duct liner where indicated on drawings, and duct insulation wrap when located in unconditioned spaces (minimum R-5), and a minimum R-8 insulation for ducts located outside the building envelope assembly.

B. Round and Oval Ductwork: ASTM A527, G-60
   1. Fabricate in accordance with SMACNA HVAC Duct Construction Standards.
   2. Seal seams, joints and connections in compliance with Section 603.9 of the Oregon Mechanical Specialty Code.
   3. Duct insulation wrap when located in unconditioned spaces (minimum R-5), and a minimum R-8 insulation for ducts located outside the building envelope assembly

C. Duct Sealant: "Hardcast" Iron Grip 601, or equivalent.

D. Manual Balancing Dampers at branch ductwork to return inlets and supply outlets. Single blade with locking quadrant regulator.

2.4 AIR BALANCING

A. By an Independent Air Balancing Firm, AABC or NEBB certified.

PART 3 – EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Prior to work of this section, carefully inspect the installed work of other trades and verify that all such work is completed to the point where this installation may properly commence. In the event of any discrepancies or conflicts, immediately notify the General Contractor.

B. Verify that HVAC system may be installed in strict accordance with all pertinent codes and regulations and contract documents. In the event of discrepancy or conflicts, immediately notify the Architect. Do not proceed with installation in areas of discrepancy or conflicts until they have been fully resolved.

3.2 COVERING OF UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and approved. Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required, make all repairs and replacement with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

3.3 DUCT LAYOUT

A. Provide duct layouts in readable form (minimum 11"x17" paper size) to the Architect for review.

3.4 DUCT INSULATION (LINER)

A. Apply to flat sheet metal prior to fabrication with minimum 90% adhesive coverage using a water-based adhesive.
B. Butt joints tightly and seal with mastic.
C. Coat exposed edges and the leading edge in the air stream with adhesive.

3.5 EQUIPMENT INSTALLATION

A. Install per manufacturer’s recommendations compatible with construction in location.

3.6 ADJUSTMENTS

A. Adjust components and items of systems to operate satisfactorily at time of Substantial Completion Review and during guarantee period. Provide demonstration of operational completion to Owner's representative.

3.7 CLEANING

A. Prior to acceptance of the building, thoroughly clean all portions of the work.
B. Replace Filters after Substantial Completion prior to Occupancy.
C. Provide one additional full filter set for each air handling system

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Utility vent blower sets.

1.2 REFERENCE STANDARDS
- A. AMCA 99 - Standards Handbook; Current Edition
- B. AMCA 211 - Certified Ratings Program Product Rating Manual for Fan Air Performance; Current Edition.
- C. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

1.3 SUBMITTALS
- A. Manufacturer's Instructions: Indicate installation instructions.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

PART 2 - PRODUCTS

2.1 POWER VENTILATORS – GENERAL
- A. Static and Dynamically Balanced: Comply with AMCA 204.
- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Fabrication: Comply with AMCA 99.
- D. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.2 PERFORMANCE REQUIREMENTS
- A. See Schematic Design drawings.

2.3 UTILITY VENT BLOWERS
- A. Manufacturers:
  1. Refer to Schedules on Drawings.
- B. Belt Drive Fan:
  1. Fan Wheel:
     - a. Type: Non-overloading, backward inclined centrifugal.
     - b. Material: Aluminum, statically and dynamically balanced.
  2. Housing:
     - a. Construct of heavy gauge aluminum including curb cap, windband, and motor compartment.
     - b. Rigid internal support structure.
     - c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
     - d. Construct drive frame assembly of heavy gauge steel, mounted on vibration isolators.
     - e. Provide breather tube for fresh air motor cooling and wiring.
- C. Shafts and Bearings:
  1. Fan Shaft:

a. Ground and polished steel with anti-corrosive coating.
b. First critical speed at least 25 percent over maximum cataloged operating speed.

2. Bearings:
a. Permanently sealed or pillow block type.
b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
c. 100 percent factory tested.

D. Drive Assembly:
1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
2. Belts: Static free and oil resistant.
3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
4. Motor pulley adjustable for final system balancing.
5. Readily accessible for maintenance.

E. Drain Trough: Allows for single-point drainage of water, grease, and other residues.

F. Options/Accessories:
1. Automatic Belt Tensioner: Automatic device that adjusts for correct belt tension for single drives.
2. Birdscreen:
a. Provide galvanized steel construction.
b. Protects fan discharge.
3. Drain Connection:
a. Aluminum.
b. Container allows single-point drainage of grease, water, or other residues.

PART 3 - EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Prior to work of this section, carefully inspect the installed work of other trades and verify that all such work is completed to the point where this installation may properly commence. In the event of discrepancies or conflicts, immediately notify the General Contractor.
B. Verify that HVAC systems may be installed in strict accordance with all pertinent codes and regulations and contract documents. In the event of discrepancies or conflicts, immediately notify the Architect. Do not proceed with installation in areas of discrepancies or conflicts until they have been fully resolved.
C. Install in accordance with manufacturer's instructions.
D. Secure units to structure per approved structural calculations and details.
E. Extend ducts to roof or wall and provide waterproof penetration.
F. General:
1. Install fans with resilient mountings and flexible electrical leads.
2. Install flexible connections between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
G. Provide sheaves required for final air balance.

H. Provide backdraft dampers on outlet from fans as required by Code.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Packaged, small-capacity air-conditioning units.
- B. Packaged, intermediate-capacity air-conditioning units.

1.2 REFERENCE STANDARDS
- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
- B. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

1.3 SUBMITTALS
- A. Manufacturer's Instructions: Indicate installation instructions.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 WARRANTY
- A. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 - PRODUCTS

2.1 PACKAGED, SMALL-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS
- A. General: Units having gas burner and electric refrigeration that are 6 tons and smaller in capacity.
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Refrigerant: Use only refrigerants that comply with current Code requirements.

2.2 PACKAGED, INTERMEDIATE-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS
- A. General: Units having gas burner and electric refrigeration that are 7.5 tons to 15 tons in capacity.
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Refrigerant: Use only refrigerants comply with current Code requirements.

2.3 PERFORMANCE REQUIREMENTS
- A. See Schematic Design drawings.

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Verify that area where equipment to be located is ready to receive work and clearance dimensions are as required by manufacturer.
- B. Verify that proper power supply is available.

3.2 INSTALLATION
- A. Install in accordance with manufacturer's instructions.

3.3 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

A. Demonstrate proper operation of equipment to Owner's designated representative.

3.5 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.
B. Provide service and maintenance of units for one year from Date of Substantial Completion.
C. Provide routine maintenance service with a two-month interval as maximum time period between calls.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Indoor mounted makeup air units.

1.2 REFERENCE STANDARDS
- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

1.3 SUBMITTALS
- A. Manufacturer's Instructions: Indicate installation instructions.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

PART 2 - PRODUCTS

2.1 PACKAGED MAKEUP AIR UNIT
- A. Manufacturers:
  1. Refer to Schedules on Drawings.
- B. Packaged Horizontal Unit:
- C. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, evaporative cooling section.
- D. Furnish dedicated outdoor air unit and associated components and accessories produced by a single manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Verify that area where equipment to be located is ready to receive work and clearance dimensions are as required by manufacturer.
- B. Verify that proper power supply is available.

3.2 INSTALLATION
- A. Install in accordance with manufacturer's instructions.

3.3 SYSTEM STARTUP
- A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES
- A. Demonstrate proper operation of equipment to Owner's designated representative.

3.5 MAINTENANCE
- A. Provide a separate maintenance contract for specified maintenance service.
- B. Provide service and maintenance of units for one year from Date of Substantial Completion.

C. Provide routine maintenance service with a two-month interval as maximum time period between calls.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Air-source outdoor cooling only condensing units.
- B. Indoor air handling (furnace/fan and cooling coil) units for ducted systems.
- C. Controls.

1.2 DELIVERY, STORAGE, AND HANDLING
- A. Protect units from physical damage by storing off site until roof mounting curbs are in place and ready for immediate installation of units.

1.3 WARRANTY
- A. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 - PRODUCTS

2.1 SYSTEM DESIGN
- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
  1. Heating and Cooling: Air-source electric cooling only outdoor condensing units with indoor gas furnace/fan/cooling coil components.
  2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
- B. Performance Requirements: See Schematic Design drawings.

2.2 INDOOR AIR HANDLING UNITS FOR DUCTED SYSTEMS
- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories; wired for single power connection with control transformer.
  1. Air Flow Configuration: As indicated on Drawings.
  2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
- B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.
- C. Air Filters: 1 inch (25 mm) thick glass fiber, disposable type arranged for easy replacement.
- D. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
  1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
  2. Manufacturers: System manufacturer.

2.3 INDOOR UNITS FOR DUCTLESS SYSTEMS
- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coli, controls, and accessories; wired for single power connection with control transformer.
  1. Location: High on wall.
  2. Cabinet: Galvanized steel with white finish.
- B. Supply Fan: Line-flow fan direct driven by single motor.

C. Filter: Integral per Manufacturer
D. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
   1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
   2. Manufacturers: System manufacturer.

2.4 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
   1. Refrigerant: Use only refrigerants that comply with current Code requirements.
   2. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
   3. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL 207.

B. Compressor: Hermetic, two speed 1800 and 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high-pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

D. Coil: Air-cooled, aluminum fins bonded to copper tubes.

E. Accessories: Filter drier, high-pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
   1. Provide thermostatic expansion valves.
   2. Provide heat pump reversing valves.

F. Operating Controls:
   1. Control by room thermostat to maintain room temperature setting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.

3.3 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

A. Demonstrate proper operation of equipment to Owner's designated representative.

3.5 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.
B. Provide service and maintenance of units for one year from Date of Substantial Completion.
C. Provide routine maintenance service with a two-month interval as maximum time period between calls.

END OF SECTION

PART 1 - GENERAL

1.1 CONTRACT DOCUMENTS

A. The Instructions to Bidders, Conditions of the Contract, and General Requirements are a part of this specification and apply to work in this Division.

1.2 WORK INCLUDED

A. Furnish and install complete and satisfactory operating electrical systems as shown or specified.

B. All labor, materials, equipment and services to construct and install these complete systems with the functions and provisions specified or shown.

1.3 PERMITS

A. Secure and pay for all necessary permits beyond those outlined in the General Conditions, arrange for all required inspections, and deliver a Certificate of Final Inspection to the Owner upon completion of the work.

1.4 CONTRACTOR DESIGN

A. Provide a design for a complete electrical system, including lighting, receptacles, equipment connections, alarm and communications systems.

B. Detailed requirements for the required systems are outlined in the subsequent specification sections and drawings.

C. Submit drawings and equipment information prior to ordering and installation. Information should contain sufficient detail for review by the Code Authority and Owner. Incomplete information will be returned for modifications prior to acceptance of the design.

1.5 CODES AND STANDARDS

A. Comply with National, State and any local electrical codes, safety orders, ordinances, applicable building codes and requirements of the serving utility.

B. Materials and equipment shall, where rated, bear the seal of approval of the NFPA, UL and conform to applicable ANSI, NEC, NEMA, OSHA, and other recognized standards.

1.6 MATERIAL AND EQUIPMENT

A. All material shall be new, of specified quality, and a standard product of a reputable manufacturer. All materials of a kind by one manufacturer.

1.7 SHOP DRAWINGS

A. Submit six (6) copies minimum in accordance with General Conditions. Submit typewritten list of manufacturer and catalog number for wiring devices and lamps. Submit manufacturer's catalog data, marked to indicate specific equipment proposed, for all other equipment items.

B. Where specifically indicated, submit shop drawings and/or wiring diagrams. Refer to individual sections for detailed requirements.

1.8 RECORD DOCUMENTS

A. Maintain one (1) copy of all Drawings at the site, in good order, marked to record all changes made during construction. Dimension exact location of feeders and stub-outs for future, even if no change from Drawings was made. Transfer these changes and dimensions to clean set blueprints and deliver to Engineer upon completion of work.

1.9 GUARANTEE

A. Warranty all work, materials and equipment for one year after date of Substantial Completion or first beneficial use.

1.10 NAMEPLATES

A. Provide engraved, laminated nameplates for identification of all equipment items, switches and breakers. Black color with white letters, except red color for main disconnects. 3/16" minimum letter height.

1.11 SAFETY

A. Coordinate all startup and shutdowns of systems with Owner to ensure safety of occupants.

1.12 CUTTING AND PATCHING

A. Provide all cutting and patching of surfaces required for installation of devices, raceways, and conductors.

B. Patch all surfaces and openings required by installation.

C. Patch matching finish and material of adjacent surfaces.

END OF SECTION

PART 1 - GENERAL

1.1 RACEWAYS

A. Run all wiring in raceways unless otherwise noted. Conceal where construction permits.

1.2 BOXES

A. Provide boxes where required to terminate, tap off, facilitate conductor installation, or mount device.

1.4 RECEPTACLES

A. Provide receptacles with type and rating as noted on Drawings.

1.4 CONTRACTOR DESIGN

A. Load on each 20-amp power circuit shall not exceed 12 amps, 9 amps on receptacle circuits.

B. Connect mechanical and other equipment per schedules and drawings.

C. Size circuitry for equipment per NEC. Size breakers and fuses per Manufacturer's specifications.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. Electrical Metallic Tubing (EMT): Use concealed above grade or exposed indoors where not subject to physical damage. Fittings: Compression type or indenter type water or concrete tight where appropriate.

B. Rigid Steel Conduit (RSC): Use below grade or outdoors above grade and where subject to physical damage. Where exposed to weather, provide PVC coating. Fittings: Threaded type.

C. Flexible Metal Conduit (FMC) or Liquid-Tight Flexible Metal Conduit (LFMC): Use for connection to adjustable or vibrating equipment. Provide suitable grounding means. Connectors: Malleable iron, clamp type, factory insulated throats.

D. Connectors shall have insulated throats.

2.2 WIRE AND CABLE

A. Copper, #12 minimum, copper, unless otherwise noted or approved.

B. Insulation: 600 volt rated, minimum. #10 and smaller, type THHN stranded. #8 and larger, type THW stranded.

C. Conductors shall be color coded to identify phase connections.

2.3 BOXES

A. Size for number of entering conduits and devices installed. Sherardized or galvanized steel. Box cover and ring as required to suit wall material and devices.

B. Indoors: Sheet metal. Outdoors: Cast steel with corrosion resistant finish.

2.4 RECEPTACLES

A. Duplex Receptacles: Full gang size, polarized, duplex, parallel blade, U-grounding slot, specification grade, rated at 20 amperes, 125 volts (unless otherwise noted), designed for split feed service.

B. Ground Fault Receptacles: Specification grade duplex receptacle with integral ground fault circuit interrupter. Test and reset buttons. Matching wall plate.

PART 3 - EXECUTION

3.1 RACEWAYS

A. Support raceways in an approved manner. 1) Single runs: One or two hole straps, properly secured to structure. 2) Multiple runs: Standard framing channels and pipe clamps.

3.2 WIRE AND CABLE

A. No splices or taps permitted in service or feeder circuits. Splices or taps in branch circuits permitted only in junction boxes.

3.3 BOXES

A. Identify each junction box with system description and circuits installed by neat hand lettering inked on inside of cover.

C. Secure boxes to structure or blocking or mounting on manufactured bar hangers.

3.4 RECEPTACLES

A. Mount receptacles vertically at 15 inches (to bottom of faceplate) above finished floor, with grounding pole at bottom.

B. Back wiring wells may be used for receptacles.

END OF SECTION

PART 1 - GENERAL

1.1 PANELBOARDS

A. Provide panelboards incorporating switching and protective devices as specified herein and shown on Drawings.

B. Panelboards shall conform to applicable NEMA and UL standards.

1.2 EQUIPMENT CONNECTIONS

A. Furnish and install power wiring and make electrical connections to all equipment items having electrical power requirements, whether under this Division or not. Coordinate with equipment supplier.

1.3 CONTRACTOR DESIGN

A. Provide panelboards to serve the equipment and spaces. Minimum quantity and size of panels are noted on Drawings. If additional circuits are required in an area, provide a second sub-fed panel. Feed through panel arrangements are not acceptable.

B. Provide a 1600-amp feeder for the building service and metering. Coordinate with serving utility.

C. Provide main switchboard and distribution for panels and equipment.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Circuit Breakers: Thermal magnetic, bolt to bus type with trip indicating handle. Multiple pole breakers shall have internal common trip mechanism.

B. Phase and Neutral Bussing: Full size and full height copper or tin plated aluminum with phase sequence type tap arrangement.

C. Cabinet Door: Equip with flush spring latches and locks, all keyed alike, flush or surface trim as shown.

D. Additions to existing panelboards and switchboards shall match existing.

2.2 EQUIPMENT

A. Provide branch circuit protection and disconnect switches required by codes and manufacturers directions. Disconnects for 120 volt equipment: Manual motor starters with integral overload protection. All others: Non-fused safety switches with suitable enclosure.

PART 3 - EXECUTION

3.1 PANELBOARDS

A. Provide typewritten circuit directory to indicate circuit assignment at time of occupancy.

B. Provide nameplate on exterior of panelboard.

3.2 EQUIPMENT

A. Mount items that are specifically electrical in nature and wired thru under this Division such as time switches, relays, starters, etc., furnished by other Divisions.

B. Motor starters and disconnects: Readily accessible and with nameplate to indicate equipment connected.

END OF SECTION 16400

PART 1 - GENERAL

1.1 MOTOR STARTERS

A. Provide motor starters for all electric motor driven equipment. All starters shall be of one manufacturer except mechanical equipment packages where motors and starters are supplied with package.

1.2 EQUIPMENT CONNECTIONS

A. Furnish and install power wiring and make electrical connections to all equipment items having electrical power requirements, whether under this Division or not. Coordinate with equipment supplier.

1.3 CONTRACTOR DESIGN

A. Provide connections to mechanical and auxiliary equipment as scheduled and described in Specifications and Drawings.

B. Provide disconnects as required by Codes.

PART 2 - PRODUCTS

2.1 MOTOR STARTERS

A. Combination Motor Protection Switches
   1. Provide molded case magnetic only circuit breakers with operating handle and lock-off facility.
   2. Provide contactors with three overload relays.
   3. 120 volt holding coil.
   4. Provide reset button, and Hand-Off-Automatic switch in cover, field convertible to Off/Auto or Start/Stop momentary pushbutton.
   5. Provide starters with a sufficient number of auxiliary contacts (N.O. and N.C.) to afford the control and interlocking required in addition to standard auxiliary holding contacts supplied with each contactor.
   6. Enclosure for dry, indoor locations: NEMA 1. Others as required by location.

2.2 EQUIPMENT

A. Provide branch circuit protection and disconnect switches required by codes and manufacturers directions. Disconnects for 120 volt equipment: Manual motor starters with integral overload protection. All others: Heavy duty, non-fused safety switches with suitable enclosure.

PART 3 - EXECUTION

3.1 MOTOR STARTERS

A. Install heaters correlated with full load current of motors provided.

B. Set overload devices according to measured current of motors provided.

3.2 EQUIPMENT

A. Mount items that are specifically electrical in nature and wired thru under this Division such as time switches, relays, starters, etc., furnished by other Divisions.

B. Motor starters and disconnects: Readily accessible and with nameplate to indicate equipment connected.

END OF SECTION

PART 1 - GENERAL

1.1 LIGHTING FIXTURES

A. Provide lighting fixtures including diffusing material, lamps, ballasts, hangers, and accessories for a complete lighting system.

1.2 LAMPS

A. Provide lamps of color and type shown for all lighting fixtures.

1.3 CONTRACTOR DESIGN

A. Lighting will generally consist of commercial grade fixtures. Refer to Architectural reflected ceiling plans for proposed fixtures and locations. Provide emergency powered egress and exit lighting as required by Codes.

B. Design light levels and illuminance ratios shall conform to current IES standards and Oregon Office of Energy lighting level recommendations. Provide lighting calculations of sufficient detail to show conformance. Provide required Energy Efficiency Specialty Code compliance calculations for lighting systems.

C. Load on each lighting circuit shall not exceed 12 amps.

D. Provide occupancy based and local bypass controls in each room. Rooms shall be configured to allow for bypass “on” with night time sweep “off” capabilities.

E. Emergency lighting shall be controlled on an occupancy and time based schedule. Loss of normal power shall activate all emergency and exit lighting.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES

A. Refer to Architectural plans for suggested fixture types and layout.

2.2 LED LUMINAIRES

A. General

1. LED light fixtures shall be in accordance with IES, NFPA, UL.
2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS)-compliant.
3. LED drivers shall include the following features unless otherwise indicated:
    a. Minimum efficiency: 85 percent at full load.
    b. Minimum Operating Ambient Temperature: -20°C (-4°F).
    c. Input Voltage: 120 - 277V (±10%) at 60 Hz.
    d. Integral short circuit, open circuit, and overload protection.
    e. Power Factor: ≥ 0.95.
    f. Total Harmonic Distortion: ≤ 20%.
4. LED modules shall include the following features unless otherwise indicated:
    a. Comply with IES LM-79 and LM-80 requirements.

b. Minimum CRI 80 and color temperature 4000˚K.

c. Minimum Rated Life: 50,000 hours per IES L70.

PART 3 - EXECUTION

3.1 LIGHTING FIXTURES

A. Support fixtures securely from structure.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install all labor and materials required for the installation of a complete voice and data cable infrastructure.

1.2 CONTRACTOR DESIGN

B. Provide a fiber connection for voice/data service to IDF room from Library MDF. Provide power capacity for a minimum of 2.4 kW UPS (3kVA) at the IDF.

C. Provide data outlets the desks and workspaces in the Collaboration spaces.

D. Provide wireless internet facilities throughout the space.

E. Provide copper connections to equipment requiring direct data connections.

1.2 SUBMITTALS

A. Submit complete and descriptive shop drawings in accordance with Section 01 33 00. Include data for wall jacks, cable, and a layout for each IDF and MDF terminal board.

1.3 GUARANTEE

A. Guarantee all work against faulty and improper material and workmanship for a minimum period of one (1) year from the date of final written acceptance by Owner, except where guarantee or warranties for longer terms are specified herein.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Fiber Patch Panels and cabling: Corning (preferred), CommScope, Panduit, Belden, Seimon..

B. Copper Cables terminations and other hardware: Panduit, CommScope (Systimax), Belden, Leviton, Seimon.

C. Termination Hardware: AMP, Avaya.

D. Fiber Cable: Corning, CommScope

E. Outlets: AMP

F. Requests for substitution of other products will be considered if submitted in accordance with Section 01 60 00.

2.2 COPPER BACKBONE

A. All indoor backbone/riser cable shall be multi-paired cable, consisting of 23AWG thermoplastic insulated conductors formed into binder groups of 25 pairs. Cable must be riser rated, and have an overall metallic sheath/shield. The cable must meet the requirement of ANSI/EIA/TIA-568 for 100-ohm UTP multipair Backbone Cable.

B. UTP backbone cable shall be terminated on 100 type UTP terminating category 6 modular RJ-45 patch panels installed in 19" equipment racks wall mount brackets. Must be UL listed.

C. 300 or 900 pair cross-connect system terminal blocks are to be used in all telecommunication rooms. Must meet requirements for Category 6.

D. 110 type protection blocks with solid state over-voltage protection and sneak current protection for terminating outdoor twisted pair cable shall be installed in the building entrance terminals. Blocks shall be complete with mounting hardware, protection modules, connecting blocks, retainers, wire management, designation strips, etc. Must be UL listed. Protection units shall be equipped with 25 feet of stub cable for splicing to the building entrance cables.

E. Cross connect cables terminating on protection blocks shall be 25 pr 23 AWG solid copper conductors under a common outer sheath. The cable shall meet the requirements for Category 3 horizontal UTP cable of EIA/TIA/TSB-36.

F. Reusable indoor rated splice cases shall be used to terminate outdoor cable to building protection module stub cables.

2.3 HORIZONTAL DISTRIBUTION

A. All UTP cable shall be 4-pair cable, of 23AWG solid copper conductors under a common sheath. Cable must meet the requirement for Category 6 standards and be rated for use in the environment in which it is used.

B. UTP cables shall terminate on 110-type terminating Category 6 modular RJ-45 patch panels and shall be provided and installed in equipment racks. Rack mount wire management panels are to be installed between each pair of 48 jack port mount 110 type modular patch panels.

C. All voice and data outlet plates shall be of a modular design capable of accepting interchangeable RJ-11, RJ-45, video F connectors, BNC, fiber ST or MT-RJ connectors or blank inserts into a single plate. Plates shall be nylon, 4 port single gang, color to match adjacent power receptacle plates.

D. Each outlet shall have UTP cables terminated on CAT 6 RJ-45 jacks. Quantity of jacks as indicated on the floor plans, but no less than two per plate.

E. Wall phone outlets shall have one 4 pair UTP cable terminated in a single gang plate.

F. All Data UTP station cable to terminate on 8-pin CAT 6 RJ-45 inserts. Use wiring pinout configuration 568B. Inserts shall be designed to permit them to be disconnected from the plate without removing the cable, and reinstalled on another plate. In addition to wall mounted outlets, include outlets in modular furniture and floor boxes.

G. All UTP cable runs shall not exceed 90 meters (295 feet) in length.

2.4 FIBER OPTIC CABLE

A. General purpose single-mode fiber of type OS2 9/125 µm, ITU-T G.652.D

B. Attenuation shall not exceed 0.40B per km at 1,310 nM.

C. Band width shall meet or exceed 160mHz at 850nM and 500mHz at 1,300nM.

2.5 CONNECTOR CABLES

A. Provide one data connector cable for each data jack. 50% shall be 6 feet and 50% shall be 12 feet in length. Data grade, category 6 with RJ-45 male connector on each end.

B. Provide one, 6 foot min. telephone connector cable for each telephone jack. Voice grade, category 6 with RJ-11/45 compatible male connector on each end.

C. Provide one, 1-foot patch cable for each patch panel jack. Data grade, category 6 with RJ-45 male connector on each end.

2.6 EQUIPMENT RACKS

A. Racks shall be free standing 7'X19" unless a different height is specified on the drawings. Chatsworth, Homaco. All aluminum bolt down EIA standard equipment rack, with 1-1/4" x ½" front and rear flange hole pattern, 12-24 threaded holes, brushed aluminum finish, and self support base. Wall mount racks may be used only where specifically called out on the drawings.

B. Provide double sided 6" wide vertical wire management section between racks and on at least one side of single racks.

C. Patch panels shall not consume more than 1/3 of any rack. The remainder of the rack shall be for the Owner's equipment.

D. Provide a single open-frame, two-post rack with overhead ladder-style cable runway anchored to the wall.

PART 3 - EXECUTION

3.1 EXECUTION

A. The Contractor shall furnish and install all cabling in accordance with these specifications, and as indicated on the cable schedules and drawings.

B. Install each cable as an uninterrupted conductor section between the designated termination points, unless otherwise directed by the cable installation specifications. There shall be no splices or mechanical coupler installed between the cable points of origin and termination except as shown on drawings and/or specifications.

C. Desk locations in private offices are unknown. Where outlets are located on opposite sides of the office, leave sufficient cable coiled up in the ceiling to permit the jacks to be removed from the plate and the jack and cable to be installed on the opposite side of the room.

D. Unless otherwise noted, all cable shall be rerouted though the building low voltage cable tray/conduit system.

E. Contractor is responsible for insuring that cable jacket is suitable for the environment in which it is placed, i.e., CM, CMR, CMP rated.

F. All cable shall be attached to building structure except as noted below, at intervals not to exceed 6 feet.

G. At the same time cable is pulled into a cable pathway, also install a pull string of appropriate size to facilitate future cable pulls along those pathways.

H. Install "J-hooks" or reusable "o-rings" for horizontal cable support. Coordinate location of support hardware to avoid conflicts with other trades.

I. At no point will any station cable be tie wrapped or fastened to the cable tray. After cables have exited the cable tray they will be tie wrapped to the "J-hooks". The tie wraps will be clinched snug enough around the cable bundle to keep them uniform and in the hooks, but not so tight as to damage the construction of the cables themselves.

J. Installation of workstation cables shall be coordinated with the modular furniture system contractor. Prior to the furniture system installation, the workstation cables will be pulled near the "stub-ups" or poke-thrus" and left coiled with enough slack to reach the eventual outlet location. After the modular furniture systems are installed and walls are finished, the contractor will pull cable to the outlet locations and complete the cable installation.

K. Provide firestopping at all locations where cables penetrate fire rated surfaces. Materials and methods used shall be acceptable to the code authority having jurisdiction and shall maintain the fire integrity of the wall, floor, or ceiling.

L. Provide a minimum of 15 feet on neatly coiled and secured fiber optic cable service slack at each end of every fiber run. Service loops shall be stored on appropriately sized cable supports, wall-mounted brackets, or cable management systems, while maintaining the manufacturer's minimum bend radius.

3.2` CABLE IDENTIFICATION

A. Cable tags containing a unique cable ID designator shall be placed on both ends of all cables, 6 inches from the connector and/or termination blocks. Also, label all backbone cables passing through telecommunications rooms. Each label shall be pre-printed with the appropriate cable number as indicated. Hand written cable labels are not acceptable.

B. Individual station outlets shall be labeled with the designator of the cables terminated at that particular outlet.

C. If at any time during the job the cable tag becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a duplicate pre-printed cable tag at the Contractor's expense.

D. Labeling sequence to be determined by the Owner and to be followed by the Contractor.

3.2 TERMINATION HARDWARE

A. Quantities of termination blocks, racks, splice enclosures, and patch panels, etc. shown on drawings are illustrative only and are meant to indicate the general configuration of the work. The Contractor is responsible for providing the correct quantities of termination hardware required to terminate, patch, cross connect, etc. the volume of cable described herein and shown on the drawings. Rack quantities shall be no less than what is shown on the drawings.

B. At all times during the construction, the Contractor shall protect the equipment from damage and theft. Equipment shall not be installed until such time as other trades have completed their work in the area.

3.3 CABLE TERMINATIONS

A. Fiber optic cables: After dressing the fiber to its final destination, sheath shall be removed to a point that allows the fibers to be splayed and terminated in a neat and uniform fashion. At this point all fiber strands will be terminated in strict compliance with the manufacturer's instructions.

B. Twisted pair metallic cables: After dressing cable to its final location the sheath shall be removed to a point that allows the conductors to be splayed and terminated in a neat and uniform fashion. Every effort must be made to maintain sheath integrity by removing only as much as is practical to accomplish termination. Cable pair twist shall be maintained up to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered beyond ½" per EIA/TIA-568.

C. Cross-connect wire: Cable pair twist shall be maintained up to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

3.4 GROUNDING

A. All metallic cable tray, ladder rack, raceways, cable sheath/armor, enclosures, and equipment racks and other conductive surfaces shall be properly bonded to the grounding system. All paint and other coatings shall be removed at all contact surfaces to ensure proper ground.

B. Furnish and install an insulated #6 copper ground wire from all telecommunication rooms to the main building electrical ground point in the main electrical room. Drawing notes indicating a larger size shall take precedence.

C. Ground all cable shields, ducts, connector panels and grounding blocks.

D. All grounding shall be in compliance with the NEC code Article 800, Article 250, as well as EIA/TIA standard 607.

3.5 CABLE TESTING

A. General
The contractor shall provide:
○ Electronic certi4fication results for every copper link and fiber strand.
○ Individual link identifiers matching installed labels.
○ Tester model, serial number, and calibration information.

All failed installations shall be repaired and retested prior to final acceptance.

B. Fiber
All installed fiber optic strands shall be tested for insertion loss, length, continuity, and polarity using an optical loss test set (OLTS) in accordance with applicable ANSI/TIA-568.3 requirements.

C. Copper:
All installed copper cabling shall be 100% certified using a calibrated field certification tester meeting ANSI/TIA-1152-A accuracy requirements appropriate to the cable category.

END OF SECTION

SECTION 27 5113

INTERCOMMUNICATION (INTERCOM) SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish and install complete and operating addition to the existing system.

B. Furnish and install all required equipment necessary to interconnect the equipment to the existing intercom system.

1.2 DESCRIPTION OF SYSTEM

A. System provides ALL CALL and zone paging throughout the building, operated by picking up a telephone with this class of service and dialing an access code.

B. When not being used for paging, system serves as a distribution system for background music.

1.3 CONTRACTOR DESIGN

A. Provide speakers and call buttons throughout the facility, tied to the Campus systems.

PART 2 PRODUCTS

2.1 FLUSH SPEAKER, STANDARD

A. Backbox: Soundolier #95-8.\

B. Speaker:

1. 8-inch, 5 watts normal power rating.
2. Full frequency response for music.

C. Baffle:

1. Round, flat, heavy gauge steel.
2. Finish: White enamel.
3. Soundolier #51-8.

2.2 VOLUME CONTROL

A. Priority attenuator type, stainless steel wall plate for single-gang outlet.

B. Outlet:

1. Box: 4-inch square, 1-1/2 inch deep, single-gang plater ring, flush in wall.
2. Conduit: 1/2-inch EMT to accessible ceiling.
3. Volume controls located at speaker, in ceiling space, require only a box.

2.3 WIRING

A. No. 22 AWG, solid, color coded pairs, overall PVC jacket.

B. Mohawk #1403 (3-pair) or Equal:

1. One Pair: To volume and speaker.
2. One Pair: To volume and speaker.
3. One Pair: Spare.

PART 3 EXECUTION

3.0 INSTALLATION

A. Rough-In and Wiring Pulling: Requirements shall be coordinated with installer.

B. Equipment Installation: Shall be made by trained manufacturer's representative.

C. Fastening and Support:

1. All equipment, except portable equipment shall be held firmly in place including loudspeakers, amplifiers and cable.
2. Adequate to support their loads with a safety factor of at least three (3).

3.1 WIRING

A. Provide wiring as required by manufacturer for number of stations and arrangement shown.

C. Circuits, home runs, and feeders shown on Drawings are to establish routing and general system connection only. Provide number and type of wires as recommended by manufacturer.

D.

3.2 TESTING AND ADJUSTMENT

A. Test each circuit after installation for quality of operation.

B. Set speaker transformer taps for proper sound volume, assuming a normal room ambient noise level.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Design, furnish, and install a complete and satisfactory operating automatic fire alarm / voice evacuation and detection system.

B. System to include control panel, detection devices, notification appliances, manual stations, digital alarm communicating transmitter, remote annunciator, accessories, raceways, wiring, batteries, and any other necessary accessories and installation materials.

C. Provide plans, specifications, equipment list and calculations for design review and permit review by the Fire Marshall.

1.2 FACILITY DESCRIPTION

A. The building consists of mixed educational and shop spaces.

B. A facility fire sprinkler system is currently being provided under separate contract.

1.3 DESCRIPTION OF SYSTEM

A. Supervised non-coded annunciated multiplex style, addressable, solid state system with intelligent analog alarm initiation.

B. System Operation:
1. Alarm Caused By: Activation of any automatic detection or manual device, or water flow within sprinkler system.
2. Alarm Initiation to Cause:
   a. Audible and visual zone identification at Control Panel and annunciators.
   b. Lamp to light in base of initiating detector; or if detector is concealed from view, light a remote lamp at nearest visible location.
   c. Closing of selected supply air dampers and HVAC units.
   d. Transmission of alarm to remote monitoring station via 2 line automatic telephone dialer.
   e. All smoke and fire doors to close.
   f. All speakers to play voice-evacuation message.
   g. All strobes to flash.
3. Audible alarm may be manually silenced at Control Panel. Alarm signal circuit and zone alarm light shall remain initiated until actuated devices have been restored to normal and Control Panel reset.
4. Trouble Signal Caused By:
   a. An open or short in detector or signaling loop wiring.
   b. Removing any initiating or signaling device from system.
   c. Moving any sprinkler system valve from the full open position.
   d. Failure of battery charger.
5. Trouble initiation to cause: audible and visual indication at the Control Panel.
6. Audible trouble indication may be silenced at Control Panel. Trouble circuit and zone light to remain initiated until trouble corrected.
7. Trouble circuit to be self-restoring after correction of problem, or have automatic "ring-back" if left in silenced condition.
8. Alarm shall override trouble.

1.04 PLAN SUBMITTAL AND INSPECTION REQUIREMENTS

A. Fire Marshall Plans and Specifications submittal: Three complete plans and specifications for fire alarm systems shall be submitted for review and approval prior to system installation. Plan review fees must be paid before

picking up the approved set of plans. Plans and specifications shall be submitted to the Permit and Information Center. Provide owner with a copy of the approved plans.

B. Plans and specifications shall include, at minimum, the following information. Provide additional information as required by Fire Marshall:
   1. Floor plan with rooms labeled and occupancy use noted.
      a. Location of all initiating, notifications devices, control panel, and remote annunciator.
      b. Mounting heights and ceiling description where detectors are installed.
   2. Point to point system wiring diagram
      a. Devices, controls, and end-of-line location for each circuit.
      b. Number of conductors and wire gauge for each circuit run
      c. Zone identification
   3. Voltage drop calculation
      a. Devices, length, resistance of wire, and end-of-line voltage for each circuit
   4. Battery calculation.
   5. Other information required by the local authority having jurisdiction.

C. Location and Security: The alarm control unit, remote annunciator panel, and access keys to locked fire alarm equipment shall be installed and maintained in a lock box location approved by the Fire Marshall. Lockbox to be provided by the Contractor. Written operating instructions shall be provided within the alarm control unit. Lock box to meet requirements of fire marshal.

1.05 CONTRACTOR DESIGN

A. Provide a complete fire alarm and communications system as needed to meet all applicable Codes and requirements. Provide the following design documents, at a minimum.
   1. Clear and concise description of operation, input/output matrix, and listing of software needed for proper system operation.
   2. System zoning boundaries.
   3. Interfaces to fire safety systems.
   4. Locations of all components, circuits, and raceways.
   5. Circuit layouts, raceways, and conductors.
   6. Fill, capacity, and voltage drop calculations.
   7. Data sheets for each component including wiring diagrams and installation instructions.
   8. Power supply and battery calculations.
   9. Evidence of installer qualifications.

B. In addition to the Code required system components, provide the following enhanced features:
   1. Provide capacity in system for a future upgrade to a complete coverage smoke detection system.
   2. Provide capacity and required modules in system to activate emergency lighting.

1.06 REFERENCE STANDARDS

A. NFPA 72: National Fire Alarm Code

B. NFPA 101: Life-Safety Code.

C. 2014 Oregon Fire Code

D. 2014 Oregon Structural Specialty Code

E. UL-STD 864, UL-UOJZ.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Siemens, Fire-Lite, Edwards EST, Simplex.

2.2 FIRE ALARM MASTER PANEL

A. Features:
1. Solid-state. "Mother/Daughter" board configuration.
2. Plug-in modules.
3. Separately fused inputs.
4. Multiple two wire addressable communication loops for zones and devices required.
5. Supervision and sensitivity testing of all circuits and devices.
6. All necessary 24 VDC power supplies.
7. Alarm reset switch.
8. Ground fault indicator.
9. Lamp test switch or lamp supervision.
10. Trouble silencing switch: self-restoring, or with ring-back.
11. Separate system trouble indicator: Supervises circuits and control panel wiring.
12. Audible and visual trouble indication including location and address of device. Visual indication shall be English language readout.
13. Power-on indicator.
14. Separate supervised alarm and trouble indicators for each circuit.
15. Detector circuit to accommodate intermixing of all types of detection and contact devices without resistors or circuits compensating devices at each initiating device.
16. Terminals for remote annunciators and controls.
17. Addressable auxiliary contacts: Two each NO/NC for alarm and trouble.
18. Fire drill switch and an audible alarm silence switch.
19. Detector sensitivity, calibration and identification to be supervised by control panel. Detector sensitivity capable of being changed from the control panel.
20. Amplifiers shall be provided as necessary.

2.3 STANDBY POWER

A. Operation:
1. Upon loss of primary power or drop in primary voltage, system shall automatically transfer to battery power without loss of signal.
2. An indicator lamp and pulsing audible annunciator shall indicate when system is on emergency power.

B. Storage Battery:
1. Integral battery to provide 24 hours operation and then sound all alarm signals for at least five (5) minutes, per NFPA 72.
2. 24 volts DC.
3. Battery charger.
4. Battery overcurrent protection.

2.3.1 MANUAL STATIONS

A. Addressable non-coded semi-flush mount, single-action, fully compatible with ionization and thermal detectors. Key reset, so that once station has been pulled, it cannot be reset by unauthorized personnel. Bright red finish. Engraved "FIRE ALARM."

B. Provide protective shields for all manual pull stations unless otherwise noted. Tamper-proof, clear lexan shield and red frame that easily fits over manual pull stations. When shield is lifted, it sounds a loud, piercing warning horn. Battery-operated horn. Acceptable Example Model: Safety Technology International Stopper II.

2.4 THERMAL DETECTORS

C. Addressable Combination Rate of Rise/Fixed Temperature:
1. Plug-in base, interchangeable with other detectors, 2-wire loop operation.
2. Alarm indicator lamp.
3. Rate of Rise Initiation: 15ºF rise over a one-minute period.
4. Fixed temperature initiation: 135ºF or 200ºF, as shown.
5. Integral communications and built-in device type identification.

2.5S MOKE DETECTORS

D. Features:
1. Optical sensing, photoelectric type addressable smoke detector.
2. No moving parts.
3. Alarm indicator LED to pulse only for trouble and alarm signals.
4. Capable of having sensitivity tested and adjusted.
5. Nominal 24V DC 2-wire loop operation.
6. Provision for connecting a remote alarm lamp.
7. Terminal base connection.
8. Concealed socket head screw to prevent tampering.
9. Integral communications and built-in device type identification.
10. The detector shall be capable of bi-directional communication with the control panel.
11. The detector shall be dynamically supervised and uniquely identifiable by the control panel. The control panel shall be capable of analyzing the signal of the detector's analog value for calibration, identification and sensitivity. These values can be displayed by the control panel and monitored for processing according to control panel instructions. The detector's sensitivity shall be individually adjustable from the control panel. Should the detector sensitivity voltage shift beyond an acceptable level and stay there for a predetermined length of time, a discrete detector trouble signal shall be annunciated at the control panel.

E. Duct detectors shall be similar with duct mounting enclosure, sampling tubes, remote test and reset station. Provide relay base with each duct detector. Connect to shut down associated HVAC unit upon alarm.

2.7 HORN/STROBE

A. Horn:
1. Selectable horn or temporal (Code 3) tones.
2. 3 selectable dBA levels: 90, 95, 99 dBA Anechoic at 10’ for both tones.

B. Strobe:
1. Capable of being synchronized by adding synchronization module.
2. 0.2 sec maximum pulse duration with 40% duty cycle.
3. Flash rate of 1 Hz to 2 Hz.
4. Clear or nominal white light source not to exceed 1000 cd.
5. Minimum intensity: 75 candela. 15/75 candela unit is not acceptable.

C. Audio and strobe inputs shall be supervised.

2.8.1 ELECTRONIC STROBE

A. Capable of being synchronized by adding synchronization module.

B. 0.2 sec maximum pulse duration with 40% duty cycle.

C. Flash rate of 1 Hz to 2 Hz.

D. Clear or nominal white light source not to exceed 1000 cd.

E. Input shall be supervised.

F. Minimum intensity: 75 candela. 15/75 candela unit is not acceptable.

2.9 REMOTE ANNUNCIATOR

A. Furnish and install where shown on the drawings, serial LCD annunciators incorporating the following features:
1. Two line by 40 character LCD display, displaying clear English language information.
2. Control switches for system acknowledgements, alarm silence and system reset.
3. Supervised from fire alarm master control panel.
4. Annunciator shall be framed in an architectural gray, extruded aluminum frame.
5. Annunciators shall be mounted as indicated on the drawings.

2.10 WIRING

A. Type:
1. UL listed limited energy cable for fire protective signaling, FPLP.
2. Conductors: Minimum size No. 18 AWG, solid, color coded, shielded where required by manufacturer.
3. Overall PVC jacket, red color.
4. Belden Fire Alarm Tray Cable or equivalent.

B. Size: The sizes and quantity of the different wires shall be those specified by the manufacturer. Color code shall be used where specified.

PART 3 - EXECUTION

3.1 WIRING

A. Raceway:
1. Raceway not required where wiring is accessible and concealed above ceiling or in chase. Raceway is required in all other areas.
2. Install surface non-metallic raceway for surface wiring in finished areas. Install conduit in all other areas where raceway is required.

B. Wire:
1. All wires shall be tagged at all junction points and shall be free from ground or crosses between conductors.
2. One-inch conduit between the FACP and the central station transmitter connection as indicated. Install number of conductors and electrical supervision for connecting wiring as required to suit central-station monitoring function. Provide telephone conductors, jacks, and boxes for connection between transmitter and MPOP.

3.2 INSTALLATION

A. Manufacturer to provide supervision of installation and make final connection of tagged wiring.

C. Ground equipment and conductor and cable shields. For audio circuits, minimize to the greatest extent possible ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

D. The Contractor shall provide for a communication line from the fire alarm master to the building security panel for monitoring alarm conditions.

3.3 FIELD QUALITY CONTROL

A. Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.

B. Pretest: Upon completing installation of the system, align, adjust, and balance the system and perform complete pretesting. Pretest shall include the following:
1. Determine the conformance of the system to the requirements of the Drawings and Specifications.
2. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
3. Perform sound level test. Adjust volume of all speakers to minimum level required to maintain sound levels of 15 dB above ambient sound levels throughout building. Retest sound level with owner present and note sound level setting of all horns on drawings. Notify owner if additional speakers are required.
4. Prepare forms for systematic recording of acceptance test results.
5. After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.

C. Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.

D. Final Acceptance Test: Test the system according to the procedures outlined in NFPA 72. Minimum required tests are as follows:
1. Verify the absence of unwanted voltages between circuit conductors and ground.
2. Megger test all conductors other than those intentionally and permanently grounded with electronic components disconnected. Test for resistance to ground. Report readings less than 1-megaohm for evaluation.
3. Test all conductors for short circuits utilizing an insulation-testing device.
4. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
5. Verify the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
6. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
7. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
8. Test the system for all specified functions according to the manufacturer's operating and maintenance manual. Systematically initiate specified functional performance items at each station including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.
9. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the period and in the manner specified.

E. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

F. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.

G. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

3.4 CLEANING AND ADJUSTING

A. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.5 DEMONSTRATION

A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.

1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours training.
2. Schedule training with the Owner at least seven days in advance.

3.6 CERTIFICATION

A. The installer shall provide written certification to the fire marshal and to the Owner that the system has been installed in accordance with the approved plans and specifications.

END OF SECTION

PART 1 – GENERAL

1.1 CODES AND STANDARDS

A. Soils classification per AASHO Standards.

B. Excavation work per Oregon Safety Code for places of Employment, Chapter 33, current edition.

1.2 NOTICES

A. Schedule compaction testing with Lab in advance.

PART 2- PRODUCTS

2.1 GENERAL EXCAVATION

A. Excavation material except rock as defined herein encountered in obtaining indicated grades and lines.

2.2 SAND

A. Natural coarse river sand, clean and washed.

B. Graded in accordance with ASTM C-136.

2.3 FILL AND BACKFILL MATERIALS

A. Stabilization Fill: Imported, clean, angular quarry rock, 3-inch or 6-inch minus material, open gradation.

B. Bar Run: Imported bar run material, round water-worn, sound durable, relatively free-draining, sandy, pit run rock. Free of friable, thin elongated or laminated pieces, disintegrated material, plastic clay, organic matter, oil, alkali or other deleterious substances, and approved prior to delivery to the site; 6”-0 maximum size with no more than 5 percent passing the No. 200 sieve.

C. Native Material: Excavated, on-site, native to project site; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Material to be approved for use as fill.

D. Engineered Fill:

1. Crushed Rock: Imported clean ¾”-0 or 1½ ”-0 crushed rock or crushed gravel, free from foreign material and conforming to the requirements of ODOT Standard Specifications (current edition) 02630.

E. Bedding/Base Rock:

1. Crushed Rock: Imported clean ¾”-0 or 1½ ”-0 crushed rock or crushed gravel, free from foreign material and conforming to the requirements of ODOT Standard Specifications (current edition) 02630.

F. Top soil: Imported, natural, fertile, friable, sandy loam with at least 10 percent humus, free of rock, clay subsoil, clods, lumps, plant, roots, sticks, weeds, seeds, and other deleterious material. Existing topsoil may be stockpiled and reused in the lawn areas, as approved.

PART 3 - EXECUTION

3.1 DUST CONTROL

A. Irrigate dust-producing soil as required to prevent damage or nuisance to adjacent property and persons.

3.2 EXCAVATION

A. Remove and dispose of materials encountered to obtain required subgrade elevations, shown on plans, or to solid bearing, whichever is deeper.

B. Remove unacceptable or excess material from site.
C. Areas found to be soft or otherwise unsuitable should be over-excavated and replaced with suitable compacted fill.

3.3 FILLING AND BACKFILLING

A. Before placing backfill remove all screed, screed stakes, other wood, debris and materials subject to rot, corrosion or termite attack.
B. Backfill as promptly as work permits but not until completion of inspection, testing, approval and recording of underground utility locations.
C. Do not use frozen material for backfill or backfill over muddy or frozen soil.
D. Prevent damage to structure in placement of backfill.

3.4 PLACEMENT SCHEDULE

A. Fill under building slab on grade: Crushed Rock 12 inch minimum depth
B. Fill under subgrade material: Crushed Rock.
C. Area well 6 inches depth: ¼ minus gravel

3.5 COMPACTION

A. Percentage of maximum density as defined by AASHO T99 method of compaction, or ASTM D698.
B. Fill and backfill under exterior slabs in 6 inch depth loose lifts and compact to 95% maximum density.
C. Other fill and backfill areas 12 inch depth loose lifts, mechanically compacted.

3.6 GRADING

A. Rough Grading
    1. Uniformly grade areas within limits of site grading under this section, including adjacent transition areas with tolerance: of plus or minus 1/10 foot in 10 feet.

3.7 DEWATERING

A. Provide necessary pumps, hose and other equipment and work to carry and keep water out of footing and excavated areas.
B. Keep streets, gutters, walks and sewers free of dirt resulting from pumping work.

END OF SECTION

PART 1– GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fence framework, fabric, and accessories.
B. Related Requirements:
   1. Section 03 30 00 - Cast-In-Place Concrete: Concrete anchorage for posts.

1.2 REFERENCE STANDARDS

A. Reference Standards: Current edition at date of Bid
B. American Society for Testing and Materials (ASTM) International:
   1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
   2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
   3. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a.
   4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
   5. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2011.

1.3 SUBMITTALS

A. See Section 01 33 00 – Submittal Requirements.
B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.5 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Failure to comply with performance requirements.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2– PRODUCTS

2.1 CHAIN LINK FENCE

A. Fabric:
   1. Galvanized Steel, comply with ASTM F668, Class 2A or 2B, one (1) piece over full fence height. Black color, polyester coated.
   2. Steel Core: .120 diameter minimum.
   3. 2-inch by eight (8) gauge mesh, with knurled top and bottom.
   4. Height: 48” or 72” as scheduled on Drawings.
B. Posts and Caps - Black color
   1. Line Posts: 2-3/8 inches schedule 40 galvanized, ASTM F1083.

2. Corner/End Posts: 2-7/8 inches schedule 40 galvanized, ASTM F1083.
3. Top, Bottom, and Brace Rail: 1-5/8 inches schedule 40 galvanized, ASTM F1083.
4. Line Post Cap: 2-3/8 x 1-5/8 inches pressed steel galvanized.
5. Post Cap: 2-7/8 inches pressed steel galvanized.
6. Rail End: 1-5/8 inches pressed steel galvanized.

C. Accessories - Black color
1. Truss Rod: 3/8 inches threaded galvanized steel rod.
2. Brace Band: 2-7/8 x 1/8 x 1 inch
3. Tension Wire: Nine (9) gauge.
4. Fabric Ties: Nine (9) gauge

D. Posts, caps, accessories and other exposed materials shall be black polyester color coated matching fabric.

2.2 MANUAL GATES AND RELATED HARDWARE, SEE ALSO HARDWARE SCHEDULE 08 71 01

A. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60-inches high, 3 for taller gates; Rolo latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.

B. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60-inches high, 3 for taller gates; Drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position.

C. Swing gates:
1. Fabricate gate frames of same material and finish of adjoining fencing. Assemble gate frames by welding prior to galvanizing.
2. Prepare gates for industrial drop rod type latches for padlock. Locks to be provided by Owner.

D. Hinges: Finished to match fence components.
1. Brackets: Round
2. Mounting: Center
3. Products:
a. TruClose Series 3 by D&D Technologies USA, Inc.
b. Substitutions: See Section 01 60 00

E. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.
B. Ensure property lines and legal boundaries of work are clearly established.
C. Confirm locations of underground utilities and other obstructions prior to work.

3.2 PREPARATION

A. Erect and maintain temporary barriers to secure work area.
B. Protect existing items from construction and debris.

3.3 CHAIN LINK FENCE FRAME INSTALLATION

A. Install rigid, plumb, and level, according to manufacturer’s directions, referenced specifications, plans, and details.

B. Locate terminal post at each fence termination and change in horizontal and vertical direction of 30 degrees or more.
C. Space line posts uniformly and equally, 96-inches maximum centers.
D. Concrete posts: drill holes in firm, undisturbed soil. Dimension holes as shown in drawings. Place concrete around posts in continuous pour. Trowel finish around post and slope to direct water away from posts or as shown in drawings.
E. Tension wires: provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties – secure tension wire to fabric.
F. Top rail: install lengths and connect joints with sleeves for rigid connections for expansion and contraction.
G. Bottom rails: install bottom rails between posts with fittings and accessories.

3.4 CHAIN LINK FABRIC INSTALLATION

A. Fabric: install fabric on security side and attach so that fabric remains in tension after pulling force is released. Leave approximately 12 inches between finish grade and bottom selvage. Attach fabric with wire ties to line posts at 15 inches on center and to rails, braces, and tension wire at 24 inches on center.
B. Tension (stretcher) bars: pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum 15 inches on center.
C. Tie wires: bend ends of wire to minimize hazard to persons and clothing.

3.5 GATE INSTALLATION

A. Install gates according to manufacturer's written instruction, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.6 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, non-alignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

3.7 CLEANING

A. Clean up debris and unused material, and remove from site. Repair, touch-up, or replace products which have been soiled, discolored, or damaged from work of this section.

END OF SECTION

PART 1- GENERAL

1.1 SUMMARY

A. Provide a complete, operational, fully integrated automatic irrigation system in complete compliance with design drawings and regulatory authorities having jurisdiction.

B. Irrigation contractor is responsible for design and complete installation of systems and equipment required for project, including existing systems damaged by work of other Sections.

C. Section Includes:

1. Piping.
2. Encasement for piping.
3. Manual valves.
4. Automatic control valves.
5. Transition fittings.
6. Dielectric fittings.
7. Miscellaneous piping specialties.
8. Sprinklers.
9. Controllers.
10. Boxes for automatic control valves.

1.2 DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for re- mote-control, signaling power-limited circuits.

1.3 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain head-to-head irrigation coverage of areas indicated.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

1. Irrigation Main Piping: 60 psig
2. Circuit Piping: 40 psig

1.4 REGULATORY AGENCY REQUIREMENTS

A. Obtain and pay for any permits and inspections required by Governing Agencies and Utility Companies.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Provide scaled irrigation drawings indicating system layout, products, and details for Owner review. Clearly indicate how new work will integrate with existing systems. Include valve and head schedules indicating make, model, size, flow rate, and pressure. No work shall occur without Owner approval.

C. Record Drawings

1. Maintain a current legible set of irrigation plans in a safe and accessible location on site at all times for review by Architect or inspector. Design and actual locations of pipe and valves shall be noted on the plans daily as the irrigation system is constructed.
2. Record actual locations of all concealed components, piping system, sleeves and drain valves. Indicate two dimensions for all valves (including hose bibb and drain valves), stub-outs, and main line T's, L's, and ends. Dimension mainline pipes and wire runs at the beginning, mid-point, and end of each curve, or at each change of direction, or at 25' intervals along the curve if longer than 50'. Submit to Architect for approval.
3. Record Drawing to be updated daily prior to backfilling.
4. Request Google map sharing and editing privileges from District representative.
5. System as-built hard-copy and AutoCAD digital file.
6. Google map and as-built shall indicate the following:
    a. Mainline Path
    b. Branch lines and head locations.
    c. Wire path both conventional and decoder two-wire path.
    d. Valve locations.
    e. Ground rod locations.
    f. Zone numbers as wired at the controller.
    g. Zone flow values as tested during commissioning.
    h. Location of all installed decoders including transition valve
7. As-built to include:
    a. Dynamic pressure per zone
    b. Estimated precipitation rate for each zone based on:
        1) Zone area
        2) Dynamic pressure readings
        3) Type of emission device

D. Zoning Chart: Provide laminated, color coded reduction of overall irrigation plan for mounting on wall near controller. Show each irrigation zone and its control valve.

E. Controller Timing Schedule: Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water for 3 seasons. Schedule is to account for differing water requirements of lawns, shrubs and different solar orientations.

F. Operation and Maintenance Data: Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. For irrigation work: Valid Oregon Landscape Contractors License for irrigation, and a valid Oregon Landscape Business License.
   2. For plumbing work: Valid Oregon Plumbing License. This includes all potable water lines. For backflow preventer installations, a valid Oregon Landscape Contractors License for irrigation and backflow or a valid Oregon Plumbing License.
   3. Control panel modifications, communication, Maxicom programming and Tucor 3D Hybrid testing and installation at controller shall be completed by Water Wise LLC or a Owner approved. Approved equal requires both Rain Bird and Tucor factory authorized service training. Contact Water Wise at 503-381-6282 or rick@waterwisenorthwest.com.

B. 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 REGULATORY REQUIREMENTS

A. Conform to applicable code for piping and component requirements.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.8 PRE-INSTALLATION MEETING

A. Convene on site meeting with general contractor, irrigation contractor, architect and appointed member of Owner's irrigation team two weeks before starting work of this section.

1.9 NOTICES

A. Notify Architect at least 48 hours before time for inspections. Request inspections at the following times:
   1. Upon completion of the main line, with all valves installed, prior to backfilling.
   2. At start and end of pressure test.
   3. System performance inspection upon completion of the entire system and after plant installation.
   4. An appointed member of the Owner's irrigation team shall be present for all requested inspections.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.11 SPECIAL WARRANTY

A. Warranty all material for one year after date of completion or longer if manufacturer furnishes a longer guarantee.

B. Correct immediately any failure caused by poor material or workmanship during warranty period. "Immediately" shall mean within 72 hours, as determined by the Owner depending upon the immediacy of the needed repair
C. Owner shall proceed with repairs and bill Contractor for costs and any damages when Contractor fails to comply.

1.12 TREE PROTECTION

A. Protect trees and roots over 2” in diameter from damage. Route pipes under roots over 2” in diameter. All trenching within critical root zones (drip lines) of trees to be performed by hand.

1.13 PROJECT CONDITIONS

A. Environmental Conditions:
   1. In freezing weather: Do no P.V.C. solvent welding.
   2. In Rainy Weather: Do no P.V.C. solvent welding, except under cover.
   3. Maximum temperature of mating surfaces of Plastic Pipe and Fittings: 110 º F.
B. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
   1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
   2. Do not proceed with interruption of water service without Owner's written permission.

1.14 EXISTING UTILITIES

A. Locate existing utilities prior to work. Protect active Pipes encountered; notify Pipe Owners. Repair or replace Utility lines damaged by Work of this Section. Remove inactive or abandoned Utilities.

1.15 CLEANING AND PROTECTION

A. Maintain Public Streets and Driveways clean and Drains open at all times.
B. Protect Persons and Property from damage and discomfort caused by dust; water as necessary and when directed.
C. Protect other work against damage and discoloration caused by work of this Section.

1.16 MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. (6) Sprinkler heads of each type and size.
   2. (4) Nozzles of each type and size.
   3. (2) Valve key for manual valves.
   4. (2) Valve Box Key.
   5. (2) Wrench for each type of head core and for removing and installing each type of head.

PART 2- PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Main Lines: Polyvinyl Chloride (PVC) 1120, Schedule 40, ASTM D-2466
B. Lateral Lines: Polyvinyl Chloride (PVC) 1120, Schedule 40, ASTM D-2466
C. Swing Joints at Spray Head: Triple elbow assembly using approved flexible tubing. 15" minimum length, 30" maximum.
D. Socket Type Fittings: ASTM D-2466, Schedule 40 P.V.C.
E. Threaded Fittings: ASTM D-2464 Schedule 80 P.V.C.
F. Sleeve Piping: ASTM D-2466, PVC 1120, Schedule 40 P.V.C.

2.2 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.
B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
C. PVC Cleaner and Primer: R. G. Sloan "Weld-on P-70" or equal.
D. Solvent Cements for Joining PVC Piping: R. G. Sloan "Weld-on 711" or equal. Ensure that manufacturer's expiration date is not exceeded.
E. Pipe Joint Tape: Teflon tape or virgin Teflon paste on all threaded joints. Minimum of 4 wraps. No pipe dope.
F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 MANUAL VALVES

A. Gate Valves:
    1. Nibco T-113-LF.
B. Manual Drain Valves: Bronze construction, angle type, 150 lb. class, threaded end connections, with cross type Operating Handle designed to receive Operating Key. All valves to have non-floating seat disk that allows positive drainage.
    1. Aqualine, Champion or approved.
    2. Provide at Main Line low points.
C. Air Relief Valve on Mainline.
D. Master Shut-off Valve: Existing to be reused.
E. Backflow Preventer: Existing to be reused.

2.4 MASTER VALVE

A. Existing master valve to be protected and maintained.

2.5 AIR RELIEF VALVE ON MAINLINE

A. Jain APV 1-1/2” or approved equal.

2.6 AUTOMATIC CONTROL VALVES

A. Plastic, Automatic Control Valves:
    1. Rain Bird PEB-PRSD.
B. Automatic Control Valve Tags: Christy’s ID-STD-Y1 or other permanent hang tag indicating zone number.
C. Valve Sump: Double valve box assembly. Provide inverted valve box sump as detailed on drawings.

2.7 SPRINKLERS

A. Plastic, Pop-up Spray Sprinklers:
   1. Rain Bird RD12.
   2. Rain Bird 6504.
   3. Hunter RD06.

2.8 CONTROLS (EXISTING TO BE REUSED WHERE APPLICABLE)

A. Automatic Control Panel Assembly:
   1. Rain Bird ESP (Existing to be reused with modules added)
   2. Pulse Transmitter: Rain Bird PT322
   3. Tucor 3D Hybrid: 3D-24
   4. Provide new Tucor 3D Hybrid: 3D-24
B. Grounding Rod: 8' Copper Clad Rod
C. Flow Sensor:
   1. Existing to be protected and maintained.
D. Zone Valve and Transition Valve Decoders: Tucor 3DLD-050 decoders at zone valves.
E. Surge Protection: Tucor SP-100.
F. Wire Connectors: DBY by 3M or approved.
G. Conduit and Fittings:
   1. Underground: Plastic, Class III, Federal Specification W-C-1094.
   2. Above-ground: Aluminum, Federal Specification WW-G-540.
H. Wire: Tucor Wire TW 18/2 or approved

2.9 TRACER WIRE AND TRACER WIRE BOX

A. Contractor shall place a UF #18 minimum blue tracer wire to allow for location and marking of all otherwise unlocatable buried pipe containing pressurized water. Tracer wire shall be continuous without splices unless approved prior to the work. If approved, splices shall be made using a high- pressure type solderless connector. All splice kits shall be approved.
B. Splices shall be insulated and waterproofed. Tape wrapped around splices will not be accepted as waterproofing. Label wire with zone numbers on each side of splice.
C. Provide and neatly coil 24" of extra wire at each splice.

2.10 VALVE BOXES

A. Automatic Control Valves, Master Valve, Master Shut-off Valve and Flow Sensor: MacLean Highline 12" standard w/ locking lid. Double valve box assembly.
B. Manual Drain, Isolation Valves, Aire Relief Valves: MacLean Highline 10" round w/ "irrigation main" labeled on inside of lid.
C. Backflow Preventer: McLean Highline Jumbo with w/ double valve box assembly.
D. Valve Box Lid Color: Green at lawns; Brown at Plant Beds.
E. Drainage Backfill at Manual Drain Valves: (1) cu. foot cleaned ¾"-1" round rock with filter fabric surround.

PART 3- EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified on Civil Drawings.
B. Provide minimum cover over top of underground piping according to the following:
   1. Irrigation Main Piping: Minimum depth of 24" below finished grade to top of pipe.
   2. Circuit Piping: Minimum depth of 18" below finished grade to top of pipe.
   3. Sleeves: Minimum depth of 24" below finished grade to center of pipe.

3.2 WORK DAMAGED BY CONSTRUCTION

A. Replace and reconnect piping and system components damaged by Construction.
B. Shift and restore irrigation heads and piping where affected by work of other Sections.

3.3 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Owner's approval before excavation.

3.4 PIPING INSTALLATION

A. Location and Arrangement:
   1. Route piping and valve boxes to avoid trees, shrubs, ground cover, and structures.
   2. If conditions differ significantly from those shown on plan, contact Architect immediately.
   3. Review layout requirements with plantings and other affected work. Contractor is responsible for ensuring irrigation equipment locations do not conflict with proposed plant locations.
B. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions and details on drawings.
C. Provide 3" sand bedding below all main line piping. Provide 3" sand bedding or clean topsoil fill below all lateral piping.
D. Provide 3" minimum debris free cover over all main and lateral line piping.
E. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
F. Install piping free of sags and bends.
G. Provide for thermal movement of components in system.
H. Install groups of pipes parallel to each other, spaced to permit valve servicing.
I. Install fittings for changes in direction and branch connections.
J. Lay piping on even bed, uniformly sloped without humps or depressions.
K. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
L. Install piping in sleeves under parking lots, roadways, and sidewalks.

3.5 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.
B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Use Teflon tape or virgin Teflon paste on all threaded joints unless dry seal threading is specified. Minimum of 4 wraps. No pipe dope.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings ac- cording to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings accord- ing to ASTM D 2855.
3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.6 VALVE INSTALLATION

A. Automatic Control Valves: Coil 30” length of control wires around ¾” pipe in box. Install plumb in valve box extending from grade to valve body. Minimum clearance from finish grade to valve top: 4 inches. Install per detail. Top of box to be flush with finished grade.

B. Program Tucor 3DLD-050 decoders with zone addresses as required.

C. Main Line Manual Drain Valves:
1. Install at main line low points.
2. Install in 10” round valve box.
3. Provide specified gravel sump.
4. Provide 4” corrugated pipe from valve box elevation to drain valve.

D. Isolation Valves:
1. Install in 10” round valve box.
2. Provide 4” corrugated pipe from valve box elevation to drain valve.

3.7 SPRINKLER INSTALLATION

A. Install sprinkler nozzles after system flushing is completed.

B. Install sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 8 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.8 CONTROL SYSTEM INSTALLATION (TO BE COORDINATED WITH OWNER AND TO USE EXISTING COMPONENTS WHERE APPLICABLE)

A. See paragraph 7.A.3 for installer qualifications to modify existing control panels.

B. School Yard Controller: Install Tucor 3D Hybrid and Rain Bird pulse transmitter
1. Program pulse transmitter appropriately for new flow sensor.

C. Controller shall connect with Owner Maxicom software. Work with Owner’s representative to program Maxicom software for operation utilizing existing CCU.

D. Final acceptance requires proper programming and commissioning of pulse transmitter, satellite channel settings and network communication and updates to Maxicom software data base. System operation from Maxicom software is required prior to final acceptance.
E. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.9 AIR RELIEF VALVES

A. Install mainline air relief per manufacturer's direction. Install within double boxed 10" round valve box per Owner's specifications.

3.10 CONNECTIONS

A. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
B. Connect wiring between controllers and automatic control valves.

3.11 GROUND RODS

A. Install per manufacturer's specifications but at a minimum:
    1. At terminal end of each wire path.
    2. At flow sensor and master valve decoder.
    3. At 500 foot intervals.
    4. At point closest to where two-wire path leaves building.
    5. Provide shop drawings indicating ground rod locations prior to installation.
    6. Install in valve box.

3.12 IDENTIFICATION

A. Provide permanent hang tags at automatic control valves indicating zone number and correlating to controller chart.
B. Provide reduced, color-coded, laminated copy of irrigation plan with valve schedule on each automatic controller.

3.13 FIELD QUALITY CONTROL

A. Tests and Inspections:
    1. Leak Test: After installation, charge system to 100 PSI and test for leaks. Pressure piping to lose no more than 4 PSI in 24 hours. Repair leaks and retest until no leaks exist.
    2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
    3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
    4. Perform coverage test of plant bed areas after plant material has been installed.
    5. Perform coverage test of lawn areas prior to seeding or sodding lawns.
B. Irrigation Site Commissioning:
    1. Set-up and verify proper communication to district's Maxicom computer.
    2. Verify required sensors are installed and calibrated.
    3. Confirm proper grounding of two-wire path.
    4. Operate flow test schedule from Maxicom at night-time hours.

5. Record and log flow volumes all zones as retrieved from item ‘4’.
6. Populate Maxicom database with flow values.
7. At final acceptance, system shall run from Maxicom remotely using smart-phone or tablet or similar.
8. Walk system to verify operation and consistency with as-built drawings.
9. Test dynamic pressure for each rotor and spray zone.
10. See Division 01 Section "Quality Requirements" for retesting and reinspecting requirements and Division 01 Section "Execution" for requirements for correcting the Work.
11. Any irrigation product will be considered defective if it does not pass tests and inspections.
12. Prepare test and inspection reports.

3.14 STARTUP SERVICE

A. Perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.
   2. Verify that controllers are installed and connected according to the Contract Documents.
   3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.15 ADJUSTING

A. Adjust settings of controllers.
B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
C. Adjust sprinklers and devices, except those intended to be mounted above ground, so they will be flush with finish grade.
D. Adjust radii and arcs of sprinklers to provide head-to-head coverage and prevent overspray onto buildings and paving.

3.16 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.17 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

END OF SECTION

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plants.
   2. Topsoil and Soil Preparation at planting areas.
   3. Seeding.

B. Related Sections:
   1. See Civil Drawings for related work.

1.2 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

D. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well- established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

E. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

F. Finish Grade: Elevation of finished surface of planting soil.

G. Planting Area: Areas to be planted.

H. Topsoil: As defined in PART 2 - PRODUCTS.

I. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

J. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

K. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of similar landscape installations.

1. According to Division 01 Section "Quality Requirements," experience qualification includes having successfully completed a minimum number of previous projects. Before retaining first two subparagraphs below for government-funded projects, verify acceptability of these requirements with Owner.
2. Experience: Five years experience in landscape installation in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

C. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site. See also: Required Inspections for Approval.

D. Preinstallation Conference: Convene onsite meeting with General Contractor, Landscape Contractor and Architect two weeks before starting work of this section, see also Irrigation Specifications. Combine and coordinate with irrigation conference per section 32 84 00.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

C. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply prod- ucts during favorable weather conditions according to manufacturer's written instructions and war- ranty requirements.

1.7 WARRANTY

A. When warranties are required, verify with Owner's counsel that special warranties stated in this article are not less than remedies available to Owner under prevailing local laws.
B. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
    1. Failures include, but are not limited to, the following:
        a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
        b. Structural failures including plantings falling or blowing over.
        c. Faulty performance of tree stabilization.
    2. Warranty Period: 1 year from Date of approved Final Completion.
    3. Include the following remedial actions as a minimum:
        a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
        b. Replace plants that are more in an unhealthy condition at end of warranty period.
        c. Provide extended warranty for period equal to original warranty period, for replaced plant material.
        d. Lawn Warranty: Include until end of specified maintenance period. Re-seed areas larger than 12 sq. inches not uniformly covered by grass over entire area.

1.8 MAINTENANCE SERVICE

A. Initial Maintenance Service for all plant materials: Provide maintenance by skilled employees of landscape installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well-established, but for not less than maintenance period below.
    1. Maintenance Period at Landscape Areas: **Maintenance service period to be for 1 year from date of substantial completion.** Service must include operation of irrigation, weed removal, mowing and clipping removal, pruning, rut filling and general plant maintenance.

1.9 REQUIRED INSPECTIONS FOR APPROVAL

A. Request visitation by the Architect 3 days minimum in advance of the following:
    1. Materials and Layout Inspection: Immediately prior to installation, place (but do not install) plant material for approval by the Architect. All materials shall be reviewed by

Architect for compliance with specifications and submittals. Layout will be approved by Architect prior to continued work.

2. Installation Inspection: At time of Substantial Completion Inspection, Architect will review installation of all work of this Section. Installation Review will not occur until completion of all planting. A punchlist will be prepared by Architect. All punchlist items must be satisfactorily completed to obtain Final Completion.
3. Warranty Inspection: Immediately prior to the expiration of the Project Warranty, review all work of this Section for compliance with requirements. Make any corrections required by these reviews.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
   1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless approved by Architect.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

2.2 SEED MIXTURES

A. Provide only current or last season's crop at manufacturer's high rate.

B. Purity: 98% by volume.

C. Germination: 92 percent.

D. Lawn Seed Mixture: Tall Fescue blend available as 'PT 301 Water Smarter' manufactured by Pro Time Lawn Seed. Phone: 1-800-345-3295.

2.3 FERTILIZER: GRANULAR OR PELLETED FERTILIZER CONSISTING OF 50 PERCENT WATER-INSOLUBLE NITROGEN, PHOSPHORUS, AND POTASSIUM IN THE FOLLOWING COMPOSITION:

A. Slow-release fertilizer compositions in subparagraphs below are examples only. Revise to suit Project. If using as a soil amendment, revise fertilizer mix to remedy deficiencies found in soil tests.

B. Composition: 16 percent nitrogen, 16 percent phosphorous, and 16 percent potassium, by weight.
C. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory

2.4 SOIL

A. Topsoil: Imported, natural, fertile, friable, topsoil loam with at least 10% humus, free from subsoils, clay, stones, lumps, roots, clods, sticks, weeds, weed seed and other foreign matter. Submit sample for approval. Available as "Processed Loam" by RiverBend Materials or approved. Topsoil to be free from horsetail.
B. Soil (growing medium) at Storm water planters: See Civil Drawings.

2.5 MULCH

A. Mulch at Plant Beds and tree mulch circles: Shredded fir bark 5/8" – ¼" diameter, free of growth or germination inhibiting ingredients. Available as premium "Bark-O-Mulch" from Rexius Forest Bi-Products or approved.
B. At Seeded Areas: Clean, seed-free hay, straw, fiber or well-composted organic material.

2.6 TREE STABILIZATION MATERIALS

A. Stakes and Guys:
    1. Upright and Guy Stakes: Rough-sawn, sound, new softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
    2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turn- buckles.
    3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted,
B. 0.106 inch in diameter.
    1. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and conditions affecting installation and performance.
    1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
    2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
    3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
    4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
    5. Verify that previous subgrade grading operations satisfactorily meet specifications and have been approved by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil- bearing water runoff or airborne dust to adjacent properties and walkways.
B. Lay out individual shrub locations according to required layout.

3.3 SOIL PLACEMENT SCHEDULE

A. At Plant Beds and Parking Lot Planting Islands:
   1. Confirm sub-grade material is acceptable to Architect before placing any fill.
   2. Fill with compacted imported topsoil to a minimum depth of 18” at plant beds and 24” at parking lot planting islands.
   3. Gravel backfill and foreign material are not permitted within 24” of finished grade. Contractor is to ensure that soil is free of gravel or foreign materials.
B. At Lawns:
   1. Confirm sub-grade material is acceptable to Architect before placing any fill.
   2. Fill with minimum 8” imported topsoil at new irrigated lawns. Fill with compacted imported top-soil to flush with adjacent finished grade or adjacent paving or curb at restored lawns. Fill to eliminate low areas, prevent puddling and provide smooth transitions to existing grades.
C. Stormwater Facilities:
   1. See Civil Engineer’s documentation for required subgrade preparation.

3.4 PLANT BED PREPARATION

A. At Plant Beds:
   1. Loosen subgrade of planting areas to a minimum depth of 8 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   2. Apply the following soil amendments and fertilizer on surface, and thoroughly blend into top 8” min. of planting soil: 3” Compost; Fertilizer at the rate of 20 lbs. per 1000 sf.
   3. Spread planting soil to a depth of 18 inches at plant beds and 24” at parking lot planters but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
   4. Spread approximately one-third the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil in two additional lifts. Compact each lift to 85%.
B. At Storm water Facilities: See Civil Engineer’s documentation.
C. At Lawns: Scarify subgrade to a depth of 6”. Remove rock, debris and vegetation.

3.5 EXCAVATION

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle or as shown on drawings. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. En- sure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
   1. Excavate two times as wide as ball diameter for rootball or container minimum or as shown in details.
   2. Excavate at least 12 inches wider than root spread.

B. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball. Retain first paragraph below if no subsoil drainage systems are indicated.

C. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

D. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.6 PLANTING

A. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

B. Balled and Burlapped Stock: Set plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades

C. Container Grown Stock: Carefully remove root ball from container without damaging root ball or plant.

D. Water thoroughly after planting.

3.7 PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape without approval of Architect.

3.8 SEEDING

A. Immediately prior to seeding, till into top 4” of soil:
   1. Fertilizer: 15 lbs. per 1000 sq. ft.
   2. Organic Material: 1 inch spread over entire area

B. Rake and drag to remove from top one inch of soil: Stones, clods, sticks and other foreign matter larger than 1 inch in any dimension; establish smooth, fine textured seed bed. Compact as necessary to prevent future settling.

C. Planting Season – Between March 15th and October 15th.

D. Do not sow immediately following rain, when ground is too dry, or during windy periods.

E. Apply half of seed in one direction and remaining at right angles to first seeding at the specified rates.

F. Lightly rake to cover seed, roll, mulch and water with a fine spray.

3.9 MULCHING

A. Mulch all plant beds and tree mulch circles to a depth of 3” minimum thickness within 24 hours after planting.
B. Where plant beds meet sidewalks or mowing edges, provide a vertical spaded edge 2” deep along edge to lock mulch in place. Provide 2” angled spaded edge where plant beds meet lawn.
C. At seeded areas: Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches.

3.10 LANDSCAPE MAINTENANCE

A. During specified maintenance period, maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
C. Grass Mowing: Mow all areas including existing lawns to remain as shown on plans for specified maintenance period. Do not attempt first mowing until grass is firmly rooted and secure in place. When grass reaches 3 inches in height, mow to 2 inches in height. Maintain grass until end of Maintenance Period or until final completion, whichever is later. Do not remove more than 1/3 of grass leaf in any mowing operation. Remove clippings from project.
D. Grass Mowing: Do not attempt first mowing until grass is firmly rooted and secure in place.

3.11 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in orderly condition.
B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
C. After installation and before Final Completion remove nursery stakes, tie tape, wire, burlap, and other debris from plant material, planting areas, and Project site.

END OF SECTION