



# **SUNSET HIGH SCHOOL STADIUM SITE IMPROVEMENTS**

## **PROJECT SPECIFICATIONS**

**MARCH 10, 2020**

PROJECT SITE:  
13840 NW CORNELL ROAD  
PORTLAND, OR 97229

BEAVERTON SCHOOL DISTRICT  
16550 SW MERLO ROAD  
BEAVERTON, OR 97003

PROJECT No. 7839

**B U G B E Y**  
**& ASSOCIATES**  
LANDSCAPE ARCHITECTURE

**PROJECT MANUAL**  
**BEAVERTON SCHOOL DISTRICT**  
**SUNSET HIGH SCHOOL STADIUM SITE IMPROVEMENTS**

MARCH 10, 2020  
Project No. 7839

Owner:

**BEAVERTON SCHOOL DISTRICT**  
BSD Facilities  
16550 SOUTHWEST MERLO ROAD  
BEAVERTON, OR 97006  
PH: 503-356-4433  
CONTACT: DOAA ELHAGGAN, CONSTRUCTION  
PROJECT MANAGER

Landscape Architect:

**BUGBEY & ASSOCIATES, LLC**  
88685 FAULHABER ROAD  
ELMIRA, OR 97437  
PH: 541-654-1513  
CONTACT: SPENCER BUGBEY, RLA



EXPIRES 02/28/2021

Civil Engineer:

**JANET TURNER ENGINEERING, LLC**  
16869 65TH AVE, #194  
LAKE OSWEGO, OR 97035  
PH: 541-510-0878  
CONTACT: JANET TURNER, P.E.

Surveyor:

**MONTOYA LAND SURVEYING, LLC**  
PO BOX 250  
BROWNSVILLE, OR 97327  
PH: 541-221-2427  
CONTACT: JAMEY MONTOYA, PLS

Electrical:

**EVANS ENGINEERING  
& CONSULTING, LLC**  
17675 SW FARMINGTON ROAD  
ALOHA, OR 97007  
PH: 503-258-7630  
CONTACT: CHARLES EVANS, P.E.

Plumbing:

**COMMERCIAL PLUMBING  
CONSULTING & DESIGN, LLC**  
18840 SW BOONES FERRY RD. #310  
TUALATIN, OR 97062  
PH: 503-843-8233 X 1001  
CONTACT: SHANE FITZPATRICK

Structural:

**SUMMIT ENGINEERING, LLC**  
PO BOX 50322  
EUGENE, OR 97405  
PH: 503-734-6633  
CONTACT: JULIE HAVELKA, P.E.



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### **1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Work of this Contract comprises the construction Beaverton School District is proposing to re-develop an existing ball field viewing area located on the north side of the multi-use sport complex at Sunset High School, 13840 NW Cornell Rd in Portland, Oregon. The high school is located east of the ball fields. A parking lot and main entry are adjacent to the north side of the site abutting NW Cornell Road. The area currently consists of gravel surfacing with three movable metal bleachers for spectator seating behind the backstop. Behind the bleacher is a grassy area and site fencing. Located behind the metal bleacher along the first base line is the existing score box and concessions stand structure, proposed to remain.
- B. The proposed Site Improvements include the following components:
  - 1. Temporary removal and re-installation of existing bleachers.
  - 2. Replacement of existing gravel areas with hardscape improvements, pervious pavers, pervious concrete, and some asphalt repairs.
  - 3. Installation of new landscaping and lawn area.
  - 4. Fabrication and installation of new commercial grade aluminum fencing, gates and brick face columns.
  - 5. Fabrication and installation of custom metal rail fencing.
  - 6. Addition of a concrete pad and cyclone fencing for a storage area attached to the bull pen.
  - 7. Minor modifications to the score box building.
- C. The overall project site consists of approximately 7,000 square feet of hardscape and landscape improvements.

### **1.2 WORK SEQUENCE**

- A. Execute Certificate of Substantial Completion for each specific portion of Work prior to Owner's occupancy of those portions.
- B. After Owner's occupancy, Contractor shall allow:
  - 1. Access for Owner and his Personnel
  - 2. Access for Public
  - 3. Utility Systems operation

### **1.3 CONTRACTOR'S USE OF PREMISES**

- A. Except as otherwise stipulated above, Contractor will have complete and exclusive use of the Premises identified on the Drawing for the execution of the Work.
- B. Owner will be involved with other work immediately adjacent to the Project and other work that may overlap by another Contractor hired by the School District under a separate Permit. Coordinate with School District and Contractor. See Drawings

### **1.4 PRE-ORDERED PRODUCTS**

- A. None.

**1.5 OVERTIME WORK**

- A. To permit arrangements for inspections, the Contractor shall notify the Landscape Architect at least 48 hours in advance of any overtime work, including nights, weekends, and holidays. Do no overtime work, requiring inspections, without notifying Landscape Architect.
- B. The Contractor shall reimburse the Landscape Architect and Owner for any expenses incurred by them because of Contractor's overtime work.
- C. Any and all overtime work is included in bid price. No additional funds will be allocated for overtime work.

**1.6 PROTECTING EXISTING UTILITIES**

- A. Drawings indicate approximate location of any known, concealed Utility Lines. Before starting work, Contractor shall determine exact location of any of these Lines that could be damaged by Contract Work.
- B. Contractor shall assume that other unknown Utility Lines do exist, and Contractor shall proceed with caution when working in areas that could conceal unknown Utilities. If such Utility Lines are encountered, immediately request disposition instructions from Landscape Architect.
- C. If Utility Lines are damaged, remove, repair, or replace Lines as directed. Additional compensation and/or extensions of time, if any, caused by removing, repairing, or replacing Lines will be determined in accordance with General Conditions.

**1.7 EXCESSIVE NOISE**

- A. Do not make excessive noise, such as that caused by Jack Hammers, Air Compressors, Electricity Generators, Impact Hammers, or other similar Devices during the hours between 7 PM and 7 AM. or at any time during Weekends or Legal Holidays. When such noise is unavoidable, notify Owner's Representative at least 24 hours prior to such noise, and comply with Owner's instructions.

**1.8 OFFENSIVE ODORS**

- A. Do not use offensive smelling Compounds. When such Odors are unavoidable, exhaust Odors directly to out-of-doors.

**1.9 RESPONSE TIME FOR CORRECTING NON-COMPLYING WORK**

- A. Contractor's response to notice of Work to be Corrected shall be accomplished during the following time periods:
  - 1. Emergency Work:
    - a. Failures or deficiencies constituting immediate danger or health hazard to People or likely damage to Property.
    - b. Response Time: 24 hours per day 7 days per week



**1.10 RESPONSE TIME FOR CORRECTING NON-COMPLYING WORK (CONT)**

2. Urgent Work:
  - a. Failures or deficiencies which do not immediately endanger Persons or Property but would soon do so if not corrected.
  - b. Response Time: Between 7:00 AM & 4:00 PM on Mondays thru Fridays and within 3 calendar days following receipt of Notice.
3. Routine Work:
  - a. Failures or deficiencies of less importance that do not meet criteria of Emergency or Urgent Work.
  - b. Response Time: Between 7:00 AM & 4:00 PM on Mondays thru Fridays and within 5 calendar days following receipt of Notice.

**END OF SECTION**

**1.1 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Summary of Work: Section 01-11-00

**1.2 BASE BID**

- A. Includes all Work shown on Drawings or included in Specifications, excepting only that Work noted in the following Alternate Bids, and that Work specifically noted as excepted.

**1.3 ALTERNATE BIDS**

- A. The following Alternate Bid Bids are each identified by number and each describes basic changes to be incorporated into the Work, only when that Alternate is made part of the Work by specific provision in the Owner-Contractor Agreement.
- B. Referenced Specification Sections stipulate pertinent requirements for Products and methods to achieve the Work stipulated in the Alternate.
- C. Coordinate related Work and modify surrounding Work as required to integrate the Work of the Alternate, and to provide complete construction required by Contract Documents.
- D. **Alternate Bid No. 1:** In lieu of painting only the new siding on the Concession Stand to match existing, as indicated on Drawings, paint the entire Concession Stand and Trim.
1. Existing Colors:
    - a. Body Color of Concession: Rodda 8466 Starlight CoverCoat Velvet
    - b. Door: Rodda 8463 Rockvale UIIL/G
    - c. Roll-up Door: Rodda Sunset Purple CH2G935 UIIL/G
  2. Entire Building color for repainting:
    - a. Body Color of Concession: Rodda 8466 Starlight CoverCoat Velvet

**END OF SECTION**

**1.1 RESPONSIBLE PARTIES**

- A. Immediately following Contract execution, Owner will and Contractor shall identify who, within their respective organizations, will be responsible for executing Change Orders.

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Applications for Payment: Section 01-29-50
- B. Construction Progress Schedules: Section 01-32-00
- C. Product Substitutions: Section 01-63-00
- D. Contract Closeout: Section 01-77-00
- E. Project Record Documents: Section 01-82-00

**1.3 DEFINITIONS**

- A. Proposal Request:
  - 1. Means request from Owner or Landscape Architect to Contractor for changes to Contract Sum and/or Contract Time for proposed changes to the Work.
- B. Change Order:
  - 1. See General Conditions.
- C. Construction Change Directive:
  - 1. Means written order to Contractor, executed on AIA Form G714 or other similar form designated by the Owner, and signed by Owner and Landscape Architect, which amends Contract Documents as described, and authorizes Contractor to proceed with change affecting Contract Sum and/or Contract Time, for inclusion in subsequent Change Order.
- D. Landscape Architect's Supplementary Instructions:
  - 1. Means written order, instruction, or interpretation to Contractor, executed on AIA Form G710 or other similar form designated by Landscape Architect or Owner and signed by Landscape Architect, which authorizes minor changes in Work not altering Contract Sum and/or Contract Time.

**1.4 OWNER OR LANDSCAPE ARCHITECT INITIATED CHANGES**

- A. Requests will include:
  - 1. Detailed description of change, including change location and products.
  - 2. Supplementary or revised Drawings and Specifications.
  - 3. When appropriate, projected time span for making change, and specific statement as to whether or not Overtime Work is authorized.
  - 4. When appropriate, specific time period during which requested price will be considered valid.
- B. Such request is for information only and is not an instruction or authorization to execute the change or an order to stop Work in progress.

**1.5 CONTRACTOR INITIATED CHANGES**

- A. Requests shall include:
1. Description of proposed change
  2. Statement of reason for making change
  3. Statement of effect upon Contract Sum and Contract Time
  4. Statement of effect upon Building Permit.
  5. Documentation supporting any change to Contract Sum and/or Contract Time

**1.6 CONSTRUCTION CHANGE DIRECTIVE**

- A. In lieu of Proposal Request, Landscape Architect may issue Construction Change Directive for Contractor to proceed with change for subsequent inclusion in future Change Order.
- B. Directive will describe Work changes with attachments of revised Contract Documents defining details of change and designating any changes in Contract Sum and/or Contract Time.
- C. Owner and Landscape Architect will sign and date Construction Change Directive as authorization for Contractor to proceed with changes.
- D. Contractor shall, if he concurs, sign and date Construction Change Directive to indicate agreement with specified terms.

**1.7 DOCUMENTATION OF PROPOSALS & CLAIMS**

- A. Support quotation for each Unit Price Proposal, which has not been previously established, and each Lump Sum Proposal with sufficient substantiating data to allow Landscape Architect and Owner to evaluate quotation.
- B. When requested by Landscape Architect, submit the following Cost and Time data:
1. Labor required.
  2. Equipment required.
  3. Products required:
    - a. Quantity required.
    - b. Purchase source.
    - c. Unit cost.
  4. Taxes, Insurance, & Bonds.
  5. Credit for deleted Work, similarly documented.
  6. Overhead and Profit.
  7. Justification for any change in Contract Time.
- C. Support each claim for additional cost, and for Work performed on time-and-material / force-account basis with documentation as required for lump-sum proposal, plus the following information:
1. Name of Owner's authorized Agent who ordered Work, and date of Order.
  2. Dates and time of Work performed, and by whom.
  3. Time Records, including summary of hours worked, and hourly rates paid
  4. Receipts and Invoices for the following:
    - a. Equipment used, including dates and time of use.
    - b. Products used, including quantities.
    - c. Subcontracts.
- D. Document requests for Product substitutions as specified in Section 01-63-00.

**1.8 PREPARATION OF CHANGE ORDERS**

- A. Landscape Architect will prepare each Change Order.
- B. Change Order Form: AIA Document G701
- C. Change Order will describe Work changes with attachments of any revised Contract Documents, which define Change details.
- D. Change Order will adjust Contract Sum and/or Contract Time.

**1.9 LUMP-SUM/FIXED PRICE CHANGE ORDERS**

- A. Change Order contents will be based on, either:
  - 1. Landscape Architect's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
  - 2. Contractor's Change Proposal as recommended by Landscape Architect, and as mutually agreed between Owner and Contractor.
- B. Owner and Landscape Architect will sign and date Change Order as authorization for Contractor to proceed with Changes.
- C. Contractor shall sign and date Change Order to indicate agreement with specified terms.

**1.10 UNIT PRICE CHANGE ORDERS**

- A. Change Order contents will be based on either:
  - 1. Landscape Architect's definition of required changes
  - 2. Contractor's Change Proposal as recommended by Landscape Architect
  - 3. Survey of completed work
- B. Unit Price amounts shall be either:
  - 1. Those stated in Agreement, if any.
  - 2. Those mutually agreed upon between Owner and Contractor
- C. When quantities of Items affected by Change Order can be determined prior to start of Work:
  - 1. Owner and Landscape Architect will sign and date Change Order as authorization for Contractor to proceed with changes.
  - 2. Contractor shall sign and date Change Order to indicate agreement with specified terms.
- D. When quantities of Items affected by Change Order cannot be determined prior to start of Work:
  - 1. Landscape Architect or Owner will issue Construction Change Authorization directing Contractor to proceed with change on basis of unit prices and will cite applicable unit prices.
  - 2. Contractor shall submit documentation to establish quantities of units of each Item and any claim for change in Contract Time.
  - 3. At change completion, Landscape Architect and Owner will determine Work cost based upon agreed unit prices and quantities used.
  - 4. Owner and Contractor will sign and date Change Order to indicate their agreement with specified terms.

**1.11 TIME & MATERIAL & FORCE ACCOUNT CHANGE ORDERS**

- A. Landscape Architect and Owner will issue Construction Change Authorization directing Contractor to proceed with changes.
- B. At Change completion, Contractor shall submit itemized accounting of change with supporting data as specified above in "Documentation of Proposals and Claims".
- C. Landscape Architect will determine allowable cost of such Work, as provided in Contract Conditions.
- D. Landscape Architect will sign and date Change Order to establish change in Contract Sum and/or Contract Time.
- E. Owner and Contractor will sign and date Change Order to indicate their agreement with specified terms.

**1.12 CORRELATING CHANGE ORDERS WITH CONTRACTOR'S OTHER SUBMITTALS**

- A. Revise Schedule of Values and subsequent Request for Payment Forms to record each Change as separate item of Work, and to record adjusted Contract Sum.
- B. Revise Construction Schedule to reflect each change in Contract Time.
- C. Revise Sub-schedules to show changes for other items of Work affected by Changes.
- D. Upon completion of Change Order Work, record Changes in Record Documents.

**END OF SECTION**

**1.1 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Summary of Work: Section 01-11-00
- B. Change Order Procedures: Section 01-25-00
- C. Payment Application Procedures: Section 01-29-50

**1.2 SCHEDULE FORMAT**

- A. Type Schedule on AIA Document G-703, Application for Payment, Continuation Sheet.
- B. Forms can be ordered from:
  - 1. Portland Chapter AIA; 403 NW 11<sup>th</sup> Ave; Portland, OR 97209; (503) 223-8757
  - 2. American Institute of Architects; Box 60; Williston, VT 05495; (800) 365-2724
- C. Additionally, Document can be ordered from American Institute of Architects at:
  - 1. <http://documentsondemand.aia.org/>

**1.3 SCHEDULE HEADINGS**

- A. Identify each major Work Item by number and title matching those listed in Table of Contents of this Project Manual.
- B. Coordinate Headings with Construction Progress Schedule.

**1.4 CONTENT**

- A. As basis for computing Progress Payment values, separately list installed value of each of the following:
  - 1. Each major Work Item
  - 2. Each subcontracted Work Item. For each major Subcontract, list products and operations of that Subcontract as separate Line Items.
  - 3. Any Products to be stored, for which separate payments will be requested.
- B. Include directly proportional amount of Contractor's Overhead and Profit in each Component Listing.
- C. Round off Values to nearest Dollar.
- D. Sum of Values listed shall equal total Contract Sum.

**1.5 SUBMITTAL REQUIREMENTS**

- A. Submit electronic copy of Schedule at least 15 days prior to first Application for Payment.
  - 1. Using e-Builder project management system
- B. Form and content shall be acceptable to Landscape Architect.

**1.6 SUBSTANTIATING DATA**

- A. When requested by Landscape Architect, submit Substantiating Data on Line Item Amounts in question.

**END OF SECTION**

**1.1 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Schedule of Values: Section 01-29-00
- B. Contract Closeout: Section 01-77-00

**1.2 FORMAT & DATA REQUIRED**

- A. Submit itemized applications typed on AIA Document G702, Application and Certificate for Payment, together with Continuation Sheets AIA Document G703.
- B. Forms can be ordered from:
  - 1. Portland Chapter AIA; 403 NW 11<sup>th</sup> Ave; Portland, OR 97209; (503) 223-8757
  - 2. American Institute of Architects; Box 60; Williston, VT 05495; (800) 365-2724
- C. Additionally, Document can be ordered from American Institute of Architects at:
  - 1. <http://documentsondemand.aia.org/>

**1.3 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT**

- A. Application Form:
  - 1. Fill in required information.
  - 2. Fill in summary of dollar values to agree with respective totals indicated on Continuation Sheets.
  - 3. Execute certification with signature of responsible officer of Contracting Firm.
- B. Continuation Sheets:
  - 1. Identify each major item of Work by number and title matching those listed in Table of Contents of this Project Manual.
  - 2. Fill in actual (not scheduled) Dollar Value for each Item.
  - 3. Fill in Dollar Value in each Column for each scheduled Line Item when Work has been performed or Products stored.
  - 4. Round off Values to nearest dollar.
  - 5. At end of Continuation Sheet(s), list each Change Order executed prior to Application submission. Include Change Order Number(s) and brief description.

**1.4 SUBSTANTIATING DATA**

- A. Submit, when requested by Landscape Architect, to justify Line Item amounts.

**1.5 PAYMENT FOR PRODUCTS STORED OFF THE PROJECT SITE**

- A. When delay or added cost to Owner can be avoided by storing Products off Site, Owner will make payment to Contractor for said Products provided that Contractor shall:
- B. Locate Storage Facilities within 10 miles of Project Site,
  - 1. Make Storage Facilities available for Landscape Architect's visual inspection.
  - 2. Segregate and label Stored Products for specified Project.
  - 3. Assume all risk for loss.
  - 4. Assume responsibility for exceeding Product "shelf life".
  - 5. Protect Stored Products and provide applicable Insurance against their damage, discoloration, and theft, naming the Owner and any Mortgagee as Additional Insureds.



**1.5 PAYMENT FOR PRODUCTS STORED OFF THE PROJECT SITE (CONT)**

6. Submit itemized Inventory and Schedule of Values for Stored Products together with Certificate of Insurance.
7. Submit payment requests to Owner as part of Contractor's regular Progress Payment Request.
8. Reimburse Owner for damages sustained if Stored Products are not delivered to Jobsite when needed.
9. Submit to Owner, with copy to Landscape Architect, a written Waiver of Lien insuring Owner against claims for unpaid Storage Costs.
10. Upon receipt of payment from Owner prepare and issue to Owner, with a copy for Landscape Architect and any Mortgagee, a Bill of Sale for Stored Products. (See required Bill of Sale Form bound hereinafter.)

**1.6 PREVAILING WAGE PAYMENT CERTIFICATION**

- A. Comply with requirements specified in Section 00-43-50.
- B. Note: If Certification is not properly submitted, Owner will retain 25% of all Payments then due.

**1.7 APPLICATION SCHEDULE**

- A. On or before 24th day of month prior to the month for which payment is due:
  1. Submit Application for Payment to Landscape Architect.
- B. On or before 8th day of month following submittal of approved Application:
  1. Until Substantial Completion, Owner will pay Ninety-five Percent (95%) of value of Work acceptably performed, and of materials stored as defined in General Conditions during the previous month, as estimated by Landscape Architect.
- C. Upon execution of Certificate of Substantial Completion:
  1. Balance due under Contract will be paid, excluding Retainage Amount of at least double the estimated value of uncompleted and/or unacceptable portions of Work, or \$5,000.00, whichever is the greater amount.
- D. 30 days after final inspection and acceptance by Owner:
- E. Balance due under Contract will be paid, provided Work is then fully completed and Contract be then fully performed.

**1.8 SUBMITTAL PROCEDURE**

- A. Submit Applications for Payment to Landscape Architect at times stipulated above.
- B. Required Application Copies with each Submittal: one, using e-Builder project management system.
- C. When Landscape Architect finds Application properly completed and correct, he will transmit Certificate for Payment to Owner, with copy to Contractor.

**END OF SECTION**

**1.1 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Summary of Work: Section 01-11-00
- B. Project Meetings: Section 01-31-50
- C. Progress Schedules: Section 01-32-00
- D. Shop Drawings, Product Data, & Samples: Section 01-33-00
- E. Temporary Facilities: Section 01-50-00
- F. Cutting & Patching: Section 01-73-00
- G. Cleaning: Section 01-74-00
- H. Contract Closeout: Section 01-77-00

**1.2 CONSTRUCTION ORGANIZATION & START-UP**

- A. Establish on-site Lines of Authority and Communications including the following:
  - 1. Preconstruction Meeting and Progress Meetings as specified in Section 01-31-50.
  - 2. Establish procedures for Intra-project Communications including:
    - a. Submittals
    - b. Reports & Records
    - c. Recommendations
    - d. Coordination Drawings
    - e. Schedules
    - f. Resolution of Conflicts
  - 3. Contract Documents Interpretation:
    - a. Consult with Landscape Architect to obtain interpretation
    - b. Assist in resolution of questions or conflicts which may arise
    - c. Transmit written interpretations to Subcontractors and to other concerned parties
  - 4. Permits & Approvals:
    - a. Verify that Subcontractors have obtained required Permits and Inspections for Work and for Temporary Facilities.
  - 5. Control use of Site:
    - a. Supervise Field Engineering and Project Layout.
    - b. Allocate Field Office Space and Work and Storage Areas for use of each Subcontractor.

**1.3 COORDINATING SUBCONTRACTORS' WORK**

- A. Coordinate the Work of all Subcontractors and make certain that, where the Work of one Trade is dependent upon the Work of another Trade, the Work first installed is properly placed, installed, aligned, and finished as specified or required to properly receive subsequent Materials applied or attached thereto.
- B. Direct Subcontractors to correct defects in Substrates they install when Subcontractors of subsequent Materials have a reasonable and justifiable objection to such surfaces.
- C. Do not force Subcontractors to apply or install Product over improperly installed or improperly finished Substrate that would result in an unsatisfactory or unacceptable finished Product.

**1.4 COORDINATING WORK WITH OWNER'S WORK**

- A. Coordinate, and make certain that, where Work of either party is dependent upon the other party, the Work first performed is properly placed, installed, aligned, and finished as required to permit the proper installation of the following Work.
- B. If the Owner's Work in any way interferes with the Contractor's Work, so notify the Owner sufficiently in advance so that the Owner has reasonable time to make necessary adjustments.
- C. If the Contractor's Work in any way interferes with the Owner's Work, so notify the Owner as soon as possible. If the Contractor's Work must be modified to accommodate the Owner's Work, the Contract Sum and/or the Contract Time will, when necessary, be adjusted by a Change Order.

**1.5 CLOSE-OUT DUTIES**

- A. Equipment start-up:
  - 1. Comply with requirements specified in Section 01-75-00.
- B. At completion of Work of each Subcontract, conduct inspection to assure that:
  - 1. Work is acceptable.
  - 2. Specified cleaning has been accomplished.
  - 3. Temporary Facilities and Debris have been removed from Site.
- C. Substantial Completion:
  - 1. Conduct inspection and prepare list of Work to be completed or corrected.
  - 2. Assist Landscape Architect in inspection.
  - 3. Supervise correction and completion of Work as established in Landscape Architect's Inspection Reports.
- D. Final Completion:
  - 1. Assist Landscape Architect in inspection.
  - 2. Comply with requirements specified in Section 01-77-00.
- E. Close-out Process:
  - 1. Follow Beaverton School District's close out procedures in e-builder CLOP process.

**END OF SECTION**

**1.1 GENERAL**

- A. This Section establishes procedures with respect to transmission or exchange of Digital Data for this Project. If and where these provisions conflict with any provisions in the Owner-Contractor Agreement, the provisions in the Agreement will prevail.
- B. All parties will use e-Build project management system for exchange of all communications and documents.

**1.2 DEFINITIONS**

- A. **Digital Data** means information, communications, drawings, or designs created or stored for the Project in digital form.
- B. **Confidential Information** means Digital Data that the transmitting party has designated as confidential and clearly marked with an indication such as “Confidential” or “Business Proprietary”.
- C. In addition, any definition included in the Agreement, **Written** or **In Writing** means any written communication sent by digital transmission that permits the recipient to print or store the communication. Communications transmitted electronically as specified herein are presumed received.

**1.3 ACCURACY OF LANDSCAPE ARCHITECT’S DIGITALLY - TRANSMITTED DRAWINGS**

- A. To the best of the Landscape Architect’s knowledge, belief, and understanding the transmitted information is accurate, however the Landscape Architect makes the Data available as a convenience to the Contractor, and the Landscape Architect does not guarantee the accuracy of the Drawings or the Dimensions thereon. The Contractor shall verify the accuracy of the furnished information.
- B. Prior transmitting any Drawings, the Landscape Architect will require the Contractor to sign a Written Release that the Contractor agrees with the above conditions.

**1.4 DIGITAL DATA TRANSMISSION**

- A. The transmission of Digital Data constitutes a warranty by the transmitting party to the receiving party that the transmitting party (1) is the copyright owner of the Digital Data, (2) has permission from the copyright owner to transmit the Digital Data for its use on the Project, or (3) is authorized to transmit the Confidential Information.
- B. The receiving party agrees to keep Confidential Information strictly confidential and not to disclose it to any other person except to (1) its employees, (2) those who need to know the content of the Confidential Information in order to perform services or construction solely and exclusively for the Project, or (3) its consultants and contractors whose contracts include similar restrictions on the use of Confidential Information.
- C. The transmitting party does not convey any right in the Digital Data or in the software used to generate the data. The receiving party may not use the Digital Data unless permission to do so is provided in the Agreement, other documents incorporated by reference in the Agreement, such as the General Conditions of the Contract for Construction, or in any separate license.

**1.4 DIGITAL DATA TRANSMISSION (Cont)**

- D. Unless otherwise granted in a separate license, the receiving party's use, modification, or further transmission of the Digital Data, is specifically limited to the design and construction of the Project, and nothing contained in this Section conveys any other right to the use of the Digital Data for another purpose.
- E. To the furthest extent permitted by law, the receiving party shall indemnify and defend the transmitting party from any and all claims arising from or related to the receiving party's modification to, or unlicensed use of, the Digital Data.

**END OF SECTION**

## **1.1 GENERAL**

- A. Pre-construction Meeting:
  - 1. Owner's Representative will:
    - a. Schedule Meeting
    - b. Make physical arrangements for Meeting
    - c. Prepare Meeting Agenda
    - d. Preside at Meeting
    - e. Record, reproduce, and distribute copies of Minutes to:
      - 1. Meeting participants
      - 2. Parties affected by decisions made at Meeting
- B. Periodic Progress Meetings and specially called Meetings throughout the progress of the Work:
  - 1. Contractor shall:
    - a. Prepare Meeting agenda
    - b. Distribute Notice of each Meeting four days in advance of Meeting date
    - c. Make physical arrangements for Meetings
    - d. Preside at Meetings
    - e. Record Meeting minutes, including significant proceedings and decisions.
    - f. Reproduce and distribute copies of Minutes within 3 days after each Meeting to each of the following:
      - 1. All Meeting participants
      - 2. All parties affected by decisions made at Meeting
      - 3. Landscape Architect
      - 4. Owner's Representative
  - 2. Representatives of Contractor, Subcontractors, and Suppliers attending Meetings shall be qualified and authorized to act on behalf of entity each represents.
  - 3. Contractor to identify and schedule appropriate Job Site meetings to coincide with the 6 site visits by the Civil Engineer.
  - 4. Landscape Architect, Landscape Architect's Professional Consultants, and Owner's Representative may attend Meetings to ascertain that Work is executed consistent with Contract Documents and Construction Schedules.

## **1.2 PRE-CONSTRUCTION MEETING**

- A. Schedule within 15 days after date of Notice to Proceed.
- B. Location: Central site, convenient for all parties, designated by Owner's Representative.
- C. Required Attendance:
  - 1. Owner's Representative
  - 2. Landscape Architect and Landscape Architect's Professional Consultants
  - 3. Contractor's Superintendent
  - 4. Major Subcontractors
  - 5. Major Suppliers
  - 6. Others as appropriate
- D. Minimum Agenda:
  - 1. Identify Owner's & Contractor's authorized Representatives
  - 2. Distribution and discussion of:
    - a. List of major Subcontractors and Suppliers
    - b. Projected Construction Schedules
  - 3. Critical work sequencing
  - 4. Major Equipment deliveries and priorities

**1.2 PRE-CONSTRUCTION MEETING (CONT)**

5. Project coordination
6. Designation of responsible personnel
7. Procedures and processing of:
  - a. Field decisions
  - b. Proposal requests
  - c. Submittals
  - d. Change Orders
  - e. Applications for Payment
8. Adequacy of Contract Documents distribution
9. Procedures for maintaining Record Documents
10. Use of premises:
  - a. Office, Staging, Storage, and Work areas.
  - b. Owner's requirements
11. Construction Facilities, Controls, and Construction Aids.
12. Temporary Utilities
13. Safety and First-aid procedures
14. Hazardous Materials
15. Security procedures
16. Housekeeping procedures
17. Product recycling & Waste management
18. Laboratory Testing Services
19. Contract Closeout & Commissioning requirements
20. Beaverton School District background check requirements

**1.3 PROGRESS MEETINGS**

- A. Meetings shall be held at the Jobsite to coordinate the Work, answer questions, and resolve problems.
- B. The following shall attend:
  1. General Contractor's Superintendent
  2. Mechanical Contractor's Superintendent
  3. Electrical Contractor's Superintendent
  4. Landscape Architect's Representative
  5. Owner's Representative.
  6. Progress schedule during succeeding work period.
  7. Coordination of schedules
  8. Review submittal schedules; expedite as required.
  9. Maintenance of quality standards
  10. Pending changes and substitutions
  11. Record Documents status
  12. Review proposed changes for :
    - a. Effect on Construction Schedule and on completion date
  13. Other business

**1.4 PRE-INSTALLATION CONFERENCES**

- A. When specified in individual Specification Section, convene Pre-installation Conference at Project site prior to commencing work.
- B. Require attendance of those specified.
- C. Notify Landscape Architect and Owner at least 4 days in advance of meeting date.
- D. Prepare Agenda, preside at Conference, and record and distribute Conference Minutes with copy to Landscape Architect.
- E. Minimum Agenda:
  - 1. Contract Documents
  - 2. Options
  - 3. Related Change Orders
  - 4. Products purchase, delivery, storage, & handling.
  - 5. Shop Drawings, Product Data, & Samples, when required.
  - 6. Compatibility of Products
  - 7. Possible conflicts
  - 8. Effects of Work on Progress Schedule
  - 9. Weather limitations
  - 10. Manufacturer's instructions and recommendations
  - 11. Acceptability of Substrate
  - 12. Temporary Facilities
  - 13. Workspace and access
  - 14. Governing regulations
  - 15. Safety
  - 16. Inspection and testing requirements
  - 17. Maintenance requirements
  - 18. Protection

**END OF SECTION**



**1.1 GENERAL**

- A. Prepare and submit to Landscape Architect estimated Progress Schedules for the Work, with Sub-schedules of Related Activities which are essential to its progress.
- B. Revise Schedules when appropriate.
- C. If Contractor fails to deliver Schedule on time or properly update Schedule, Landscape Architect may withhold Progress Payment approval until such time as Contractor complies with these requirements.
- D. If, in Landscape Architect's opinion, Work progress falls behind approved Schedule, Contractor shall take necessary action to regain lost time. Contractor shall increase Work amount, or number of shifts, or establish overtime operations, or all three, and submit for review Schedule revisions in which progress rate will be regained, all without additional cost to the Owner.
- E. Contractor's failure to comply with these requirements shall be grounds for determination that Contractor is not prosecuting Work with such diligence as will insure Project completion within specified time. Upon such determination Owner may terminate Contractor's right to proceed with Work, or any separable part thereof, in accordance with General Conditions.
- F. The Contractor and all Subcontractors, Suppliers, and Manufacturers shall schedule material deliveries and installations to conform to the Schedule, and provisions to this effect shall be included in all Subcontracts.

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Summary of Work: Section 01-11-00
- B. Project Meetings: Section 01-31-50
- C. Shop Drawings, Product Data, & Samples: Section 01-33-00

**1.3 SCHEDULES**

- A. Form: Critical Path Network Analysis complying with Associated General Contractors (AGC) publication "The Use of CPM in Construction A Manual for General Contractors and the Construction Industry".
- B. Horizontal Time Scale: Identify first Workday of each Week.
- C. Scale and Spacing: Allow space for notations and future revisions.
- D. Headings: Include separate heading for each Specification Section Title and Section Number listed in Project Manual Table of Contents.

**1.4 SCHEDULER'S QUALIFICATIONS**

- A. Contractor's Personnel or Outside Consultant specializing in CPM Scheduling with at least 1 year's experience scheduling work similar to this Project, having use of Computer Facilities capable of delivering Readout within 48 hours.

**1.5 SCHEDULE CONTENTS:**

- A. Show complete sequence of construction by activity, including any Work performed by Owner.
  - 1. Show dates for beginning, and completion, of each major element of Work.

**1.5 SCHEDULE CONTENTS(CONT)**

- B. Submittal Schedule for Shop Drawings, Product Data, and Samples:
  - 1. Show dates for Contractor's submittals.
- C. Products Delivery Schedule:

**1.6 SCHEDULE REVISIONS**

- A. Indicate progress of each Activity up to date of each Schedule submission.
- B. Show changes occurring since previous Schedule submission, including the following:
  - 1. Major changes in scope
  - 2. Activities modified since previous submission
  - 3. Revised projections of progress and completion
  - 4. Other identifiable changes
- C. Provide a Narrative Report as needed to define:
  - 1. Problem areas, anticipated delays, and related impact on Schedule.
  - 2. Corrective action recommended and expected effect.

**1.7 SUBMISSIONS**

- A. Submit initial Schedule within 15 days after Contract award. by or before Pre-construction Conference.
- B. Landscape Architect will review Schedules and return Review Copy within 10 days after receipt. Landscape Architect's review will be for Schedule Format and Content only, and will not include Schedule "achievability", which is Contractor's responsibility.
- C. If required, resubmit within 7 days after return of Review Copy.
- D. At each weekly Progress Meeting, submit 2-week Projected Progress Schedule, which shall include Work to be performed during current week and following week.
- E. Submit updated overall Progress Schedules with each Application for Payment.
- F. Submit electronic copy of each submission for Landscape Architect's permanent use thru e-Build project management system.

**1.8 DISTRIBUTION**

- A. Distribute copies of Schedules thru e-Build project management system to:
  - 1. Jobsite file
  - 2. Subcontractors
  - 3. Landscape Architect
  - 4. Construction Manager
  - 5. Owner's Representative
  - 6. Other concerned parties
- B. Instruct recipients to report promptly to Contractor, in writing, any problems anticipated by projections shown in Schedules.

**END OF SECTION**

### **1.1 GENERAL**

- A. Extent of Work:
  - 1. Submit Shop Drawings, Product Data, and Samples only for those Items specifically required. The Landscape Architect will not be obligated to review Shop Drawings, Product Data, or Samples other than those required by the Contract Documents.
  - 2. Incomplete Submittals will be returned without review.
- B. Related Requirements specified Elsewhere:
  - 1. Definitions, and additional requirements; see General Conditions, Section 00-70-00.
- C. Submittal Schedule:
  - 1. Designate in Construction Schedule, or in separate coordinated Schedule, submission dates and dates that reviewed Shop Drawings, Product Data, and Samples will be needed.

### **1.2 SPECIAL REQUIREMENTS**

- A. Shop Drawings:
  - 1. Identify Shop Drawing Details by reference to Drawing Sheet, Detail, Schedule, or Room Number shown on Contract Drawings.
  - 2. Sheet Size: 8-1/2 x 11 inch or folded to that size to facilitate filing.
- B. Product Data:
  - 1. Clearly mark each copy to identify pertinent Products.
  - 2. Show performance characteristics and capacities.
  - 3. Show dimensions and required clearances.
  - 4. Show wiring and piping diagrams, and controls.
  - 5. Manufacturer's standard schematic drawings and diagrams:
    - a. Modify to delete information not applicable to Work.
    - b. Supplement standard information to provide information specifically applicable to Work.
- C. Samples:
  - 1. Size & Quantity: See respective Specification Sections.
  - 2. Show full range of color, texture and pattern.
  - 3. Deliver to Landscape Architect's office, unless otherwise specified.

### **1.3 CONTRACTOR'S RESPONSIBILITIES**

- A. Review and approve Shop Drawings, Product Data, and Samples prior to submission.
- B. Determine and verify:
  - 1. Field measurements
  - 2. Product Quantities
  - 3. Field construction criteria
  - 4. Catalog numbers and similar data
  - 5. Conformance with Specifications
- C. Comply with Contract Documents.
- D. Coordinate each Submittal with requirements of Work.
- E. Notify Landscape Architect in writing, at submission time, of any deviations in Submittals from Contract Document requirements.
- F. Perform no Work or Fabrication requiring Submittal until Landscape Architect approves Submittal.

#### **1.4 SUBMISSION REQUIREMENTS**

- A. Including attached Submittal Transmittal (CSI Form 12.1A), make submittals promptly in accordance with approved Progress Schedule, and in such sequence as to cause no Work delay.
- B. Quantity of submittals required:
  - 1. Shop Drawings:
  - 2. Catalog numbers and similar data
  - 3. Conformance with Specifications
- C. Comply with Contract Documents.
- D. Use e-Build project management system for all submittals.
- E. Coordinate each Submittal with requirements of Work.
- F. Notify Landscape Architect in writing, at submission time, of any deviations in Submittals from Contract Document requirements.
- G. Perform no Work or Fabrication requiring Submittal until Landscape Architect approves Submittal.

#### **1.5 SUBMITTAL REQUIREMENTS**

- A. Including attached Submittal Transmittal (CSI Form 12.1A), make submittals promptly in accordance with approved Progress Schedule, and in such sequence as to cause no Work delay.
- B. Quantity of submittals required:
  - 1. Shop Drawings:
    - a. Landscape Architecture, Structural, Mechanical, and Electrical Work: Submit electronic to Landscape Architect.
    - b. Landscape Architect will return electronic copy to Contractor with comments and corrections.
    - c. Contractor shall resubmit copy of corrected Drawings for Landscape Architect's permanent files, plus copy to Landscape Architect's Consultants when applicable.
  - 2. Product Data:
    - a. General:
      - 1. Include Manufacturer's detailed specifications and data sheets which describe Products. Cross-out any information that does not relate to this Project. Identify any deviations from requirements specified in Contract Documents.
    - b. Submit electronic copy to Landscape Architect.
    - c. Mechanical & Electrical Products:
      - 1. Submit electronic copy directly to appropriate Engineer, plus copy to Landscape Architect.
  - 3. Samples:
    - a. Submit as stipulated in respective Specification Section.
- C. Submittals shall contain:
  - 1. Project Title and names of Contractor, Supplier, and Manufacturer, all visible on outside of Submittal.
  - 2. Product identification complete with Specification Section number.
  - 3. Field measurements clearly identified as such.
  - 4. Applicable Standards, such as ASTM or Federal Specification numbers.
  - 5. Identification of deviations from Contract Documents.
  - 6. Identification of resubmittal revisions

**1.5 SUBMITTAL REQUIREMENTS (CONT)**

7. Contractor's Stamp, signed and certifying that Products, field measurements, field construction criteria, and information submitted has been reviewed and accepted by Contractor as accurate and conforming with Contract Documents. Submittals not bearing Contractor's signed Approval Stamp will be returned unreviewed.
8. At least 6x8 inch space on each page for Landscape Landscape Landscape Landscape Architect's Approval Stamp.

**1.6 RESUBMISSION REQUIREMENTS**

- A. Make any corrections or changes in submittals required by Landscape Architect and resubmit until approved.
- B. Shop Drawings and Product Data:
  1. Revise initial drawings or data and resubmit as specified for initial submittal.
  2. Identify any changes made other than those requested by Landscape Architect.
- C. Samples:
  1. Submit new samples as required for initial submittal.

**1.7 LANDSCAPE ARCHITECT'S RESPONSIBILITIES**

- A. Review submittals with reasonable promptness.
- B. Affix signature and indicate approval, or requirements for resubmittal.
- C. Return submittals to Contractor for distribution, or resubmission.

**END OF SECTION**

**1.1 RELATED SECTIONS**

- A. Testing Laboratory Services: Section 01-45-30

**1.2 EXTENT OF WORK**

- A. Contractor shall implement and maintain aggressive Quality Control Program conforming to the following requirements:
1. Monitor quality of all Work, including that of Subcontractors and Service Providers, to ensure that Work complies with Contract Documents.
  2. Include compliance with currently approved Progress Schedule.
  3. Include continuing inspections of Work.
- B. Responsibilities include, but are not limited to the following:
1. Prior to submission to Landscape Architect, and in compliance with requirements specified in Section 01-33-00, review and approve Shop Drawings, Product Data, and Samples for compliance with Contract Documents.
  2. Prior to starting Work, review appropriate Contract Drawings & Specifications, Shop Drawings, Product Data, Samples, and Contract Modifications, as well as affected Existing Conditions.
  3. Work closely and cooperate with Landscape Architect, attend required Meetings, and execute decisions reached by Landscape Architect.
  4. Assign and maintain at Jobsite, Supervisory Personnel acceptable to Owner, who have authority to act in Contractor's behalf at all times Work is being performed, including any Overtime Periods.
  5. Schedule and coordinate inspections and tests with Regulatory Agency Inspectors and with Testing Agency Personnel.
  6. Submit to Landscape Architect, Construction Manager, and Owner's Representative signed Reports of Inspections and Tests made by Building Officials, Special Inspectors, and any others performing inspections or tests.
  7. Schedule and coordinate required Pre-Installation Conferences.
  8. Assure that Record Documents, including those prepared by Subcontractors, are accurately maintained and up to date.
  9. Schedule and coordinate specified System and Equipment demonstrations and training sessions for Owner's Personnel.
  10. Make final inspections with Subcontractors of all Work to determine that Work is in compliance with Contract Documents. Prior to calling for Landscape Architect's, Construction Manager's, and Owner's Substantial Completion and Final Inspections, verify that Work deficiencies discovered during Contractor's inspections have been satisfactorily corrected.
  11. Unless otherwise directed, accompany Landscape Architect, Construction Manager, and Owner during Landscape Architect's their inspections.
  12. Coordinate final closeout procedures, including those of Subcontractors, to assure compliance with procedures specified in Section 01-77-00.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 COSTS**

- A. Paid by Owner:
- B. For Testing Laboratory services specified in this Section.
  - 1. For Code-required Special Inspections of Structural Foundations, Masonry, Welding, Bolting, Epoxy Anchoring, and Concrete Placing.
- C. Paid by Contractor:
  - 1. The Contractor shall pay for retesting required because of defective Work or ill-timed notices, and for re-inspections.

**1.2 LABORATORY'S QUALIFICATIONS**

- A. Independent Laboratory acceptable to Landscape Architect, Owner and Building Official.
- B. Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition, published by American Council of Independent Laboratories; 1725 K Street, N.W.; Washington, D.C. 20036.
- C. Meet ASTM E-329 latest edition, "Standards of Recommended Practice for Inspection and Testing agencies for Concrete and Steel as used in Construction".

**1.3 LABORATORY'S DUTIES**

- A. Provide qualified Personnel for specified inspections, sampling, and testing.
- B. Ascertain and certify compliance with Contract Documents.
- C. When requested by Landscape Architect, provide interpretation of Test results.
- D. Promptly submit written Inspection & Test Reports to:
  - 1. Owner's Representative
  - 2. Building Official
  - 3. Contractor
  - 4. Landscape Architect
- E. Include the following in Test Reports:
  - 1. Date issued
  - 2. Project title, location, and Building Permit number.
  - 3. Testing Laboratory name and address
  - 4. Inspector's name
  - 5. Date of inspection or sampling
  - 6. Record of temperature and weather
  - 7. Date of test
  - 8. Identification of Product tested
  - 9. Test location in Project
  - 10. Type of inspection or test
  - 11. Observations regarding compliance with Contract Documents
- F. Laboratory is not authorized to:
  - 1. Release, revoke, alter, or enlarge on Contract Documents requirements.
  - 2. Approve or accept any portion of Work
  - 3. Assume any duties of Contractor
  - 4. Stop Work

**PART 1 - GENERAL**

**1.4 CONTRACTOR'S RESPONSIBILITIES**

- A. Cooperate with Laboratory Personnel and provide access to Work and to Manufacturer's operations.
- B. Provide to Laboratory representative samples of materials to be tested, in required quantities.
- C. Furnish casual labor and facilities:
  - 1. For access to Work to be tested
  - 2. To obtain and handle Test Samples at Site
  - 3. To facilitate inspections and tests
  - 4. For Laboratory's exclusive use for storage and curing of Test Samples until removed to Laboratory
- D. Notify Laboratory, Owner and Landscape Architect at least 48 hours in advance of operations to allow for Personnel assignments and Test scheduling.
- E. Repair any Test Holes to match original conditions.

**1.5 LIABILITY**

- A. Laboratory service is provided for Owner's self-assurance and does not relieve Contractor's responsibility to comply with Contract Documents.

**PART 2 - DETAILED REQUIREMENTS**

**2.1 EARTHWORK DENSITY**

- A. Method: Nuclear Gauge
- B. Provide Tests for each layer of Fill and Backfill placed in any 1 day, for Pavement Beds in cuts, if any, and for any Earthwork Construction which will support Finished Surfaces or Structures.

**2.2 ASPHALT PAVEMENT**

- A. Conduct 1 test for each 20,000 sq. ft., or less, of Pavement placed in any 1 day as follows:
  - 1. Compacted Base Rock field-density using Nuclear Gauge.
  - 2. Placement Tests to determine Asphalt-Cement content, gradation of Aggregate, Voids, Temperature, and Marshall Stability of Mix.
  - 3. Finished product Core Sample to check Compaction and Voids.

**2.3 CAST IN PLACE CONCRETE**

- A. Continuous inspection during Concrete placement.
- B. Test Samples shall be taken at the following locations:
  - 1. At Pumped Concrete, if any: At Pump Hose discharge end
  - 2. At Rotary Mixer: At Mixer Chute discharge end



**PART 2 - DETAILED REQUIREMENTS**

**2.3 CAST IN PLACE CONCRETE (CONT)**

- C. Test Concrete Slump as follows:
  - 1. Follow ASTM C-143 and C-172.
  - 2. Prepare tests from same batch as that employed in preparing Strength-test Specimens, unless otherwise directed.
  - 3. If Measured Slump falls outside specified limits retest immediately from another portion of same load. In event of second failure Concrete shall be considered as failing Specification requirements.
- D. Test Concrete Compressive Strength as follows:
  - 1. Follow ASTM C-31, C-39, and C-172.
  - 2. Prepare not less than 5 Test Cylinders for each 100 cu. yds. or less for each strength of Concrete cast in any 1 day.
  - 3. Test-break two Cylinders at 7 days of age, two at 28 days, and remaining Cylinder if and when directed to do so.
  - 4. If any set of two Cylinders does not develop full design strength at 28 days of age, Cores and Load-testing may be called for. All Coring and Load-testing costs shall be paid by Contractor.

**2.4 MASONRY**

- A. Mortar:
  - 1. Test Method: IBC para. 1704.5.3
  - 2. Test Specimens: Four 2 inch diameter by 4 inch long Cylinders for each 2000 sq. ft. of Masonry
  - 3. Cylinder-Breaking: 2 at 7 days of age, and unless otherwise directed, remainder at 28 days of age.
- B. Grout:
  - 1. Test Method: IBC para. 1704.5.3
  - 2. Test Specimens: 4 Cubes approximately 3x3x6 inches for each 20 cu. yds. of Grout
  - 3. Cube Breaking: 2 at 7 days of age, and unless otherwise directed, remainder at 28 days of age.

**2.5 ON-SITE WELDING**

- A. Visually monitor welding that occurs on site.
- B. Verify certification of welders
- C. Inspect for compliance with structural requirements of welds

**END OF SECTION**

**1.1 GENERAL**

- A. Comply with governing Codes and Regulations.
- B. Pay any required Fees or Easement Assessments.
- C. Enforce safe and sanitary practices.
- D. Maintain clean Facilities.
- E. Prevent interference with Owner's normal use of Owner's Facilities.
- F. Prevent wasteful Utility uses.
- G. Should Owner occupy part of Facility, Owner will pay Owner's proportional Utility cost.

**1.2 FIELD OFFICE**

- A. General:
  - 1. Provide substantial, weather-tight Office Building on Premises where directed.
  - 2. At Contractor's option, Contractor may use Portable Buildings suitable for office-use.
  - 3. Provide with Heat, Electric Light, and Janitorial Service.
  - 4. Do not use Field Office or Storage Buildings for Personnel housing.

**1.3 TEMPORARY WATER**

- A. Provide and maintain Water for the following purposes:
  - 1. Service Standpipe equipped with sufficient 3/4inch Hydrants that any Work Center can be reached with 100 ft. Extension Hose. Equip Hydrants with Backflow Prevention Devices. Each Contractor shall provide his own Extension Hoses.
- B. Drinking Water dispensed in Single-service Containers or Sanitary Fountains.
  - 1. Temporary Toilet Facilities
- C. Maintain cool as practicable, clean, and fresh.
- D. Maintain adequate volume.
- E. Protect against freezing.
  - 1. Ascertain where Water Service is available, provide required connections, and extend System to Work area.

**1.4 TEMPORARY TOILET FACILITIES**

- A. Provide Toilet and Washing Facilities in accordance with governing Regulations. Chemical Toilets equipped with Waterless Hand Cleaners will be permitted.
- B. For Enclosures accommodating more than 1 Person, provide Privacy Screens for each Toilet Fixture.
- C. If both Men and Women are working, provide separate Facilities for each sex.
- D. Maintain each Toilet with Toilet Tissue on suitable Dispenser.
- E. Remove Temporary Toilets and use Building Fixtures as soon as feasible.
- F. Where necessary, disinfect Premises after Toilet removal and restore to specified condition.
- G. Do not use Owner's existing Toilet Facilities.

**1.5 TEMPORARY BARRICADES**

- A. Provide all necessary to protect Public and Workers against injury and to protect Project against damage and unauthorized intrusion.

**1.6 TEMPORARY EXTERIOR ENCLOSURES**

- A. Provide sufficient Enclosures to prevent infiltration of Rainwater, Wind, and other Elements, and prevent undue Heat Loss from within Enclosed Area.
- B. At no additional cost to Owner, clean, repair, and, when directed, replace any Building Materials or Contents which have been damaged or discolored because of lack of enclosure.

**1.7 TEMPORARY FIRE PROTECTION**

- A. Provide and maintain necessary Facilities and Equipment to safeguard Project against Fire Damage.

**1.8 TEMPORARY FENCING**

- A. 6 ft. minimum height Chain Link Fencing where shown on Drawings.
- B. Submit to Owner 2 Keys for each Gate Lock.
- C. Comply with Building Code Section 33-03-.0

**1.9 TEMPORARY ELECTRICITY**

- A. Power:
  - 1. Electrical Subcontractor shall Provide and maintain structurally and electrically sound, Code-approved, Temporary Power Distribution System as follows:
    - a. Sufficient Load Centers that any Work Area can be reached with 100 ft. long Extension Cord. General Contractor and each Subcontractor shall provide their own grounded, UL approved Extension Cords.
    - b. Load Centers shall include:
      - 1. Weatherproof Distribution Boxes
      - 2. Circuit Breakers for each Outlet
      - 3. Equipment Grounding Continuity for entire System
      - 4. Power at proper voltage for:
        - a. Temporary Field Offices
        - b. Temporary Lighting and Power
  - 2. General Contractor and each Subcontractor shall provide their own power and distribution system for Field Welders and any other Special Power beyond that specified herein.

**1.9 TEMPORARY ELECTRICITY (CONT)**

- B. Lighting:
  - 1. Electrical Subcontractor shall Provide and maintain Temporary Lighting at least as follows:
    - a. 30 ft. candles measured 3 ft. above Floor in spaces during work. Energize permanent Lighting Fixtures prior to painting, except where Fixtures are mounted on Walls or Ceilings to be painted. Maintain from 15 minutes prior to until 15 minutes past scheduled Work hours.
    - b. 5 ft. candles measured 3 ft. above Floor where necessary to prevent damage or injury. Maintain when authorized Personnel are present. Provide Light Control Switches at Area Entrances and successive Areas so Personnel access to Project can be through lighted Areas.
- C. Power Source:
  - 1. Ascertain where Electrical Service is available, provide required connections, and extend System to Work Area.
  - 2. Power costs shall be paid by General Contractor.

**1.10 TEMPORARY VEHICLE PARKING**

- A. Maintain within Project Boundary Limits shown on Drawings.
- B. Do not obstruct existing Streets, Drives, or Walks.

**1.11 TEMPORARY STAGING & MATERIAL STORAGE SPACES**

- A. Maintain within Project Boundary Limits shown on Drawings.

**1.12 TEMPORARY FACILITIES REMOVAL**

- A. Remove Temporary Facilities at Project completion or sooner, if directed.
- B. Repair any damage resulting from Temporary Facilities, including that to existing Lawn, and other Plant Growth.

**END OF SECTION**

**1.1 REQUIREMENTS INCLUDED**

- A. Establish and maintain Project Security Program to:
  - 1. Protect Work, Stored Products, and Construction Equipment against Theft and Vandalism.
  - 2. Protect Premises against unauthorized intrusion.
- B. Protect Owner's facilities and operations at Site against Theft, Vandalism, and Damage by Contractor's Work or Workers.
- C. Comply with Owner's Security requirements to include:
  - 1. Photo ID Badges to be worn by all construction individuals on site.
  - 2. Screening of all employee's background utilizing a professional screening firm.
  - 3. Follow Beaverton School District's background check requirements ( see SOP provided by School District)

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Project Meetings: Section 01-31-50
- B. Temporary Facilities: Section 01-50-00
- C. Storage and Protection of Products: Section 01-60-00

**1.3 MAINTENANCE OF SECURITY**

- A. Initiate Security Program in compliance with Owner's System prior to Job Mobilization.
- B. Maintain Security Program throughout construction period, until Owner-occupancy or Owner-acceptance precludes the need for Contractor-security.

**END OF SECTION**

**1.1 GENERAL**

- A. Materials and Equipment incorporated into Work shall:
  - 1. Conform to applicable Specifications and Standards.
  - 2. Comply with size, make, type, and quantity specified, unless otherwise approved in writing.
- B. Manufactured and Fabricated Products:
  - 1. Manufacture like parts of duplicate units to standard sizes and gauges, and to be interchangeable.
  - 2. Two or more items of same kind shall be identical, and by same Manufacturer.
  - 3. Products shall be suitable for service conditions.
  - 4. Equipment shall comply with capacity, sizes, and dimensions shown or specified, unless otherwise approved in writing.
- C. Do not use Materials or Equipment for any purpose other than that for which designed or specified.

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Summary of Work: Section 01-11-00
- B. Shop Drawings, Product Data, & Samples: Section 01-33-00
- C. Product Substitutions: Section 01-63-00
- D. Cleaning: Section 01-74-00

**1.3 REUSE OF EXISTING MATERIALS**

- A. Unless specifically indicated or specified, do not use Materials removed from existing Building in new Work.
- B. Where existing Materials are indicated or specified for reuse:
  - 1. Use special care in removing, handling, storing, and reinstalling, to prevent damage and assure proper function in completed Work.
  - 2. Arrange for transportation, storage, and handling of Products which require off-site storage, restoration, or renovation. Pay all costs for such Work.

**1.4 CONTRACTOR'S OPTIONS**

- A. For Products specified only by Referenced Standard, select any Product meeting Standard.
- B. For Products specified by naming several Products, select anyone complying with Specifications.
- C. For Products specified by naming one or more Products and "or approved", select any one specified Product or submit request for substitution as specified below.

**1.5 QUANTITY OF PRODUCTS REQUIRED**

- A. Whenever in Specifications a Product is referred to in singular number, such reference shall include as many such Products as are shown on Drawings or are required to complete the Work.

**1.6 PRODUCTS LIST**

- A. Before Contractor's first request for payment, submit to Landscape Architect complete list of major Products proposed for use; include proprietary Product names, Manufacturer's name, and installing Subcontractor's name.

**1.7 MANUFACTURERS' INSTRUCTIONS**

- A. Perform Work in accord with Manufacturers' instructions.
- B. Do not omit preparatory or installation procedures required by Manufacturer, unless specifically modified or exempted by Contract Documents.
- C. When Contract Documents require Work to comply with Manufacturers' instructions, obtain and distribute such instructions to parties performing work including 2 copies to Landscape Architect. Maintain 1 set at jobsite during installation and until acceptance.
- D. Handle, install, connect, clean, condition, and adjust Products in strict accord with such instructions and in conformance with specified requirements.
- E. Should job conditions or specified requirements conflict with Manufacturers' instructions, consult Landscape Architect for further instructions.
- F. Do not proceed with Work without clear instructions.

**1.8 PRODUCT SUBSTITUTIONS**

- A. Refer to Section 01-63-00.

**1.9 TRANSPORTATION & HANDLING**

- A. Arrange Product deliveries in accord with Construction Progress Schedule. Coordinate to avoid conflict with work and site conditions.
- B. Deliver Products undamaged, in Manufacturer's original containers or packaging, and with legible identifying labels intact.
- C. Immediately upon delivery, inspect shipments to assure compliance with Contract Documents and approved Submittals requirements, and assure that Products are properly protected and undamaged.

**1.10 STORAGE & PROTECTION**

- A. Follow Manufacturer's instructions.
- B. Do not store Products where location could interfere with or impede Owner's use of Existing Facilities.
- C. If and when necessary, provide additional Off-site Storage as specified in Section 01-29-50.
- D. Maintain Product Identity Labels intact.
- E. Store Products subject to weather-damage in weather-tight enclosures.
- G. Maintain Storage Room temperature and humidity within ranges required by Manufacturer's instructions.
- H. Maintain reasonable protection against Product theft and vandalism.

**1.10 STORAGE & PROTECTION (CONT)**

- I. Exterior Storage:
  - 1. Store fabricated Products above ground, on blocking or skids; prevent Product damage and discoloration.
  - 2. Cover Products subject to deterioration with impervious sheet coverings; provide adequate ventilation to prevent condensation.
  - 3. Store loose Granular Materials in well-drained area on solid surface to prevent mixing with foreign matter.
- J. Inspection of Stored Products:
  - 1. Arrange Storage to permit easy access for inspection.
  - 2. Make periodic inspections of stored Products to assure that Products are maintained as specified and are free from damage, discoloration, and deterioration.
- K. Protection after Installation:
  - 1. Provide substantial Coverings as necessary to protect installed Products against damage and discoloration. Remove Covering when no longer needed.

**1.11 DAMAGED & REJECTED PRODUCTS DISPOSAL**

- A. Immediately remove from Project Site, and lawfully dispose, any Damaged or Rejected Products.

**END OF SECTION**



### **1.1 GENERAL**

- A. Wherever a Material, Article, or piece of Equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Landscape Architect, of equal substance, appearance, and function. The substituted Product shall not be purchased or installed by the Contractor without the Landscape Architect's written approval.
- B. The Landscape Architect will be sole judge of acceptability of any proposed substitution.
- C. Only approved substitutions may be used on Contract Work.
- D. Each request for substitution approval shall include:
  - 1. Identity of Product for which substitution is requested; include Specification page and paragraph number.
  - 2. Identity of substitution including complete Product description, drawings, photographs, performance and test data, and all other information necessary for evaluation.
- E. Quality comparison of proposed substitution with specified Product.
  - 1. Changes in other Work required because of substitution.
  - 2. Effect on construction progress schedule.
  - 3. Cost of proposed substitution compared with specified Product.
  - 4. Any required license fees or royalties.
  - 5. Availability of maintenance service.
  - 6. Source of replacement materials.

### **1.2 SUBSTITUTIONS DURING BIDDING PERIOD**

- A. No request for substitution approval will be considered unless written request in triplicate has been submitted on Standard Form bound hereinafter and has been received by Landscape Architect at least 5 Working Days prior to Bid opening.
- B. Requests must be e-mailed to Landscape Architect and [Contracts@beaverton.k12.or.us](mailto:Contracts@beaverton.k12.or.us) using CSI Substitution Form, attached as Section 01 63 00.1.
- C. Beaverton School District will issue Addenda prior to Bid opening listing all approved substitutions.

### **1.3 SUBSTITUTIONS AFTER CONTRACT AWARD**

- A. In accordance with General Conditions Article 3.4.2, approval will be granted only when recommended by Landscape Architect, when approved by Owner, and when:
  - 1. Specified Product cannot be delivered without Project delay, or
  - 2. Specified Product has been discontinued, or
  - 3. Specified Product has been replaced by superior Product, or
  - 4. Specified Product cannot be guaranteed as specified, or
  - 5. Specified Product will not perform properly, or
  - 6. Specified Product will not fit within designated space, or
  - 7. Specified Product does not comply with governing codes, or
  - 8. Substitution will be clearly in Owner's interest.
- B. If and when approved, Landscape Architect will issue Change Order for Owner's signature authorizing approved substitution and revising Contract Sum where appropriate.

**1.3 SUBSTITUTIONS AFTER CONTRACT AWARD (CONT)**

- C. Owner will be entitled to deduct from the Contract Sum such amounts paid to Landscape Architect for evaluating Substitution Requests after Contract award, and to make agreed-upon changes to the Drawings and Specifications made necessary by Owner's acceptance of such substitutions.

**1.4 CONTRACT COMPLIANCE**

- A. Substitution approval does not relieve Contractor from responsibility for proper execution of the Work and for compliance with other Contract requirements.

**END OF SECTION**

# SUBSTITUTION REQUEST

To: \_\_\_\_\_

Project: \_\_\_\_\_

Specified item: \_\_\_\_\_

Specifications Section No.: \_\_\_\_\_ Page No.: \_\_\_\_\_ Para. (Line) No.: \_\_\_\_\_

Proposed Substitution Item: \_\_\_\_\_

Attached Data Includes:

1. Product description, specifications, photographs, drawings, performance data, and/or test data necessary for request evaluation.
2. Description of changes to Construction Documents that proposed substitution will require for proper installation.

The Undersigned hereby certifies that the following is correct, unless otherwise modified by included attachments:

1. Proposed substitution is equivalent or superior to specified item.
2. If proposed substitution should alter project design, dimensions, or installation requirements, the Undersigned will pay for any increased costs necessitated by substitution, including costs for additional engineering, drawing, and specifying.
3. Proposed substitution will have no adverse effect upon Work of other trades, progress schedule, Code compliance, or warranty requirements.
4. Maintenance service and replacement products will be locally and readily available.

Additionally, the Undersigned hereby certifies that if this page is altered or modified, that the terms and requirements of the Contract Documents will remain unaltered or unmodified.

*(Print or type the following)*

Submitted by: \_\_\_\_\_

Signature: \_\_\_\_\_

Firm Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, & Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Date: \_\_\_\_\_

*(If submitted after Contract award):*

Contractor's Signature: \_\_\_\_\_

Owner's Signature: \_\_\_\_\_

*(For use by design professional)*

\_\_\_\_ Approved \_\_\_\_ Approved as noted

\_\_\_\_ Not approved \_\_\_\_ Received too late

By \_\_\_\_\_

Date \_\_\_\_\_

Remarks \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

October 10, 2003



Advancement  
of Construction  
Technology

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Perform all cutting, fitting, and patching, including related excavation or backfill required to complete Work, and to:
  - 1. Make Work fit properly
  - 2. Integrate with other Work
  - 3. Uncover Work for installation of ill-timed Work
  - 4. Remove and replace defective and non-conforming Work
  - 5. Remove samples of installed Work for testing
  - 6. Provide penetrations through non-structural surfaces for Mechanical and Electrical Work

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Demolition Work: Section 02-22-00

**1.3 REQUIRED SUBMITTALS**

- A. Submit written request for Cutting Approval to Landscape Architect well in advance of any cutting which affects:
  - 1. Structural integrity of any completed or existing Work
  - 2. Waterproof integrity of any weather-exposed or moisture-resistant Work
  - 3. Efficiency, operational life, maintenance, or safety of any complete or existing Work
  - 4. Visual qualities of any sight-exposed Work
- B. Request shall include:
  - 1. Project identification
  - 2. Location and description of affected Work
  - 3. Necessity for cutting or alteration
  - 4. Description of proposed Work including:
    - a. Extent of cutting, patching, alteration, or excavation.
    - b. Trades who will execute Work
    - c. Products proposed for use
    - d. Extent of required refinishing
  - 5. Alternatives to cutting and patching
  - 6. Cost proposal, when applicable.
- C. Submit written notice to Landscape Architect designating date and time Work will be performed.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Products similar to those specified elsewhere in this Project Manual:
  - 1. Follow those Specifications.
- B. Other Products:
  - 1. Follow Landscape Architect's instructions.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Inspect existing conditions and identify Work subject to damage or movement caused by proposed cutting and patching.
- B. After uncovering, inspect conditions affecting performance of Work.
- C. Report unsatisfactory and questionable conditions to Landscape Architect.
- D. Do not proceed with Work until Landscape Architect provides further instructions.

**3.2 PREPARATION**

- A. Maintain adequate Temporary Support necessary to assure structural integrity of affected Work.
- B. Protect other portions of Project Work against damage and discoloration.
- C. Protect Work exposed by cutting against damage and discoloration.

**3.3 PERFORMANCE**

- A. Provide proper surfaces for patching and finishing.
- B. Employ qualified Installer or Fabricator to perform cutting and patching for:
  - 1. Weather-exposed or moisture-resistant surfaces.
  - 2. Sight-exposed finished surfaces.
- C. Cut Concrete and other Rigid Materials with Masonry Saw or Core Drill. Do not over-cut at Corners.
- D. Restore cut or removed Work with new Products to provide Work complete in accordance with Contract Documents. Maintain any original Fire-resistance Rating.
- E. Fit Work air-tight to Pipes, Sleeves, Ducts, Conduits, and other surface penetrations.
- F. Where patching occurs, refinish entire surface to provide even finish to match adjacent Work as follows:
  - 1. Continuous Surfaces: Refinish to nearest Intersection or Joint.
  - 2. Assemblies: Refinish entire Unit.

**3.4 CUTTING STRUCTURAL FRAMING**

- A. Exposed Members, including any Columns & Posts:
  - 1. Not permitted, unless shown on Drawings or otherwise pre-approved.
- B. Concealed Horizontal Lumber Framing Members:
  - 1. Notches Prohibited:
    - a. In Tension Edge of nominal 4 inch or deeper Members, except at Member Ends.
    - b. In middle 1/3 of Member length.
    - c. Greater than 1/4 of Member depth at Member Ends, and greater than 1/6 of Member depth elsewhere.
  - 2. Cover Notches with Metal Plate; Simpson SS Stud Shoe or approved.
  - 3. Bored Holes prohibited:
    - a. Greater than 1/3 of Member depth.
    - b. Within 2 inches of Member top or bottom.

**PART 3 - EXECUTION**

**3.4 CUTTING STRUCTURAL FRAMING (CONT)**

- 4. Cover Member edge at Bored Holes with Metal Plate; Simpson NS Nail Stopper or approved.
- C. Concealed Lumber Wall Framing Members:
  - 1. Maximum Notching Depth:
    - a. At Exterior & Bearing Walls: 25% of Member width.
    - b. At all other locations: 40% of Member width.
  - 2. Cover Notches with Metal Plate; Simpson SS Stud Shoe or approved.
  - 3. Bored Holes Prohibited:
    - a. Within 5/8 inch of Member edge.
    - b. Within same section as Cut or Notch.
  - 4. Maximum Size of Bored Holes:
    - a. At Bearing Walls: 40% of Member width.
    - b. At all other locations: 60% of Member width.
  - 5. Cover Stud edge at Bored Hole with Metal Plate; Simpson NS Nail Stopper or approved.

**3.5 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. Remove Debris from Project Site upon work completion or sooner, if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 EXTENT OF WORK**

- A. As required by Contract Conditions and as specified herein, execute Cleaning and Trash removal during Work progress and at Work completion.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Cleaning specific Products or Work: See respective Specification Sections.

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 REGULATORY AGENCY REQUIREMENTS**

- A. Comply with governing Codes, Regulations, Ordinances, and Antipollution requirements.

**PART 2 - PRODUCTS**

**2.1 CLEANING MATERIALS**

- A. Use only those which will not create hazards to health or property, and which will not damage Surfaces.
- B. Use only those recommended by Manufacturer of Surface to be cleaned.
- C. Use only on Surfaces recommended by Cleaning Material Manufacturer.
- D. VOC & Toxic Chemical Content: Comply with Section 01-35-50.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. Follow Cleaning Material and Surface Manufacturers' instructions.

**3.2 DURING CONSTRUCTION**

- A. Periodically, and when directed by Landscape Architect, clean to maintain Work, Site, and adjacent Properties free from accumulations of Waste, Rubbish, and Windblown Debris, resulting from Construction Operations.
- B. Provide on-site Containers for collection of Waste, Debris, and Rubbish.
- C. Periodically remove Waste, Debris, and Rubbish; legally dispose of away from Project Site.

**PART 3 - EXECUTION**

**3.3 DUST CONTROL**

- A. Clean Surfaces prior to painting and continue cleaning as needed until painting is complete.
- B. Schedule cleaning so that resultant Dust and Contaminants will not fall on wet or newly coated Surfaces.

**3.4 FINAL CLEANING**

- A. Remove Waste, Debris, and Surplus Material from Project Site and Adjacent Property.
- B. Clean Grounds where soiled or trashed by work of this Project, as follows:
  - 1. Paved Surfaces: Remove Stains, Spills, and Foreign Substances; and hose clean.
  - 2. Other Surfaces: Rake-clean.
- C. In addition to debris-removal and cleaning specified in other Sections, clean exposed-to-view Surfaces.
- D. Remove any Temporary Protection and Labels not required to remain.
- E. Clean Equipment Surfaces and remove excess Lubricants.
- F. Remove Waste, Debris, and Foreign Substances from Drainage System.
- G. Maintain Components clean until Project Substantial Completion.

**END OF SECTION**



**1.1 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Cleaning & Trash Removal: Section 01-74-00
- B. Warranties & Bonds: Section 01-78-00
- C. Record Documents: Section 01-82-00
- D. Operating & Maintenance Data: Section 01-83-00

**1.2 SUBSTANTIAL COMPLETION INSPECTION**

- A. When Contractor considers Work substantially complete, as defined in General Conditions, he shall submit to the Landscape Architect:
  - 1. Written notice that Work, or designated portion thereof, is substantially complete.
  - 2. List of Items to be completed or corrected.
- B. Landscape Architect will, as soon as possible thereafter, make inspection to determine completion status.
- C. If Landscape Architect should determine that Work is not substantially complete:
  - 1. Landscape Architect will promptly notify Contractor in writing, giving reasons therefore.
  - 2. Contractor shall remedy Work deficiencies and send second notice of substantial completion to Landscape Architect.
  - 3. Landscape Architect will reinspect Work.
- D. When Landscape Architect concur that Work is substantially complete, Landscape Architect will:
  - 1. Prepare Certificate of Substantial Completion using AIA Document G704, accompanied with Contractor's list of items to be completed or corrected, as verified and amended by Landscape Architect.
  - 2. Submit Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

**1.3 FINAL INSPECTION**

- A. When Contractor considers Work complete, he shall submit written certification that:
  - 1. Contract Documents have been reviewed.
  - 2. Contractor has inspected Work for compliance with Contract Documents.
  - 3. Work has been completed in accordance with Contract Documents.
  - 4. Equipment and Systems have been tested in presence of Owner's Representative and are operational.
  - 5. Work is complete and ready for final inspection.
- B. Landscape Architect will inspect Work to verify completion status as soon as possible after receipt of Contractor's Certification.
- C. If Landscape Architect should consider Work incomplete or defective:
  - 1. Landscape Architect will promptly notify Contractor in writing, listing incomplete or defective Work.
  - 2. Contractor shall immediately remedy deficiencies and send second written certification to Landscape Architect that Work is complete.
  - 3. Landscape Architect will reinspect Work.
- D. When Landscape Architect finds Work acceptable under Contract Documents, he will request Contractor to make closeout submittals.

#### **1.4 REINSPECTION FEES**

- A. Landscape Architect will make 2 Substantial Completion Inspections to determine any Work Deficiencies and 2 Final Completion Inspections to ascertain that Deficiencies have been satisfactorily completed.
- B. If Landscape Architect should be required to make more than 4 Inspections:
  - 1. Owner will compensate Landscape Architect for such additional services.
  - 2. Owner will deduct Landscape Architect's compensation amount from Contractor's final payment as follows:
    - a. Landscape Architect's time at current Billing Rates.
    - b. Landscape Architect's Employees' time at current Billing Rates.
    - c. Others at 1.10 times direct cost incurred.
    - d. Charges will be made for necessary travel time, inspection time, and inspection report writing time; commercial air fare; 65 cents per mile; room and board; and all other expenses incurred in making inspections.

#### **1.5 EVIDENCE OF PAYMENTS & RELEASE OF LIENS**

- A. Contractor shall submit the following:
  - 1. Contractor's Affidavit of Payment of Debts and Claims, AIA Doc. G706.
  - 2. Contractor's Affidavit of Release of Liens, AIA Doc. G706A including the following:
    - a. Consent of Contractor's Surety, if any, to Reduction in or Partial Release of Retainage, AIA Doc. G707A.
    - b. Consent of Contractor's Surety, if any, to Final Payment, AIA Doc. G707.
    - c. Contractor's Release or Waiver of Liens.
    - d. Separate releases or waivers of lien for Subcontractors, Suppliers, and others with lien rights against Owner's Property, together with list of those parties.
- B. Sign and execute all Submittals, before delivery to Landscape Architect.

#### **1.6 CONTRACTOR'S CLOSEOUT SUBMITTALS TO LANDSCAPE ARCHITECT**

- A. Wage Certification: See Section 01-29-50
- B. Project Record Documents: See Section 01-82-00
- C. Owner's Operating & Maintenance Manual: See Section 01-83-00
- D. Building Official's Certificates of Inspections
- E. Building Official's Certificate of Occupancy

#### **1.7 DEMONSTRATIONS**

- A. Instruct Owner in operation of all Systems and Equipment in accordance with Section 01-83-00.

**1.8 FINAL ADJUSTMENT OF ACCOUNTS**

- A. Submit final statement of accounting to Landscape Architect, including the following:
  - 1. Original Contract Sum
  - 2. Additions and deductions resulting from:
    - a. Previous Change Orders
    - b. Deductions for Reinspection Payments
  - 3. Total Contract Sum, as adjusted
  - 4. Previous payments
  - 5. Sum remaining due
- B. Landscape Architect will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

**1.9 FINAL APPLICATION FOR PAYMENT**

- A. Follow procedures specified in Section 01-29-50.

**END OF SECTION**

**1.1 REQUIREMENTS INCLUDED**

- A. Compile specified Bonds, if any, and Warranties.
- B. Compile specified Service and Maintenance Contracts.
- C. Review submittals to verify compliance with Contract Documents.

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Contract Closeout: Section 01-77-00
- B. Operating & Maintenance Data: Section 01-83-00
- C. Warranties or Bonds required for Specific Products: See respective Specification Sections

**1.3 REQUIRED SUBMITTALS**

- A. Assemble Bonds, Warranties, and Service & Maintenance Contracts executed by Contractor, and each of respective Manufacturers, Suppliers, and Subcontractors.
- B. Number of Original Signed Copies Required: Provide 1 for each volume of Owner's Operating & Maintenance Manual specified in Section 01-83-00.
- C. Table of Contents: Neatly type in orderly sequence.
- D. Provide complete information for each of the following:
  - 1. Product or Work Item
  - 2. Firm, with name of Principal, Address, and Telephone Number
  - 3. Beginning date and duration of Bond, Warranty, or Service & Maintenance Contract.
  - 4. The following information for Owner's Personnel:
    - a. Procedure in event of failure or malfunction.
    - b. Instances which affect Bond, Warranty, or Service & Maintenance Contract.
  - 5. Contractor, name of responsible Principal, Address, and Telephone Number.
- E. Warranties shall be submitted in the CLOP process in e-Builders.

**1.4 SUBMITTAL FORM**

- A. Punch sheets for standard 3-ring Binder.
- B. Size: 8-1/2 x 11 inches
- C. Fold larger sheets to fit into Binder.
- D. Cover: Identify each Packet with printed title "WARRANTIES & BONDS".
- E. List:
  - 1. Title of Project
  - 2. Name of Contractor

**1.5 SUBMITTAL LOCATION**

- A. Bind into Owner's Operating & Maintenance Manuals specified in Section 01-83-00.

**1.6 SUBMITTAL TIME**

- A. See Section 01-83-00.

**1.7 MANUFACTURER'S WARRANTIES**

- A. In addition to Contractor's Warranty, Manufacturers' Warranties shall pass to Owner and shall not take effect until affected Work has been accepted in writing by Owner.
- B. Warranties shall be submitted in the CLOP process in e-Builders.

**END OF SECTION**

**1.1 GENERAL**

- A. Maintain at Project Site for Owner, 1 record copy of:
  - 1. Contract Drawings & Specifications
  - 2. Addenda
  - 3. Change Orders & other Contract Modifications
  - 4. Field Orders & other Written Instructions
  - 5. Approved Shop Drawings, Product Data, & Samples.
  - 6. Field Test Reports
- B. Maintain at Project Site for Owner for Permit Set.

**1.2 MAINTENANCE OF DOCUMENTS & SAMPLES**

- A. Store in Contractor's Field Office apart from Documents used for Construction.
- B. Provide Files, Shelving, and Cabinets necessary to safely and securely store Documents and Samples.
- C. Maintain Documents clean, dry, legible, and in good order.
- D. Do not use Record Documents for Construction purposes.
- E. Make Documents available at all times for Landscape Architect's inspection.
- F. Landscape Architect will monitor Record Documents during each Jobsite visit. prior to each Contractor's Application for Payment. Up-to-date Record Documents are prerequisite to acceptance and approval of Payment Application.

**1.3 DRAFTER'S QUALIFICATIONS**

- A. Drafting must be accurate and legible.
- B. If Landscape Architect deems submitted Drafting to be unacceptable, redraft until acceptable at no additional cost to Owner.
- C. Set is to be able to be reproduced for submission to the City.
  - 1. Drawings to be clean, complete and accurate.

**1.4 WORK SET MARKING DEVICES**

- A. Type: Waterproof soft tip
- B. Color Code, unless otherwise directed or approved:
  - 1. Green: Document changes
  - 2. Red: Work deleted
  - 3. Other Contrasting Color: Revised Dimensions and other Notations

**1.5 RECORD DRAWINGS**

- A. Maintain 1 complete set of Black-line Prints of Contract Drawings as Work-set; use Marking Devices specified above to record all Contract changes.
- B. Show actual conditions where installation varies substantially from Work shown on Drawings. Give particular attention to Concealed Work that would be difficult or impossible to record at later date. Record location of Backing and other Concealed Items required for installation of Future Work.

### **1.5 RECORD DRAWINGS (CONT)**

- C. Mark whichever Contract Drawing or Shop Drawing is most appropriate and most capable of accurately and clearly showing actual "field conditions". Where Shop Drawings are used to record changes, record cross-reference on appropriate Contract Drawing.
- D. Where applicable, indicate Change Order numbers with each Change.
- E. Note related Specification or Product Data revisions, where applicable.
- F. Upon Work completion, transfer Recorded Information (in PDF format) to DVD Disk or thumb drive.
  - 1. Landscape Architect will supply digital copy of original Drawings to Contractor, and Contractor shall pay cost of transferring Recorded Information.
    - a. To the best of the Landscape Architect's knowledge, belief, and understanding; the submitted Drawings are accurate, however the Landscape Architect makes the Drawings available as a convenience to the Contractor, and the Landscape Architect does not guarantee the accuracy of the Drawings or the dimensions thereon. The Contractor shall verify the accuracy of the furnished information.
  - 2. Submit copies of DVD Disk or thumb drive to the following:
    - a. Landscape Architect for forwarding to Owner
    - b. General Contractor for inclusion within Owner's Operating & Maintenance Manual specified in Section n01-83-00.
- G. Contractor may retain Work-set for his Records.

### **1.6 RECORD SPECIFICATIONS**

- A. Maintain 1 complete copy of Project Manual including Specifications; any Addenda; and other Written Documents such as Change Orders, Supplemental Instructions, and similar written Modifications issued during course of Work.
- B. Mark Documents to show actual conditions where installation varies substantially from specified Work. Give particular attention to Concealed Work that would be difficult or impossible to record at later date.
- C. Note related Record Drawing and Product Data revisions, where applicable.

### **1.7 RECORD PRODUCT DATA**

- A. Maintain 1 copy of each Product Data submittal.
- B. Mark documents to show actual conditions where installation varies substantially from Contract Specifications or Drawings. Include any variations in installed Products or in Manufacturer's installation instructions. Give particular attention to Concealed Work that would be difficult or impossible to record at later date.
- C. Note related Record Drawing and Specifications revisions, where applicable.

### **1.8 RECORD SAMPLES**

- A. Immediately prior to Substantial Completion date, Contractor shall coordinate with Landscape Architect to determine which, if any, Contractor-maintained Samples shall be submitted for Owner's permanent record.

**1.9 RECORDING**

- A. Label each Document PROJECT RECORD in neat, large, printed letters.
- B. Record Information concurrently with Construction progress.
- C. Do not conceal any Work until required Information is recorded.
- D. Legibly mark Drawings to record the following Actual Construction:
  - 1. Horizontal and Vertical Locations of Underground Utilities and Appurtenances referenced to permanent Surface Improvements.
  - 2. Location of Internal Utilities and Appurtenances concealed in Construction, referenced to visible and accessible Features of Structure.
  - 3. Field Changes of Dimensions and Details.
  - 4. Changes made by Change Order or Field Order.
  - 5. Details not shown on original Contract Drawings.
- E. Legibly mark Specifications and any Addenda to record the following:
  - 1. Manufacturer, Trade Name, Catalog Number, and Supplier of each Product actually installed.
  - 2. Changes made by Change Order or Field Order.

**1.10 SUBMITTAL**

- A. Organize Record Documents into manageable Sets, bind together with durable Cover Sheet, and print on Cover of each Set the following:
  - 1. Project title
  - 2. Date
  - 3. Contractor's Name & Address
  - 4. Title and number of each Record Document
  - 5. Name of Person who prepared Sheet
  - 6. Signature of Contractor or his authorized Representative
- B. Submit to Landscape Architect for forwarding to Owner.
  - 1. Use e-Builder project management system

**END OF SECTION**



**1.1 GENERAL**

- A. Compile Product Data and related Information appropriate for Owner's maintenance and operation of Products furnished under Contract.
- B. Prepare as specified herein and in other Specification Sections.
- C. Instruct Owner's Personnel in maintenance of Products and in operation of Equipment and Systems.

**1.2 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS**

- A. Shop Drawings, Product Data, & Samples: Section 01-33-00
- B. Equipment & Systems Start Up: Section 01-75-00
- C. Contract Closeout: Section 01-77-00
- D. Warranties & Bonds: Section 01-78-00
- E. Project Record Documents: Section 01-82-00

**1.3 QUALITY ASSURANCE**

- A. Data preparation shall be done by Personnel:
  - 1. Trained and experienced in maintenance and operation of described Products.
  - 2. Completely familiar with requirements of this Section.
  - 3. Sufficiently skilled as Technical Writer to communicate essential data.
  - 4. Sufficiently skilled as Drafter to competently prepare required Drawings.

**1.4 FORM OF SUBMITTALS**

- A. Prepare Data electronically in form of Instructional Manual for use by Owner's Personnel.
- B. Format:
  - 1. Size: 8-1/2 x 11 inches
    - a. Text: Manufacturer's printed data or neatly typed
    - b. Drawings PDF to scale
  - 2. Provide label for each separate Product arranged sequentially in compliance with Project Manual Table of Contents.
- C. Submit using CLOP process in e-Builder project management system and a copy on a thumb drive delivered to Landscape Architect.

**1.5 THUMBDRIVE**

- A. Commercial quality size larger than required for all data.
  - 1. Label with Project Title and Owner's Project Number (if any) and date.
- B. Identity of general subject matter contained in Manual

## **1.6 CONTENT, GENERAL**

- A. Neatly typewritten Table of Contents arranged in systematic order.
- B. List:
  - 1. Contractor, name of responsible Principal, address, and telephone number.
  - 2. Each Product including name, address, and telephone number of:
    - a. Subcontractor or Installer
    - b. Recommended Maintenance Contractor
    - c. Local source for Replacement Parts
  - 3. Product name and other Identifying Symbols as set forth in Contract Documents.
- C. Product Data:
  - 1. Include only those Sheets which are pertinent to specific Product.
  - 2. Annotate each Sheet to:
    - a. Clearly identify specific Product or Part installed.
    - b. Clearly identify Data applicable to installation.
    - c. Delete references to inapplicable Data.
- D. Drawings:
  - 1. Supplement Product Data with Drawings where necessary to clearly illustrate:
    - a. Relations of Component Parts
    - b. Control and Flow Diagrams
  - 2. Do not use Project Record Documents as Maintenance Drawings.
- E. Written Text:
  - 1. Provide where necessary to supplement Product Data and Drawings.
  - 2. Write all text in English.
  - 3. Organize in consistent format under separate headings for different procedures.
  - 4. Provide logical sequence of instructions for each procedure.
- F. Warranties, Bonds, & Maintenance Contracts:
  - 1. Provide copy of each.
  - 2. Include the following:
    - a. Proper procedures in event of failure.
    - b. Instances which might affect validity of Warranties, Bonds, or Contracts.

## **1.7 MANUAL FOR LANDSCAPE ARCHITECTURAL MATERIALS & FINISHES**

- A. Include the following Manufacturer's data:
  - 1. Catalog Number, Size, & Composition.
  - 2. Color & Texture designations.
  - 3. Required Reordering Information.
  - 4. Recommended Cleaning Materials & Methods.
  - 5. Cautions against detrimental Cleaning Materials & Methods.
  - 6. Recommended Cleaning & Maintenance Schedule.

## **1.8 MANUAL FOR WEATHER PROTECTION MATERIALS**

- A. Include the following Manufacturer's data:
  - 1. Instructions for Inspection, Maintenance, & Repair.
- B. Submit specified information for the following Products:

## **1.9 MANUAL FOR MECHANICAL EQUIPMENT & SYSTEMS**

- A. Include the following Manufacturer's data:
  - 1. Description of Unit and Component Parts including:
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data, and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
  - 2. Operating procedures including:
    - a. Start-up, break-in routine, and normal Operating Instructions.
    - b. Regulation, control, stopping, shut-down, and emergency instructions.
    - c. Summer and winter operating instructions.
    - d. Special operating instructions.

## **1.10 MANUAL FOR ELECTRICAL EQUIPMENT & SYSTEMS**

- A. Include the following Manufacturer's data:
  - 1. Description of unit and component parts including:
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curve, engineering data and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.

## **1.11 ADDITIONAL DATA**

- A. Prepare and include the following:
  - 1. Additional data when need becomes apparent during instruction of Owner's personnel.
  - 2. Additional data specified in other Sections of Specifications to be included.

## **1.12 SUBMITTAL SCHEDULE**

- A. Submit to Landscape Architect in final form, 1 copy of complete data 15 days prior to Final Completion Inspection.
- B. Copy will be returned with comments.
- C. Resubmit copy in approved final form, within 10 days following Final Inspection.

## **1.13 INSTRUCTION OF OWNER'S PERSONNEL**

- A. Prior to Final Project Acceptance, instruct Owner's personnel in necessary operation, adjustment, and maintenance of Products, Equipment, and Systems.
- B. Operating & Maintenance Data specified herein shall be used as Training Manual. Trainers shall review Manual contents with Owner's Personnel in detail as required to clearly explain all aspects of Equipment and Systems operation and maintenance.

**1.13 INSTRUCTION OF OWNER'S PERSONNEL (CONT)**

C. Training:

1. Location: At Project Site.
2. Training shall be performed by experienced and Factory-trained Personnel, whose qualifications shall be approved by Landscape Architect and Owner prior to start of Training period.
3. Training shall continue until Owner decrees that Personnel are adequately trained.
4. At least 48 hours prior to Training Meeting, notify Landscape Architect of Meeting time and location.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 WORK INCLUDED**

- A. Do all demolition required for completion of Work shown on Drawings or in Specifications.
- B. Include, but not limited to the following:
  - 1. Remove Chain Link Fencing System and store where indicated until reinstalled in the Project.
  - 2. Remove the existing Bleachers and store where indicated until reinstallation in the Project.
    - a. Protect from damage during relocation, project construction and relocation.

**1.3 SALVAGE**

- A. To Contractor:
  - 1. All Surplus Material becomes property of Contractor.
  - 2. Surplus Material may be re-used on Work only if Landscape Architect judges it equal to specified Products.
- B. Certain Items are specifically noted on Drawings for re-use.
- C. Remove all other Surplus Material from Site.

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 SAFETY REQUIREMENTS**

- A. If more restrictive than those specified herein, conform to Building Code requirements, ANSI A10.6 "Safety Requirements for Demolition", and applicable OSHA requirements.

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that portion of Structure to be demolished is vacant and not in use.
- B. Do not start Work until conditions are satisfactory.
- C. Should any suspected Asbestos, Lead Paint, or other Hazardous Material be encountered perform the following:
  - 1. Immediately notify Landscape Architect and Dept. of Environmental Quality.
  - 2. Comply with Landscape Architect's directions and Regulatory Agency requirements.
  - 3. Owner will employ Testing Lab to confirm presence of Hazardous Material.
  - 4. Perform no Work that could disturb or spread suspected Hazardous Material.
  - 5. If Laboratory Tests confirm presence of Hazardous Material; Owner will remove, contain, or encapsulate Hazardous Material; and will issue Change Order increasing Contract Sum for any proven additional cost to Contractor and extending Contract Completion Date for any proven loss of Contractor's time.

**3.2 PROTECTION**

- A. General:
  - 1. Protect portions of existing Building which are to remain against damage and discoloration.
  - 2. Allow no Leaks, even temporary, in existing Building.
- B. Barriers, Safety Guards, & Warning Lights:
  - 1. Provide where necessary for Public protection.
- C. Utilities:
  - 1. Keep active Utilities intact and in continuous operation.
  - 2. Keep Street Drains and Sewers open for free drainage at all times.
- D. Adjacent Spaces:
  - 1. Provide protection required by General Conditions.
  - 2. Protection includes adjacent portions of Property, Occupants of and Visitors to the Property, and adjacent Vehicles against damage, injury, and discomfort.
  - 3. Sprinkle Loose Debris with Water where necessary to control Dust. Do not use enough Water to cause flooding, icing, or contaminated runoff.
  - 4. Keep Streets, Driveways and Walks clean and free of Obstructions.
- E. Existing Trees & Plants to be protected:
  - 1. Protect against damage, in accordance with Section 01 56 00

**3.3 PREPARATION**

- A. Arrange for, and verify Utility Service termination including capping any Active Lines.
- B. Exterminate any present Vermin or Rodents.
- C. Remove Salvage and store where directed.

**PART 3 - EXECUTION**

**3.4 DEMOLITION**

- A. Remove existing Bleachers as required for re-installation and use in Project, see Drawings.
- B. Remove existing Chain link fencing for re-installation in Project, see Drawings.
- C. Remove existing Stairs on Score Box building.
- D. Remove various areas of asphalt paving, concrete walks, curbs.
- E. Remove wooden rail fence and awning at Scorebox Building
- F. Remove and relocate Memorial Plaque.
- G. Remove mechanical, electrical and plumbing lines and items as indicated on drawings and required as a result of other items being removed.
- H. Saw cut asphalt and Concrete for patching and repair and where new material to abut existing.
- I. See Drawings for complete demolition and alteration of existing conditions.

**3.5 WASTE MANAGEMENT**

- A. Separate and recycle Waste Materials in accordance with City Standards.
- B. All waste and disposal responsibility of Contractor. Do not use School or District facilities.

**3.6 PRODUCT CLEANING & REPAIRING**

- A. Allow no Debris to accumulate in or around Buildings, or on Grounds, Driveways, or Walks.
- B. Haul Debris away from Site as soon as removed, and legally dispose at Contractor's expense.
- C. 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.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Drawings and Specifications indicate Contract Work.
- B. If Work adjustments must be made because of hidden unacceptable soil conditions, Contract Sum will be adjusted in accordance with Contract Conditions.

**1.3 PRODUCTS INSTALLED, BUT FURNISHED UNDER OTHER SECTIONS**

- A. Build in as directed by those Trades, without weakening or defacing Formwork.

**1.4 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Formwork for Concrete Walks & Curbs: Section 02-77-00
- B. Concrete Reinforcement including Bar Supports & Accessories: Section 03-20-00
- C. Cast In Place Concrete: Section 03-30-00

**1.5 DESIGN & ENGINEERING**

- A. Formwork Design and Engineering, as well as Construction, are Contractor's responsibility.

**1.6 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.7 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.8 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.



**PART 2 - PRODUCTS**

**2.1 BOARD FORMS**

- A. Material: Lumber
- B. Species: Douglas Fir or Hemlock
- C. Moisture Content: Contractor's choice
- D. Casting Face Texture: Smooth
- E. Casting Face Appearance: No loose Knots or Knot Holes;
- F. Extent of Work: Provide where Board Forming is shown on Drawings.

**2.2 WOOD PLANK FORMS**

- A. Material: Lumber
- B. Species: Douglas Fir or Hemlock
- C. Moisture Content: Contractor's choice
- D. Casting Face Texture: Smooth
- E. Casting Face Appearance: No loose Knots or Knot Holes; maximum Knot size 1-1/2 inch and well scattered.
- F. Size: Support Concrete at rate poured
- G. Extent of Work: Provide at Footing and Flatwork perimeters, unless otherwise indicated.

**2.3 PLYWOOD FORMS**

- A. At Vertical Concrete Exposed to View:
  - 1. Manufacturing Standard: APA Product Standard 1-07
  - 2. Type: 1-step Medium Density Overlaid
  - 3. APA Grade: EXT-MDO
  - 4. Overlay Resin Content: 34% - 35%
  - 5. Surface Finish: Matte
- B. At all other Vertical Concrete:
- C. APA Grade: B-B Plyform
- D. Class: 1
- E. Thickness: As required by Concrete placement rate

**2.4 STEEL FORMS**

- A. For all Concrete Work:
  - 1. At Contractor's option, approved type Steel Forms may be used in lieu of Boards and Plywood.

**2.5 EMBEDDED ITEMS**

- A. Steel Reinforcement: Refer to Section 03-20-00
- B. Anchor Bolts: Furnished by Steel Fabricators and Equipment Suppliers.

**PART 2 - PRODUCTS**

**2.6 FORM TREATMENT MATERIALS**

- A. For Board Forms: & Wood Plank Forms: Nox-Crete "Pre-Form," or approved.
- B. For Overlaid Plywood Forms: Nox-Crete Form Coating, or approved.

**2.7 FORM JOINT CAULKING COMPOUND**

- A. Manufacturer & Brand: Sonneborn Sonolac, Dap Acrylic Latex, or approved.

**PART 3 - EXECUTION**

**3.1 PROTECTION**

- A. Protect other Work against damage and discoloration caused by Work of this Section.

**3.2 INSTALLATION**

- A. Conform to shapes, lines, and dimensions shown on Drawings.
- B. Brace and tie together to ensure that position and shape are maintained.
- C. Make tight to prevent Concrete leakage.
- D. Arrange Joints as indicated or directed.
- E. Form any Weakened Plane Joints and other Surface Indentations shown on Drawings.
- F. Provide Access Openings as required for cleaning and inspection of Forms and Embedded Items prior to placing Concrete. Locate where not exposed to view.

**3.3 EARTH FORMS**

- A. Hand trim where necessary.
- B. Remove any loose Dirt.

**3.4 BOARD FORMS**

- A. Install horizontal, full length no butt joints permitted.
- B. Stagger Board end joints at least one Framing Member. Do not align within 4 adjacent Boards.
- C. Locate Board ends over Supports.

**3.5 PLYWOOD FORMS**

- A. At Forms for Exposed Concrete, fill Form Panel joints with Form Joint Caulking Compound, and strike Compound flush with Panel on face adjacent to exposed Concrete, or cover Joints with thin, smooth, plastic, Pressure-sensitive Tape.

**PART 3 - EXECUTION**

**3.6 STEEL FORMS**

- A. Install by clipping to Supports in accordance with Manufacturer's instructions.
- B. Provide Vent Clips in side laps of each span, one Clip for spans up to 4 feet, two Clips for longer spans.
- C. Minimum Bearing: 2 inches
- D. Minimum End Lap: 2 inches

**3.7 BRACING**

- A. Provide as required to meet load requirements.
- B. Protect against undermining or settlement when placed on ground.
- C. Anchor as required to prevent upward or lateral Formwork movement during Concrete placement.

**3.8 OPENINGS & CHASINGS**

- A. Provide Openings and Chasings of Forms for Work or others. Sizes and locations as directed by other Trades.

**3.9 ALLOWABLE TOLERANCES FOR CONCRETE**

- A. Variation from level:
  - 1. 1/4 inch in any 10 ft.
  - 2. Maximum over entire length: 1/2 inch
- B. Variation from plumb:
  - 1. 1/4 inch in any 10 ft.
  - 2. Maximum over entire length: 1 inch
- C. Variation in Cross Sectional Dimensions: Minus 1/4 inch; plus 1/2 inch
- D. Variation in Surface Tolerance: 1/8 inch in any 10 ft. measured with 10 ft. straight-edge.
- E. Maximum Deflection of Form Facing between Supports:  $0.0025 \times \text{Span}$

**3.10 FORM TREATMENT**

- A. Metal Plank Forms: Lightly oil immediately prior to Concrete placement.
- B. Wood Plank Forms: & Board Forms: Keep wet previous to placing Concrete; wet thoroughly just before Concrete placing.
- C. Metal Forms:
  - 1. Apply Release Compound in accordance with Manufacturer's instructions.
- D. Plywood Forms:
  - 1. Prior to first use of Overlaid Plywood Forms: Fog-apply Form Coating to contact surfaces.
  - 2. Prior to each reuse of Overlaid Plywood Forms after initial use: Apply Form Coating to contact surfaces in accordance with Manufacturer's instructions.

**PART 3 - EXECUTION**

**3.10 FORM TREATMENT (CONT)**

3. Prior to each use: of all other Plywood Forms: Apply Form Coating to contact surfaces in accordance with Manufacturer's instructions.
4. When treating previously set Forms, prevent Coatings from covering Reinforcing Steel or existing Concrete where bond is required.
5. Prevent Coatings from collecting in puddles.

**3.11 EMBEDDED ITEM INSTALLATION**

- A. Steel Reinforcement: Refer to Section 03-20-00.
- B. Anchor Bolts:
  1. Set with Templates to assure accurate Bolt positioning.
  2. Secure in accordance with approved Setting Drawings.

**3.12 ADJUSTMENTS**

- A. Reposition to true alignment prior to, during, and after Concrete placement, if necessary.
- B. During Concrete placement, in areas where Formwork develops weakness, settlement, or distortion, stop Concrete placement, remove placed Concrete, and remove or strengthen Formwork.

**3.13 FORM REMOVAL**

- A. Leave Forms and Shoring in place until Concrete has attained sufficient strength to safely support own weight and imposed loads. 14 days minimum,
- B. Remove Forms at time and in manner to insure safety of Structure, and without Concrete surface damage.
- C. At exposed Concrete, Form-removal time shall be uniform to avoid color differences.
- D. Remove Top Forms from any sloping Concrete surfaces as soon as Concrete is self-supporting. Repair and finish, if necessary, and cure immediately.

**3.14 FORM CLEANING**

- A. Remove debris and foreign matter from Formwork prior to Concrete placement.
- B. Remove loose rust and foreign matter from reusable Hardware prior to installation into Formwork.

**3.15 FORM RE-USE**

- A. Withdraw projecting Nails and clean Concrete Form contact surfaces. Replace with new material when necessary or when directed.
- B. Re-use Forms only when contact-surfaces equal those specified for original use.

**PART 3 - EXECUTION**

**3.16 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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Except where otherwise specified below, provide all required Steel Reinforcement.
- B. Drawings and Specifications indicate Contract Work.
- C. If Work adjustments are made because of hidden unacceptable soil conditions Contract Sum will be adjusted in accordance with Contract Conditions.

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Concrete Formwork: Section 03-10-00
- B. Cast in Place Concrete: Section 03-30-00
- C. Furnishing & placing Prestressed Concrete Reinforcement: Section 03-42-00

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and coverage by Mud or Ice.
- B. Tag each Piece or Bundle; indicate size, grade, and location.

**PART 2 - PRODUCTS**

**2.1 BARS**

- A. Material: Steel
- B. Manufacturing Standard:
  - 1. If and where Welded: ASTM A-706
  - 2. All Other Bars: ASTM A-615
- C. Grade: 60
- D. Sizes: See Drawings.

**2.2 WIRE MESH**

- A. Material: Cold drawn Steel Wire
- B. Manufacturing Standard: ASTM A-1064
- C. Condition: Flat sheets
- D. Size, unless otherwise shown on Drawings:
  - 1. Mesh: 6x6 inches
  - 2. Wire: W 1.4
- E. Extent of Work: Except where Bar Reinforcement is called for, provide in all Concrete Flatwork, including Exterior Work.

**2.3 TIE WIRE**

- A. Material: Black annealed Steel
- B. Manufacturing Standard: ASTM A-82
- C. Minimum Size: 16 ga.

**2.4 WELDING ELECTRODES**

- A. Type: Low Hydrogen
- B. Manufacturing Standard: AWS A5.1
- C. Series: E-70

**2.5 SPLICE DEVICES**

- A. Manufacturer & Brand: Cadweld C-series, Dayton Bar Grip, NMB Splice Sleeve, or approved.
- B. Minimum Yield Strength: 125% of Bar Yield Strength
- C. Type: Contractor's choice to suit conditions of use.
- D. Extent of Work: See Drawings.

**PART 2 - PRODUCTS**

**2.6 ACCESSORIES**

- A. Material: Concrete, Ceramic, Plastic, or Metal. Hot-dip galvanize any Metal Accessories adjacent to exposed Concrete surfaces.
- B. Manufacturing Standard: Manual of Standard Practice, published by Concrete Reinforcing Steel Institute; 933 N. Plum Grove Rd.; Schaumburg, IL 60173; (800-465-2774). Copies can be obtained from Institute or viewed at [www.crsi.org](http://www.crsi.org)
- C. Extent of Work: Provide all Accessories necessary for proper Reinforcement placement, spacing, support, and fastening.

**2.7 FABRICATION**

- A. Follow Manual of Standard Practice published by Concrete Reinforcing Steel Institute.

**2.8 ALLOWABLE FABRICATION VARIATION FROM DRAWING DIMENSIONS**

- A. Sheared Bar Lengths: Plus or Minus 1 inch
- B. Tie, Dimensions: Plus or minus 1/2 inch
- C. All other Bend Dimensions: Plus or minus 1 inch

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that surfaces to receive Reinforcement are accurately sized and located, square, plumb, rigid, secure, and otherwise accurately prepared.
- B. Prior to starting Work, notify General Contractor about defects requiring correction.
- C. Do not start Work until conditions are satisfactory.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**3.3 INSTALLATION**

- A. General: Conform to International Building Code (IBC) paragraphs hereinafter named and amplified.
- B. Bending:
  - 1. Conform to Code paragraph 1907.1
  - 2. Bend Bars without heat.
  - 3. Field bending partially embedded Bars, not permitted without Landscape Architect's approval.



**PART 3 - EXECUTION**

**3.3 INSTALLATION (CONT)**

- C. Placing:
  - 1. Conform to Code paragraph 1907.5
  - 2. Secure against displacement.
- D. Extend Wire Mesh to within 1/2 inches of Concrete edges. Support Mesh with Chairs.
- E. Spacing:
  - 1. Conform to Code paragraph 1907.6
  - 2. Clear distance between parallel Bars, including splices, unless otherwise permitted by Code, not less than:
    - a. Nominal Bar diameter
    - b. 1-1/2 times maximum Concrete Aggregate size
    - c. 1 inch
- F. Splicing:
  - 1. Conform to Code paragraph 1907 & ACI 318, as applicable.
  - 2. Do not weld or tack-weld Reinforcement Splices.
  - 3. Minimum Lap at Splices:
    - a. At Tensile Bar Reinforcement: Bar diameters
    - b. At Compressive Bar Reinforcement: 48 Bar diameters
    - c. At Wire Mesh: Lap one full mesh, plus 2 inches.
- G. Protective Concrete Covering:
  - 1. Conform to Code paragraph 1907.1
    - a. Concrete cast against and permanently exposed to Ground: 3 inches
    - b. Concrete not cast against Ground, but exposed to Ground or Weather:
      - 1. No. 6 through No. 18 Bars, if any: 2 inches
      - 2. No. 5 Bars and smaller, if any: 1-1/2 inches

**3.4 SPECIAL REINFORCEMENT INSTALLATION, unless otherwise shown on Drawings**

- A. Masonry Reinforcement Bars:
  - 1. At reinforced Masonry Walls cast Bar Dowels into Concrete as required to develop continuity between Masonry and Concrete; space and size Dowels to match vertical Masonry Reinforcing.
- B. Reinforcing Bar for Electrical Grounding:
  - 1. Provide one #4 Grounding Bar which overlaps lowest longitudinal Building Foundation Reinforcing Bar. Overlap Foundation Bar 12 inches minimum and secure to Foundation Bar.
  - 2. Bend Grounding Bar upward and extend vertically at least 12 inches above top of Sill Plate so Electrician can make Grounding Connection.
  - 3. Locate Grounding Bar as close as possible to Electrical Service.
  - 4. Coordinate with Electrical Subcontractor.
- C. Reinforcement at Concrete Slab Re-entrant Corners:
  - 1. Provide two, 48 inch long, #4 Bars diagonally across Re-entrant Corners.

**PART 3 - EXECUTION**

**3.5 ALLOWABLE PLACEMENT VARIATION FROM DRAWING DIMENSIONS**

- A. Concrete Cover: Plus or minus 1/4 inch
- B. Spacing between Bars: 1/4 inch
  - 1 Any Top Bars in Slabs
  - 2 Members 8 inches deep or less: Plus or minus 1/4 inch
- C. Transverse Bars: Space evenly within 2 inches of stated separation.
- D. Bar relocation to avoid interference with other Reinforcement, Conduits, or Embedded Items: 1 Bar diameter, unless otherwise approved by Landscape Architect.

**3.6 PRODUCT CLEANING & REPAIRING**

- A. Prior to Concrete placement, remove loose flaky rust, mud, oil, and other bond-reducing Coatings.
- B. 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.
- C. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Drawings and Specifications indicate Contract Work.
- B. If Work adjustments are made because of hidden unacceptable soil conditions Contract Sum will be adjusted in accordance with Contract Conditions.

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Laboratory Testing of Concrete: Section 01-45-30
- B. Concrete Formwork: Section 03-10-00
- C. Concrete Reinforcement: Section 03-20-00
- D. Pervious Concrete Paving: Section 32-13-43
- E. Masonry Grout: Section 04-10-00

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 REQUIRED SUBMITTALS**

- A. Prior to starting Work and in accordance with requirements specified in Section 01-33-00 submit, for Structural Engineer's review and acceptance, Concrete Design Mix for each Concrete type and strength of Concrete. Prepare Submittal in accordance with IBC Section 19-05-0
- B. In accordance with requirements specified in Section 01-33-00, submit the following:
  - 1. Mix Design:
    - a. Prior to starting Work and for each Concrete type and strength, submit Mix Design, prepared in accordance with UBC Section 19-05-.0 for Landscape Architect's review and acceptance.

**1.7 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.
- B. Conform to ASTM C-94.

**PART 1 - GENERAL**

**1.8 WEATHER REQUIREMENTS**

- A. General:
  - 1. Follow Standard Specification for Cold & Warm Weather Concreting, ACI 306 & 305 respectively; copies of which can be obtained from the Institute at 38800 Country Club Dr.; Farmington Hills, MI 48331; (248) 848-3700.
- B. Cold Weather:
  - 1. Do not place Concrete during cold weather until Protection Materials and Equipment are at or near Project Site.
  - 2. Place no Concrete on frozen Subgrade.
  - 3. Remove Ice and Snow from Reinforcing, Forms, Embedded Items, and other Contact Surfaces.
  - 4. Raise and maintain temperature of all Surfaces in contact with Concrete above 40°F prior to Concrete placement.
  - 5. Do not use Salts or Chemical Admixtures to prevent Concrete freezing.
  - 6. Terminate any Water Curing at least 24 hours before any anticipated freezing temperatures.
  - 7. Locate and direct any Heaters or Ducts so as not to cause overheating or over-drying of Concrete or create fire hazards. Directly exhaust Flue Gases from any Combustion Heaters to outside of any enclosures.
  - 8. Following protection period, allow Concrete to cool gradually.
  - 9. Assume responsibility, including costs, for testing suspected frozen Concrete.
  - 10. Remove and replace freeze-damaged Concrete at Contractor's expense.
- C. Warm Weather:
  - 1. When Air temperature exceeds 85°F or when Wind exceeds 10 mph place Concrete in accordance with the following requirements:
  - 2. Maximum Concrete temperature at time of placement: 70°F.
  - 3. Mix Concrete minimum possible time, and place as soon as possible thereafter.
  - 4. Sprinkle Forms, Reinforcing, Embedded Items, and Subgrade with cool Water immediately prior to Concrete placement.
  - 5. Protect unstripped Formwork and exposed Concrete surfaces against excessive drying with water spray or other approved method.
  - 6. Assume responsibility, including costs, for testing damage-suspected Concrete.
  - 7. Remove and replace heat-damaged or wind-damaged Concrete at Contractor's expense.

**1.9 ADVANCE NOTICES**

- A. Notify Landscape Architect and Testing Lab at least 24 hours before intended Concrete placement.
- B. Place no Concrete until Formwork and Reinforcement have been inspected.

**PART 2 - PRODUCTS**

**2.1 PORTLAND CEMENT**

- A. Manufacturing Standard: ASTM C-150
- B. Type: I-II
- C. Manufacturer & Brand: Use only one for all exposed Concrete.

**2.2 AGGREGATE**

- A. Manufacturing Standard: ASTM C-33
- B. Maximum Size: 3/4 inches and not more than one-fifth of narrowest dimension between sides of Forms, one-third of depth of Flatwork, or three-fourths of narrowest space between Reinforcing Bars.

**2.3 FLY ASH**

- A. Manufacturing Standard: ASTM C-618
- B. Class: F
- C. Extent of Work: May be used at Contractor's option.

**2.4 ENTRAINED AIR**

- A. Manufacturing Standard: ASTM C-260
- B. Mixture (in percentage of Concrete Volume):
  - 1. At Exterior Concrete Flatwork with 3/4 inch max. Aggregate: 4% to 6%
  - 2. At all other Exterior Concrete Flatwork: 3% to 6%
- C. Extent of Work: Provide in all Concrete exposed to Freeze-Thaw Cycles while in wet condition during construction or during intended use.

**2.5 WATER REDUCING ADMIXTURES**

- A. Manufacturing Standard: ASTM C-494
- B. Type: A
- C. Material: Shall not increase Concrete-shrinkage or promote Water-bleeding
- D. Extent of Work: May be used at Contractor's option.

**2.6 PROHIBITED ADMIXTURES**

- A. Calcium Chloride, Thyocyanates, and any others containing more than 0.05% Chloride Ions.

**PART 2 - PRODUCTS**

**2.7 BONDING AGENT**

- A. At Dry Surfaces: Dayton Superior Day-Chem Ad Bond (J-40), Euclid Euco Weld, Sonneborn Sonocrete, or approved.
- B. At Damp Surfaces: Euclid Euco Epoxy 452 MV or 620, Sika Sikadur Hi-Mod, or approved.

**2.8 EXPANSION JOINT FILLER**

- A. For Use without Joint Sealing Compound:
- B. Material: Asphalt-impregnated Cane Fiber
- C. Manufacturing Standard: ASTM D-1751
  - 1. Thickness: 3/8 inch

**2.9 EPOXY ADHESIVE**

- A. Manufacturer & Brand: Hilti Hit HY-150, ITW Ramset Red Head Epcon, Simpson Strongtie Set Adhesive, or approved.
- B. Manufacturing Standard: ASTM C-881
- C. Type: 2-component for use on dry or damp surfaces
- D. Hazardous Material Handling: Follow Manufacturer's instructions.
- E. Extent of Work:
  - 1. Around Reinforcing Dowels, Anchors, etc. where anchoring new Work to existing.
  - 2. Elsewhere shown on Drawings.

**2.10 NON-SHRINK GROUT**

- A. Manufacturer & Brand: Euclid Euco-NS, L&M Crystx, Master Builders Masterflow 713, Sonneborn SonogROUT, US Grout Five Star Grout, or approved.
- B. Manufacturing Standard: ASTM C-1107
- C. Minimum 28 day Compressive Strength: 5000 psi
- D. Positive Expansion: Demonstrate compliance with ASTM C-827
- E. Extent of Work:
  - 1. Under Base Plates
  - 2. Elsewhere shown on Drawings.

**2.11 CURING COMPOUNDS**

- A. At Exterior Flatwork:
  - 1. Type: Non-yellowing, VOC-compliant, and with disappearing White Pigment.
  - 2. Manufacturer: Sonneborn, Meadows, or approved.
  - 3. Manufacturing Standard: ASTM C-1315, Type 2, Class A

**PART 2 - PRODUCTS**

**2.12 FREEZE-THAW PROTECTION SEALER**

- A. Manufacturer & Brand: L & M, Aquapel; or; or approved.
- B. Type: Penetrating, water-based, VOC-compliant, non-yellowing, non-gloss, and odorless.
- C. Extent of Work: Provide over exposed surfaces of Concrete to prevent freeze-thaw damage to Concrete caused by Salts, Deicer Chemicals, and other Contaminates.

**2.13 MIXING CONCRETE**

- A. General:
  - 1. Readymix type conforming to ASTM C-94.
  - 2. Assume responsibility for Mix design and Product performance.
- B. Design Strength:
  - 1. Minimum Density: 145 pcf, plus or minus 5%
  - 2. Minimum 28 day compressive strengths, locations, and minimum Cement content as follows:
    - a. At 4000 psi Concrete; 6 sacks per cu. yd.
- C. Maximum Water-Cement Ratios:
  - 1. Where Air-entrained: 0.45
  - 2. Where not Air-entrained: 0.50
- D. Maximum Slump:
  - 1. 4 inches (plus or minus 1 inch) at any time is maximum.
  - 2. Concrete with greater Slump, or Concrete showing Bleeding or Aggregate Separation as Concrete comes out of Delivery Truck, will be rejected and must be replaced.
  - 3. Add Water only with Landscape Architect's permission.
  - 4. Do not add Water after acceptable Slump Test has been obtained.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Formwork, Reinforcement, and Embedded Items are accurately and securely placed, clean, water and frost-free, and ready to receive Concrete.
- B. Prior to starting Work, notify General Contractor about defects requiring correction.
- C. Do not start Work until conditions are satisfactory.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**PART 3 - EXECUTION**

**3.3 SURFACE PREPARATION**

- A. Remove Foreign Matter from surfaces and areas to receive Concrete.
- B. Sprinkle Subgrade and other porous surfaces with Water to eliminate suction.

**3.4 CONCRETE BOND**

- A. Coat Bonding Agent over existing Concrete to be joined with new Concrete.
- B. Follow Manufacturer's instructions.

**3.5 CONSTRUCTION JOINTS IN FLATWORK**

- A. General:
  - 1. Form to true, straight lines, and with adjacent Flatwork Panels flush at Joints.
  - 2. Make Panels as close to square as possible.
- B. At Ground Supported Flatwork, unless otherwise shown on Drawings:
  - 1. Do not extend Reinforcement through Joints.
- C. Except at Expansion Joints, key adjacent Joints.
  - 1. At Keyed Joints, increase Slab thickness by 2 inches for 12 inches beyond each side of Joint.
  - 2. Joint Spacing in each direction: Do not exceed 30 times Slab thickness.

**3.6 PLACING CONCRETE**

- A. Convey and place by methods which will prevent Material separation and loss.
- B. If and when under-water Concrete placement is approved, deposit fresh Concrete into mass of previously placed Concrete causing Water to be displaced with minimum Concrete surface disturbance.

**3.7 CONSOLIDATING CONCRETE**

- A. Employ mechanical, high-frequency Vibrators to consolidate Concrete around Reinforcement, into corners and angles of Forms, and to exclude rock pockets, air bubbles, and honeycomb.
- B. Hold Vibrator in one spot no longer than 15 seconds; keep in constant motion, insert and withdraw at points approximately 18 inches o.c.
- C. Maintain Vibrator in vertical position when penetrating Concrete.
- D. Transporting Concrete with Vibrator not permitted.
- E. Maintain spare Vibrator at jobsite during Concrete placement.



**PART 3 - EXECUTION**

**3.8 VOIDS & GRAVEL POCKETS**

- A. Repair where necessary and where directed by Landscape Architect.
- B. Satisfactory repair of Concrete is virtually impossible, therefore take all necessary precautions to assure that repairs are unnecessary. If imperfections are sufficiently objectionable, replace Work in question when directed.

**3.9 CONCRETE FLATWORK FINISHES**

- A. Required Preparation Work:
  - 1. Screed all Flatwork to true levels or slopes.
  - 2. Prior to finishing Concrete, remove any accumulated Bleed Water.
  - 3. Evenly slope to any Drain at 3/16 inch per ft., unless otherwise shown on Drawings.
- B. Non-slip Finish:
  - 1. Screed and tamp Concrete to bring Fine Particles to surface.
  - 2. Bring to true surfaces with Wood or Carpet Float.
- C. Slightly roughen Surfaces with wet, fine Hair Broom.
  - 1. Extent of Work: Provide at exterior Flatwork, unless otherwise shown on Drawings.

**3.10 ALLOWABLE FLATWORK TOLERANCES**

- A. All Surfaces: True within 1/4 inch per 10 ft.

**3.11 CURING**

- A. Minimum Curing Periods:
  - 1. High-early Strength Cement, if used: 3 days
  - 2. All other Cement: 7 days
- B. Minimum Curing Air Temperature: 50° F
- C. Flatwork:
  - 1. Immediately after Slabs are finished, treat Concrete with Curing Compound applied in accordance with Manufacturer's instructions.

**3.12 FREEZE-THAW PROTECTION SEALER APPLICATION**

- A. Uniformly apply in accordance with Manufacturer's instructions.

**3.13 NON-SHRINK GROUT INSTALLATION**

- A. Follow Manufacturer's instructions.
- B. Do not retemper set Grout.
- C. Saturate Concrete contact-surfaces prior to grouting; remove excess Water.
- D. Thoroughly compact Grout free of Air Pockets; do not vibrate Grout.
- E. Cure Grout with Moisture for at least 24 hours.

**PART 3 - EXECUTION**

**3.13 NON-SHRINK GROUT INSTALLATION (CONT)**

- F. Do not remove Leveling Shims, if any, until 48 hours after Grout placement. After Shim removal fill Voids with Standard Grout.

**3.14 EPOXY ADHESIVE INSTALLATION**

- A. Follow Manufacturer's instructions.

**3.15 SAWN CONTRACTION JOINTS IN FLATWORK**

- A. In Flatwork provide the following:
  - 1. Using "Wet Blade" Saw, cut Joints through at least 25% of Slab depth. Do not "dry-saw" without Water. Do not use Grooving Tools or Joint-forming Strips.
- B. Locate Joints where shown on Drawings.
  - 1. Apply Curing Compound to "cut" surfaces as soon as possible after sawing.
- C. Optional Method: Contractor may, at Contractor's option, substitute the following:
  - 1. System: Soff-Cut System; Concord, CA; (909) 272-2330; or approved.
  - 2. Method: In accordance with System Manufacturer's instructions, and within 0 to 2 hours following Concrete finishing, saw-cut Joints at least 10% of Slab thickness (1 inch min.)
- D. Open Joint Filling:
  - 1. After waiting as long as possible for Slabs to shrink, fill Joints with semi-rigid Epoxy Joint Filler with A-80 Shore Hardness, which is capable of supporting heavy wheel loads while not becoming hard or brittle with age. Install Filler full depth of Joint without using Backer Rod. Install Filler flush with Slab surface, and finish smooth and dense.

**3.16 DEFECTIVE WORK**

- A. If Tests specified in Section 01-45-30 indicate that Concrete has failed to meet Specifications, replace Substandard Material, unless otherwise directed by Landscape Architect.
- B. Additionally, remove and replace the following:
  - 1. Surfaces which show excessive Shrinkage Cracks or Cracking.
  - 2. Flatwork which does not drain properly
  - 3. Curled or Warped Slabs
  - 4. Rain-damaged or Scaled Concrete
- C. Remove and replace honeycombed and other defective Concrete down to sound Concrete and replace. If chipping is necessary, shape Edges perpendicular to Surface or slightly undercut. Do not feather Edges.

**3.17 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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**PART 3 - EXECUTION**

**3.18 PROTECTING COMPLETED WORK**

- A. Protect against damage and discoloration.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 WORK INCLUDED**

- A. In accordance with governing laws, regulations, and ordinances; and requirements specified in Section 01-11-50; design, engineer, fabricate, and install Plant-cast Concrete as specified herein and as shown on Drawings.
- B. Contractor's design and engineering shall support the following:
  - 1. Design Loads applicable Design Loads stipulated in Building Code.
  - 2. Loads induced by Impact Loads and Thermal Movement Stresses.
  - 3. Loads encountered during Shipping, Handling, and Installation
- C. Work includes Column Cap and Ball.

**1.3 PRODUCTS INCLUDED, BUT SPECIFIED IN OTHER SECTIONS**

- A. Provide the following Products, and conform to indicated Specification Section, unless otherwise supplemented and/or modified herein:
  - 1. Reinforcement: Section 03-20-00
  - 2. Concrete: Section 03-30-00
  - 3. Metal Anchors cast into Precast Concrete: Section 05-50-00

**1.4 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Cast-in-place Concrete: Section 03-30-00
- B. Sealant: Section 07-92-00

**1.5 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.6 REFERENCED STANDARDS**

- A. Unless otherwise specified herein, comply with the following requirements published by Precast/Prestressed Concrete Institute. Copies may be obtained from Institute at 209 W. Jackson Blvd.; Suite 500; Chicago, IL 60606; (312) 786-0300:
  - 1. Manual for Quality Control for Plants & Production for Plant-cast Architectural Concrete (MNL-117)
  - 2. Standards & Guidelines for Erection of Precast Concrete Products (MNL-127)
  - 3. Erection Safety Manual for Precast & Prestressed Concrete (MNL-132)

**PART 1 - GENERAL**

**1.7 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.8 DESIGN DEVIATIONS**

- A. Submit requests at least 5 Working Days prior to Bid opening.
- B. Include necessary Drawings to permit Architect's evaluation.

**1.9 SAMPLES**

- A. In accordance with Section 01-33-00, submit 2 samples of **concrete finish** not less than 6x6 inches in size, showing texture and color of finish product..
- B. Damage part of exposed-face surface for each product and demonstrate adequacy of proposed Blemish repair technique.
- C. Obtain Architect's acceptance before proceeding.
- D.
- E. **SHOP DRAWINGS**
- F. Submit in accordance with Section 01-33-00.
- G. Show layout, dimensions, fabrication details, reinforcing, setting and attachment details, abutments, and finishes.
- H. Indicate Anchoring Inserts if Embedded Items required
- I. Include Casting-date Mark with Identity-Mark.

**1.10 FABRICATOR'S INSTRUCTIONS**

- A. Prior to Product jobsite delivery, submit Handling & Installation Instructions to General Contractor with copy to Architect.

**1.11 FABRICATOR FABRICATOR'S QUALIFICATIONS**

- A. The following Fabricators are approved:  
**1.**Knife River Corp.; OR 97446; (503) 944-3500
- B. Other may be approved upon compliance requirements specified in Section 01-63-00.

**1.12 ERECTOR'S QUALIFICATIONS**

- A. Company successfully specializing in erecting Plant-cast Concrete of this type for at least 5 years, with sufficient capacity to erect Work without Project delay, and employed by or acceptable to Fabricator.

**PART 1 - GENERAL**

**1.13 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Deliver in accordance with General Contractor's setting schedule.
- B. Follow Fabricator's instructions.
- C. Protect against damage and discoloration.
- D. Handle and transport Units in position to prevent excessive Stress.
- E. Support Units on non-staining shock-absorbing Material. Do not place Units on Ground.
- F. Provide non-staining resilient Spacers of even thickness between adjacent Units.
- G. Position stored Units so that Identification Marks are discernible.

**1.14 WEATHER REQUIREMENTS**

- A. Comply with requirements specified in Section 03-30-00.

**1.15 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.

**PART 2 - PRODUCTS**

**2.1 FORMS**

- A. Where Smooth Finish is Scheduled:
  - 1. Steel, standard with Manufacturer, and approved by Architect.
  - 2. Any suitable material to produce specified finish.

**2.2 REINFORCEMENT SUPPORTS**

- A. Material: Stainless Steel or Plastic. Do not use Carbon Steel, with or without Coating.

**2.3 ANCHOR BOLTS**

- A. Material: Steel
- B. Manufacturing Standard: ASTM A-307 Grade A
- C. Finish: Cadmium-coated in accordance with ASTM A-165.

**2.4 BONDING AGENT**

- A. Manufacturer & Brand: Dewey & Almy "Duraweld-C", Unicon 240, or approved.

**PART 2 - PRODUCTS**

**2.5 CONCRETE MIX**

- A. ASTM C-39 Minimum 28 day Compressive Strength: 5000 psi
- B. Maximum Water-Cement Ratio at Concrete Placement Point: 0.45
- C. Maximum ASTM C-642 Water Absorption Rate (by weight): 6%
- D. Admixtures: Do not use Calcium Chloride, Chloride Ions, or other Salts.

**2.6 FABRICATION**

- A. Follow PCI Manual 116.
- B. Form and finish at Fabrication Plant as follows:
  - 1. Concealed Work:
    - a. Remove Fins and large Protrusions; fill large Holes and Pockets.
    - b. Formwork surface texture, Air Bubble holes, Form Joint marks, and minor Chips and Spalls are acceptable.
  - 2. Where Smooth Finish is scheduled:
    - a. Knock fins off and patch imperfections to match adjacent surfaces.
    - b. Rub rough surfaces smooth with Carborundum Stone.
    - c. Cover exposed surfaces with Sand-Cement Paste drawn from Green Concrete by rubbing process.
    - d. Do sacking immediately after Forms are removed.
    - e. Leave surfaces clean and smooth.
  - 3. Defective Finish Surfaces:
    - a. Chipped, spalled, or cracked Units may be repaired, if repaired Units match adjacent acceptable Work. Architect reserves right to reject non-conforming Work, and Contractor shall replace rejected Units at no additional cost to Owner.

**2.7 ALLOWABLE FABRICATION TOLERANCES**

- A. All Work true and level, with straight sides, and sharp arises in accordance with Drawings, Referenced Standards, and the following maximum tolerances:
  - 1. Maximum Warpage: L/360
  - 2. Linear Shrinkage: 1/8 inch in any dimension
  - 3. Squareness: Opposite diagonal measurements within 1/8 inch per 6 ft.; 1/4 inch maximum.
  - 4. Panel Thickness: 1/4 inch plus and 1/8 inch minus
  - 5. Opening dimensions: 1/4 inch plus
  - 6. Insert Locations: 1/4 inch plus or minus

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Structure and Surfaces to receive plant-cast Concrete are accurately sized and located, sound, true, and otherwise properly prepared.
- B. Prior to starting Work notify General Contractor of conditions requiring correction.
- C. Do not start Work until conditions are satisfactory.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**3.3 ERECTION**

- A. Erect Members plumb, level, true, in accurate alignment, and within Allowable Erection Tolerances.
- B. Secure and stabilize Members as required during erection.
- C. Anchor Members securely and permanently as indicated on approved Shop Drawings.

**3.4 ALLOWABLE ERECTION TOLERANCES**

- A. Joint Widths: 3/16 inch plus and 1/4 inch minus, non-cumulative.
- B. Edge Alignment Offset: 1/4 inch
- C. Panel Face Alignment Offset: 1/4 inch

**3.5 PATCHING**

- A. Field-patching Materials shall be furnished by Plant-cast Concrete Fabricator. Use of Patching Materials from other sources not permitted.
- B. Match color and texture of surrounding Concrete.
- C. Minimize shrinkage.
- D. Apply Bonding Agent prior to patching.
- E. Replace Defective Work if Patching is ruled unacceptable.

**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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**



**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Unit Masonry: Section 04-20-00

**1.3 OPTIONS**

- A. Contractor may, at his option, provide approved Waterproof Cement in lieu of adding Waterproof Admixture.

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 REFERENCED SPECIFICATIONS**

- A. Except as modified herein, comply with the following:
  - 1. Unit Masonry Mortar: ASTM C-270, except Masonry Cement not permitted
  - 2. Reinforced Masonry Grout: ASTM C-476

**1.7 HARDENED MORTAR COLOR SAMPLES**

- A. Submit in accordance with Section 01-33-00.
- B. Required Quantity: 2
- C. Minimum Face Size: 12x12 inches

**1.8 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Stockpile and handle Materials as required to prevent segregation and contamination.
- B. Maintain Sand in damp and loose condition.
- C. Immediately remove unacceptable Materials from Site.

**PART 1 - GENERAL**

**1.9 WEATHER REQUIREMENTS**

- A. During Rainy, Snowy, or other Inclement Weather:
  - 1. Work only under Cover.
- B. During Cold Weather:
  - 1. Anti-freeze Ingredients prohibited.
  - 2. Perform no work unless:
    - a. Approved means for heating Materials is provided.
    - b. Masonry is protected against Frost until Mortar has set.
  - 3. When Air Temperature is between 40°F & 32°F:
    - a. Heat Mixing Water and Sand to maintain Materials between 40°F & 120°F.
    - b. After work day cover Materials and Completed Work with Canvas or Polyethylene Film to protect Work against freezing and wetting.
  - 4. When Air Temperature is between 32°F & 25°F:
    - a. Heat Mixing Water and Sand to maintain Materials between 40°F & 120°F.
    - b. When Wind Velocity exceeds 15 mph during Work Day: Protect Work with Windbreaker.
    - c. After Work Day: Cover Materials and Completed Work with Canvas or Polyethylene Film to protect Work against wetting and freezing.
  - 5. When Air Temperature is between 25°F & 20°F:
    - a. In addition to above requirements, Maintain Materials on Mortar Boards above 40°F.
    - b. Maintain Materials and Completed Work above freezing for at least 48 hours by using Auxiliary Heat and/or Insulating Blankets.
  - 6. When Air Temperature is below 20°F:
    - a. In addition to above requirements, enclose Materials and Completed Work, and maintain enclosed Air Temperature above 40°F for at least 48 hours.
- C. During Hot Weather:
  - 1. If and when Air Temperature exceeds 100°F or Wind Velocity exceeds 8 mph, fog-spray Masonry Work with Water until Work becomes damp.
  - 2. Repeat treatment at least 3 times per day until Work is 3 days old.

**PART 2 - PRODUCTS**

**2.1 PORTLAND CEMENT**

- A. Manufacturing Standard: ASTM C-150
- B. Type: I-II
- C. Manufacturer & Brand: Contractor's choice; use only one brand at exposed Work.

**2.2 LIME**

- A. Manufacturing Standard: ASTM C-207
- B. Type: S hydrated
- C. Manufacturer & Brand: Contractor's choice; use one Brand only at exposed Work.

**PART 2 - PRODUCTS**

**2.3 AGGREGATE**

- A. Material: Sand
- B. Manufacturing Standard:
  - 1. For Mortar: ASTM C-144
  - 2. For Grout: ASTM C-404

**2.4 MORTAR COLOR**

- A. Material: Pure inorganic Mineral Oxide
- B. Manufacturer & Brand: Sonneborn Sonobrite, or approved.
- C. Type: Harmless to Mortar strength and set, and stable at high temperatures.
- D. Color: See Schedule on Drawings.
- E. Extent of Work: Provide in all exposed Mortar.

**2.5 ACCELERATOR**

- A. Manufacturer & Brand: Sonneborn Trimix, Anti-Hydro, or approved.

**2.6 RETARDANT**

- A. Manufacturer & Brand: Sika Plastiment, Protex, or approved.

**2.7 WATER**

- A. Clean and free of Deleterious Matter.

**2.8 MORTAR & GROUT MIXING**

- A. General:
  - 1. Comply with Referenced Specifications.
  - 2. Assume responsibility for Mix design and Product performance.
  - 3. Measure Materials by volume; do not measure by Shovel-load.
  - 4. Mix Ingredients in clean Mixer.
  - 5. Mix Proprietary Products in accordance with Manufacturer's instructions.
- B. Admixtures:
  - 1. Mortar Color: Do not exceed 10% of Portland Cement weight in Mortar.
  - 2. Waterproofing: Add to Mortar.
  - 3. Accelerator & Retardant: Add to Mortars and Grouts where required by Weather Conditions.
- C. Minimum 28 Day Compressive Strengths:
  - 1. Unit Masonry Mortar: 1800 psi.
  - 2. Masonry Grout: 2000 psi.
  - 3. Pointing Mortar: 750 psi.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Mortar and Grout Mixing Equipment, Surfaces, and Tools are clean and free of contaminants.
- B. Do not proceed with mixing until conditions are acceptable.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**3.3 QUALITY CONTROL**

- A. Refer to Section 01-45-30 for details.
- B. If ready-mixed Mortar or Grout is used, furnish certificate from Mixing Plant stating that delivered Mortar conforms to Specifications.

**3.4 RETEMPERING**

- A. Use Mortar and Grout only within 2 hours after initial mixing.
- B. Discard unused Mortar and Grout 2 hours after initial mixing.

**3.5 MORTAR & GROUT APPLICATION**

- A. Refer to the following:
  - 1. Section 04-20-00 (Unit Masonry)

**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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Masonry Mortars & Grouts: Section 04-10-00
- B. Joint Sealants: Section 07-92-00
- C. Graffiti Coating: Section 09-96-00
- D. Porous Concrete Pavers: Section 32 14 13 19

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.5 SAMPLES**

- A. Prior to starting work and in accordance with Section 01-33-00, submit 2 full size samples of Masonry Units for approval.
- B. Show texture and full color range.

**1.6 FIELD MOCK UP - MASONRY VENEER**

- A. In accordance with Section 01-33-00, build Sample Wall for all exposed Masonry types.
- B. Layout Wall where and as directed by Landscape Architect.
- C. Show Masonry color range, texture, typical coursing, bond, reinforcing, joint treatment, Mortar color, corner construction, etc.
- D. Do no additional work until Mock-Up is reviewed and accepted.
- E. Accepted Mock-Up represents minimum acceptable workmanship standard. Work of lesser quality is subject to rejection and replacement.
- F. Accepted Mock-up, in like-new condition, may be used in Project Work.

**1.7 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.

**PART 1 - GENERAL**

**1.8 WEATHER REQUIREMENTS**

- A. See Section 04-10-00.

**1.9 ADVANCE NOTICES**

- A. Notify Landscape Architect and Testing Lab at least 48 hours before Grout placement. Place no Grout until Reinforcement has been reviewed and accepted.

**1.10 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 Landscape Architect prior to fabrication.

**PART 2 - PRODUCTS**

**2.1 BRICK**

- A. Manufacturer: Belden, Summit, Interstate, Mutual Materials or approved.
- B. Brand: Full Size Veneer Unit
- C. Manufacturing Standard: ASTM C-216
- D. Durability Grade: SW
- E. Appearance Type:
  - 1. Solid Units: FBX
- F. Size: Jumbo Modular 3-5/8" x 2-3/4" x 7-5/8" inches
- G. Face Texture: Smooth
- H. Color: See Color Schedule on Drawings.
- I. Design Basis: Beldon
- J. Extent of Work: Veneer on Columns

**2.2 CONCRETE BLOCK**

- A. Type: Hollow-core and load -bearing.
- B. Manufacturing Standard: ASTM C90, Type 1, modified as follows:
- C. Class: Medium Weight
- D. Minimum Compressive Strength f'm: 1900 psi
- E. Minimum Dry Density: 106 pcf
  - 1. Exposed Chips: Unacceptable
  - 2. Maximum Fly Ash Content, if used: 22% of combined Cement and Fly Ash weight.
- F. Nominal Size, unless otherwise shown on Drawings: 8x8x16 inches

**PART 2 - PRODUCTS**

**2.2 CONCRETE BLOCK (Cont)**

- G. Required Special Shapes:
  - 1. As shown on Drawings
- H. Color & Face Texture: Manufacturer's standard

**2.3 REINFORCING BARS**

- A. Material: Steel
- B. Manufacturing Standard: ASTM A-615
- C. Grade: 60
- D. Extent of Work: Furnish and install all required for Unit Masonry Work.

**2.4 VENEER ANCHORS**

- A. Manufacturer & Brand: Contractor's choice
- B. Material: Steel with Hot-dip Galvanized Coating complying with ASTM A-123
- C. Type: Permitting vertical and horizontal differential movement between Masonry Facing and Backup Support, and complying with IBC Sect.1405.5.
- D. Size: Extend to within 1 inch of Masonry face

**2.5 WEEP HOLES**

- A. Plastic Tubing Type:
- B. Manufacturer: AA Wire Products, or approved.
- C. Model: AA 223
- D. Material: Plastic Tubing
- E. Tubing Diameter: 3/8 inch

**2.6 SILL FLASHING**

- A. Manufacturer: MortarNet, (800) 664-6638, or approved.
- B. Brand: TotalFlash
- C. Components: Factory-assembled flexible flashing, termination bar, vertical edge-dam, clog-preventing drainage matte & weep tabs, stainless steel drip-edge, corner pieces, fasteners, adhesive, and other items required for complete and waterproof assembly.
- D. Extent of Work: Provide at Veneer Column Sills.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that surfaces to receive Masonry are accurately sized and located, solid, level, dry, clean, 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 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.
- B. Protect Sills, Ledges, and Offsets against Mortar droppings.

**3.3 PREPARATION**

- A. When Relative Humidity reaches 30% or less, soak Brick to reduce initial absorption. Do not soak Concrete Block
- B. Remove dirt, ice, loose rust, and scale from Anchors, Ties, and Reinforcement prior to setting Masonry.

**3.4 SILL FLASHING INSTALLATION**

- A. Follow Manufacturer's instructions.
- B. Clean Surfaces to receive Flashing, and make smooth and free from projections which might puncture or otherwise damage Flashing.

**3.5 MASONRY INSTALLATION**

- A. General:
  - 1. Do not install cracked, broken, or chipped Masonry Units.
  - 2. Use Masonry Saws to cut and fit exposed Units.
  - 3. Lay Units plumb, true to line, and with level courses accurately spaced within allowable tolerances.
  - 4. Do not furrow Bed Joints.
  - 5. Stop horizontal runs by racking back in each course; toothing not permitted.
  - 6. Adjust Units to final position while Mortar is soft and plastic.
  - 7. If Units are displaced after Mortar has stiffened, remove Units, clean Joints and Units of Mortar, and relay Units with fresh Mortar.
  - 8. When joining fresh Masonry to set or partially set Masonry: Remove loose Units and Mortar. Clean and lightly wet exposed surface of set Masonry prior to laying fresh Masonry.
  - 9. Remove misplaced Mortar and Grout immediately.



**PART 3 - EXECUTION**

**3.5 MASONRY INSTALLATION (CONT)**

- B. Mortar Beds:
  - 1. Fill Joints with Mortar, except at:
    - a. Expansions Joints, Shrinkage Control Joints, and Weep Holes
    - b. Joints in open-end hollow Masonry Units
    - c. Space between Masonry Veneer and Backing
  - 2. Take special care to keep above spaces clean and free from Mortar droppings.
  - 3. Where adjustment must be made after Mortar has started to set, remove Mortar and replace with fresh Mortar.
- C. Laying Exposed Brick:
  - 1. Layout:
    - a. Unless otherwise shown on Drawings, select and arrange Brick Units to achieve uniform appearance, including randomly and evenly distributing Units without discernible repeating patterns or accumulations of same colors.
  - 2. Lay in running bond, alternating vertical Joints at mid-points of adjacent Bricks.
    - a. Make Joints uniform and approximately 1/2 inch wide.
  - 3. Joint Finishing:
    - a. All Horizontal Vertical Joints: Compress with Round Tool to produce concave Mortar shape.
- D. Laying Concrete Block:
  - 1. Layout:
    - a. Unless otherwise shown on Drawings, select and arrange Block Units to achieve uniform appearance, including randomly and evenly distributing Units without discernible repeating patterns or accumulations of same colors.
  - 2. Lay Units in running bond, alternating vertical Joints at midpoint of adjacent Units.
    - a. Units with exposed Open Cells not permitted. Where Hollow Cell Units can not be used, substitute matching Solid Units.
    - b. Make Joints uniform and approximately 1/2 inches wide.
  - 3. Joint Finishing:
    - a. At Joints to receive Veneer Brick Strike Mortar flush with Block face.
  - 4. At all other Horizontal Vertical Round Tool to produce concave Mortar shape.
- E. Shrinkage Control Joints:
  - 1. In straight Masonry Wall runs where located on Drawings, provide unbroken vertical Joint as follows:
    - a. Leave Control Joints open to receive Joint Sealant specified in Section 07-92-00.

**3.6 ALLOWABLE INSTALLATION TOLERANCES**

- A. Unless otherwise specified, construct Masonry Work true within 1/8 inch per 10 ft.
- B. Accurately size Masonry Openings within 1/4 inch, plus or minus.

**PART 3 - EXECUTION**

**3.7 PROTECTING WORK IN PROGRESS**

- A. When Work is not in progress, including shutdowns between each day's work:
  - 1. Bring Masonry Face and Backing to same level before stopping Work.
  - 2. Cover Wall tops with non-staining, Waterproof Covering; extend Covering 2 ft. minimum down both faces of Wall and secure in place.
- B. When Work is resumed:
  - 1. Remove any loose Mortar from Work Surfaces, and dampen Surface if necessary and when directed.
  - 2.

**3.8 ANCHORING**

- A. For Masonry Veneer over Concrete Backing
  - 1. Position Anchors into Anchor Slot not more than 16 inches apart; staggering alternate courses.
- B. For all other Masonry Veneer:
  - 1. In accordance with IBC Sect.1405.5, anchor Facing to Backing with Anchors embedded into Mortar and securely attached to Backing.
  - 2. Space Anchors to support 2 sq.ft. maximum of Veneer Wall area.
  - 3. Maximum Spacing:
    - a. Horizontally: 24 inches
    - b. Vertically: 18 inches
    - c. At Openings & Wall Edges: 8 inches
  - 4. Align Anchors with Masonry Joints to eliminate Anchor eccentricities.
  - 5. Stagger Anchors in alternate courses.
  - 6. Extend Anchor Fasteners through Wall Sheathing and secure to Wall Framing Studs.
  - 7. Extend Anchors into Concrete Masonry Cores and grout solid.
  - 8. Remove Mortar Droppings from Anchor Surfaces.

**3.9 REINFORCING**

- A. Reinforced Brickwork:
  - 1. Locate accurately and set in Mortar bed; cover with Mortar of same type.
  - 2. Lay succeeding Brick courses before Mortar sets.

**3.10 REINFORCING SOLID UNITS**

- A. Install Wire Reinforcing into horizontal Mortar Joints and aligned with adjacent Veneer Anchors. Lap Reinforcing 8 inches at End Joints.
- B. Install succeeding Masonry courses before Mortar sets.

**PART 3 - EXECUTION**

**3.11 REINFORCING HOLLOW CELL UNITS**

- A. Unless otherwise shown on Drawings:
1. Vertical Reinforcement:
    - a. Set one Reinforcing Bar vertically in Open Cells as follows:
      1. Where located on Drawings
      2. At Wall Ends and Corners
      3. At each side of any Shrinkage Control Joints
      4. At each side of any Openings
      5. At each side of adjacent Open Cells at Intersecting Walls
    - b. After laying first 4 courses of Masonry Units, slide Target-Cone Assembly into Masonry Unit Cavity over upcoming Reinforcing Bar.
    - c. After laying each additional 8 courses (maximum) of masonry units, place Reinforcing Bar into cavity through guide hole in top Target-Cone Assembly until Reinforcing Bar comes to rest on Reinforcing Bar Stop in bottom Target-Cone Assembly, then slide another Target-Cone Assembly into Masonry Unit cavity over upcoming Reinforcing Bar and continue Masonry Work.
    - d. When ready to place Grout, invert top Target-Cone Assembly in order to center Reinforcing Bar during Grout placement. After sufficient Grout has been placed to stabilize Reinforcing Bar in center of Masonry Cell, remove inverted Target-Cone Assembly and rinse-clean for reuse.
    - e. Fill Reinforced Cells with Masonry Grout.
  2. Horizontal Reinforcement:
    - a. Provide Horizontal Bond Beams at Wall tops, and at 48 inches o.c. maximum there under.
    - b. Reinforce Bond Beams as shown on Drawings.
    - c. Fill Reinforced Cells with Masonry Grout.

**3.12 GROUTING**

- A. Assure that Open Cells to receive Grout are free of Mortar Droppings and other Obstructions.
- B. Before Grout plasticity-loss, mechanically vibrate to consolidate Grout and fill Grout Space. Comply with IBC Section 21-03-.012.
- C. When grouting is delayed for 1 hour or more stop Grout 1-1/2 inches below top of adjacent Masonry.
- D. Maximum Grout Pour Height: 4 ft. unless otherwise approved and Cleanouts are provided; comply with IBC Section 21-04-.07.

**3.13 WEEP HOLES**

- A. Provide in Head Joints at first course immediately above Flashing and Sills.
- B. Leave Head Joint free and clean of Mortar.
- C. Maximum spacing between Weep Holes: 32 inches o.c.
- D. Keep Weep Holes and area above Sill free of Mortar droppings.
- E. Fill Cavity behind Weep Holes with Pea Gravel to level position above Weep Hole top, or with Plastic Fiber Device designed to prevent Mortar Droppings from plugging Weep Holes.

**PART 3 - EXECUTION**

**3.14 SEALANT JOINTS**

- A. Provide 1/4 inch wide by 3/4 inch deep Sealant Openings around outside perimeters of exterior Masonry Openings, unless otherwise shown on Drawings.

**3.15 MISCELLANEOUS ITEM INSTALLATION**

- A. Accurately locate and secure in place following Manufacturer's instructions.
- B. Set square, true, and flush with adjacent Construction.

**3.16 CLEANING & REPAIRING**

- A. In accordance with Masonry Manufacturer's instructions, remove Mortar, Efflorescence, and Stains from exposed Masonry surfaces.
- B. Delay cleaning until Masonry is dry.
- C. Prior to cleaning, remove excess Mortar by scraping with Brass, Nylon, or other Non-ferrous Devices only.
- D. Mask or otherwise protect adjacent Metalwork, Vegetation, and other Materials damageable by Cleaning Agents.
- E. Prior to applying fluid Cleaning Agents, wet Masonry with clean Water. Do not exceed Water-pressure rates recommended by Masonry Manufacturer.
- F. Unless otherwise approved, do not use Muriatic or other Acid type Cleaning Solutions.
- G. Follow Manufacturer's instructions for applying and removing Cleaning Agents.
- H. Immediately following cleaning, remove Cleaning Agents from Masonry. Do not exceed Water-pressure rates recommended by Masonry Manufacturer. Do not allow Cleaning Agents to dry on Masonry.
- I. Remove any Waste Materials containing Lime from Landscape Planting Beds.
- J. Including Work of other Sections, clean, repair and touch-up, or replace when directed, Products which have been soiled, discolored, or damaged by Work of this Section.
- K. Remove debris from Project Site upon Work completion, or sooner if directed.

**3.17 PROTECTING COMPLETED WORK**

- A. Protect Masonry against freezing, damage, and dislocation until Mortar has set.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Miscellaneous Fabricated Steel & Iron Subcontractor:
  - 1. Except for Related Work Items specified below, provide all other Iron and Steel Work.
  - 2. Provide fencing and indicated and detailed on Drawings

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Laboratory Testing: Section 01-45-30
- B. Chain Link Fencing: Section 02-82-00
- C. Reinforcing Steel for Concrete: Section 03-20-00
- D. Anchors for Masonry: Section 04-20-00

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 ABBREVIATIONS**

- A. AISC: American Institute of Steel Construction; One East Wacker Dr.; Suite 700; Chicago, IL 60601; (312) 670-2400.
- B. ANSI: American National Standards Institute; 1819 L St. NW; 6<sup>th</sup> Floor; Washington DC 20036; (202) 293-8020.
- C. ASTM: American Society for Testing and Materials; 100 Barr Harbor Dr.; West Conshohocken, PA 19428; (610) 832-9585

**1.6 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**PART 1 - GENERAL**

**1.7 SHOP DRAWINGS**

- A. General:
  - 1. Submit in accordance with Section 01-33-00.
  - 2. Indicate Shop and Field Welds by AWS Welding Symbols.
  - 3. Illustrate erection procedures and sequence.
  - 4. Furnish Anchor Bolt Templates, Setting Drawings, and Installation Details.
  - 5. Show locations, critical dimensions, required clearances, construction details, installation methods including any splices, attachments, and anchors.

**1.8 QUALIFICATIONS**

- A. Structural Steel Fabricator:
  - 1. Not less than 5 years experience in work of this type.
- B. Structural Steel Welders:
- C. Welders must be qualified for Welds to be performed in accordance with AWS D1.1 Standards.
  - 1. For each Welder submit, from approved Independent Laboratory or Inspection Service, Qualification Test Reports not older than 1 year.

**1.9 PRODUCT DELIVERY**

- A. Deliver Structural Steel to Jobsite in accordance with approved Progress Schedule and in proper erection sequence.
- B. Include all required Bolts and other Fastening Devices.

**1.10 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.

**1.11 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 Landscape Architect prior to fabrication.

**PART 2 - PRODUCTS**

**2.1 STEEL SHAPES, BARS, & PLATES**

- A. Manufacturing Standard: ASTM A-36 or A-572
- B. Minimum Yield Strength: 36 ksi

**2.2 STEEL TUBING & HOLLOW STEEL SECTIONS (HSS)**

- A. For Structural Uses:
  - 1. Manufacturing Standard: ASTM A-500
  - 2. Grade: B
  - 3. Minimum Yield Strength: 46 ksi
- B. For Non-structural Uses:
- C. Manufacturing Standard: ASTM A-501
- D. Minimum Yield Strength: 36 ksi

**2.3 STANDARD STRENGTH THREADED FASTENERS**

- A. Manufacturing Standard:
  - 1. Bolts & Nuts: ASTM A 307, Grade A
  - 2. Washers: ANSI Standard B 27
- B. Size & Spacing: See Drawings
- C. Finish:
  - 1. Where Fastening or Anchoring Galvanized Steel Items: Galvanize in accordance with ASTM A-153
  - 2. Elsewhere: Manufacturer's standard
- D. Extent of Work: Provide for all Work, except where High-Strength Threaded Fasteners are required.

**2.4 ANCHOR BOLTS**

- A. Manufacturing Standard ASTM F-1554
- B. Grade: 36
- C. Size: See Drawings

**2.5 WELDING ELECTRODES**

- A. Series: E-70
- B. Type: Satisfy conditions of use

**2.6 MISCELLANEOUS ITEMS**

- A. Provide all Steel Items shown on Drawings

**PART 2 - PRODUCTS**

**2.7 FINISHES**

- A. Shop Paint
  - 1. Rust-Inhibiting Primer specified in Section 09-90-00.
  - 2. Finish: Painting
  - 3. Extent of Work: All steel except Fencing
- B. Powder Coat
  - 1. All exposed Fence components

**2.8 ZINC-RICH PAINT**

- A. Manufacturing Standard: ASTM A-780
- B. Minimum Coating Thickness: Match Member Coating thickness.
- C. Extent of Work: Touch-up Galvanizing where Coating is damaged or missing.

**2.9 FABRICATION**

- A. Miscellaneous Steel - General:
  - 1. Punch and shear to leave clean Surfaces.
  - 2. Weld permanent Connections; grind exposed Welds smooth.
  - 3. Provide Holes and Connections for Work of other Trades.
  - 4. Cut abutting Members to fit with full bearing contact.
  - 5. Form Elbows and Bends to uniform radii, free from buckles and twists, and with finished Surfaces smooth.
  - 6. Miter and cope Member intersections within 2°, fit to within 0.02 inches, and weld all around.
  - 7. Where exposed to weather, form to exclude water; allow for expansion and contraction.
  - 8. Do not use Screws or Bolts when they can be avoided; when used countersink Heads, draw up tight, and nick Threads to prevent loosening.
- B. Shelf Angles:
  - 1. Standard Steel shapes, sizes, and weights shown on Drawings.
  - 2. Allow Expansion Spaces no greater than 10 ft. apart.
  - 3. Provide where shown on Drawings.
- C. Tube Railings:
  - 1. Size noted on Drawings.
  - 2. Fabricate to true lines; weld joints and grind smooth.
  - 3. Provide Fasteners for securing Horizontal Members.
  - 4. Return Wall-mounted Handrail Ends to Wall.
  - 5. Close exposed Open Railing Ends with 3/16inch Welded Plate or Prefabricated Fitting.
  - 6. Furnish 4inch long Sleeves to General Contractor for casting Posts into Concrete.



**PART 2 - PRODUCTS**

**2.10 FABRICATION TOLERANCES**

- A. Maximum deviation of individual Members from dimensions shown on Drawings as follows:
  - 1. Overall length of Members with both ends finished for compact bearing: 1/32 inch
    - a. Overall length of Members without finished ends:
    - b. For Members up to 30 ft. long: 1/16 inch
    - c. For Members over 30 ft. long: 1/8 inch
- B. Twists, Bends, & Kinks: Unacceptable

**2.11 SHOP TREATMENT**

- A. Surface Preparation:
  - 1. Remove Grease, Oil, Dirt, loose Rust, loose Mill Scale, and any other bond-reducing Materials.
  - 2. Within 8 hours of Surface Preparation, apply the following:
    - a. Permanent Treatment:
      - 1. At Steel Angles Galvanize in accordance with ASTM A-123.
      - 2. At all other Steel:
      - 3. Apply 1 coat Shop Paint.
      - 4. Minimum Dry Film Thickness: 1.0 mil
      - 5. Do not apply Shop Paint to the following:
        - a. Within 2 inches of Surfaces to be field welded
        - b. Surfaces to be encased in Concrete

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Surfaces and Structures to receive Fabricated Steel and Iron are accurately sized and located, square, plumb, true, rigid, secure, 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 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**PART 3 - EXECUTION**

**3.3 MISCELLANEOUS FABRICATED STEEL INSTALLATION**

- A. General:
  - 1. Follow approved Shop Drawings.
  - 2. Install to true lines, plumb and level, and as detailed or required for rigidity and permanence.
- B. Angles:
  - 1. Secure to Substrate with Steel Inserts and Bolts.
- C. Tube Railings:
  - 1. Set vertical Members into Sleeves previously built into Concrete.
  - 2. Position Railings parallel with adjacent Stair, Ramp, and/or Floor, unless otherwise shown on Drawings.
  - 3. Set true within 1/8 inch per 12 ft.; Brace as required.
  - 4. Secure Railing Members cast into Concrete with Metal Wedges; caulk with Epoxy Grout.

**3.4 ADJUSTMENTS**

- A. Adjust Moving Parts to operate satisfactorily at time of Project Substantial Completion and during Warranty Period.

**3.5 TOUCH UP**

- A. Touch up damaged Galvanized Surfaces with Zinc-Rich Paint. Match original Coating thickness, and apply in accordance with ASTM A-780.
- B. Touch up damaged Paint Surfaces with matching Paint. Apply in accordance with Paint Manufacturer's instructions.

**3.6 PRODUCT CLEANING & REPAIRING**

- A. Remove loose Rust, heavy Mill Scale, Oil, Dirt, and other bond-reducing Foreign Substances from Members scheduled to receive Finish Painting, or other direct-to-steel Coatings.
- B. Leave Surfaces ready for finishing specified in other Sections.
- C. 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.
- D. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Concrete Formwork: Section 03-10-00
- B. Miscellaneous Fabricated Steel: Section 05-50-00
- C. Preservative Treatment of Wood: Section 06-31-00
- D. Wood Siding & Paneling: Section 06-42-00

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.5 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.
- B. Do not store Wood materials in wet or damp areas, or in contact with Ground.

**PART 2 - PRODUCTS**

**2.1 LUMBER**

- A. Where Pressure-preservative Treated: Hem-Fir
  - 1. Elsewhere: Douglas Fir
- B. Finish, unless otherwise specified herein: Surfaced 4 sides
- C. Sizes & Shapes, unless otherwise specified herein: Standard nominal dimensions
- D. Manufacturing Standard: Dept. of Commerce Product Standard 20.
- E. Grade & (WWPA Grading Rules Paragraph Number):
- F. Posts smaller than 5x5: No. 1 (42.11)
  - 1. Beams: Select Structural (70.10) & free of Heart Center (FOHC)
- G. Joists & Rafters: No. 2 (62.12)
  - 1. Wall Studs up to 10 ft. Long:
    - a. 2x4 inch & Smaller: No. 2 (42.00)
    - b. 2x6 inch & Larger: No. 2 (80.12)

**PART 2 - PRODUCTS**

**2.1 LUMBER (Cont)**

- H. Wall Studs Longer than 10 ft.: Select Structural (80.10)
  - 1. Stair Framing Members: No. 1 (62.11)
  - 2. Stud Wall Plates: No. 2 (80.12)
  - 3. Furring, Blocking, Curbing, & Bracing: Standard (40.12)
- I. Maximum Moisture content when installed in Project:
  - 1. Wood embedded in Concrete: 12%
  - 2. Douglas Fir: 19%
  - 3. Hemlock, if any: 17%

**2.2 FASTENERS**

- A. Manufacturing Standard:
  - 1. Bolts: Fed. Spec. FF-B-575
  - 2. Nuts: Fed. Spec. FF-N-836
  - 3. Expansion Shields: Fed. Spec. FF-S-325
  - 4. Lag Screw & Lag Bolts: Fed. Spec. FF-B-561
  - 5. Toggle Bolts: Fed. Spec. FF-B-588
  - 6. Wood Screws: Fed. Spec. FF-S-111
  - 7. Nails & Staples: Fed. Spec. FF-N-105B
- B. Washers: Provide Washers under Bolt heads, Lag heads, and Nuts.
- C. Material: Steel
- D. Finish:
  - 1. At Preservative-treated Wood: Stainless Steel
  - 2. At Exterior Work: Hot-dip Galvanized
  - 3. At Interior Work: Contractor's choice
- E. Type:
  - 1. Where type is specifically noted: Use type specified.
  - 2. Elsewhere:
    - a. Where applied to Lumber: Nails or Wood Screws
    - b. Where applied to Plywood or Particle Board: Nails or Sheetmetal Screws
    - c. Where applied to Metal: Machine Screws or Bolts
    - d. Where applied to Masonry: Machine Screws with Expansion Shields
- F. Extent of Work:
  - 1. Provide all necessary for installation of Work specified herein.
  - 2. Sizes and quantities noted in Building Code.

**2.3 ADHESIVE**

- A. Manufacturer & Brand: Contractor's choice
- B. Type: Water-based with 15 grams/liter maximum VOC's

**PART 2 - PRODUCTS**

**2.4 WALL STUDS**

- A. Material: Framing Lumber
- B. Size: See Drawings
- C. Extent of Work: Provide at all Frame Walls.

**2.5 WALL SHEATHING PAPER**

- A. Manufacturers: Dupont, Fortifiber, Vapro-shield or approved
- B. Design Basis: DuPont Tyvek.
- C. Brand:
  - 1. At Walls: CommercialWrap
  - 2. At Opening Heads & Jambs: StraightFlash
  - 3. At Opening Sills: FlexWrap
- D. Extent of Work: Cover Exterior Wall Studs

**2.6 WOOD STAIRS**

- A. Material: Framing Lumber and Cedar as noted on Drawings
- B. Size & Shape: See Drawings
- C. Face Grain: Flat
- D. Surface: Smooth
- E. Edges & Corners: Eased

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Surfaces to receive Work specified herein are rigid, secure, accurately sized and located, 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 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**PART 3 - EXECUTION**

**3.3 INSTALLATION GENERAL**

- A. Install Proprietary Products in accordance with Manufacturer's instructions.
- B. Use additional Fasteners to those specified herein where necessary to insure rigidity and permanence.
- C. Provide Washers under Nuts and Heads when making Bolted or Lag Screwed connections.
- D. Drive Nails perpendicular to grain in lieu of toe-nailing where feasible.
- E. Accurately locate, cut, fit, and install Work secure, rigid, to true lines, plumb, and level, unless otherwise indicated.

**3.4 FRAMING CONNECTOR INSTALLATION**

- A. Provide where indicated; secure with Fasteners recommended by Manufacturer.

**3.5 JOIST, RAFTER, & BEAM INSTALLATION**

- A. Except at Cantilevered Members, if any, set with Crown Edge facing upward.
- B. Locate Splices over Bearing, and lap and spike together.
- C. Minimum Bearing: 3 inches
- D. Double Joist located under Overhead Partitions running parallel with Joists, if any; space Joists as required for clear passage of Pipes in Partitions.

**3.6 WALL PLATE INSTALLATION**

- A. Provide Single plates at Floors and at Opening Sills, and Double-plates face-nailed together at Ceilings and at Opening Heads.
- B. In lieu of Double-plates, provide Headers over Openings more than 30 inches wide as shown on Drawings. as specified below.
- C. Stagger Ends of adjacent Double-plates at least 4 ft. apart.
- D. Splice Plates butting at Corners.
- E. Locate Single-plate Splices and Splices in bottom piece of Double-plates directly over Wall Studs.

**3.7 WALL STUDS INSTALLATION**

- A. Spacing: See Drawings
- B. Install with Wide-face perpendicular to Wall-direction line.
- C. Double Studs at Opening Jambs, and triple Studs at Wall Corners and Intersections, unless otherwise shown on Drawings.
- D. Secure Studs to Top and Bottom Plates as shown on Nailing Schedule hereunder.
- E. Where necessary to receive Wall Covering Fasteners, provide Blocking fabricated of 2 inch minimum thick Framing Lumber matching full-width of Stud.

**PART 3 - EXECUTION**

**3.8 FIREBLOCKING & DRAFSTOPPING**

- A. Comply with IBC Section 717 requirements

**3.9 HEADER INSTALLATION, UNLESS OTHERWISE SHOWN ON DRAWINGS.**

- A. Spans up to 30 inches: 2 each nominal 2x4 inch
- B. Spans up to 42 inches: 2 each nominal 2x6 inch
- C. Spans up to 60 inches: 2 each nominal 2x8 inch
- D. Spans up to 72 inches: 2 each nominal 2x10 inch
- E. Spans longer than 72 inches: See Drawings
- F. At 72 inch and longer spans: Triple Studs at each end of Header and bear each end on 2 studs.

**3.10 SHEATHING PAPER INSTALLATION**

- A. Follow Manufacturer's instructions.
- B. Using full-width rolls, cover Exterior Wall Sheathing including any Window, Door, or other Openings.
- C. Remove Paper at Wall Openings by making 2 diagonal cuts in Paper, extending Paper Flaps into Opening, and securing Flaps to interior face of Wall Framing.
- D. Seal any Paper Penetrations or Tears with Duct Tape.

**3.11 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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

### **1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Rough Carpentry to be treated: Section 06-10-00

### **1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

### **1.4 REFERENCED SPECIFICATIONS**

- A. Pressure Treatments specified hereunder refer to Specifications of American Wood Preservers Assn. (AWPA); Box 5690; Granbury, TX 76049; (817) 326-6300.
- B. Specifications can be obtained from Association.

### **1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

### **1.6 CERTIFICATION**

- A. Affix Quality Seal of American Wood Preservers Bureau (AWPB) to each treated Member or, submit Affidavit stating that Preservative Treatment complies with these Specifications.
- B. Indicate year of treatment, Preservative used in treatment, applicable AWPB Quality Standard, trademark of AWPB Certified Agency, proper exposure conditions, Treating Company and Plant location, and Moisture condition of treated material.

### **1.7 REGULATORY AGENCY REQUIREMENTS**

- A. Comply with Environmental Protection Agency requirements including the following:
  - 1. Wear Dust Masks and Eye Goggles when sawing or machining Treated Wood.
  - 2. Wash Hands after working with Treated Wood.
  - 3. Do not burn Treated Wood; dispose in normal Trash Collector.



**PART 1 - GENERAL**

**1.8 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage.

**PART 2 - PRODUCTS**

**2.1 PRESSURE-APPLIED TREATMENT MATERIAL**

- A. Treatment: AWPAC-2
- B. Preservative:
  - 1. Manufacturer & Brand: CSI ACQ Preserve, Osmose Nature Wood, Wolmanize Natural Select, or approved.
  - 2. Material: Alkaline Copper Quat or Copper Azole (ACQ)
- C. Extent of Work: Apply to Wood, if any, in the following locations:
  - 1. In contact with Earth
  - 2. In contact with Concrete
  - 3. In contact with Masonry
  - 4. In contact with exterior Sheetmetal
  - 5. Elsewhere shown on Drawings or in Specifications

**2.2 BRUSH-APPLIED TREATMENT MATERIAL**

- A. Material: 2% minimum Copper Naphthenate Solution, or approved.
- B. Extent of Work: Treat any Field Cuts to Pressure-treated Material

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Material to receive Treatment does not exceed Moisture Content specified for similar Untreated Wood.
- B. Prior to starting Work, notify General Contractor about defects requiring correction.
- C. Do not start Work until conditions are satisfactory.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**PART 3 - EXECUTION**

**3.3 PRESSURE TREATMENT**

- A. Follow Referenced Specifications.
- B. Incise Members prior to Treatment. except where exposed to view.
- C. Minimum Retention: 0.40 pcf
  - 1. If and where in contact with Ground or Water: 0.40 pcf
  - 2. Where above Ground: 0.25 pcf

**3.4 FIELD CUTS**

- A. Liberally apply 2 coats of Brush Treatment Material to field-cut Surfaces.

**3.5 WASTE DISPOSAL**

- A. Do not burn Treated Wood Scraps.
- B. Do not mix Treated Wood Scraps with Untreated Wood. Separate Scraps and lawfully dispose.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Rough Carpentry: Section 06-10-00
- B. Sealant & Sealing: Section 07-92-00
- C. Field Painting & Finishing: Section 09-90-00

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 REFERENCED QUALITY STANDARDS**

- A. Unless otherwise specified herein, Standards shall be defined by the following:
- B. Material Standards:
  - 1. Softwood Lumber: Grading Rules of Western Wood Products Assn. (WWPA); 522 S.W. 5th Ave.; Portland, OR 97204; (503) 224-3930; or Grading Rules of other Agency certified by Board of Review of American Lumber Standards Committee. Standard Specifications for Grades of California Redwood of Redwood Inspection Service (RIS); 617 Montgomery St.; San Francisco, CA 94111.
  - 2. Plywood: APA Grading Rules of Engineered Wood Assn. (formally known as American Plywood Assn.); 7011 S. 19<sup>th</sup> St.; Tacoma, WA 9841; (253) 565-6600.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 PRODUCT DELIVERY**

- 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.

**1.7 PRODUCT STORAGE & HANDLING**

- A. Protect against damage and discoloration.

**PART 2 - PRODUCTS**

**2.1 PLYWOOD SIDING**

- A. Species: Douglas Fir
- B. Face Veneer Grade: APA 303 Match Existing
  - 1. Face Pattern: Match Existing
  - 2. Thickness: Match Existing
- C. Sheet Width: 48 inches
- D. Glue: Exterior Type
  - 1. Manufacturer & Brand: Contractor Choice
- E. Extent of Work: Patch and repair and infill openings where shown on Drawings.

**2.2 ADHESIVE**

- A. Type: Recommended by Siding Manufacturer for conditions of use.

**2.3 PREFINISHING**

- A. Notify Painter to finish Exterior Materials before installation.
- B. Apply to exposed surfaces and concealed back and edge surfaces of each Member.
- C. Air-dry Stain without artificial heat.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Structure and Surfaces to receive Siding are straight, plumb, true, solid, rigid, dry, 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 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**3.3 INSTALLATION, GENERAL**

- A. Securely install straight, plumb, level, parallel, and true as appropriate.
- B. Fit neatly at Joints and against Trim.
- C. Accurately scribe to adjacent Surface irregularities.
- D. Locate Joints over solid bearing.
- E. Remove sharp External Corners.
- F. Fit accurately and neatly around any Projections through Siding.

**PART 3 - EXECUTION**

**3.4 PLYWOOD SIDING INSTALLATION**

- A. Install in one-piece lengths, where possible; where not possible,
- B. Match and align with existing
- C. Install with 1/16 inch gap between adjacent Panels.
- D. Secure with Nails spaced 6 inches apart along Panel Edges and 12 inches apart along Intermediate Supports. Drive Nails flush with Panel Surface, but do not set.
- E. Provide 'z' flashing as required to match existing installation.

**3.5 PAINTING & FINISHING INCLUDED IN THIS SECTION**

- A. Before installing, finish Concealed Ends of Exterior Siding as specified in Section 09-90-00.
- B. Touch-up, or completely refinish if determined necessary by Landscape Architect, Surfaces which have become damaged, soiled, or discolored.
- C. Remove Debris from Project Site upon Work completion, or sooner if directed.

**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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Stair Tr4eads and Landing Deck: Section 06-10-00

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.5 SAMPLES**

- A. Prior to starting work and in accordance with Section 01-33-00, submit 2 full size x 12 inch samples of Plastic Lumber for approval.
- B. Show each shape, texture and full color range.

**1.6 MAINTENANCE INSTRUCTIONS**

- A. In accordance with Section 01-83-00, submit Instructions to General Contractor for inclusion in Owner's Maintenance Manual.

**1.7 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Deliver in unbroken Packages with Manufacturer's legible Label thereon. Do not remove Labels or open Packages until Architect inspects and approves.
- B. Store in a clean and dry Storage Area.
- C. Protect against damage and discoloration.
- D. 24 hours prior to application, remove Panels from package and allow Panels to acclimatize to Installation Area Temperature and Humidity.

**1.8 EXTRA STOCK**

- A. Provide 10% extra material of each color and type of Plastic Lumber.
- B. Store on Project Premises where directed by Owner.

**PART 2 - PRODUCTS**

**2.1 PLASTIC LUMBER**

- A. Material: Recycled High Density Polyethylene (HDPE)
  - 1. Extruded.
  - 2. Additives:
    - a. UV Stabilizers
    - b. Fiberglass Strengtheners
  - 3. Characteristics:
    - c. Chemical Resistant
    - b. Graffiti Resistant
- B. Finish: Wood Grain.
- C. Capabilities:
  - 1. Span: 24 inches minimum
  - 2. Load: 100 psf with 24inch span
- D. Color: Selected by Architect after Contract award from Manufacturer's standard choices. Color to be Charcoal or Dark Gray.
- E. Extent of Work: Stair Treads and Landing Decking, see Drawings.
- F. Basis of Design: Bedford Technology

**2.2 FASTENERS**

- A. Type: Screws recommended by Manufacturer to satisfying conditions of use.
  - 1. Material: Stainless Steel

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Surfaces to receive materials are true, sound, clean, dust-free, mildew-free, free from conditions that could damage or impair attachment, and be 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 INSTALLATION**

- A. Follow Manufacturer's Installation Instructions.
- B. Follow Manufacturer's recommendations for cutting and drilling material.
- C. Follow Manufacturer's instructions for end joint spacing at miters for expansion.
- D. Secure all boards from underside of bracket.
  - 1. Provide minimum 3 fasteners each board end.
- E. All boards to be continuous from end to mitered corner

**PART 3 - EXECUTION**

**3.3 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.

**3.4 PREPARATION WORK**

- A. Before applying Panels, remove any materials or defects which interfere with application.
- B. Carefully store Removed Items, and accurately replace following Panel application.

**3.5 SURFACE PREPARATION**

- A. Remove any Substrate Surface Defects that could effect material installation or function.

**3.6 PANEL INSTALLATION**

- A. Follow Manufacturer's instructions.
- B. Except at any Color or Pattern breaks, do not install Panels with Horizontal Seams.
- C. Do not extend Panels below top of any adjacent Wall Base.
- D. Take special care to assure complete adhesion at Joints, Edges, and Corners.

**3.7 PRODUCT CLEANING & REPAIRING**

- A. Leave Surfaces clean and defect-free at time of Substantial Project Completion.
- B. 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.
- C. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**



**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Caulk Exterior Joints as follows:
  - 1. Joints around Window Frames, Door Frames, and other Openings in Exterior Walls: Modified Silicone (STPe) Sealant
  - 2. Joints between adjacent Dissimilar Materials: Modified Silicone (STPe) Sealant
- B. Caulk within Exterior Frame Walls as follows:
  - 1. Space between Wall Framing Members and Windows, Doors, and other Openings where subject to Air-infiltration: Foam Air-Infiltration Sealant
  - 2. Joints around Window Frames, Door Frames, and other Openings in Exterior Walls: Acrylic Latex Sealant
  - 3. Elsewhere caulking is shown on Drawings or required to fill Open Joints: Acrylic Latex Sealant
- C. Follow Beaverton School District's Standards for method, product selection and installation.

**1.3 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.4 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.5 INSTALLER'S QUALIFICATIONS**

- A. Installer must have successfully completed at least 2 similar Projects and be in full-time business performing Work of this type.

**1.6 FIELD MOCK-UP**

- A. Provide examples of each type of Joint Sealant for Landscape Architect's review.
- B. Re-prepare, if necessary, until Mock-Up is accepted.
- C. Accepted Mock-Ups represent minimum standard, and Work of lesser quality is subject to rejection.
- D. Approved Mock-Ups may be used on Project Work.

**PART 1 - GENERAL**

**1.7 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.
- B. Store in original, tightly sealed Containers, and with original legible Labels thereon. Do not open Containers or remove Labels until Landscape Architect reviews.
- C. Do not exceed Sealant shelf life.

**1.8 WEATHER REQUIREMENTS**

- A. Perform no Work when weather exceeds Manufacturer's specified limits.
- B. Prohibited Air Temperature:
  - 1. Minimum: 40°F and falling
  - 2. Maximum: 90°F and rising

**PART 2 - PRODUCTS**

**2.1 POLYURETHANE SEALANT (Paintable surfaces)**

- A. Manufacturer & Brand: Vulkem 921, Sikaflex-1 or approved.
- B. Material: 1-component polyurethane.
- C. Manufacturing Standard: ASTM C-920, Type S, Class 50, Grade NS.
- D. ASTM C-661 Shore A Hardness Range: 15-20
- E. Joint Movement Range: Plus 100% to Minus 50%

**2.2 SILICONE SEALANT (Non-paintable surfaces)**

- A. Manufacturer & Brand: Dow Corning 'Dowsil 795' or approved.
- B. Components: 1-part, neutral cure silicone
- C. Manufacturing Standard: ASTM C-920, Type S, Class 25, Grade NS.
- D. Required Ingredient: Mildew Inhibitor
- E. Cure Method: Neutral
- F. ASTM C-661 Shore A Hardness Range: 15-20 minimum
- G. Joint Movement Range: Plus 100% to Minus 50%
- H. Minimum Elongation: 1200%

**2.3 ACRYLIC LATEX SEALANT**

- A. Manufacturer & Brand: Contractor's choice
- B. Components: 1
- C. Manufacturing Standard: ASTM C-834
- D. Minimum ASTM C-736 Recovery: 75%
- E. Joint Movement Range: Plus or Minus 7½ %

**PART 2 - PRODUCTS**

**2.4 FOAM AIR-INFILTRATION SEALANT**

- A. Manufacturer & Brand: Grace Polycel One, or approved.

**2.5 SEALANT COLORS**

- A. Foam Sealant: Contractor's choice  
B. Silicone Sealant: Clear Translucent, unless otherwise indicated.  
C. All Other: Approximate color of Adjacent Surfaces, unless otherwise indicated, and subject to Landscape Architect's approval. Obtain Landscape Architect's instructions if Sealant is adjacent to more than 1 different color.

**2.6 PRIMER & SURFACE CONDITIONER**

- A. Manufacturer & Type: Recommended by Sealant Manufacturer

**2.7 BACKER ROD**

- A. Manufacturer & Brand: Nomac SOF Rod  
B. Material: Polyolefin Open & Closed-cell, soft-rod, non-off gasing, and recommended by Sealant Manufacturer for conditions of use.  
C. Chemically inert. Non-absorbing.  
D. Diameter: 25% greater than Joint width  
E. Extent of Work: Provide for all Sealants, except Foamed types.

**2.8 BOND BREAKER TAPE**

- A. Manufacturer & Brand: Contractor's choice  
B. Material: Polyethylene Tape, or approved.  
C. Extent of Work: Where Backer Rod can not be used, provide Tape where necessary to prevent 3-sided adhesion of Sealant to Substrate

**2.9 FOAM SEALANT DAMS**

- A. Material: Contractor's choice  
B. Minimum UL Fire Resistance Rating:  
1. At Dams Remaining in Place: Match adjacent Wall or Floor Rating.  
2. At Dams to Be Removed: None required

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Joints to be sealed are clean, dry, and free from Dust, Oil, Grease, Rust, Lacquer, loose Mortar, Ice, Frost, or other Bond-reducing Matter. If necessary, remove Bond-reducing Matter by grinding.
- B. Verify that Sealants are compatible with Substrate.
- C. Prior to starting Work, notify General Contractor about defects requiring correction.
- D. Do not start Work until conditions are satisfactory.

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by work of this Section.
- B. Mask Surfaces adjacent to Joints as required for complete protection.

**3.3 SURFACE PREPARATION**

- A. Remove Dust, Dirt, Moisture, and any other Foreign Matter from Joints to be sealed.

**3.4 PRIMING**

- A. Unless otherwise recommended by Sealant Manufacturer, prime Surfaces to receive Sealant.
- B. Apply with Bristle Brush.
- C. Do not flood surfaces.

**3.5 INSTALLATION - GENERAL**

- A. Follow Manufacturers' instructions.
- B. Follow Beaverton School District Standards regarding sealants.

**3.6 BACKER ROD INSTALLATION**

- A. Using dry Wheeled Tool, install Backer Rod behind Sealant in accordance with Sealant Manufacturer's instructions. Do not use Lubricants to ease installation.
- B. Provide in continuous, one-piece lengths where practicable. Where discontinuous pieces are necessary, butt Rod Joints neatly and snugly.
- C. Depth behind adjacent Surface: Approximately 1/2 Joint width (1/4 inch minimum and 5/8 inch maximum).
- D. Do not stretch, twist, puncture, or tear Rods. Replace any damaged Rods.

**PART 3 - EXECUTION**

**3.7 FOAM SEALANT INSTALLATION**

- A. Inject Sealant continuously until Opening is filled.
- B. If Opening is not filled within Sealant Snap Time or maximum of 3 minutes, stop application for at least 15 minutes before resuming work.
- C. Trim cured Foam flush with Adjacent Surface.
- D. Remove any combustible Dams.

**3.8 MODIFIED SILICONE (STPE) & ACRYLIC LATEX SEALANT INSTALLATION**

- A. Apply in accordance with Manufacturer's instructions using Hand or Pressure Gun type Dispenser.
- B. Size Gun Nozzle to fit Joint.
- C. Force Sealant into Joints firmly against Joint Sides to fill Joints and Voids solid; superficial pointing with Skin Bead not acceptable.
- D. Prevent 3-sided adhesion of Sealant to Substrate.
- E. Install Sealant flush with Adjacent Surface.
- F. Within 10 minutes after installation, and using Dry Tool finish Sealant to smooth, uniform, and slightly concave shape.
- G. Remove excess Sealant and Masking Materials, if any, immediately after Sealant installation.
- H. Leave Sealant Surfaces neat and smooth.

**3.9 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. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Siding: Section 06420
- B. Joint Sealants: Section 07920
- C. Hollow Steelwork Shop Painting: Section 08110

**1.3 ALTERNATES**

- A. Refer to Section 01200 for possible effect upon Work of this Section.

**1.4 COORDINATION**

- A, Coordinate with other Trades affecting or affected by Work of this Section.

**1.5 PRODUCTS LIST**

- A. Before ordering, submit complete List of Materials proposed for use.
- B. Obtain Architect's acceptance before ordering.

**1.6 COLOR SAMPLES**

- A. In accordance with Section 01330, submit 2 Samples of each specified Finish, Color, and Sheen.
- B. Minimum Sample Size: 8-1/2 x 11 inches
- C. Sample Substrates:
  - 1. For Paint: Stiff Paper, or approved.

**1.7 REGULATORY AGENCY REQUIREMENTS**

- A. Removal of any Lead-base Paint Products (exceeding 20 sq. ft of Exterior Surface or 6 sq. ft. of Interior Surface) must be performed by Workers who have been Pre-certified by Environmental Protection Agency.

**1.8 CERTIFICATE OF COMPLIANCE**

- A. Submit Affidavit from Paint Manufacturer's Representative that exterior Concrete Block Base Coat and Finish Coat were properly applied.
- B. Submit Affidavit from Paint Manufacturer's Architectural Service Representative that Products and Work of this Section comply with these Specifications.

**PART 1 – GENERAL**

**1.9 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Deliver in Manufacturer's original, unopened Containers with legible Labels intact.
- B. Do not open Containers or remove Labels until Architect inspects.
- C. Store in suitable location where directed by General Contractor.
- D. Protect against damage and contamination.
- E. Remove unacceptable Materials from Project Site.

**1.10 PRODUCT LABELS**

- A. Each Product Container Label shall include:
  - 1. Manufacturer's Name
  - 2. Type of Material
  - 3. Manufacturer's Product Number
  - 4. Manufacturer's Batch Number
  - 5. Color

**1.11 WORK SPACE ENVIRONMENTAL REQUIREMENTS**

- A. Comply with Manufacturer's recommendations.
- B. Perform Work only under the following conditions, unless otherwise instructed by Manufacturer:
  - 1. Maximum Relative Humidity: 85%
  - 2. Minimum Dew Point Variance between Air & Surface Temperature: 5°F.
- C. Minimum Ambient Air & Surface Temperature during application and until Film is dry-hard thereafter: 45°F.

**1.12 EXTRA STOCK**

- A. Submit, in previously unopened Containers, 1 gallon of each color of each Top Coat.
- B. Label each Container with Product-identification and Use-location.
- C. Store on Project Premises where directed by Owner.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. Products for each general purpose shall meet Beaverton School District's Standards and Beaverton School District's Technical Standards, Division 9.
- B. Products shall be free of Lead and Mercury and must comply with Federal VOC requirements.
- C. Products shall have good flowing and brushing properties and shall dry or cure free of Blemishes or Sags.
- D. Products shall not exceed Code-required Flame-spreads or Smoke-developments.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Examine Surfaces to receive Coatings for existing conditions that could adversely effect Work execution, permanence, or quality. Give particular attention to Primer Coatings applied by other Trades. and to existing Coated Surfaces scheduled to receive new Coatings.
- B. Verify that General Contractor has removed Door Hardware, as specified in Section 08710.
- C. Do not apply Coating over Substrates which exceed the following Maximum Moisture Content:
  - 1. Wood: 15%
- E. Prior to starting Work, notify General Contractor about defects requiring correction.
- F. Do not start Work until conditions are satisfactory. Applying Coatings to defective Substrates indicates acceptance of Defective Substrate by Painter, and Painter shall bear all costs to produce acceptable Work, including re-painting entire Surface (No touch-up painting).

**3.2 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.
- B. Prior to painting, remove or otherwise protect any Finish Hardware, Accessories, Cover Plates, Lighting Fixtures, and similar Items. After painting, reinstall Removed Items and remove Protective Coverings.
- C. Do not dump Waste Materials, including Thinners, into Landscape Planting Beds, Plumbing Fixtures, or Storm Drains.
- D. Cover or otherwise protect Paint Storage and Mixing Rooms.

**3.3 FIRE PROTECTION**

- A. Take extraordinary care to prevent Fire.
- B. Open Coating Containers only when needed.
- C. Keep Rubbing Cloths and Oily Rags submersed in Water.

**3.4 SURFACE PREPARATION**

- A. General:
  - 1. Remove any Loose Material, Dirt, Dust, or Foreign Matter.
- B. Non-galvanized Ferrous Metal:
  - 1. Remove any Rust, Grease, Oil, or loose Scale.
- C. Existing Surfaces to be refinished:
  - 1. Clean thoroughly.
  - 2. Remove any Mildew by scrubbing with Trisodium Phosphate Solution, treat with Bleach Solution, rinse with clean Water, and allow Surfaces to completely dry before proceeding with remaining work.
  - 2. Remove any loose, scaly, or other Defective Film.
  - 3. Fill any Voids.
  - 4. Sand any Irregular Surfaces smooth.
  - 5. Remove any Film Gloss by washing and sanding.
  - 6. Seal any Stains or Graffiti with Shellac.
  - 7. Touch-up any Bare Spots with proper Primer.
- D. Existing Surfaces to be refinished:
  - 1. Clean thoroughly.
  - 2. Remove any Mildew by scrubbing with Trisodium Phosphate Solution, treat with Bleach Solution, rinse with clean Water, and allow Surfaces to completely dry before proceeding with remaining work.
  - 3. Remove any loose, scaly, or other Defective Film.
  - 4. Fill any Voids.



**PART 3 - EXECUTION**

**3.4 SURFACE PREPARATION (Cont)**

5. Sand any Irregular Surfaces smooth.
6. Remove any Film Gloss by washing and sanding.
7. Seal any Stains or Graffiti with Shellac.
8. Touch-up any Bare Spots with proper Primer.
9. Flat Metalwork, including Doors: Apply Paint with Roller or Airless Spray Equipment only. Do not apply by Brush.
10. If, and when, painting Door Hinges such as on Electrical Panels, open and close Doors several times after painting to prevent Paint bridging across Hinge Knuckles.
11. Roller-applied High-build Coatings: Do not "move" Paint with roller, or stop rolling prior to roller going dry. Remove roller marks by back-rolling, using minimum possible pressure, and rolling in 1 direction only.

**3.5 FIELD QUALITY CONTROL**

- A. Before proceeding with remaining Work, request Architect to inspect each first-finished Room, Space, and Item for acceptability.
- B. Immediately following application, Wet Film Thickness of Coatings may be tested in compliance with ASTM D-4414.
- C. After 14 calendar days following application, Coatings may be tested as follows:
  1. In compliance with ASTM D-4138, Dry Film Paint Thicknesses may be measured using a Mark II Tooke Coating Inspection Gage, or a similar Precision Instrument, designed for measuring Paint Coating Thicknesses. Touch-up Test Surface, which will measure approximately 1 sq. inch per Test.
  2. In compliance with ASTM D-3359 Tape Test, Coating Adhesion may be determined.
- D. Recoat any Work which fails Test.

**3.6 PRODUCT CLEANING & REPAIRING**

- A. Remove any Spills, Splatters, and Stains including those in Paint Storage and Mixing Room.
- B. Unless otherwise approved, refinish entire Surface where portion of Coating is unacceptable.
- C. 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.
- D. Remove Debris from Project Site upon Work completion, or sooner if directed.

**3.7 PROTECTING COMPLETED WORK**

- A. Post Signs and install Barricades where necessary to protect Completed Work of this Section against damage and discoloration.

**PART 3 - EXECUTION**

**3.8 PAINTING SCHEDULE**

**A General:**

1. Prime Coats specified below may be omitted where Factory-applied Shop Coatings have been applied by other Trades.
2. Prime Coats specified below may be omitted from Existing Finished Surfaces, provided Existing Coating is sound.
3. Quantities of Coats specified below are minimum. Finished Work shall be even, uniform, and free from cloudy and mottled appearance. Apply additional (4 minimum) Coats of any Deep or Bright Tone Colors where necessary to hide Substrate.

**B. Minimum Dry Film Thicknesses specified below include Prime Coat and Finish Coats combined**  
**C. Exterior Galvanized Steel:**

- 1 Latex Enamel
  - a. 1 coat Galvanized Primer, (MPI Product #134 - *Min. Solids Volume 38% & Max. VOC 100 grams/liter*), followed by:
  - b. 2 coats Semi-gloss (MPI Level #5) Latex Enamel (MPI Product #11 - *Min. Solids Volume 39% & Max. VOC 50 grams/liter*)
  - c. Minimum Total Dry Film Thickness: 4.0 mils

**D. Exterior Steel Handrails:**

1. Polyurethane Enamel
  - a. 1 coat Epoxy Coating (MPI Product #98 - *Min. Solids Volume 45% & Max. VOC 250 grams/liter*), followed by:
  - b. 2 coats High Gloss (MPI Level #7) Polyurethane Enamel (MPI Product #72 - *Min. Solids Volume 64% & Max. VOC 250 grams/liter*)
  - c. Minimum Total Dry Film Thicknesses: 5.0 mils

**E. All Other Exterior Ferrous Metal:**

1. Latex Enamel
  - d. 1 coat Bonding Primer (MPI Product #107 - *Min. Solids Volume 38% & Max. VOC 100 grams/liter*), followed by:
  - e. 2 coats Semi-gloss (MPI Level #5) Latex Enamel (MPI Product #11 - *Min. Solids Volume 39% & Max. VOC 50 grams/liter*)
  - f. Minimum Total Dry Film Thickness: 4.0 mils

**F. Exterior Woodwork:**

1. Alkyd Enamel
  - a. 1 coat Exterior Alkyd Primer (MPI Product #5 - *Min. Solids Volume 75% & Max. VOC 200 grams/liter*), followed by:
  - b. 2 coats Semi-gloss (MPI Level #5) Alkyd Enamel (MPI Product #81 - *Min. Solids Volume 53% & Max. VOC 380 grams/liter*)
  - c. Minimum Total Dry Film Thickness: 4.0 mils

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 EXTENT OF WORK**

- A. Apply Coating full height over exterior surfaces of Concrete Block columns.

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Concrete Block to receive Coating: Section 04-20-00

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.6 PRODUCTS LIST**

- A. Before ordering, submit complete List of Materials proposed for use.
- B. Obtain Landscape Architect's acceptance before ordering.

**1.7 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Deliver in Manufacturer's original, unopened Containers with legible Labels intact.
- B. Do not open Containers or remove Labels until Landscape Architect inspects.
- C. Store in suitable location where directed by General Contractor.
- D. Protect against damage and contamination.
- E. Remove unacceptable Materials from Project Site.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Comply with Manufacturer's recommendations.

**PART 1 - GENERAL**

**1.9 EXTRA STOCK**

- A. In previously unopened containers, submit 1 gallon each of:
  - 1. Protective Coating
- B. Store on Project Premises where directed by Owner.

**PART 2 - PRODUCTS**

**2.1 PROTECTIVE COATING**

- A. Manufacturer & Brand: Evonik 'Protectosil Antigraffiti', or approved.
- B. Type: Non-sacrificial
- C. Material: Water-based, Zero VOV, breathable, clear..
- D. Extent of Work: Coat all exterior exposed surfaces of masonry columns.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to starting this Work, verify the Transparent Water Repellent Work specified in Section 07-18-00 is complete and has been accepted.
- B. Examine Surfaces to receive Coating for existing conditions that could adversely effect Work execution, permanence, or quality.
- C. Prior to starting Work, notify General Contractor about defects requiring correction.
- D. Do not start Work until conditions are satisfactory.

**3.2 PREPARATION WORK**

- A. From Surfaces to receive Coating, remove any Moisture, Soil, Oil, Grease, or other Foreign Matter that could prevent proper Coating application.
- B. Follow Manufacturer's instructions.

**3.3 PROTECTING WORK OF OTHER SECTIONS**

- A. Protect against damage and discoloration caused by Work of this Section.
- B. Prior to applying Coating, remove or otherwise protect adjacent surfaces. After Coating application is complete, reinstall Removed Items and remove any Protective Coverings.

**PART 3 - EXECUTION**

**3.4 COATING APPLICATION**

- A. Follow Coating Manufacturer's instructions.
- B. Maintain Application Equipment clean, free from contaminates, and suitably prepared for conditions of use.

**3.5 PROTECTING COMPLETED WORK**

- A. Protect Coating against rain or other damage until Coating is cured.

**3.6 PRODUCT CLEANING & REPAIRING**

- A. Remove any Spills, Splatters, and Stains.
- B. 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.
- C. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. Excavation and fills, including compaction, of on-site private pavement and landscaped areas.

**1.3 RELATED SECTIONS**

- A. Section 312333 - Trenching and Backfill

**1.4 REFERENCED SPECIFICATIONS**

- A. ODOT Standard Specifications (latest revision).

**1.5 REFERENCED DOCUMENTS**

- A. Geotechnical Report: Report of Geotechnical Engineering Services, Sunset High School Football field, as provided by GeoDesign Inc., dated January 20, 2015.
- B. All earthwork operations shall comply with the recommendations and requirements of the Geotechnical Report.

**1.6 DEFINITIONS**

- A. Rock: Material that cannot be removed by one-yard shovel, by backhoe with 9,500 lb. digging force, by pick and shovel, or by 200 HP Crawler fitted with normal excavating equipment. Ripper attachment as might be hooked into seam is not considered "normal" excavating equipment.
- B. Unstable Soil: Soft, loose, wet, or disturbed ground that is incapable of supporting material, equipment, personnel, or structure.
- C. Wet Weather Conditions: Wet Weather Conditions apply to materials placed during dry weather but which are subsequently subjected to rainfall and equipment or construction traffic. The Contractor shall be responsible for the performance of the selected type of material.
- D. Large Woody Debris: Tree trunks over 8 inches in diameter and a minimum of 12 feet long (without root wads), cleaned to be free of weeds or weed seed by power washing subject to approval by Owner's Wetlands Consultant prior to installation in Wetland Mitigation Areas.

**1.7 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise noted.

- B. Product Data: Manufacturer's specifications and technical data including performance, construction, and manufacturing information.
  - 1. Submit for: Stabilization Rock, Crushed Rock Fill and Subgrade geotextile fabrics.
- C. Field Quality Control: Submittals as specified in Part 3 of this section.
  - 1. Field Tests.
  - 2. Special Inspections for Code Compliance.
- D. Closeout Requirements: Comply with Section 017700.
  - 1. Provide record documents.

#### 1.8 **QUALITY CONTROL**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- B. Installers Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.
- C. Product/Material Qualifications:
  - 1. Design Data: Compaction testing shall be in accordance with Section 014500, QUALITY CONTROL.
  - 2. Test Reports: Provide imported material gradation test reports. Provide material compaction test reports.
- D. Regulatory Requirements:
  - 1. An erosion control permit is not required from Oregon DEQ. The contractor shall comply with the standard erosion control measures, as approved by Clean Water Services and as documented on the approved plans, to ensure the outcomes required by the Project Site Development Permit.
- E. Observation and Inspection: Owner will retain a Geotechnical Engineer to monitor earthwork operations.

#### 1.9 **DELIVERY, STORAGE, AND HANDLING**

- A. Delivery, Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

#### 1.10 **ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before starting work of this section.

#### 1.11 **COORDINATION**

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

**PART 2 - PRODUCTS**

**2.1 STABILIZATION FILL**

- A. Imported, clean, angular quarry rock, 4-inch or 6-inch minus material, open-gradation, meeting ODOT Select Stone Backfill, Section 00330.15.

**2.2 CRUSHED ROCK FILL AND PAVEMENT BASE**

- A. Imported clean 3/4" - 0 or 1-1/2" - 0 crushed rock or crushed gravel, free from foreign material and conforming to the requirements of ODOT Standard Specification (latest revision) 02630.

**2.3 DRAIN ROCK (BEDDING COURSE)**

- A. Imported, clean 1/4" – 3/8" angular, crushed rock or crushed gravel, free from foreign material with no more than 2 percent passing the No. 200 sieve.

**2.4 OPEN-GRADED CRUSHED ROCK FILL (CHOKER COURSE)**

- A. Imported, clean 3/4" - 1/4" angular, crushed rock or crushed gravel, free from foreign material with no more than 2 percent passing the No. 200 sieve.

**2.5 PERMEABLE PAVER DRAIN ROCK (AGGREGATE RESERVOIR)**

- A. Imported, clean 3/4" - 2" angular, uniform graded crushed rock or crushed gravel, free from foreign material.

**2.6 SAND**

- A. Imported natural coarse river sand; clean, washed material, graded in accordance with ASTM C136 with 100 percent passing a No. 4 sieve; free from subsoil, vegetative materials, seed, litter, stiff clay, stones larger than 1 inch in diameter, stumps, roots, trash, or toxic substances. Soil particles shall be within the following relative proportions:
  - Clay – 0% to 10%
  - Silt – 0% to 13%
  - Sand – 86% - 100%
- B. Submit sample to Landscape Architect for approval prior to ordering.

**2.7 NATIVE MATERIAL**

- A. Excavated, on-site soil, native to project site, free of organics, solids larger than 3-inch diameter, weeds and other deleterious matter and approved by the Geotechnical Engineer for use as fill only during dry weather conditions.



**2.8 SUBGRADE STABILIZATION GEOTEXTILE**

- A. Subgrade woven geotextile; grab tensile strength 250 lb minimum per ASTM D4632 (latest revision) each direction; puncture strength 495 lb per ASTM D6241 (latest revision); No. 40 sieve per ASTM D4751 (latest revision) or smaller opening; 0.05 sec water permittivity per ASTM D4491 (latest revision).

**2.9 NON-WOVEN GEOTEXTILE FOR PERMEABLE PAVER BASE**

- A. Non-woven geotextile conforming to ODOT Type II variation or approved equal.

**2.10 CONDUIT**

- A. Irrigation sleeves as specified in Section 32 80 00, IRRIGATION.
- B. Electrical conduit as specified in Division 26, ELECTRICAL.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to starting of the work of this section verify that existing grades and field conditions agree with drawings. Notify Engineer of deviations.
- B. Do not start work of this section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

**3.2 PROTECTION**

- A. Monuments: Carefully maintain benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Existing Utilities: Existing utilities shall be field located. Protect active utility lines encountered. Repair or replace utility lines damaged by work of this Section.
- C. Pavement Cleaning: Maintain pavements and walkways clean at all times.
- D. Dust Control: Protect persons and property against damage and discomfort caused by dust; water as necessary and when directed.
- E. Other Work and Adjacent Property: Protect against damage caused by work of this section.

**3.3 GENERAL REQUIREMENTS**

- A. Contractor shall perform all excavation necessary or required for proper construction of the work and placement or installation of materials.
- B. Cutting Pavements: Cut vertical, straight-line joints using power saw designed for cutting pavements.

- C. Line and Grade: Excavate to lines and grades shown on the drawings or as established by the Engineer.
- D. Shoring: Shore excavations when necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public or as required by local, state, or federal agencies. Shoring shall be removed, as the backfilling is done, in a manner that does not damage work or permit voids in the backfill. It shall be the sole responsibility of the Contractor to see that safety requirements are met.
- E. Temporary stockpiling of Excavated Materials: Excavated materials may be placed in approved areas. Do not obstruct roadways, bikeways, or pedestrian walkways. Conform to all federal, state and local codes governing the safe loading of excavated materials adjacent to excavations.
- F. Excess Excavation: Where excavation, through the Contractor's error, is carried to levels lower than those shown on drawings, backfill with specified bedding material to proper levels at Contractor's expense.
- G. Drainage: Except as otherwise permitted, excavation shall be done in a manner as to provide for adequate drainage. In excavation where gravity drainage is not practical, the Contractor shall provide pumps and accessories with which to remove and dispose of all water, including but not limited to, surface water from rainfall entering the excavations, as required to accomplish the work and as required by governing jurisdictions.
- H. Backfilling shall not commence until after excavations have been inspected. Backfill shall be placed in such a manner as not to disturb, damage, or subject such facilities to unbalanced loads or forces. Make fills as soon as feasible after Engineer's review and acceptance.
- I. If rock or unstable soil are encountered, notify Engineer. Removal of rock or unstable soil will be paid for as an addition to the contract.

### 3.4 GEOTEXTILE PLACEMENT

- A. Acquisition and Storage: Provide complete rolls of geotextile as furnished by the manufacturer, and protect against damage and deterioration. Store all geotextile rolls in a dry place and off the ground at all times according to ASTM D4873 (latest revision). Cover all rolls and partial rolls with a dark protective covering when received. The geotextile will be rejected for use if the Engineer determines it has defects, deterioration, or has been damaged.
- B. Surface Preparation: Prepare the surface receiving the geotextile to a smooth condition free of obstructions, depressions, and debris unless otherwise directed. Do not drag the geotextile on the ground or mishandle it in any way.
- C. Loosely place the geotextile without wrinkles so placement of the overlying material will not tear the geotextile. Lap or sew the geotextile at the ends and sides of adjoining sheets as specified.
- D. On Slopes: Place the geotextile with the machine direction oriented up-down the slope. Lap the upper sheets over the top of the lower sheets. When the geotextile is placed on a slope steeper than 6:1, securely anchor the laps to the ground surface with pins or stakes as necessary to prevent slippage and tearing of the geotextile. Start placement of fill material on the geotextile at the toe of the slope and proceed upwards.
- E. Overlap: Minimum overlap shall be 24 inches.
- F. If the Engineer determines the specified overlap is not sufficient, increase the overlap to provide adequate coverage or sew the geotextile together in the field. If field-sewn, the provisions of ODOT 00350.20 and 00350.41(a-3) apply.
- G. Protection of Geotextile: Protect the geotextile at all times from ultraviolet (UV) rays, contamination by surface runoff, and construction activities.
- H. Traffic or construction equipment will not be permitted directly on the geotextile except as authorized by the Engineer. When placed for construction, cover the geotextile with specified cover material as soon as possible.

- I. Place cover material on the geotextile in a manner that the geotextile is not torn, punctured, or shifted. Use a minimum 6-inch-thick cover layer or twice the maximum aggregate size, whichever is thicker. End-dumping cover material directly on the geotextile will not be permitted.
- J. Limit construction vehicles in size and weight so rutting in the initial layer above the geotextile is not more than three inches deep or one half the layer thickness, whichever is less. Turning of vehicles on the first layer will not be permitted.
- K. Repair of Geotextile: Repair or replace all torn, punctured, or contaminated geotextiles during construction at no cost to the Owner. Repair by placing a patch of the specified geotextile over the affected area. Where geotextile seams are required to be sewn, repair any damaged sheet by sewing unless otherwise indicated on the plans or special provisions or as directed.

### **3.5 CLEARING AND GRUBBING**

- A. Clear and grub site in all areas to receive improvements. Clearing shall be the removal of all brush, grass, shrubs, trees, weeds, rubbish, structures, pavements, and debris flush with or slightly below original ground surface.
- B. Dispose of all cleared and grubbed materials off site.

### **3.6 EXCAVATION AND FILLS AT PERMEABLE PAVEMENT AREAS**

- A. Excavate existing material to the grades required on the drawings. Remove any excavated material from site.
- B. Do not traffic the subgrade with construction equipment or vehicles until proof roll. Proof roll the sub-grade as directed by the Geotechnical Engineer. Unstable material shall be overexcavated as directed by the Geotechnical Engineer. Overexcavation will be paid for as an addition to the contract, as approved by the Owner. Overexcavated material shall be removed from site. Use Stabilization Rock or Crushed Rock Fill to fill the voids left after overexcavation. Place fill in 12-inch maximum loose lifts and compact to a minimum density of 95 percent relative compaction, per a maximum dry density of ASTM D1557 (latest revision) at an optimum moisture content of  $\pm 2$  percent.
- C. Place subgrade non-woven geotextile over entire permeable paver subgrade.
- D. Use Crushed Rock Fill to raise the grade to the bottom of the paver section. Place fill in 12-inch maximum loose lifts and compact to a minimum density of 95 percent relative compaction, per a maximum dry density of ASTM D1557 (latest revision) at an optimum moisture content of  $\pm 2$  percent. Fill that cannot be tested shall be compacted to the approval of the Geotechnical Engineer.
- E. Place Permeable Paver Drain Rock. Place material in 12-inch maximum loose lifts and compact to a minimum density of 95 percent relative compaction, per a maximum dry density of ASTM D1557 (latest revision).

### **3.7 EXCAVATION AND FILL AT LANDSCAPED AREAS**

- A. Refer to landscape drawings and Section 329300, GROUND COVER PLANTING.
- B. Excavate to the grades required on the drawings. Scarify subsoil to a depth of 6 inches at all plant beds and lawn areas.
- C. When necessary, eliminate uneven areas and low spots in subsoil. Remove debris, roots, branches, stones, etc. Notify Owner if subsoil contaminated with petroleum products is encountered.

- D. Place loam in relatively dry state at areas where scheduled. Fine grade loam within specified tolerances eliminating rough or low areas. Establish levels, profiles, slopes, and contours shown on drawings. Establish uniform gradients between given grade points.
- E. Remove stone, roots, grass, weeds, debris, and foreign material while spreading. Manually spread around existing trees, paving, and other structures to prevent damage.
- F. At plant beds, soil shall be loam, minimum 18 inches thick, and shall be compacted to a minimum density of 80 percent relative compaction, per a maximum dry density of ASTM D1557 (latest revision) at an optimum moisture content of  $\pm 2$  percent.
- G. At lawn areas, soil shall be loam, minimum 6 inches thick, and shall be compacted to a minimum density of 80 percent relative compaction, per a maximum dry density of ASTM D1557 (latest revision) at an optimum moisture content of  $\pm 2$  percent.

### 3.8 **GRADING**

- A. Perform all earthwork to the lines and grades shown on the drawings. Shape and finish slopes to conform to the lines, grades, and cross sections as shown or approved by the Landscape Architect. Provide positive drainage away from buildings and sidewalks.

### 3.9 **MAINTENANCE OF EARTHWORK**

- A. Contractor shall maintain all earthwork surfaces until all work has been completed and accepted. Such maintenance shall include, but not be limited to, addition of appropriate backfill material to keep backfilled surface smooth, free from ruts and potholes, and suitable for traffic flow.

### 3.10 **DISPOSAL OF WASTE MATERIAL AND EXCESS EXCAVATION**

- A. Remove from site excess material that is unsuitable for backfilling or stockpiling at the Contractor's expense.

### 3.11 **SETTLEMENT**

- A. Any settlement in earthwork which occurs during the warranty period and is attributable to construction procedures, such as improper removal of shoring or insufficient compaction, shall be corrected by the Contractor at his own expense. Any piping or facilities damaged by such settlement shall be restored to their original condition at the Contractor's expense.

### 3.12 **FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  - 1. Subgrade compaction testing.
  - 2. Material compaction testing.
  - 3. Imported material gradation testing.
- C. Field Inspections: Notify Engineer prior to work of this section.
- D. Special Inspections for Code Compliance: Obtain building inspector approvals.

3.13 **CLEANING**

- A. Upon completion of the work of this section promptly remove from the working area all scraps, debris, and surplus material.

3.14 **PROTECTION**

- A. Protect all work installed under this section.
- B. Replace at no additional cost to Owner, any damaged work of this Section.

END OF SECTION

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. Excavation and fills, including compaction, of on-site private storm drain, sanitary sewer, manholes, and water distribution systems.

**1.3 RELATED SECTIONS**

- A. Section 31 20 00 – Earth Moving

**1.4 REFERENCED SPECIFICATIONS**

- A. ODOT Standard Specifications (current edition).

**1.5 DEFINITIONS**

- A. Rock: Material that cannot be removed by one-yard shovel, by backhoe with 9,500 lb. digging force, by pick and shovel, or by 200 HP Crawler fitted with normal excavating equipment. Ripper attachment as might be hooked into seam is not considered “normal” excavating equipment.
- B. Unstable Soil: Soft, loose, wet, or disturbed ground that is incapable of supporting material, equipment, personnel, or structure.

**1.6 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise indicated.
- B. Product Data: Manufacturer's specifications and technical data including performance, construction, and manufacturing information.
- C. Field Quality Control submittals as specified in Part 3 of this Section.
  - 1. Field Tests
  - 2. Special Inspections for Code Compliance

**1.7 QUALITY REQUIREMENTS**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.

- B. Installer's Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.
- C. Product/Material Qualifications:
  - 1. Design Data: Compaction testing shall be in accordance with Section 014500, QUALITY CONTROL.
  - 2. Test reports: Provide imported material gradation test reports. Provide material compaction test reports.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

#### 1.9 ADVANCE NOTICES

- A. Notify Engineer at least 48 hours before starting work of this section.

#### 1.10 COORDINATION

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

### PART 2 - PRODUCTS

#### 2.1 CRUSHED ROCK

- A. Imported, clean, 3/4" - 0 crushed rock or crushed gravel, free from foreign material and meeting the requirements of ODOT Standard Specifications (current edition) 02630.
- B. To be used for Pipe Base Material, Pipe Zone Material, and Trench Backfill.

#### 2.2 NATIVE MATERIAL

- A. Excavated on-site soil, native to project site, free of organics, solids larger than 3 inch diameter, weeds and other deleterious materials and approved by the Geotechnical Engineer for use as on-site backfill only during dry weather conditions.

#### 2.3 DRAIN ROCK

- A. Refer to SECTION 312000 – EARTH MOVING, for permeable paver drain rock material specification.

#### 2.4 DRAINAGE GEOTEXTILE

- A. Refer to SECTION 312000 – EARTH MOVING.

**2.5 TRACER WIRE**

- A. Electrically conductive tracer wire, 18 - gauge, insulated copper or heavier, green in color, or other approved material. To be placed full length of trench with non - metallic pipe.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to starting work of this section, verify that existing grades and field conditions agree with drawings. Notify Engineer of deviations.
- B. Do not start work of this section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

**3.2 PROTECTION**

- A. Monuments: Carefully maintain benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Existing Utilities: Existing utilities shall be field located. Protect active utility lines encountered. Repair or replace utility lines damaged by work of this section.
- C. Pavement Cleaning: Maintain pavements and walkways clean at all times.
- D. Dust Control: Protect persons and property against damage and discomfort caused by dust; water as necessary and when directed.
- E. Other Work and Adjacent Property: Protect against damage caused by work of this section.

**3.3 GENERAL REQUIREMENTS**

- A. Contractor shall do all trenching and excavating necessary or required for proper construction of the work and placement or installation of materials. Tunneling or jacking shall not be used unless approved in writing by the Engineer.
- B. Cutting Pavements: Cut vertical, straight - line joints using power saw designed for cutting pavements. Cut minimum one foot beyond each side of trench.
- C. Obstructions: Remove all obstructions encountered within the trench area or adjacent thereto. If requested by Contractor, Engineer may make minor changes in trench alignment to avoid major obstructions, provided such alignment changes can be made without adversely affecting the intended function of the facility. Contractor shall pay any additional costs resulting from such alignment changes.
- D. Trenching: Minimum trench width to be 12 inches greater than outside diameter of pipe. Maximum trench width at top of trench shall not be limited except where excess width of excavation would cause damage or create damage to adjacent structures or facilities.
- E. Line and Grade: Excavate trench to lines and grades shown on the drawings or as established by the Engineer with proper allowances for pipe thickness and special bedding when required.
- F. Shoring: Shore trench when necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public or as required by local, state, or



- federal agencies. Shoring shall be removed, as the backfilling is done, in a manner that will not damage pipe or permit voids in the backfill. It shall be the sole responsibility of the Contractor to see that safety requirements are met.
- G. Temporary Stockpiling of Excavated Material: Locate at least 2 feet from trench edges. Place excavated material only within approved areas. Do not obstruct roadways, bikeways, or pedestrian walkways. Conform to all federal, state and local codes governing the safe loading of excavated materials adjacent to trenches.
- H. Excess Excavation: Where excavation, through Contractor's error, is carried to levels lower than those shown on drawings, backfill with specified bedding material to proper levels at Contractor's expense.
- I. Drainage: At all times keep trenches dry. Provide and operate pumping equipment necessary to keep excavations free from standing water. Dispose of water in manner to prevent damage to adjacent property and as required by governing jurisdiction.
- J. If rock or unstable soil are encountered, notify Engineer. Removal of rock or unstable soil will be paid for as an addition to the contract.

### 3.4 EXCAVATION

- A. Excavate trenches to the line and grades shown on the drawings.

### 3.5 BACKFILL

- A. Backfilling shall not commence until after pipe, conduit, structures, and other equipment and appurtenances placed in trench or similar excavations have been properly constructed or installed, as applicable, and inspected. Backfill shall be placed in such a manner as not to disturb, damage, or subject such facilities to unbalanced loads or forces. Make fills as soon as feasible after Engineer's review and acceptance.
- B. Pipe Base: Place required thickness of Pipe Base Material over full width of trench. Provide uniform bearing under entire length of each pipe.
- C. Pipe Zone: Place required thickness of Pipe Zone Material over full width of trench.
- D. Above Pipe Zone: Backfill full width of trench to paving subgrade elevation or to within depth of loam in landscaped areas with Trench Backfill.
- E. Compaction: Trench backfill shall be compacted in maximum 12-inch lifts to:
1. 95 percent compaction under pavement areas per ASTM D1557 at an optimum moisture content of  $\pm 2$  percent.
  2. 90 percent compaction elsewhere per ASTM D1557 at an optimum moisture content of  $\pm 2$  percent.
  3. Water settling of trench backfill will not be considered an acceptable compaction procedure.

### 3.6 MAINTENANCE OF TRENCH BACKFILL

- A. Contractor shall maintain all backfilled trench surfaces until all work has been completed and accepted. Such maintenance shall include, but not be limited to, addition of appropriate backfill material above the pipe zone to keep backfilled trench surface smooth, free from ruts and potholes, and suitable for traffic flow.

**3.7 DISPOSAL OF WASTE MATERIAL AND EXCESS EXCAVATION**

- A. Remove from site excess material and that unsuitable for backfilling.

**3.8 SETTLEMENT**

- A. Any settlement in trench backfill which occurs during the warranty period and is attributable to construction procedures, such as improper removal of shoring or insufficient compaction, shall be corrected by the contractor at his own expense. Any piping or facilities damaged by such settlement shall be restored to their original condition at the Contractor's expense.

**3.9 FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  - 1. Material compaction testing:
    - a. Trench Compaction: A minimum of one field density test shall be conducted on compacted material for every 100 linear feet, or fraction thereof, of trench and for every 3 feet, or fraction thereof, of fill placed.
  - 2. Imported material gradation testing.
- C. Field Inspections: Notify Engineer prior to work of this section.
- D. Special Inspections for Code Compliance: Obtain building inspector approvals.

**3.10 CLEANING**

- A. Upon completion of the work of this section promptly remove from the working area all scraps, debris, and surplus material.

**3.11 PROTECTION**

- A. Protect all work installed under this section.
- B. Replace, at no additional cost to Owner, any damaged work of this section.

END OF SECTION

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventative measures.
- D. Compensation of owner fines levied by authorities having jurisdiction due to non-compliance by contractor.

**1.3 RELATED SECTIONS**

- A. Section 31 20 00 - Earth Moving

**1.4 REFERENCED SPECIFICATIONS**

- A. ODOT Standard Specifications (current edition).

**1.5 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise noted.
- B. Product Data: Manufacturer's specifications and technical data including performance, construction, and manufacturing information.
  - 1. Submit for None.
- C. Closeout Requirements: Comply with Section 017700.

**1.6 QUALITY REQUIREMENTS**

- A. All measures indicated in this specification may not be required. Contractor responsible for implementing erosion and sediment controls adequate to comply with permit requirements.
- B. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- C. Installers Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.
- D. Regulatory Requirements:
  - 1. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained.

2. An erosion control permit is not required Oregon DEQ. The Owner shall apply, pay for, and secure the permit. The contractor shall comply with the construction erosion control drawings and Clean Water Service requirements, including all requirements noted in the Site Development Permit.
3. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
- E. Stormwater Runoff: Control increased stormwater runoff due to disturbance of surface cover due to construction activities for this project.
  1. Prevent runoff into storm sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
  2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  1. Control movement of sediment and soil from temporary stockpiles of soil.
  2. Prevent development of ruts due to equipment and vehicular traffic.
  3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  1. Prevent windblown soil from leaving the project site.
  2. Prevent tracking of mud onto public roads outside site.
  3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including open drainage ways and storm sewers.
  1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments and relocate on site; comply with requirements of authorities having jurisdiction.
- I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments and relocate on site; comply with requirements of authorities having jurisdiction.
- J. Open Water: Prevent standing water that could become stagnant.
- K. Monitoring and Inspection:
  1. Contractor shall be responsible for monitoring the construction erosion control measures and shall make adjustments to measures, in accordance with the drawings and permit, to accommodate changes in earthwork operations and weather conditions.
  2. Contractor shall be responsible for appointing an Erosion Control Inspector. Inspector shall be a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, is knowledgeable in the correct installation of the erosion and sediment controls, and is able to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity. Erosion Control Inspector shall submit periodic inspection reports as noted on the Drawings.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery, Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

**1.8 ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before starting work of this section.

**1.9 COORDINATION**

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

**PART 2 - PRODUCTS**

**2.1 BARK/MULCH BIO BERM**

- A. The compost filter berm material consists of compost or a blend of compost and mulch materials according to the specifications as follows.
- B. The filter berm material shall meet particle sizing specifications that when used in a filter berm system are tested in conformance with the outlined methods and scope of ASTM D6459 (latest revision), standard test method for determination of Erosion Controlled Blanket (ECB) Performance in Protecting Hill Slopes from Rainfall Erosion.
- C. The compost portion of the filter berm shall be derived from well-decomposed organic matter source produced by controlled aerobic (biological) decomposition that has been sanitized through the generation of heat and stabilized to the point that it is appropriate for this particular application. Compost material shall be processed through proper thermophilic composting, meeting the U.S. Environmental Protection Agency's definition for a 'process to further reduce pathogens' (PFRP). The compost portion shall meet the chemical, physical and biological properties outlined below.
  - 1. The pH shall be between 5.0 and 8.5 for berms to receive vegetation.
  - 2. Nitrogen Content: 0.5 - 2.0%.
  - 3. Soluble Salts: Maximum 5 mmhos/cm.
  - 4. Compost shall be weed and pesticide free, with manmade materials comprising less than 1%.

**2.2 SEDIMENT FENCE**

- A. Sediment Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths.
- B. Apparent Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751 (latest revision).
- C. Permittivity:  $0.05 \text{ sec}^{-1}$ , minimum, when tested in accordance with ASTM D4491 (latest revision).

- D. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 (latest revision) after 500 hours exposure.
- E. Grab Tensile Strength-Supported: 100 lb-f, minimum, in cross-machine direction; 120 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632 (latest revision).
- F. Grab Tensile Strength-Unsupported: 90 lb-f, minimum, in cross-machine direction; 100 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632 (latest revision).
- G. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
- H. Manufacturers:
  - 1. BP Amoco, Amoco Fabrics and Fibers; [www.geotextile.com](http://www.geotextile.com).
  - 2. TC Mirafi; [www.tcmirafi.com](http://www.tcmirafi.com).
  - 3. Synthetic Industries; [www.fixsoil.com](http://www.fixsoil.com).

### **2.3 BIO-FILTER BAGS**

- A. Provide minimum size 18" x 6" x 30" plastic mesh bags with 1/2 inch openings filled with approximately 45 pounds of clean, 100% recycled wood-product waste.

### **2.4 CATCH BASIN INSERT BAG / CURB INLET SEDIMENT DAM**

- A. Provide prefabricated filter inserts manufactured specifically for collecting sediment in drainage inlets. Include handles and/or fasteners sufficient to keep the insert from falling into the inlet during maintenance and removal of the insert from the inlet. Insert bags shall be included on the Oregon Qualified Products List (QPL) for Type 3 Inlet Protection, or approved. Curb Inlet Sediment Dams shall be included on the Oregon QPL for Type 6 Inlet Protection, or approved.

### **2.5 SUBGRADE GEOTEXTILE**

- A. Subgrade geotextile shall meet the requirements of SECTION 312000, EARTH MOVING.

### **2.6 GRASS SEED FOR TEMPORARY COVER**

- A. Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- B. Seeds shall be of blue tag stock and from the current or latest season's crop and shall be in containers labeled in accordance with Oregon State and U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.

## **PART 3 - EXECUTION**

### **3.1 EXISTING CONDITIONS**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.
- B. Do not start work of this section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.

- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

### 3.2 **INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES**

- A. Install as shown on drawings, or as directed by Engineer, Erosion and Sediment Control Inspector, or Local Authority Having Jurisdiction. All measures included in this specification or details shown on Drawings may not be necessary. Contractor to utilize measures, as needed, to meet the requirements of erosion control permit(s) and the intent of this specification.

### 3.3 **TEMPORARY SEEDING**

- A. When hydraulic seeder is used, seedbed preparation is not required.
- B. When surface soil has been sealed by rainfall or consists of smooth, undisturbed cut slopes and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
- C. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq. ft.
- D. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq. ft.
- E. Incorporate fertilizer into soil before seeding.
- F. Apply seed uniformly; if using drill or cultipacker seeder, place seed 1/2 to 1 inch deep.
- G. Irrigate as required to thoroughly wet soil to depth that will ensure germination without causing runoff or erosion.
- H. Repeat irrigation as required until grass is established.

### 3.4 **PROTECTION**

- A. Monuments: Carefully maintain bench marks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Existing Utilities: Existing utilities shall be field located. Protect active utility lines encountered. Repair or replace utility lines damaged by work of this Section.
- C. Pavement Cleaning: Maintain pavements and walkways clean at all times.
- D. Dust Control: Protect persons and property against damage and discomfort caused by dust; water as necessary and when directed.
- E. Other Work and Adjacent Property: Protect against damage caused by work of this section.

### 3.5 **FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Special Inspections for Code Compliance:
  - 1. Obtain building approvals from Local Authority Having Jurisdiction.
  - 2. Provide periodic inspection reports as noted on the Drawings.

**3.6 MAINTENANCE**

- A. Maintain temporary measures until permanent measures have been established.
- B. Repair deficiencies immediately.

**3.7 CLEANING**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

**3.8 PROTECTION**

- A. Protect all work installed under this section.
- B. Replace at no additional cost to Owner, any damaged work of this Section.

END OF SECTION



**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. Asphaltic concrete pavements, crushed rock pavement base for on-site private improvements.

**1.3 WORK INCLUDED BUT SPECIFIED IN OTHER SECTIONS**

- A. Section 31 20 00 – Earth Moving

**1.4 REFERENCED SPECIFICATIONS**

- A. 2018 Oregon Standard Specifications for Construction, HMAC Pavement Reference, Section 00744.

**1.5 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise indicated.
- B. Product Data: Manufacturer's specifications and technical data including performance, construction, and fabrication information.
  - 1. Submit for job mix formulas (JMF).
- C. Field Quality Control submittals as specified in Part 3 of this Section:
  - 1. Field Tests.
- D. Closeout Requirements: Comply with Section 0177 00.
  - 1. Special warranties
  - 2. Provide record documents.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- B. Installer's Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.
- C. Pre-installation Conference: Contractor, installer, Engineer, and representatives of other affected trades shall meet at site to review paving operations, acceptance of substrata surfaces, and coordination with other trades.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery, Storage and Protection: Comply with manufacturer's recommendations.
1. Protect materials and maintain product temperature during delivery.

**1.8 SPECIAL WARRANTIES**

- A. Contractor shall warrant installed pavement for a period of 2 years from date of Substantial Completion. When notified in writing from Owner, they shall promptly and without inconvenience and cost to Owner correct said deficiencies to comply with requirements.

**1.9 COORDINATION**

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

**1.10 ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before starting work of this section at each site.

**PART 2 - PRODUCTS**

**2.1 CRUSHED ROCK PAVEMENT BASE**

- A. Imported Clean 3/4"-0 or 1-1/2"-0 dense graded crushed rock or crushed gravel, free of foreign material and meeting the requirements of ODOT Standard Specifications (current edition) 02630, Base Aggregate.

**2.2 HOT MIXED ASPHALT CONCRETE (HMAC)**

- A. Asphalt Mixture: The asphalt concrete mixture shall be a well-graded, uniform coated, durable mix of the mix type(s) as shown on the plans or approved by the Engineer.

**BROADBAND LIMITS**

**DENSE GRADED MIXTURE**

Sieve Size Passing	Percentage of Total Aggregate (by weight) 1/2" Dense	Percentage of Total Aggregate (by weight) 3/4" Dense
1"	--	99-100
3/4"	99-100	92-100
1/2"	90-100	75-91
1/4"	52-80	50-70
No. 10	21-46	21-41
No. 40	8-25	6-24
No. 200	3-8	2-7
Asphalt Cement	4-8	4-8

- B. Asphalt Cement (Binder): Per Oregon Standard Specifications for Construction, (current edition). Use PG (Performance Grade) 64-22 for base and wearing courses.
- C. Aggregate for Base Course Mix: Per Oregon Standard Specifications for Construction (current edition).
- D. Aggregate for Wearing Course (Top Lift of HMAC) Mix: Per Oregon Standard Specifications for Construction (current edition).
- E. Fine Aggregate: Per Oregon Standard Specifications for Construction (current edition).
- F. Mineral Filler: Finely ground particles of limestone, hydrated lime, or other mineral dust, free of foreign matter.
- G. Asphalt Tack Coat: Type CSS-1, CSS-1h, CMS-2, CMS-2S, CMS-2h, CRS-2, HFRS-2 or HFMS-2 emulsified asphalt (EA) conforming to Standard Specifications for Highway Construction (current edition).
- H. Reclaimed Asphalt Pavement (RAP) Material: Shall not exceed 30% in the new pavement. Rap material not permitted in open graded or Level 4 HMAC pavement, in accordance with Standard Specifications for Highway Construction (current edition). Asphalt mixtures including RAP to meet all normal specification and Oregon Standard Specifications for Construction (current edition) requirements.

### 2.3 **JOB MIX FORMULA (JMF)**

- A. Mix Formula: The Contractor shall submit a JMF for each mixture to be used on the project and meeting the Level 2 criteria of Oregon Standard Specifications for Construction, Current Edition.
- B. The Contractor shall supply the job mix design to the Engineer ten (10) work days prior to production. The job mix formula shall be no more than five (5) years old.
- C. Approval: No paving shall occur until the Contractor receives written approval of the Contractor's job mix formula.

### 2.4 **HMAC ACCEPTANCE**

- A. The mixture will be accepted by visual inspection of the Engineer. If the mixture is considered suspect, the Contractor shall obtain samples under the observation of the Engineer and tested as per Oregon Standard Specifications for Construction, Current Edition (section 00744.16). Testing shall be performed by an independent testing agency paid for by the Contractor. Contractor to be reimbursed by Owner if testing shows HMAC is within the specified limits and tolerances.

### 2.5 **HMAC PRODUCTION QUALITY CONTROL/ASSURANCE**

- A. As specified for Level 2 HMAC in the Oregon Standard Specifications for Construction, Current Edition. Submit the appropriate documentation/reports to Engineer for review.

### 2.6 **MODIFICATION OF MIXES**

- A. Modification: The Engineer reserves the right to modify specified mixes for use under various traffic conditions on various segments of the work and for feathering, spot patching, and other

special purposes. The Contractor shall provide mixes proportioned as directed by the Engineer for such purposes.

### **PART 3 - EXECUTION**

#### **3.1 EXISTING CONDITIONS**

- A. Prior to starting of the work of the section verify that existing grades and field conditions agree with drawings. Notify Engineer of deviations.
- B. Do not start work of this section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

#### **3.2 WEATHER LIMITATIONS**

- A. Surface Temperature: Asphalt concrete shall be placed on a dry prepared surface when the surface temperature is not less than specified below.

Nominal Specified Compacted Thickness of Individual Courses	
2" to 2-1/2"	50°F
2-1/2" and over	40°F

- B. Weather: Asphalt concrete shall not be placed during rain or other adverse weather conditions. However, if approved by the Engineer, the mix in transit at the time the adverse conditions occur may be laid if the mix has been covered during transit and is at the specified temperature, if the foundation is free from pools or flow of water, and if all other requirements of these specifications are met. Asphalt concrete mixtures shall not be placed when the foundation is frozen or when, in the opinion of the Engineer, existing or expected weather conditions will prevent the proper handling, finishing, or compaction of the mixtures. Dense and open graded mixes shall only be placed from 3/15 – 9/30.
- C. Ambient Temperature Caution: The Contractor is cautioned that placing asphalt concrete on cool days when the temperature is less than 60°F may require an adjustment in Contractor's normal placing and compaction procedures so that specified minimum compaction requirements will be met. The temperatures shown in the table in this section are not recommended temperatures for paving, but paving may be allowed at these temperatures on the condition that specified pavement compaction is achieved.

#### **3.3 ASPHALT CONCRETE PAVING MACHINE**

- A. Pavers: Pavers shall be self-contained, power-propelled units with an activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing layers of asphalt concrete material to the widths thicknesses, lines, grades, and cross sections required.

**3.4 COMPACTORS**

- A. Rollers: Rollers shall be steel wheel, pneumatic tire, vibratory or a combination of these types. They shall be in good condition and capable of reversing without backlash.

**3.5 PREPARATION OF FOUNDATION**

- A. Bases: All bases and foundations on which the pavement is to be constructed shall meet the applicable specifications and be approved prior to the start of paving. Existing bases and foundations shall be reconditioned as specified or directed.
- B. Edges: Broken or ragged edges of existing paved surfaces underlying or abutting the new pavement shall be trimmed back to firm material. Surfaces against which asphalt concrete is to be placed shall be treated with an asphalt tack coat.
- C. Tack Coat: Prior to placing each lift of asphalt concrete, tack coat asphalt shall be applied to completely cover all cold longitudinal joint and all prepared existing asphalt and portland cement concrete surfaces. Immediately before applying the tack coat, the surface to be tacked shall be clean and dry. The application rate shall be between 0.05 and 0.20 gallons per square yard of surface area to achieve uniform, thorough coverage and as approved by the Engineer. Emulsified asphalt temperature to be between 140 and 185°F and application to be in accordance with manufacturer's recommendations.

**3.6 CRUSHED ROCK PAVEMENT BASE PLACEMENT**

- A. Placement and compaction shall conform to the requirements of SECTION 312000, EARTH MOVING.

**3.7 PLACING ASPHALT PAVEMENT - SINGLE COURSE**

- A. Place asphalt within 24 hours of applying tack coat. Do not place HMAC pavement on the tack coat until the asphalt separates from the water (breaks), but before it loses its tackiness.
- B. Place up to 3 inch compacted thickness in one lift.
- C. Install drainage covers and frames in correct position and elevation.
- D. Compact pavement by rolling. Do not displace or extrude pavement from position. Use hand-operated compacting equipment in areas inaccessible to rolling equipment.
- E. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

**3.8 CONTROL OF LINE AND GRADE**

- A. Line and Grade: The Contractor shall furnish, place, and maintain supports, wires, devices, and materials as necessary to provide continuous line and grade reference control to the automatic paver control system on either or both sides of the paving machine.

**3.9 HAULING, DEPOSITING AND PLACING**

- A. Hauling: Cover HMAC if rain or cold air temperatures are encountered any time between loading and placement. Engineer may reject material compromised (below specified temperature,

slumping or separating, solidifying or crusting). Rejected loads will be disposed of off-site at the Contractor's expense.

- B. Depositing: Material shall be deposited from vehicles to prevent segregation.
- C. Placing: Do not place material during rain or other adverse weather conditions, unless allowed by Engineer. Material placed in adverse conditions is to meet all normal contract specification requirements. Material in transit at the time adverse conditions occur may be placed if it has been covered during transport, it is placed in areas free of standing or flowing water, temperature and all other requirements are met.

### 3.10 TEMPERATURE CONTROL

- A. Temperature of Mixture:
  - 1. The temperature of the mixture at the time it is placed in final position shall be within 10 degrees of 280°F. The Engineer may adjust the lay-down temperature in 10-degree increments to attain maximum workability and compaction. In no case shall the lay-down temperature of mixture be less than 240°F.

### 3.11 COMPACTION

- A. Rolling: Immediately after the asphalt concrete mixture has been spread, struck off and surface irregularities and other defects remedied, it shall be thoroughly and uniformly rolled until the mixture is compacted. Complete breakdown and intermediate compaction before the mix temperature drops below 180°F.
- B. General:
  - 1. The type, number, and weight of rollers shall be sufficient to compact the mixture while it is still within the specified temperature range. Rollers shall not be operated in vibratory mode when the temperature of the mixture has dropped below 180 degrees.
  - 2. Steel roller wheels shall be moistened with water or other approved material to the least extent necessary to prevent pickup of mixture and not cause spotting or defacement of the surface of the mixture.
  - 3. Rollers shall be operated at speeds recommended by the roller manufacturer and slow enough to avoid displacement of the mixture. The maximum speeds shall be 3 miles per hour for steel-wheeled rollers and pneumatic-tired rollers, unless faster speeds are approved.
  - 4. Care shall be exercised not to displace the line and grade of edges. Displacement of any course occurring as a result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of approved rakes and addition of fresh mixture when required.
  - 5. Any mixture that becomes loose and broken, contaminated, segregated, or is in any way defective, shall be removed and replaced with new mixture at no expense to the Owner.
  - 6. Finish rolling shall continue until all roller marks are eliminated.
  - 7. Along curbs and walls, on walks, irregular areas, and other areas not practicably accessible to specified rollers, the mixture shall be compacted with approved self-propelled rollers, mechanical tampers, hot hand tampers, or heavy hand rollers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.
- C. Density Requirements:
  - 1. The Contractor is responsible for process control and shall conduct sampling, testing, measurement and inspection. The contractor shall provide daily nuclear density testing

(ODOT Test Method 310C-87) to develop rolling patterns necessary to achieve the minimum compaction requirement of 91 percent as determined by Rice Density Test AASHTO T 209 as modified by ODOT TM 306. This is in addition to Owner's testing as necessary to ensure the finished pavement meets specifications. A copy of all compaction test reports shall be provided to the Engineer. Contractor to immediately take corrective measures when it is determined that specified compaction density is not achieved. If specified compaction density cannot be achieved the Contractor shall remove and replace the defective asphalt areas at the Contractor's expense. The Owner has the option of accepting these areas with a reduced payment to the Contractor.

2. Asphalt compaction below 88 percent as determined by Rice Density Test AASHTO T 209 as modified by ODOT TM 306 is not acceptable.
3. The Landscape Architect will determine the suitability of the final product through final acceptance testing. Results of these tests will be used to determine payment deductions, if any to be assessed against the Contract. The final density of each paving project location will be determined by averaging the results of a minimum of five (5) density tests taken with a nuclear gauge (ODOT TM 310C-87) at randomly selected locations within each paving project.
4. Paving in areas 6 feet wide or less and irregular areas not accessible by large rollers are not subject to the minimum compaction per (2) above.
5. The Owner shall take acceptance tests to verify that the work meets specifications.

### 3.12 PAVEMENT SMOOTHNESS

- A. Utility Structures: The joint between the pavement and the top surface of utility structures, such as manhole covers and valve boxes located in the traveled way, shall meet the pavement surface tolerances.
- B. Tolerance: The surface of the finished pavement shall be within 0.02 foot of the specified line, grade, and cross section.
- C. Texture: The completed surface of all courses of the mixture shall closely parallel that specified for the top surface of the finished pavement and shall be smooth, uniform on texture and conform to the specified crown and grade.
- D. Job control testing shall be performed with a 10 foot straightedge furnished and operated by the Contractor. The Engineer may observe this testing, or the Engineer may require additional testing to be performed under the Engineer's supervision. Operations to eliminate the unacceptable pavement shall be corrected by the Contractor using a method or methods listed below and approved by the Engineer.
- E. Roughness: When tests show the pavement is not within the above tolerances, the Contractor shall take immediate action to correct equipment or procedures in the paving operations to eliminate the unacceptable pavement roughness.

### 3.13 FIELD QUALITY CONTROL

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  1. Base rock compaction testing.
  2. Asphaltic concrete pavement compaction testing.
  3. Asphaltic concrete pavement gradation testing.
- C. Field Inspections: Notify Engineer prior to paving operations.

**3.14 CORRECTIVE ACTION**

- A. Corrective Measures: The Engineer shall require one or more of the following corrective measure be performed on the deficient areas:
  - 1. Remove and replace the surface course.
  - 2. Place an overlay of a thickness approved by the Engineer.
  - 3. Grind the pavement surface utilizing diamond blades up to a maximum depth of 0.3 inch and apply an emulsion fog coat as directed by the Engineer.
- B. Additional Corrective Work: After completion of the corrective work, if the Engineer finds it is still not satisfactory, the Contractor shall perform additional corrective work on areas still not meeting the above tolerances.
- C. Expense: All corrective work, including furnishing of materials, shall be performed at the Contractor's expense and no adjustment in contract time will be made for corrective action work.
- D. Localized Surface Irregularities: Where surface irregularities are localized or where the Engineer determines corrective work would not be in the Owner's best interests, the Engineer may deduct from payment due the Contractor amounts equivalent to the Engineer's estimate of work costs had the corrective work been done.

**3.15 STRUCTURE ADJUSTMENT**

- A. Prior to placement of wearing course, locate and adjust to finished pavement grade all catch basins and other structures and appurtenances within the pavement area.

**3.16 CLEANING**

- A. Trim and remove excess asphalt concrete accumulations from abutting structures such as curbs, manholes, catch basins, and other structure.
- B. Including work of other sections, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section. Remove excess spilled material and debris from project site upon work completion or sooner, if directed.
- C. Upon completion of the work of this section promptly remove from the working area all scraps, debris, and surplus material.

**3.17 PROTECTION**

- A. In addition to other required provisions for traffic, the following shall apply to pavement construction: No traffic or equipment shall come in contact with the compacted mixture until it has cooled and set sufficiently to prevent marking; edges shall be protected from being broken down; and edge drop-off(s) one inch or more in height shall be marked with approved reflectorized and/or flashing warning devices visible by day and night to the traveling public, and placed at spacings as specified by the Engineer.
- B. Protect all work installed under this section.
- C. Replace at no additional cost to Owner, any damaged work of this section.

END OF SECTION



**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this Section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this Specification and accompanying Drawings.

**1.2 WORK INCLUDED**

- A. Provide Fencing to integrate with existing chain link being reinstalled where located on Drawings.
- B. New components to match existing.

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS**

- A. Temporary Fencing: Section 01-50-00

**1.4 ALTERNATES**

- A. Refer to Section 01-20-00 for possible effect upon Work of this Section.

**1.5 REFERENCED SPECIFICATIONS**

- A. Comply with applicable requirements of specifications published by Chain Link Fence Manufacturer's Institute; 9891 Broken Land Parkway; Suite 300; Columbia, MD 21046; (301) 596-2583.
- B. Specifications can be obtained from Institute.

**1.6 COORDINATION**

- A. Coordinate with other Trades affecting or affected by Work of this Section.

**1.7 INSTALLER'S QUALIFICATIONS**

- A. Employed by, or acceptable to, Fence Manufacturer

**1.8 REGULATORY AGENCY REQUIREMENTS**

- A. Gate Latches shall conform to applicable requirements of Americans with Disabilities Act

**PART 1 - GENERAL**

**1.9 SHOP DRAWINGS**

- A. Submit in accordance with Section 01-33-00.
- B. Show Fencing layouts, dimensions, installation methods, and other pertinent details.
- C. Include illustrations of any Equipment to be provided.
- D. Coordinate with additional information shown on drawings.

**1.10 PRODUCT DELIVERY, STORAGE, & HANDLING**

- A. Protect against damage and discoloration.
- B. Deliver with Manufacturer's Tags and Labels intact and legible.
- C. Labels or Tags shall identify Manufacturer, brand name, material, size, and applicable standards.

**1.11 GROUND & AIR TEMPERATURE**

- A. Above 32°F during Concrete Footing placement, and for 72 hours minimum thereafter.
- B. Remove and replace freeze-damaged Concrete.

**PART 2 - PRODUCTS**

**2.1 POSTS & FRAMES**

- A. Material: Match existing
  - 1. Zinc coated Steel with powder coated finish
- B. Shape: Round
- C. Diameter:
  - 1. Line Posts: 2-3/8 inches o.d.
  - 2. Top & Brace Rails: 1.66 inches o.d.
  - 3. Terminal Posts: 2 -7/8 inches o.d.
- D. Fence Height: See Drawings
- E. Required Brace Locations:
  - 1. Between Post tops
  - 2. Gate Posts
  - 3. End Posts
  - 4. Pull Posts
  - 5. Corner Posts, including adjustable, diagonal, 3/8 inch diameter Tension Rods.
- F. Tension Cables between Posts: Required at top and bottom.
- G. Color: Black

**PART 2 – PRODUCTS**

**2.2 GATES**

- A. Material: Match Posts and Frames.
- B. Type: Match existing
- C. See Drawings for additional requirements

**2.3 FABRIC**

- A. Material: 9ga. Wire
- B. Coating:
  - 1. Material: 7 mil thick PVC thermally-fused to wire
  - 2. Color: Black
- C. Mesh Opening Size:
  - 1. 2 inches square
- D. Selvage: Knuckled top and bottom

**2.4 ACCESSORIES**

- A. Follow Referenced Specifications.
- B. Provide all required for complete installation.

**2.5 CONCRETE**

- A. Cement: ASTM C-150 type I-II
- B. Aggregate: ASTM C-33, 3/4 inch maximum.
- C. Water: Clean & potable
- D. Entrained Air: ASTM C-160, 3% - 5% of Concrete Volume.
- E. Max. Slump: 3 inches
- F. Min. 28 day Compressive Strength: 2,500 psi

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Verify that Site and Ground Work are accurately graded, completed, and in condition to receive Fencing.
- B. Prior to starting Work notify General Contractor of defects requiring correction.
- C. Do not start Work until conditions are satisfactory.

**PART 3 – EXECUTION**

**3.2 PROTECTING OTHER WORK**

- A. Protect against damage and discoloration caused by Work of this Section.
- B. Protect contacting Dissimilar Materials against Galvanic Corrosion.
- C. Protect existing Vegetation against damage.

**3.3 INSTALLATION**

- A. General:
  - 1. Install rigid, plumb, true, in perfect alignment, and in accordance with Manufacturer's instructions and Referenced Specifications.
- B. Posts:
  - 1. Set plumb to 1/4 inch in 10 ft. and not more than 10 ft. apart.
  - 2. In Ground:
    - a. Set not less than 36 inches deep into 12-inch diameter Concrete Footings; not less than 4 inches of Concrete below Post bottom.
    - b. Remove excess Earth or spread on Site.
- C. Fabric:
  - 1. Install taut, cover full-height of Fence, and extend to within approximately 1 inch above adjacent Ground Surface at Posts.
  - 2. Join Fabric ends by weaving with single strand of Fabric Wire to form continuous mesh pattern with Selvage twisted to match Fabric.
- D. Gates:
  - 1. Install plumb and level within 1/4 inch in 10 ft.
  - 2. Install Ground-Set Items in Concrete.

**3.4 ADJUSTMENTS**

- A. Adjust Moving Parts to operate satisfactorily at time of Substantial Project Acceptance and during Warranty Period.
- B. Lubricate where necessary.

**3.5 PRODUCT CLEANING & REPAIRING**

- A. Including Work of other Sections, clean, repair and touch-up, or replace when directed, Products which have been soiled, discolored, or damaged by Work of this Section
- B. Remove Debris from Project Site upon Work completion, or sooner if directed.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. On-site private curb and walk improvements.

**1.3 RELATED SECTIONS**

- A. Section 031000 - Concrete Formwork
- B. Section 032000 - Concrete Reinforcement
- C. Section 033000 - Cast-In-Place Concrete
- D. Section 312000 - Earth Moving

**1.4 DESIGN AND ENGINEERING**

- A. Formwork design and engineering, as well as construction, are the sole responsibility of the Contractor.

**1.5 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise indicated.
- B. Quality Control:
  - 1. Submit joint layout drawings for Engineer's review and acceptance.
- C. Field Quality Control Submittals:
  - 1. Before starting work and in accordance with Section 01 33 00, prepare mockups for Engineer's review and acceptance of concrete walk surface texture.
    - a. Minimum Panels Size: 4 ft. square.
    - b. Re-prepare, if directed, until accepted.
    - c. Accepted mockup represents minimum quality standard. Work of lesser quality will be subject to rejection and replacement.
  - 2. Accepted mockup, in like new condition, may be used in contract work.
- D. Closeout Requirements: Comply with Section 017700.
  - 1. Provide record documents.

**1.6 WEATHER PRECAUTIONS**

- A. Provide cold weather and/or hot weather protection as recommended in ACI 306 and ACI 305.
- B. Unless adequate protection is provided, concrete shall not be placed during rain, sleet, or snow. Protect concrete from rain water, maintain concrete water ratio and protect concrete surface.

- C. All concrete shall be adequately protected after pouring to prevent damage from freezing, by the use of suitable cover. Frozen and damaged concrete must be removed and replaced at the Contractor's expense. Do not place concrete on frozen earth.

**1.7 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- B. Installers Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.
- C. Product/Material Qualifications:
  - 1. Design data: Compaction testing shall be in accordance with Section 014500, QUALITY CONTROL.
  - 2. Test reports: Provide job mix test reports.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery, Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

**1.9 ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before intended concrete placement.
- B. Place no concrete until formwork and reinforcement have been inspected.

**1.10 COORDINATION**

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

**PART 2 - PRODUCTS**

**2.1 CRUSHED ROCK PAVEMENT BASE**

- A. Imported, clean, 3/4"-0 Crushed Rock Pavement Base as specified in Section 312000, EARTH MOVING.

**2.2 CAST-IN-PLACE CONCRETE**

- A. Concrete shall be ready-mixed conforming to Section 033000, CAST-IN-PLACE CONCRETE, and shall have a minimum compressive strength of 3,000 psi at 28 days.

**2.3 FORMS**

- A. Conform to Section 031000, CONCRETE FORMWORK.

**2.4 REINFORCEMENT**

- A. Conform to Section 032000, CONCRETE REINFORCEMENT.
- B. Provide where shown on drawings.

**2.5 CURING COMPOUND**

- A. Curing compound for all other concrete shall conform to AASHTO M171, White Polyethylene Film for curing concrete or AASHTO M148, Liquid Membrane-Forming Compounds for Curing Concrete.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to starting work of this section verify that existing grades and field conditions agree with drawings. Notify Engineer of deviations.
- B. Do not start work of this section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

**3.2 EXCAVATION**

- A. All excavation shall be in accordance with Section 31200, EARTH MOVING.

**3.3 CRUSHED ROCK BASE**

- A. After the subgrade is compacted and at the proper grade, spread required thickness of 3/4-inch minus crushed rock. Compact by rolling or other approved method. Surface of the compacted base shall be at the proper level to receive the concrete. Manholes, catch basins, inlets, and other such structures shall be completed, adjusted, cured, and otherwise prepared, as applicable, and made clean and ready to have concrete placed in contact with them.

**3.4 FORMWORK**

- A. Conform to the requirements of Section 031000, CONCRETE FORMWORK. Construct forms to the shape, lines, grades, and dimensions called for on the Drawings. Stake wood or steel forms securely in place, true to line and grade. Brace forms to prevent change of shape of movement in any direction resulting from the weight of the concrete during placement.
- B. Allowable Tolerances: Tops of forms shall not depart from grade line more than 1/8-inch when checked with 10-foot straightedge. Alignment of straight sections shall not vary more than 1/8-inch in 10 feet.

**3.5 REINFORCEMENT**

- A. Reinforcement shall conform to the requirements of Section 032000, CONCRETE REINFORCEMENT. Provision shall be made for placing dowels, tie bars, and other devices called for by the Contract Documents, during placement of the pavement. Reinforcement shall be placed on supporting devices, or "chairs," and maintained in position while the pavement is being placed.

**3.6 FINISHING**

- A. After the pavement has been struck off and consolidated, it shall be scraped with a straightedge equipped with a handle to permit operation from the edge of the pavement. Any excess water shall be removed from the surface of the pavement. Irregularities shall be corrected by adding or removing concrete. All disturbed places shall be again straightedged.
- B. After the concrete has been given a preliminary finish, the surface of the pavement shall be checked by the contractor with a straightedge device. Each successive check with the straightedge device shall lap the previous check path by at least half the length of the straightedge. Surface deviations exceeding 0.01 foot shall be corrected. Upon completion of the surface floating, but before any required edge tooling or joint tooling, and before initial set of the surface pavement, the pavement shall be given a textured finish perpendicular to match the existing. The textured finish shall be accomplished by a steel tine tool that will mark the finished pavement to a depth of 1/8 inch plus or minus 1/16 of an inch. Match finish of existing pavement where new pavement is adjacent. The surface of the pavement shall not vary from a true surface, when tested with a 12-foot testing straightedge, more than 1/8 inch in 12 feet.
- C. Finish shall be a light broom finish for slip resistant surface. Broom pattern to be parallel to slope.

**3.7 JOINTS**

- A. Construction joints, expansion joints, transverse contraction joints, and all longitudinal contraction joints shall be placed as indicated in the drawings.
- B. Contraction Joints:
  - 1. Longitudinal contraction joints shall consist of planes of weakness created by grooves in the surface of the pavement.
  - 2. Maximum joint spacing shall be 5 feet for sidewalks, and as shown on drawings for other work.
- C. Construction Joints: Construction joints shall be placed whenever the placing of concrete is suspended for more than 45 minutes. A butt joint with dowels or a thickened-edge joint shall be used if the joint occurs at the location of a contraction joint.

**3.8 WALK EDGING**

- A. Before final finishing is completed and before final concrete set has occurred, finish concrete edges with edging tool shaped with ¼-inch radius.
  - 1. Take particular care to maintain surface on both sides of joint in same plane.
  - 2. Do not use kneeling planks on concrete surface.



**3.9 CURING**

- A. Minimum Curing Period: 3 days.
- B. Uniformly apply compound in accordance with manufacturer's instructions, after final Concrete finishing is complete, and after all free water has disappeared from pavement surface.
- C. Apply to concrete edges immediately after formwork removal.
- D. Do not use membrane compound method if pavement will be exposed to de-icing chemicals within 30 days following curing period completion.

**3.10 FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  - 1. Observance and approval of subgrade and base rock compaction.
  - 2. Concrete cylinder strength tests. Concrete flexural strength tests.
  - 3. Slump and air tests.
- C. Field Inspections: Notify Engineer prior to work of this section.
- D. Special Inspections for Code Compliance: Obtain building inspector approvals.

**3.11 DEFECTIVE WORK**

- A. Remove and replace any surfaces which show excessive cracks, pavements that do not drain properly, and other defective concrete.
- B. Minimum Surface Evenness: 1/8 inch per 10 ft.

**3.12 CLEANING**

- 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. Upon completion of the work of this section, promptly remove from the working area all scraps, debris, and surplus material.

**3.13 PROTECTING COMPLETED WORK**

- A. Protect all work installed under this section.
- B. Replace, at no additional cost to Owner, any damaged work of this section.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The Contractor shall furnish all labor, supervision, and materials to install a complete irrigation system as described by and implied in the Contract Documents.
2. Contractor shall provide design/build irrigation system. All irrigation is to be permanently installed.
3. The Contractor shall repair any settling of backfilled trenches that may occur during the guarantee period, and completely restore and repair all plantings, paving, and other site improvements disturbed by this construction

B. Coordination:

1. Work under this division shall be conducted in a manner to cooperate with other trades and contracts involved with this project.
2. Consult all drawings and specifications for the project and verify the requirements of all equipment by other divisions, the Owner or by other contracts prior to installation and connection.
3. Consult the drawings of all other divisions to avoid conflicts with cabinets, equipment, structural members, etc.
4. Field-verify points-of-connection to existing irrigation systems. Coordinate connection to existing irrigation systems with BSD representative.
5. Throughout the construction period, the Contractor shall be responsible for maintaining continuous uninterrupted operation of the existing irrigation system to provide adequate irrigation of all existing plant material. The Contractor shall be fully responsible for replacement of plant material determined to be dead or otherwise compromised by failure to maintain irrigation system operation.

C. Related Sections:

1. Section 32 91 00 – Soil Preparation.
2. Section 32 93 00 – Trees, Shrubs and Groundcover.
3. Section 03 30 00 – Concrete.
4. Division 22 - Plumbing.
5. Division 26 – Electrical.

0.2 REFERENCES

- A. American Society for Testing and Materials (ASTM).

0.3 SUBMITTALS

- A. The Contractor shall make all submittals in accordance with the contract documents.

B. Product Submittals:

1. Products used shall not deviate from those indicated on the Contract Drawings, specified herein or approved through the substitution request process. Product submittals are required for all irrigation items.

C. Quality Assurance Submittals:

1. Submit copies of design drawings with layout and diagram of irrigation system.
2. Submit copies of manufacturer's installation instructions for irrigation equipment.
3. Submit documentation that the installer is a licensed and bonded landscape or irrigation contracting firm that specializes in and has experience in the successful installation of irrigation systems.
4. Submit results of pressure and flow rate verification checks at points of connection.

D. Contract Closeout Submittals:

1. The Contractor shall submit Record Drawings and shall include all approved variations or changes, indicating all sleeve, main line, lateral line, valve, quick-coupler, controller, wire runs, and other irrigation component locations to be located by field dimensions to the nearest permanent landmark, as approved by the Landscape Architect.
2. The Record Drawings shall be submitted as electronic files in AutoCAD, most current version, on a compact disc format and hard copy.
3. The Contractor shall provide a color coded Irrigation Valve Schedule, which shall be a 50% reduced printed layout of the irrigation system showing the as-built locations of all piping and valves, laminated on both sides with plastic, for placement inside the appropriate controller cabinet.
4. The Contractor shall provide 3 copies of all equipment operation instructions, parts lists, service manuals, specification sheets, warranty information, precipitation rates for irrigation heads, and circuit operating time for each zone; collated, punched and bound in a 3 ring binder. Each binder shall be clearly marked with the following information:

PROJECT MANUAL

"Project Name" (from Contract Documents)

Date of Project Completion

Contractor's Name and Address

5. Submit project manuals to Landscape Architect for review and approval.
6. The Contractor shall be responsible for providing up to 8 hours of training and orientation to the Owner's staff covering the adjustment and maintenance of the irrigation system. This training session shall be video recorded by Owner.

0.4 SITE CONDITIONS

A. Weather Requirements:

1. Do not solvent weld polyvinyl chloride pipe (PVC) when ambient temperature is below 40° F and falling.
2. Do not solvent weld polyvinyl chloride pipe in wet conditions, without adequate cover.

B. Schedule for Installing Pipe Sleeves, Conduits, Drip Line, and Sprinkler Heads:

1. Coordinate with other trades as required to schedule installation of pipe sleeves and conduit below paving and through walls prior to installation of paving and walls.
2. Schedule installation of sprinkler heads and drip line after final grading.
3. Pre-installation Conference: Conduct Conference at Project site to comply with requirements.

0.5 DAMAGES

- A. Any structures or facilities damaged by work on this project shall be restored to equal or better than original condition at the Contractor's expense and to the satisfaction of the Landscape Architect.
- B. The Contractor shall be responsible for all damage caused by leaks or breaks in the equipment and materials furnished or installed in this contract for 2 years after the date of final acceptance.

0.6 EXISTING UTILITIES

- A. The Contractor shall verify, locate, and identify, with visible marking, all existing underground utilities in the areas of work and maintain such markings until all work in those areas is complete. If utilities are to remain in place, the Contractor shall provide adequate means of protection during excavation operations.
- B. Should uncharted piping or other utilities be encountered during the execution of the work, the Contractor shall notify the Landscape Architect immediately and consult with the utility owner for instructions before proceeding with the work.
- C. The Contractor shall cooperate with the Owner and public or private utility companies in keeping their respective services and facilities in operation. If it becomes necessary to temporarily interrupt existing services or facilities, the Contractor must provide temporary utility services to the satisfaction of the Landscape Architect.

0.7 PERMITS AND REGULATIONS

- A. The Contractor shall obtain all necessary permits and inspections as applicable and required for this project. All work detailed and specified herein shall be accomplished in strict accordance with the applicable local, state, and federal codes and regulations.

0.8 RECORD DRAWINGS

- A. The Contractor shall maintain a current record of all pipe, wire, and equipment placement, and shall record all variations or changes approved by the Landscape Architect. Changes in layout of proposed work shall be recorded on the Record Drawing Set in blue pencil or ink. Additions to the proposed scope of work shall be recorded on the Record Drawing Set in green pencil or ink. Deletions either in the proposed scope of work or by a change in layout shall be recorded on the Record Drawing Set in red pencil or ink.
- B. Complete Record Drawings shall be included in the Maintenance Manual.

0.9 SUBSTITUTIONS

- A. Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements".
- B. If materials other than those specified in the Contract Documents are proposed, the Landscape Architect shall determine whether such materials or methods are a suitable or equal substitute. The irrigation system described in the Contract Documents is based on specific GPM output, static and operating pressures. Approved substitutions may require partial or complete redesign of the system at the Contractor's expense. The Landscape Architect's decision will be final.

0.10 WARRANTIES

- A. Manufacturer's Warranty: Provide equipment manufacturer's standard warranties for factory-assembled equipment and products. The Contractor shall agree to correct, repair or replace defective materials/equipment at no additional cost to the Owner.
- B. Installer's Guarantee:
  - 1. Provide installer's 1-year guarantee for entire system to the Owner's Representative at the time of final acceptance, showing the date of completion, which shall be the beginning of the guarantee period.
  - 2. Guarantee shall include correction of defective workmanship found at any time during guarantee period.
  - 3. Guarantee shall include one full winterization and spring startup of the irrigation system, including training and orientation to Owner for those procedures at that time.
  - 4. Guarantee shall include repair of trench backfill that settles more than 1/2-inch or of plantings, paving, and walk materials damaged by settlement of trench backfill soils during the guarantee period.
  - 5. Guarantee shall include setup and configuration of the Controllers, as well as system adjustments over the course of the guarantee period to optimize system efficiency.

6. Guarantee shall include removal of temporary above-ground irrigation components and piping at the end of the guarantee period, including repair of disturbed landscape areas as required.

PART 2 - PRODUCTS

0.1 PIPE

- A. All main line pipe: PVC (Polyvinyl Chloride Plastic) pipe shall be PVC 1120, Type 1, normal impact, I.P.S., N.S.F. approved. All main line pipe shall be Schedule 40 PVC pipe and shall conform to ASTM D1784-69, ASTM D1785, and PS22-70. All PVC lateral line pipe shall be Class 200 PVC pipe and shall conform to ASTM D1784-69, ASTM D1785, and PS22-70.
- B. All PVC pipe shall be new, defect free, and continuously and permanently marked with the manufacturer's name or trademark, size, schedule and type of pipe.

0.2 PVC PIPE FITTINGS

- A. All PVC fittings shall be PVC 1220, Schedule 40, type 1, normal impact, I.P.S., N.S.F. approved and meeting the requirements of ASTM D-2466.
- B. All PVC nipples shall be standard weight Schedule 80, with molded threading.

0.3 PVC CLEANER AND PRIMER

- A. "Weld-On P-75". All equals for "Weld-On P-75" shall meet the requirements of ASTM F-656.

0.4 PVC SOLVENT CEMENT

- A. "Weld-On 725". All equals for "Weld-On 725" shall meet N.S.F. approval for Type I and II PVC through 3" and meeting the requirements of ASTM D-2564.

0.5 PVC SLEEVES AND CONDUITS

- A. All pipe sleeves shall be Schedule 40 PVC and shall be sized to accommodate piping and control wire.
- B. All conduits for irrigation wires shall be Schedule 40 PVC gray electrical conduit, sized as needed to accommodate wires, unless otherwise noted.

0.6 BACKFLOW UNIT

- A. See Plumbing drawings.

0.7 PRESSURE REGULATOR

- A. Watts LF223-HP, line size, or as specified by Plumbing.

0.8 VALVES

- A. For new construction, Master Valves shall be installed immediately beyond the double check valve on the irrigation side, followed by a Flow Sensor. Master Valve and Flow Sensor must be the same size as the main line.
- B. Use Ball Valves for 2" and smaller lines and Gate Valves for lines 2" and larger.
- C. Isolation Valves: Ball valve type, 150 psi min., rated, with standard seat and threaded ports.
- D. Valve boxes for control, isolation valves: 12" minimum size box. For single valves, boxes should have locking top with 3" and/or 6" extensions, as needed, to facilitate required installation.
- E. Double check valves: Use Febco Master Series 850 or approved equal.
- F. Drain valves: complete with fittings in valve boxes and extensions. Install a minimum of 1 cubic foot drain rock at each drain valve location.
- G. Manual drain valves: Buckner 2200 series bronze angle valve, or approved equal.
- H. Manual drain valve covers: Weathermatic model number 960L, locking cover, or approved equal. Provide suitable length of 2" class 200 PVC pipe to fit over Drain Valve Stem and install locking valve cap flush with finish grade. Provide two valve-operating keys of type and length required to operate manual drain valves.
- I. Quick coupling valves: Provide stub at end of main lines to allow for future addition of quick coupling valves. Quick couplers shall be installed on 1" prefabricated swing joint assemblies.

0.9 VALVE BOXES AND VALVE COVERS

- A. All valves shall be installed in valve boxes with locking covers. No more than one valve per valve box. Valve boxes shall be of adequate size to allow room to perform routine maintenance and full movement of valve handle. Valve boxes shall be set level so that no part of the valve box, or its lid, is above finish grade or more than 1" below grade after settle. Valve boxes shall be supported on pre-cast concrete pavers or blocks so that they will not shift or sink when run over by lawn maintenance equipment or service vehicles.
- B. Valve Boxes for Control Valves: Carson Model #1419 with bolt-down lid and extensions as needed to facilitate required installation. Verify all valves, unions and other equipment will fit fully within box and allow access and servicing of all components. At no extra cost to Owner, install larger boxes if necessary to achieve this.
- C. Valve Boxes for Isolation and Quick-Coupling Valves: Carson Model #910 with bolt-down lid and extensions as needed to facilitate required installation.
- D. Bolts for Locking Valve Box Lids: where bolt-down lids are required, the Contractor shall provide stainless steel "penta" bolts (5-sided) and stainless steel washers. Bolts shall be of appropriate size and length for the specified valve box lid.
- E. All boxes, extensions and lids to be black color.

0.10 SWING JOINT ASSEMBLIES

- A. Lasco model number G132-212 with 18" lay length, MIPT by MIPT, schedule 80, or approved equal. Swing Joint assemblies must be minimum 1" Ø pipe size.

0.11 IRRIGATION CONTROLLER

- A. Site Controller: Connect to existing irrigation controller. Notify Landscape Architect if existing controller does not satisfy irrigation requirements, or if connection to existing controller is not possible.

0.12 IRRIGATION HEADS AND SPRINKLERS

- A. Hunter heads are preferred for rotors. Hunter or Rainbird are preferred for spray heads.

0.13 DRIP LINE SYSTEM AND ACCESSORIES

- A. Netafim Techline HCXVR:
  - 1. Planting areas at grade: 0.26 GPH emitters with 18-inch emitter spacing. Row spacing 18-inch on center or equally spaced between 15- and 18-inches on center.
  - 2. Planting areas on structure: 0.40 GPH emitters with 18-inch emitter spacing. Row spacing 18-inch on center or equally spaced between 15- and 18-inches on center.
  - 3. Drip lines and headers shall be installed 4-inches from the edge of planting bed or planter wall.
- B. Dripline fittings: adapters for PVC piping per manufacturer's recommendations.
- C. Manual Flush Valve: Netafim TLSOV.
- D. Staples: Netafim TLS6.

0.14 WIRE AND ELECTRICAL CONNECTORS

- A. Control wiring inside the control box is only acceptable use of Multi-strand wire bundles. Make splices only in valve boxes. When that is not possible, create a splice box by installing a standard valve box and make splices at this location. Identify location of all splice boxes on asbuilt drawings. Provide minimum of 2' coiled slack between splices.

0.15 OTHER MATERIALS

- A. Pipe Joint Tape: Pipe joint tape shall be a minimum of 1/2" wide Teflon tape intended for use in wrapping threaded PVC pipe fittings and joints, as required.
- B. Drain Rock: 3/4" to 1/4" washed gravel, with no fines.

PART 3 - EXECUTION

0.1 GENERAL

- A. Do not allow any work to be covered or enclosed until it has been successfully pressure tested and approved by the Landscape Architect.



- B. Installation of all materials and equipment shall be in strict accordance with the manufacturer's written specifications and recommendations and with local and state codes, whether detailed or not. The Contractor is responsible for calling to the immediate attention of the Landscape Architect any conflicts between the manufacturer's written specifications and recommendations, local and state, and the Contract Documents. The Landscape Architect may require the Contractor to correct to the Landscape Architect's satisfaction any work installed that results from such conflicts at no additional cost to the Owner.
- C. The location of pipe, valves, and other equipment shall be as detailed and shall be the size and type indicated by the design/build plan. In exceptions, all changes must be recorded on the Record Drawings.
- D. Permission to shut of any water lines must be obtained in writing from the Owner prior to the beginning of any work. Disruptions in service shall be kept to a minimum.
- E. The Contractor shall be responsible for maintaining the system and protecting it from all damage, including damage caused by vandalism or adverse weather conditions, until date of final acceptance. The Contractor shall be responsible for repairing such damage at no additional cost to the Owner.
- F. The Contractor shall maintain at the site a clean copy of the drawings for recording changes to the project. All changes shall be recorded within 24 hours of occurrence.
- G. The Contractor shall coordinate all work with other trades to insure desired installation and performance of irrigation system.

## 0.2 INTERIOR IRRIGATION SYSTEM COMPONENTS

- A. General requirements:
- B. Backflow preventer: Irrigation system shall be connected to domestic water supply with a dedicated backflow preventer. Comply with all Federal, State, and Local requirements for installation of backflow preventer.
- C. Provide master isolation valve(s) immediately downstream from the backflow preventer.
- D. Pressure regulator:
  - 1. If review of ambient pressure readings exceed 85psi, a pressure regulator shall be installed on the irrigation service line downstream from the backflow preventer.
  - 2. Adjust pressure regulator to provide a working pressure of 60psi when system is operating at 40 gallons per minute.
- E. Master valve shall be located downstream from the isolation valve for the main site irrigation and shall be connected to the site irrigation controller.
- F. Irrigation controller: Existing irrigation controller to be used, location as indicated on drawings.

## 0.3 TRENCHING

- A. A minimum depth of cover to the top of irrigation piping shall be as follows:

1. All lateral lines shall be a minimum of 18" deep.
  2. All main line shall be a minimum of 24" deep.
  3. Where multiple pipes are laid in common trench, the Contractor must maintain a minimum separation of 2" in any direction between all pipe.
- B. Backfill in the cool part of the day whenever possible to minimize expansion and contraction of the PVC pipe.
- C. Remove all lumber, rubbish, and rocks from irrigation trenches. Irrigation lines shall have a firm, uniform bearing surface for the entire length of each line. Wedging or blocking of pipe is not permitted.
- D. Before back-filling trenches, all pipe shall be flushed clear and clean of all dirt and foreign material.
- E. Backfill trenches in layers of not more than 6" in depth and compact each layer. Fill trenches to finish grade with native or imported topsoil keeping the top 12" free of rock. Restore surface to original condition.
- F. Any materials or equipment damaged or destroyed while back-filling shall be repaired or replaced by the Contractor at no additional cost to the Owner.
- G. Backfilling under all paved areas shall conform to minimum density and compaction requirements as described in applicable specification sections.

0.4 PIPE

- A. Exercise care in handling and storing all pipe and fittings. Store materials under cover before using. Transport materials in a vehicle of adequate size and capacity to prevent bending or the concentration of an external load at any point on the materials. Any materials or portions of materials that show such damage shall be discarded and replaced.
- B. Remove all foreign matter and dirt from inside pipe or fittings before lowering into the trench.
- C. Install all pipe and fittings per the manufacturer's specifications. Use the specified primer and cement on all glue joints. Use Teflon tape on all threaded joints. Do not use Teflon tape on Marlex type fittings.
- D. Install the specified tracer wire on the top side of main line and lateral pipes, except for drip irrigation header and exhaust pipes. Tape tracer wire to the pipe at not less than 10' intervals. All sections of tracer wire shall be spliced together with watertight splice connectors, to provide a continuous run. Tracer wire shall be taped at intervals of no less than 10' and at all Tee's and turns in the pipe. A minimum of 2' of tracer wire shall be looped in each valve box unless otherwise directed by the Landscape Architect.
- E. Snake pipe in trenches to allow for expansion and contraction as recommended by the manufacturer.
- F. At all installed joints cut pipe ends square and remove all burrs.

0.5 BACKFLOW UNIT

- A. See Plumbing drawings.

0.6 REMOTE CONTROL, QUICK-COUPLING AND ISOLATION VALVES

- A. Install complete with fittings and covers as detailed.
- B. Verify locations with Owner prior to installation.

0.7 IRRIGATION SLEEVES AND CONDUITS

- A. Install sleeves for irrigation lines and/or control wire under pavement prior to placing pavement materials. Extend sleeves beyond pavement edge a minimum of 12-inches. All sleeves shall be installed with a depth of cover to the top of the pipe of 24-inches. If length of required sleeve is greater than the length of the unit of pipe, solvent weld all joints required. Otherwise all sleeves shall be of one continuous length of pipe.
- B. Tape ends of sleeve closed to keep soil out of the sleeve until irrigation lines and/or control wire are installed.
- C. Permanently attach a single length of 14-gauge locator wire alongside the entire length of the sleeve.
- D. Stake both ends of sleeves with a readily visible stake extending 12-inches above grade and below grade to the bottom of the sleeve. Mark the above grade portion of the stake with the words "Irrig. Sleeve". Remove stakes after sleeves are recorded on the Record Drawings and after irrigation lines and/or control wires are installed and inspected.
- E. In areas of new paving, place a minimum of 4-inches of sand backfill over the top of all sleeves before back-filling with soil or other subgrade materials.
- F. Conduits and sweep fittings as required to route wires and cables from the controller shall be installed per Division 26-Electrical. All wires and cables shall be routed within electrical conduits securely fastened to the wall. Coordinate with other trades as required.

0.8 DRIP LINE STSYEM

- A. Make all connections and elements of installation per recommendations of the manufacturer.
- B. Install in conjunction with planting installation. Install at specified depth and row spacing.
- C. Where between plant rows, place drip line between plants. Where adjacent to a single row of plants, place immediately adjacent to plant root ball.
- D. Secure drip line in place with staples as indicated on the Drawings and at ends.
- E. Provide each zone with flush valve(s) as shown on the Drawings and/or as required by the manufacturer.

0.9 IRRIGATION WIRING

- A. Tape wires in trench under main line or lateral lines whenever they occur in the same trench. Place control wires in sleeves/conduit under all paving and when not in common trench with mainline or lateral lines.
- B. Make all wire and splices moisture proof using specified electrical connectors. Splices shall be made in valve boxes only. All splices shall be noted on Record Drawings. Provide a minimum of 1' of coiled slack between all wire splices.
- C. Control wires shall be bundled together and wrapped with electrical tape at intervals of no more than 10'. Wires shall be placed below mainline or laterals when in same trench.
- D. Clearly mark both ends of all wiring, on a permanent tag, with the number of the corresponding valve and controller station. Locate 1 tag at each control valve and 1 tag per wire in the controller.
- E. Sharp bends or kinks in the wiring shall not be permitted. Wires shall be unreeled in place alongside of or in the trench and shall be carefully placed along the bottom of the trench. Wire shall not be unreeled and pulled into trench from one end.
- F. Where any wiring is run in trench without irrigation piping, the wires shall be installed in electrical conduit, sized to contain all wires.
- G. Install 2 extra wires from controller to furthest run of main line, including all spurs.

0.10 IRRIGATION CONTROLLERS

- A. Connect to existing irrigation controller, location as indicated on drawings.

0.11 FLUSHING AND TESTING

- A. Thoroughly flush all piping before testing and installation of irrigation bubblers and before back-filling any trenches.
- B. The Contractor shall not allow or cause any work to be covered before it has been inspected and approved. Work covered before approval shall be uncovered at the Contractor's expense.
- C. Soil may be placed in trenches between fittings to insure the stability of the line under pressure. In all cases, fittings and couplings must be open for visual inspection for a full period of test. No testing shall be done until the last solvent welded joint has had a minimum of 24-hours to set and cure.
- D. Before testing, fill pipe with water and expel all air from pipes.
- E. Minimum pressure test on mainline, valves, joints and fittings, shall be 100-lbs./sq. in. without losing more than 1-pound per square inch during a period of 1-hour. Lateral lines shall be visually inspected by Landscape Architect at line pressure with swing joints installed and capped. The Contractor shall first perform the tests for himself and repair any leaks or defects. The Contractor shall then notify the Landscape Architect at least 24-hours in advance and complete another test

in the presence of the Landscape Architect for approval. All testing shall be done with a certified pressure gauge supplied by the Contractor.

- F. All extra wires must be tested by the Contractor and approved by the Landscape Architect prior to Final Payment.
- G. Where inspected work does not comply with specified requirements or if pressure tests fail, replace the rejected work until re-inspected by the Landscape Architect and found to be acceptable. The Contractor shall credit the Owner, against the contract amount, at the rate of \$75.00/hr for all reinspection of failed tests.

0.12 CLEAN-UP

- A. Upon completion of the work, clean up all boxes, wrappings, excess materials, and other rubbish resulting for this work and leave the site in original or better condition.

0.13 FINAL SUBMITTAL

- A. Submit Record Drawings, project manuals, and provide training to Owner.
- B. The Contractor shall be responsible for one full winterization and one spring activation of the irrigation system, and shall conduct these operations as part of the Owner's training and orientation procedures.
- C. Provide Plan of all Irrigation Zones as installed.

END OF SECTION

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Furnish labor, material and equipment required for:
  - 1. Removal of soil that has been filled with construction rock and debris in all planting areas.
  - 2. Installation of topsoil in planting areas, including soil preparation of areas to be planted, and finish grading, as detailed and specified herein for the following areas:
    - a. At-grade Planting Areas.
    - b. LIDA Flowthrough Planters
    - c. LIDA Rain Garden
  - 3. Coordinate work with installation of other site work including irrigation, seeding and planting.
- B. Related Sections:
  - 1. Section 31 20 00 – Earth Moving.
  - 2. Section 32 84 00 – Planting Irrigation.
  - 3. Section 32 93 00 – Trees, Shrubs and Groundcover.

**1.2 REFERENCES**

- A. American Society for Testing and Materials (ASTM).

**1.3 SUBMITTALS**

- A. The Contractor shall make all submittals in accordance with Section 013300 – Submittal Procedures.
- B. Provide certificates signed by manufacturers certifying that their products comply with specified requirements.
  - 1. Manufacturer's certified analysis for standard products.
  - 2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Furnish ½ cu. ft. of each of the following, including supplier's name and location of supply.
  - 1. Landscape Architect for approval before delivering to job site:
    - Imported Topsoil Blend.
  - 2. Stockpiled Topsoil.
  - 3. Compost.
  - 4. Extensive Soil Blend.
  - 5. Intensive Soil Blend
- D. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the stockpiled topsoil with requirements indicated in this Section.
- E. Product data for fertilizer amendments recommended by Soils Report as stated in Part 1.4.
- F. Product data for mycorrhizal inoculum.

**PART 1 - GENERAL**

**1.4 QUALITY ASSURANCE**

- A. Analysis and Testing:
  - 1. Contractor shall be responsible for securing soil testing from testing laboratory with not less than 5 years experience providing soil testing services.
  - 2. Laboratory Instructions: Obtain from the testing laboratory instructions for submission of samples and minimum sample sizes.
  - 3. Laboratory Analysis Requirements: The following analyses are required for each sample submitted.
    - a. Complete Soil Test for New Planting, including evaluation of chemical suitability, available nutrients, texture, and organic matter content.
    - b. Amendment recommendations.
- B. For stockpiled topsoil, furnish a soil analysis made by a testing laboratory stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, nitrate N, strong bray phosphorous, potassium, calcium, sodium, zinc, magnesium, boron and copper content at topsoil, as well as particle size. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorous, and potash nutrients and any limestone, or other soil amendments, including compost, to be added to produce a satisfactory topsoil. Furnish fertilizer recommendations in ratio format, i.e. 10/20/10.
- C. Analysis is to be approved by Landscape Architect, before placement of topsoil.
- D. The Landscape Architect may inspect topsoil mixes at any time both prior to and after placement.
  - 1. Topsoil mixes found not meeting specifications or not matching the samples provided will be rejected. Rejected topsoil mix shall be removed and replaced at no cost to the Owner. Plants affected by topsoil removal may be required by the Landscape Architect to be replaced by new materials.
  - 2. Pre-installation Conference: Conduct conference at project site to comply with requirements.

**1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver packaged materials in manufacturer's unopened containers fully identified by name, brand, type, weight and analysis.
- B. Store and handle packaged materials to prevent damage and intrusion of foreign matter. Maintain topsoil in area designated by Owner. Provide erosion control measures to prevent contamination of the soil.

**1.6 SITE CONDITIONS**

- A. Topsoil placement and soil preparation shall not take place during periods where saturated soil or surface water is present in work areas.
- B. Work shall not take place when temperature is less than 32° F. or frozen soil is existing on site.
- C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before placing topsoil.

**PART 1 – GENERAL**

**1.6 SITE CONDITIONS (Cont)**

- D. Utilities: Determine location of above grade and underground utilities and perform work in a manner that will avoid damage. Hand excavate as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

**1.7 PROTECTION**

- A. Provide adequate measures to protect workers and passersby at the site. Execute all works in an orderly and careful manner with due consideration for any and all surrounding areas, plantings, or structures which are to remain. Protect all adjacent property and improvements from work damage, and replace any portions damaged through this operation.

**PART 2 - PRODUCTS**

**2.1 TOPSOIL**

- A. Topsoil shall meet the requirements of AASHTO T 88 and shall be a fertile, loamy, natural surface soil consisting of sands, silts, clay and organic matter in combination, with a pH range of 6.0-7.0, 4% organic material minimum, and free from substances toxic to plant growth, subsoil, stones or hard earth 1-inch or larger, noxious weeds (including quack grass, reed canary grass, blackberry and horsetail), roots, refuse, sticks and other extraneous material.
1. When tested according to AASHTO T 88, topsoil shall conform to the following:

Sieve Analysis	Percentage
Particle Size Range	by Weight
Larger than 2-inch	0
2-inch to 0.75-inch	0 to 5
0.75-inch to 0.187 inch (No. 4 sieve)	0 to 20
  2. Of the fraction passing the No. 4 sieve, excluding organic material, the topsoil shall conform to the following materials:

Hydrometer Analysis	Percentage
Particle Size Range	by Weight
0.187-inch to 0.003-inch (Sand)	5 to 70
0.003-inch to 0.00008-inch	20 to 80
Less than 0.00008-inch (Clay)	5 to 30
- B. Topsoil Source:
1. All soil at at-grade planting beds shall be import topsoil. Verify suitability of import topsoil to meet requirements of paragraph 2.1A, and amend as necessary with amendments as indicated in Paragraph 2.2.
  2. All soil at LIDA facilities (Flow-through planters and Rain Garden) shall be mixed per Clean Water Services standards. Primary treatment will occur in the top 18 inches of the infiltration planter. Amended soil in the treatment area is composed of organic compost, gravelly sand and topsoil. Compost is weed free, decomposed, non-woody plant material; animal waste is not allowed. Check with the local jurisdiction or Clean Water Services for Seal of Testing Approval Program (STA) Compost provider



## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL (Cont)**

- C. Obtain imported topsoil from naturally well-drained sites where topsoil occurs at least 4-inches deep; do not obtain from bogs or marshes. Verify suitability of topsoil to meet requirements stated above, and amend as necessary with amendments as shown in Paragraph 2.2 and as recommended by soils report.
- D. If regenerative noxious weeds are present in the soil, all resultant growth including roots, will be removed by Contractor throughout one-year period after acceptance of Work at no additional cost to Owner.
- E. Screen topsoil as necessary to remove objects 1" or larger, including stones, debris, hard earth, roots, sticks or other extraneous materials.
- F. Approved soil mixes and suppliers:
  - 1. Import topsoil blend for at-grade ornamental planting beds: "Landscape Blend #2, by Pro Gro (503) 682-3500.
  - 2. Import topsoil blend for LIDA Flow-Through Planters and Rain Garden: by Pro Gro
  - 3. Or approved equivalent

### **2.2 SOIL AMENDMENTS**

- A. Compost: The compost shall be derived from plant material and provided by a member of the US Composting Council Seal of Testing Assurance (STA) program. The compost shall be the result of the biological degradation and transformation of plant-derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. It shall meet the following criteria, as reported by the US Composting Council STA Compost Technical Data Sheet provided by the vendor:
  - 1. 100% of material must pass through a ½-inch screen.
  - 2. The pH of the material shall be between 6 and 8.
  - 3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0% by weight.
  - 4. The organic matter content shall be between 35 and 65 percent.
  - 5. Soluble salt content shall be less than 6.0 mmhos/cm.
  - 6. Germination (an indicator of maturity) shall be greater than 80%.
  - 7. Stability shall be 5-7.
  - 8. Carbon/nitrogen ration shall be less than 25:1
  - 9. Trace metals test result = "pass".
  - 10. Approved compost suppliers
    - a. Pro Gro.or approved equivalent.
- A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80% calcium carbonate equivalent, with a minimum 99% passing a No. 8 sieve and a minimum 75% passing a No. 60 sieve. Provide lime in the form of dolomite limestone.
- B. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.
- C. Other Amendments: Gypsum, magnesium sulfate, iron sulfate, soil sulfate and others that may be recommended in soils report.
- D. Fertilizer: As recommended in soils report.
- E. Mycorrhizal treatment: "Myco Endo Apply" mycorrhizal granular inoculum as available from Mycorrhizal Applications (541) 476-3985.

**PART 2 – PRODUCTS**

**2.2 SOIL AMENDMENTS (Cont)**

- F. Seeded Area Amendment: EcoLive Organics, as available from Sunmark Seeds.
- G. Herbicide: Round-up, approved.
- H. Water: Potable.
- I. Filter Fabric: Nonwoven permeable garden type filter fabric.
- J. Drain Rock: 1” diameter round, clean drain rock.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine areas to receive plantings for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until satisfactory conditions have been corrected, including adequacy of preinstalled irrigation system. Verify that subgrades and slopes of planting bed areas are acceptable to Landscape Architect prior to commencing work of this section

**3.2 PREPARATION**

- A. Prepare soil at a time when moisture conditions will permit proper cultivation. Do not prepare soil when soils are saturated, during periods of heavy rains or freezing temperatures. Do not install or prepare topsoil during the months of November through March unless approved by Landscape Architect.
- B. Provide 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. Remove stones over 1-inch dia., sticks, mortar, concrete, rubbish, debris and all materials harmful to plant life.
- C. Remove or spray as required to eradicate noxious weed growth and roots.
- D. Achieve complete removal or kill of all weeds within all areas receiving new plantings.
- E. Kill achieved by working soil is permissible for annual non-noxious broad leaf type weeds.
- F. Locate and securely mark or flag irrigation sprinkler heads, area drains, catch basins, cleanouts, manholes, valve boxes, and other site improvements not extending above finish grade.
- G. Request inspection and allow observation by Landscape Architect of prepared soils before planting.

**3.3 SOIL TEST FOR ONSITE STOCKPILED TOPSOIL**

- A. Provide number of soil samples of imported topsoil as recommended by certified soil testing laboratory in clearly identified containers.
- B. Do not include plant residue in samples.
- C. Provide written test reports for topsoil tests to the Landscape Architect 30 days before topsoil placement minimum.

**PART 3 - EXECUTION**

**3.4 SOIL PREPARATION FOR SHRUB, GROUNDCOVER, AND ORNAMENTAL GRASS AREAS**

- A. This section pertains to those areas on-site where mass planting of shrubs, groundcover and ornamental grasses are scheduled.
- B. Excavate and remove soil, debris, rock and other materials to 18-inches below adjacent flatwork or finish grade or deeper as required to ensure that all soil with construction rock and other debris is removed from all planting areas. Contact Landscape Architect for approval of all excavated planting areas prior to installing topsoil.
- C. Thoroughly rototill subgrade to a minimum 6-inches depth for approval.
- D. Import topsoil blend shall be fully mixed including compost prior to installation of topsoil mix in planting beds.
  - 1. If ProGro Landscape Blend #2 is used, additional compost is not required.
- E. Place topsoil mix in 6-inch lifts, watering lightly to allow topsoil to settle between lifts.
- F. Add additional blended material at mixture rate indicated in paragraph "E" to bring soil level to grades shown on plan with allowance for amendments and bark mulch placement. See Section 32 93 00 – Trees, Shrubs, and Groundcovers for placement of bark mulch.
- G. Prior to planting and mulch placement, uniformly broadcast other amendments as recommended by the soils report over the topsoil and rototill to 6" depth:
- H. If gravel backfill is encountered in soil excavation, notify Landscape Architect. All gravel in planting beds shall be removed to a depth of 3-feet and replaced with native subsoil or topsoil.
- I. Total soil depth (native subsoil and topsoil) is required to be 3-feet minimum. Total topsoil mix depth is required to be 18-inches minimum.

**3.5 SOIL PREPARATION FOR PLANTING PITS OF TREES, SHRUBS AND GRASSES**

- A. Excavate planting pits at least twice the diameter of the rootball.
- B. Backfill Mix: Thoroughly mix 3 parts topsoil with 1 part compost. Additionally, add mycorrhizal granular inoculum to the soil mix at the following rate:
  - Shrubs and Groundcover: 1 Tablespoon per gallon planting size
- C. Grade smooth to elevations shown on Contract Documents.

**3.6 CULTIVATION AT EXISTING TREES AND SHRUBS**

- A. Do not cultivate within existing tree protection zones.

**PART 3 - EXECUTION**

**3.7 FINE GRADING**

- A. Finish grade after full settlement including mulch, shall be 1-inch below tops of curbs, walks, or existing grades in shrub, groundcover and ornamental grass areas.
- B. Slope all areas to prevent puddling and drain surface water toward catch basins, drains, curbs, or off site as detailed.
- C. Soil in all areas shall be thoroughly settled, with a smooth surface free of humps and hollows, and shall be firm enough to resist undesirable impressions when stepped upon.
- D. Use levels, screens, drags, or any other equipment necessary to establish and verify grades and surfaces.
- E. Schedule inspection 48 hours in advance with Landscape Architect for review of fine grading operations.

**3.8 CLEAN-UP**

- A. Clean up excess materials and debris from project site upon completion of work or sooner if directed.
- B. Leave in neat and tidy condition daily.

**END OF SECTION**

PART 1 - GENERAL

0.1 SUMMARY

- A. Work included in this Section: Furnish labor, material and equipment required for the application of seed to establish grass areas as shown on the Drawings.
  - 1. Lawn Seed Areas. At the Contractor's discretion lawn areas may be seeded manually or hydroseeded.
- B. Landscape Architect shall determine areas beyond those shown on Contract Drawings disturbed by construction and to be prepared and seeded at no additional cost to the Owner.
- C. Related Sections:
  - 1. Section 32 84 00 – Irrigation System.
  - 2. Section 32 91 00– Soil Preparation.

0.2 REFERENCES

- A. AOSA – Association of Official Seed Analysis:
  - 1. Rules for Testing Seeds, Journal of Seed Technology, latest edition.
- B. FSA – Federal Seed Act.

0.3 DEFINITIONS

- A. PLS: Pure Live Seed.

0.4 SUBMITTALS

- A. Submit certificates of inspection as required by County Agricultural Inspector. Submit manufacturer's or vendor's certified analysis for soil amendments, fertilizer and other materials. Submit other data substantiating that materials comply with specified requirements. Such certificates may be tags, labels, and manufacturer's literature, and all submittals shall be reviewed for approval by Landscape Architect prior to installation.
- B. Submittals shall include but not be limited to the following:
  - 1. Seed: Botanical and common name, percentage by weight, percentages of purity, germination and weed seed for each grass seed species.
  - 2. Compost: Size, type of material and composition.
  - 3. Mulch: Size, type of material and fertilizer amendments.
  - 4. Fertilizer: Chemical and percentage composition.
  - 5. Amendments: Type, size and composition.

6. Tackifier.
7. Planting Schedule: indicating anticipated dates for seeding.

0.5 QUALITY ASSURANCE

- A. Installer Qualifications; Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful grass establishment.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that grass planting is in progress.
- C. Pre-installation Conference: Conduct conference at project site to comply with requirements.

0.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
  1. Ship and store seed, compost and fertilizer with protection from weather or other conditions that would damage or impair the effectiveness of the product.
  2. Contractor shall save all seed, compost, and fertilizer tags for the Landscape Architect to verify compliance with the drawings and specifications.

0.7 COORDINATION AND SCHEDULING

- A. Planting Season: Sow grass seed during normal planting seasons for type of grass area work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion.
- B. Weather Limitations: proceed with planting only when existing and forecast weather conditions are suitable for work.
- C. Coordinate work with installation of other site work including irrigation and planting.

0.8 INSPECTIONS

- A. Site visits for review of work shall be scheduled by the Contractor a minimum of 48 hours in advance with the Landscape Architect

0.9 MAINTENANCE

- A. Begin maintenance of grass areas immediately after each area is planted and continue until acceptable grass mix is established, but not for less than the following periods.
  1. When full maintenance has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

PART 2 - PRODUCTS

0.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.
  - 1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated.
  - 2. Seed shall be purchased on a "Pure Live Seed" (PLS) basis.
- B. Substitutions:
  - 1. If specified seed material is not obtainable, submit proof of non-availability to Owner's Representative, together with proposal for use of equivalent material.
  - 2. Substantiate such proof in writing no later than 30 days after Award of Contract.

0.2 MATERIALS

- A. Seed mixes to be applied in areas as indicated on Drawings and approved by BSD. For athletic fields:
  - 1. Three-way rye grass seed in compliance with Oregon blue tag certification (annual rye is not to be included in the seed mix.) Grass seed shall be applied at the rate of 10 pounds per 1,000 square feet.
  - 2. Or Sunmark Seeds "SPORTS TURF" Lawn Mix at the rate of 4 pounds per 1,000 square feet.
- B. Approved Seed Supplier:
  - 1. Sunmark Seeds.
  - 2. Or approved equivalent.
- C. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, non-toxic, free from plant growth or germination inhibitors, with a maximum moisture content of 15% and a pH range of 4.5-6.5.
- D. Non-asphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, non-toxic and free of plant growth or germination inhibitors.
- E. Fertilizer:
  - 1. Hydromulch Mix Fertilizer: Low nitrogen, slow release fertilizer with a 16-16-16 ratio.
  - 2. Maintenance Fertilizer for lawn areas only: Calcium nitrate (15.5-0-0).
- F. Compost: Fine grade compost meeting the requirements of specification section 32 91 00 – Soil Preparation.

## 2.3 HYDRO-SLURRY MIX

- A. The slurring mix shall consist of the following:
  - 1. Seed mix at rate indicated on Drawings.
  - 2. Wood cellulose fiber mulch, dyed green at 2,000 lb. per acre.
  - 3. Apply tackifier at 50 lb. per acre.
  - 5. Apply fertilizer at 200 lb. per acre.

## PART 3 - EXECUTION

### 0.1 EXAMINATION

- A. Examine areas to receive seed mix for compliance with requirements and for conditions affecting performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 0.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. Protect adjacent and adjoining areas from hydroseed overspraying.
- B. For grass areas, all seeding shall occur between March 1 – October 1.

### 0.3 MANUALLY SEEDING NEW GRASS AREAS

- A. Final grades to be approved by Landscape Architect prior to seeding.
- B. Broadcast seed at rate indicated on Drawings with a brillion seeder or other application equipment capable for accurately distributing seed. Make two passes perpendicular to each other ensuring even distribution. Rake seed very lightly into 1/8-inch of soil, roll lightly and remove all ridges and imperfections.
- C. Apply a thin layer of fine grade compost over seed mix, water with a fine spray.

### 0.4 HYDROSEEDING NEW GRASS AREAS

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
  - 1. Mix slurry with nonasphaltic tackifier.
- 2. Apply slurry uniformly to area to be seeded in a 1-step process at given rate in paragraph 2.3A.
- 3. Agitate as necessary the slurry to assure an even mix of ingredients.



0.5 MAINTENANCE

A. Maintain finish grass areas including handwatering and fertilizing, and continue until final project acceptance. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn free of weeds and eroded or bare areas. Replant bare areas with same materials specified for seeded grass areas.

2. For lawn areas, approximately 45 days after planting, uniformly broadcast calcium nitrate (15.5-0-0) at a rate of 6 lb. per 1,000 sq.ft.

0.6 FINAL ACCEPTANCE

A. Acceptance of all seeded grass areas will be based on growth of a uniform color and dense stand of grass, without bare spots of over 100 sq. in.. Grass shall have a lush, green appearance without yellow spots. Contractor shall ensure seed establishment of all areas prior to October 15.

0.7 CLEAN-UP AND PROTECTION

A. Promptly remove soil and debris created by seeded grass area work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soils onto surfaces of roads, walks, or other paved areas. Remove germinated seed in planting areas without harming other plant material.

0.8 FINAL PROTECTION

A. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

END OF SECTION

PART 1 - GENERAL

0.1 SUMMARY

A. This Section includes:

1. Install trees, shrubs, ornamental grasses and groundcovers, including accessories, as detailed and specified herein.
2. Secure and maintain all plant material so as to have minimum 1-year acclimation in a similar climate to project site.
3. Establish a coordination schedule for supplying and installing plants and related materials.

B. Related Sections:

1. Section 32 84 00 – Irrigation System.
2. Section 32 91 00 – Soil Preparation.

0.2 REFERENCES

A. Plant Standards: Comply with botanical names, sites, and conditions provided in:

1. Botanical Names: American Joint Committee on Horticulture Nomenclature, “Standardized Plant Names” or “Hortus Third”.
2. Sizes and Conditions: American National Standards Institute (ANSI) Z60.1, “American Standards for Nursery Stock”, latest edition.

0.3 SUBMITTALS

- A. The Contractor shall make all submittals in accordance with Section 01 33 00-Submittal Procedures.
- B. Submit list of growers for each plant species to be installed within 30 days after the award of Contract. List to include plant sizes and conditions. Certify, in writing, confirmed orders for plants and provide the quantity, location, phone number, and address of the grower who has agreed to provide any plant material. Each plant species shall be supplied by one grower only unless approved by Landscape Architect.
- C. Contractor shall inspect plants at growing or holding area and send letter of confirmation of plant quantities and conditions to Landscape Architect 100 days before planting time.
- D. Submit a ½ cu. ft. sample of mulch and river rock for approval prior to delivery.
- E. Submit planting schedule indicating anticipated dates and locations for each type of planting.

- F. With application for final payment submit duplicate copies of delivery invoices, labels, or other acceptable proof of quantities of materials used.
- G. Requests for substitutions of plants not available in size, quantity or type specified must be made within 30 days after the award of bid. Submit proof of non-availability to Landscape Architect, together with proposal for use of equivalent material.
- H. Submit copy of Oregon Landscape Contractor's Association certification for Certified Landscape Technician.

0.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment, with 5 years minimum experience.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress. Supervisor shall be a Certified Landscape Technician, certified by the Oregon Landscape Contractor's Association.
- C. Government Inspection: All plants and planting material shall meet or exceed the specifications of federal, state, and county laws requiring inspection for plant disease and control. Submit certificate of inspection of plant material by State or Federal authorities if required.
- D. All plant material is to be grown from cuttings or seed. Collected plants are not acceptable.
- E. Provide quality, size, genus, species, and variety of trees, shrubs and groundcover indicated, complying with applicable requirements of ANSI Z60.1, "American Standard for Nursery Stock".
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements.

0.5 QUALITY CONTROL

- A. Inspection:
  - 1. Plants not conforming to specifications shall be rejected.
  - 2. Approval of material at a growing or holding site is a qualified endorsement of general quality only, and does not certify a compliance with the specifications in all particulars; such approval does not preclude the right of rejection on the job site.
- B. The presence of noxious weeds in plant balls shall be cause for rejection of any or all plants from that source.

0.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in manufacturer's unopened containers, fully identified by name, brand, type, weight and analysis.
- B. Store materials to prevent damage or intrusion of foreign matter.

- C. Plant Materials: Deliver trees, shrubs, and groundcovers after preparations for planting have been completed. Protect trunks and branches from damage. Protect root systems from drying out. Label one of each tree and shrub species with securely attached waterproof tag bearing botanical name and supplier's name.
- D. Heel-in plants immediately upon delivery if not planted within 4 hours.
- E. Store plants in shade and protect from harmful weather until planted.
- F. Water, maintain, and protect stored material from drying or other injury or damage
- G. Store plants in upright position and allow sufficient ventilation.
- H. Do not drop plants.
- I. Do not pick up containerized or balled plants by stems or trunks.
- J. Aquatic Plants: Install aquatic plants the same day they arrive to the project site.
- K. Sedum Tiles: Install sedum tiles the same day they arrive to the project site. Store per manufacturer's instructions until installed so that sedum plants do not get crushed.

0.7 INSPECTIONS

- A. Notify Landscape Architect 48 hours in advance for the following reviews of work:
  - 1. Review of plant stock upon arrival to site or at nursery, 90 days in advance of planting, or as determined by Landscape Architect.
  - 2. Review of plant materials located in position for planting, but not yet planted.
  - 3. Schedule an inspection to take place during the last weeks of the 90-day establishment period.

0.8 COORDINATION AND SCHEDULING

- A. Coordinate planting of trees and shrubs during normal planting seasons for such work in location of Project.
  - 1. Plant trees, shrubs, ornamental grasses and groundcover only after danger of frost is past or before frost season to allow establishment before first frost. Do not plant in frozen ground.
- B. Coordination with Seeded Grasses: Plant trees and shrubs after finish grades are established and before installation of seeded grasses, unless otherwise acceptable to Landscape Architect. When planting trees and shrubs after grass installation, protect grass areas and promptly repair damage caused by planting operations.
- C. Environmental Conditions: Plants shall not be installed when temperatures are below or forecasted to be below freezing or when temperatures are above or forecasted to be above 95 degrees fahrenheit. Do not install plants in waterlogged soil. Do not install plants in prolonged periods of drought unless irrigation is available.

0.9 WARRANTY AND ACCEPTANCE

- A. All trees, shrubs, ornamental grasses and groundcover plants shall be guaranteed for a one year warranty period, from the end of the establishment period. Contractor shall notify Landscape Architect 2 weeks prior to commencement of warranty period for inspection of adequate establishment. If such notice is not provided, the establishment period shall be extended. Plants shall be replaced at the Contractor's expense if not in a healthy condition during this time. If the end of the establishment period falls after October 1, however, the 1 year guarantee will begin the following spring, March 15.
- B. The establishment period shall consist of 90 calendar days starting after final inspection and written approval of the Work in total. Work shall include watering, weeding, spraying, replacement of plants, mowing, edging, cleanup and other Work to keep the landscaped areas in a neat and clean condition.
- C. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs, which are in doubtful condition, at end of warranty period; unless requested by Landscape Architect, it is advisable to extend warranty period for a full growing season.
- D. Another inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Only 1 replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.
- E. Eco-roof planting shall additionally meet the requirements and warranty of Section 07 52 00 Modified Bituminous Membrane Roofing.

0.10 MAINTENANCE

- A. Begin maintenance immediately after planting.
- B. Maintain trees, shrubs and other plants until Final Acceptance but in no case less than following period: 90 calendar days after Final Acceptance and review of tree, shrub, groundcover, and grass planting. If the end of the maintenance period falls after October 1, however, the remaining period will begin the following spring, March 15.
- C. During the maintenance period maintain trees, shrubs and other plants by watering, pruning, cultivating, weeding and replenishing mulch as required and needed for healthy growth. Restore planting basins. Adjust and repair stake supports and reset trees and shrubs to proper grades or vertical position as required. Spray as required and approved by City to keep trees, shrubs, and other plantings free of insects and disease. Rake and remove leaves and debris from deciduous plant foliage.
  - 1. Contractor shall provide resources for bed weeding every two weeks through the duration of the maintenance period. Contractor to provide a monthly report stating hours spent maintaining the landscape and activities. For every month that maintenance activities do not occur per these specifications, the maintenance period shall be extended one month.

PART 2 - PRODUCTS

0.1 BACKFILL SOIL MIXTURE

- A. See Section 32 91 00-Soil Preparation.

0.2 PLANTING BEDDING MULCH

- A. Mulch for shrub and groundcover beds: Organic medium ground hemlock bark, free from deleterious materials and suitable as a top dressing of trees and shrubs.

PART 3 - EXECUTION

0.1 PLANTING GROUNDCOVER

- A. See Section 32 91 00 – Soil Preparation for preparation of soil prior to applying mulch.
- B. Apply mulch in beds as specified.
- C. Plant material in areas as detailed after the mulch has been applied.
- D. Plant material deep enough so that plant roots are embedded in soil.

0.2 MULCH INSTALLATION

- A. Apply an average thickness of 2-inches hemlock bark mulch or approved cover over groundcover areas and finish level with adjacent finish grades. Do not place mulch against trunks or stems.
- B. Rake mulch surface smooth.

0.3 PRUNING

- A. Prune plant material if necessary and as directed by Landscape Architect to balance root and top growth.

0.4 CLEAN-UP AND PROTECTION

- A. During landscape planting work, keep pavements clean and work area in an orderly condition.
- B. Protect trees and shrubs from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

0.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove subbase surplus soil and waste material, including excess subsoil, unsuitable soil, trash and debris, and legally dispose of it off the property.

END OF SECTION



PART 1 - GENERAL

0.1 SUMMARY

A. This Section includes:

1. Install trees, shrubs, ornamental grasses and groundcovers, including accessories, as detailed and specified herein.
2. Secure and maintain all plant material so as to have minimum 1-year acclimation in a similar climate to project site.
3. Establish a coordination schedule for supplying and installing plants and related materials.

B. Related Sections:

1. Section 32 84 00 – Irrigation System.
2. Section 32 91 00 – Soil Preparation.

0.2 REFERENCES

A. Plant Standards: Comply with botanical names, sites, and conditions provided in:

1. Botanical Names: American Joint Committee on Horticulture Nomenclature, “Standardized Plant Names” or “Hortus Third”.
2. Sizes and Conditions: American National Standards Institute (ANSI) Z60.1, “American Standards for Nursery Stock”, latest edition.

0.3 SUBMITTALS

- A. The Contractor shall make all submittals in accordance with Section 01 33 00-Submittal Procedures.
- B. Submit list of growers for each plant species to be installed within 30 days after the award of Contract. List to include plant sizes and conditions. Certify, in writing, confirmed orders for plants and provide the quantity, location, phone number, and address of the grower who has agreed to provide any plant material. Each plant species shall be supplied by one grower only unless approved by Landscape Architect.
- C. Contractor shall inspect plants at growing or holding area and send letter of confirmation of plant quantities and conditions to Landscape Architect 100 days before planting time.
- D. Submit a ½ cu. ft. sample of mulch and river rock for approval prior to delivery.
- E. Submit planting schedule indicating anticipated dates and locations for each type of planting.



- F. With application for final payment submit duplicate copies of delivery invoices, labels, or other acceptable proof of quantities of materials used.
- G. Requests for substitutions of plants not available in size, quantity or type specified must be made within 30 days after the award of bid. Submit proof of non-availability to Landscape Architect, together with proposal for use of equivalent material.
- H. Submit copy of Oregon Landscape Contractor's Association certification for Certified Landscape Technician.

#### 0.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment, with 5 years minimum experience.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress. Supervisor shall be a Certified Landscape Technician, certified by the Oregon Landscape Contractor's Association.
- C. Government Inspection: All plants and planting material shall meet or exceed the specifications of federal, state, and county laws requiring inspection for plant disease and control. Submit certificate of inspection of plant material by State or Federal authorities if required.
- D. All plant material is to be grown from cuttings or seed. Collected plants are not acceptable.
- E. Provide quality, size, genus, species, and variety of trees, shrubs and groundcover indicated, complying with applicable requirements of ANSI Z60.1, "American Standard for Nursery Stock".
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements.

#### 0.5 QUALITY CONTROL

- A. Inspection:
  - 1. Plants not conforming to specifications shall be rejected.
  - 2. Approval of material at a growing or holding site is a qualified endorsement of general quality only, and does not certify a compliance with the specifications in all particulars; such approval does not preclude the right of rejection on the job site.
- B. The presence of noxious weeds in plant balls shall be cause for rejection of any or all plants from that source.

#### 0.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in manufacturer's unopened containers, fully identified by name, brand, type, weight and analysis.
- B. Store materials to prevent damage or intrusion of foreign matter.

- C. Plant Materials: Deliver trees, shrubs, and groundcovers after preparations for planting have been completed. Protect trunks and branches from damage. Protect root systems from drying out. Label one of each tree and shrub species with securely attached waterproof tag bearing botanical name and supplier's name.
- D. Heel-in plants immediately upon delivery if not planted within 4 hours.
- E. Store plants in shade and protect from harmful weather until planted.
- F. Water, maintain, and protect stored material from drying or other injury or damage
- G. Store plants in upright position and allow sufficient ventilation.
- H. Do not drop plants.
- I. Do not pick up containerized or balled plants by stems or trunks.

0.7 INSPECTIONS

- A. Notify Landscape Architect 48 hours in advance for the following reviews of work:
  - 1. Review of plant stock upon arrival to site or at nursery, 90 days in advance of planting, or as determined by Landscape Architect.
  - 2. Review of plant materials located in position for planting, but not yet planted.
  - 3. Schedule an inspection to take place during the last weeks of the 90-day establishment period.

0.8 COORDINATION AND SCHEDULING

- A. Coordinate planting of trees and shrubs during normal planting seasons for such work in location of Project.
  - 1. Plant trees, shrubs, ornamental grasses and groundcover only after danger of frost is past or before frost season to allow establishment before first frost. Do not plant in frozen ground.
- B. Coordination with Seeded Grasses: Plant trees and shrubs after finish grades are established and before installation of seeded grasses, unless otherwise acceptable to Landscape Architect. When planting trees and shrubs after grass installation, protect grass areas and promptly repair damage caused by planting operations.
- C. Environmental Conditions: Plants shall not be installed when temperatures are below or forecasted to be below freezing or when temperatures are above or forecasted to be above 95 degrees fahrenheit. Do not install plants in waterlogged soil. Do not install plants in prolonged periods of drought unless irrigation is available.

0.9 WARRANTY AND ACCEPTANCE

- A. All trees, shrubs, ornamental grasses and groundcover plants shall be guaranteed for a one year warranty period, from the end of the establishment period. Contractor shall notify Landscape Architect 2 weeks prior to commencement of warranty period for inspection of adequate establishment. If such notice is not provided, the establishment period shall be extended. Plants shall be replaced at the Contractor's expense if not in a healthy condition during this time. If the end of the establishment period falls after October 1, however, the 1 year guarantee will begin the following spring, March 15.
- B. The establishment period shall consist of 90 calendar days starting after final inspection and written approval of the Work in total. Work shall include watering, weeding, spraying, replacement of plants, mowing, edging, cleanup and other Work to keep the landscaped areas in a neat and clean condition.
- C. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs, which are in doubtful condition, at end of warranty period; unless requested by Landscape Architect, it is advisable to extend warranty period for a full growing season.
- D. Another inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Only 1 replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.
- E. Eco-roof planting shall additionally meet the requirements and warranty of Section 07 52 00 Modified Bituminous Membrane Roofing.

0.10 MAINTENANCE

- A. Begin maintenance immediately after planting.
- B. Maintain trees, shrubs and other plants until Final Acceptance but in no case less than following period: 90 calendar days after Final Acceptance and review of tree, shrub, groundcover, and grass planting. If the end of the maintenance period falls after October 1, however, the remaining period will begin the following spring, March 15.
- C. During the maintenance period maintain trees, shrubs and other plants by watering, pruning, cultivating, weeding and replenishing mulch as required and needed for healthy growth. Restore planting basins. Adjust and repair stake supports and reset trees and shrubs to proper grades or vertical position as required. Spray as required and approved by City to keep trees, shrubs, and other plantings free of insects and disease. Rake and remove leaves and debris from deciduous plant foliage.
  - 1. Contractor shall provide resources for bed weeding every two weeks through the duration of the maintenance period. Contractor to provide a monthly report stating hours spent maintaining the landscape and activities. For every month that maintenance activities do not occur per these specifications, the maintenance period shall be extended one month.

PART 2 - PRODUCTS

0.1 BACKFILL SOIL MIXTURE

- A. See Section 32 91 00-Soil Preparation.

0.2 PLANTING BEDDING MULCH

- A. Mulch for shrub and groundcover beds: Organic medium ground hemlock bark, free from deleterious materials and suitable as a top dressing of trees and shrubs.

PART 3 - EXECUTION

0.1 PLANTING GROUNDCOVER

- A. See Section 32 91 00 – Soil Preparation for preparation of soil prior to applying mulch.
- B. Apply mulch in beds as specified.
- C. Plant material in areas as detailed after the mulch has been applied.
- D. Plant material deep enough so that plant roots are embedded in soil.

0.2 MULCH INSTALLATION

- A. Apply an average thickness of 2-inches hemlock bark mulch or approved cover over groundcover areas and finish level with adjacent finish grades. Do not place mulch against trunks or stems.
- B. Rake mulch surface smooth.

0.3 PRUNING

- A. Prune plant material if necessary and as directed by Landscape Architect to balance root and top growth.

0.4 CLEAN-UP AND PROTECTION

- A. During landscape planting work, keep pavements clean and work area in an orderly condition.
- B. Protect trees and shrubs from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

0.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove subbase surplus soil and waste material, including excess subsoil, unsuitable soil, trash and debris, and legally dispose of it off the property.

END OF SECTION



**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Work included in this Section: Furnish all labor, material and equipment necessary for the installation of site furnishings including picnic tables, custom benches and custom planters.
  - 1. Provide all hardware and ancillary materials as needed to comply with code, Drawings, and for complete and fully functioning installations.
- B. Related Sections:
  - 1. Section 32 13 13 – Concrete Paving.
  - 2. Section 32 14 13 – Unit Paving.
  - 3. Division 3 – Concrete.
  - 4. Division 5 – Metals.

**1.2 QUALITY ASSURANCE**

- A. Metal fabrications in this section shall meet the technical requirements of Section 05 50 00 – Metal Fabrications.
- B. Fabricators for steelwork shall have completed custom steel site furniture work with a record of successful performance, and with minimum of 5 years' experience.
- C. Metal Finishes:
  - 1. Painted metal finishes shall meet the technical requirements of Division 9 – Painting.

**1.3 SUBMITTALS**

- A. Submit the following in accordance with Division 1 Section "Submittal Procedures".
  - 1. Product information indicating quantity, factory finish, and size of each type of furnishing and product material specified in this section. Indicate methods of attachment recommended by each manufacturer.
  - 2. Provide material samples indicating color and finish of products for approval.
    - a. 12-inch segment of handrail at welded corner condition, with both round handrail and bar post, finished as detailed.
  - 3. Indicate methods of attachment recommended by each manufacturer.
  - 4. Shop Drawings: Submit shop drawings for approval, prior to manufacturing, describing and detailing typical details of custom benches, handrails, including all dimensions, weights, welds and attachments for all metalwork, and plastic lumber.

**PART 2 - PRODUCTS**

**2.1 METAL HANDRAILS**

- A. Custom design as detailed and meeting the requirements of Division 5 – Metals.
- B. Finish: All ferrous metal handrails are to be galvanized.

**PART 2 – PRODUCTS**

**2.2 MISCELLANEOUS MATERIALS**

- A. Hardware as indicated and as required for assembly and secure installation as acceptable to Landscape Architect.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install site furnishings in accordance with manufacturer's printed instructions and as indicated on Drawings.

**3.2 COMPLETION**

- A. Adjusting and Cleaning:
  - 1. Replace defective components.
  - 2. Apply color matching touch up paint to damaged shop finish.
  - 3. Clean exposed surfaces after installation of site furnishings.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. Private on-site domestic water distribution system improvements.

**1.3 WORK INCLUDED BUT SPECIFIED IN OTHER SECTIONS**

- A. Section 31 23 33 - Trenching and Backfill

**1.4 REFERENCED SPECIFICATIONS**

- A. ASTM Standards (current edition)
- B. AWWA Standards (current edition)
- C. NFPA Standards (current edition)

**1.5 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise indicated.
- B. Product Data: Manufacturer's specifications and technical data including performance, construction, and fabrication information.
  - 1. Submit for: Pipe materials and fittings.
- C. Field Quality Control submittals as specified in Part 3 of this Section:
  - 1. Field Tests
  - 2. Special Inspections for Code Compliance
- D. Closeout Requirements: Comply with Section 017700.
  - 1. Provide record documents.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- B. Installer's Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.



**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Packing and Shipping: Deliver products in original, unopened packaging with legible manufacturer's identification.
- B. Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

**1.8 ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before starting work of this section.

**1.9 COORDINATION**

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

**PART 2 - PRODUCTS**

**2.1 DOMESTIC WATER PIPE AND FITTINGS (3 INCH AND SMALLER) (UNLESS OTHERWISE NOTED)**

- A. Pipe and Fitting Material shall be:
  - 1. Pipe: Type L copper, hard drawn, conform to ASTM B88.
  - 2. Fittings: Grooved-end, wrought copper, conform to ANSI B16.22.
  - 3. Joints: Roll-grooved CTS with rigid couplings.

**2.2 MECHANICAL JOINT RESTRAINT**

- A. Mechanical Joints: At MJ Fittings: Ductile iron mechanical joint follower gland with restraining wedges secured to pipe by torque-limiting twist-off nuts. EBBA iron sales "Mega Lug" Series 2000 PV or Romac "Romagrip". At Push-on Joints: Clamp-ring and fire-bolt assembly with ductile iron ring and corrosion resistant bolts. Uni-flange series 1350.

**2.3 CONCRETE**

- A. Concrete shall be ready-mixed conforming to Section 033000, CAST-IN-PLACE CONCRETE, and shall have a compressive strength of 3,000 psi at 28 days. Maximum size of aggregate shall be 1½ inches.

**2.4 OTHER MATERIALS**

- A. Recommended by Manufacturer and subject to Engineer's review and acceptance. Provide all materials required to complete and make water system operational.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to installation, carefully inspect trench, excavations and base to verify that all such work is complete to the point where this installation may properly commence.
- B. Do not install work of this Section until all unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

**3.2 TRENCHING AND BACKFILL**

- A. Trenching and backfill shall conform to the requirements of Section 312333, TRENCHING AND BACKFILL.

**3.3 PIPE INSTALLATION**

- A. Installation shall be in accordance with the manufacturer's recommendations. All pipe ends and interiors shall be thoroughly cleaned of all foreign matter and shall be kept clean during installation. When work is not in progress, all open ends of pipe and fittings shall be securely closed so that no trench water, earth, animal life or other substance may enter.
- B. Cutting of pipe to be done in a neat and workmanlike manner by method which will not damage pipe and as recommended by manufacturer.
- C. Install piping within 0.02 feet of indicated grade and location.

**3.4 MECHANICAL JOINT RESTRAINT**

- A. Install at all changes of directions and fittings as shown on the drawings.
- B. Install mechanical joint restraint at fittings and pipe joints where indicated on drawings.

**3.5 FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  - 1. Hydrostatic tests as described below.
  - 2. Disinfection Tests.
- C. Field Inspections: Notify Engineer prior to work of this section.
- D. Special Inspections for Code Compliance:
  - 1. Test hydrostatically. All testing, acceptance, and documentation shall comply with Oregon State Plumbing Specialty Code (current edition) and NFPA and AWWA specifications as applicable.
  - 2. Prior to testing partially backfill or provide other means of restraint to prevent any movement during the test.

3. Observance: Plumbing inspector to observe domestic, mainline irrigation, and fire line testing. Fire Department to observe fire line testing. Contractor shall notify plumbing inspector and Fire Department at least 48 hours prior to testing.
4. Obtain plumbing inspector and fire marshal approvals and submit to Engineer.

### 3.6 **FLUSHING AND DISINFECTION**

- A. Flushing:
  1. Contractor shall flush and clean all parts of all completed system. All pipe and structures shall be clean and free of all construction debris, rocks, gravel, mud, sand, silt, and other foreign material, and as directed by the Engineer.
- B. Disinfection:
  1. Disinfect all domestic water supply piping and appurtenances in accordance with AWWA C651 and Oregon State Health Department requirements.
  2. Provide written certification from a firm specializing in disinfection that the disinfection has been successfully completed.
  3. Dispose of test water in accordance with all governing rules and regulations.

### 3.7 **CLEANING**

- A. Upon completion of the work of this section promptly remove from the working area all scraps, debris and surplus material.

### 3.8 **PROTECTION**

- A. Protect all Work installed under this section.
- B. Replace, at no additional cost to Owner, any damaged work of this section.

END OF SECTION

**PART 1 - GENERAL**

**1.1 CONTRACT CONDITIONS**

- A. Work of this section is bound by the Contract Conditions and Division 1, bound herewith, in addition to this specification and accompanying drawings.

**1.2 SECTION INCLUDES**

- A. On-site private storm drain system improvements.

**1.3 RELATED SECTIONS**

- A. Section 31 23 33 - Trenching and Backfill

**1.4 SUBMITTALS**

- A. Comply with Section 013300, unless otherwise indicated.
- B. Product Data: Manufacturer's specifications and technical data including performance, construction, fabrication, and installation information.
  - 1. Submit for: Pipe and fittings, surface drains, and storm drain treatment structure.
- C. Field Quality Control submittals as specified in Part 3 of this Section:
  - 1. Field Tests
  - 2. Special Inspections for Code Compliance
- D. Closeout Requirements: Comply with Section 017700.
  - 1. Provide record documents.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Not less than 5 years of experience in the actual production of specified products.
- B. Installer's Qualifications: Firm with not less than 5 years of experience in installation of systems similar in complexity to those required for this project.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Packing and Shipping: Deliver products in original, unopened packing with legible manufacturer's identification.
- B. Storage and Protection: Comply with manufacturer's recommendations.
  - 1. Protect from damage by the elements and construction procedures.

**1.7 ADVANCE NOTICES**

- A. Notify Engineer at least 48 hours before starting work of this section.

**1.8 COORDINATION**

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

**PART 2 - PRODUCTS**

**2.1 STORM PIPE AND FITTINGS (UNLESS OTHERWISE NOTED)**

- A. Either of the following pipe materials may be used.
1. PVC Solid Wall: Shall be Polyvinyl chloride plastic pipe with rubber gasket joints. Manufacturing Standard: ASTM D3034 (latest revision) SDR 35 for pipe sizes 4"-15", T-1 wall thickness. Provide with manufactured fittings unless otherwise noted on drawings.
  2. Polyethylene Pipe: Corrugated polyethylene meeting the requirements of AASHTO M252 Type S (pipe sizes 3" – 10"). Joint shall be water-tight according to the requirements of ASTM D3212 (latest revision). Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 (latest revision) with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 (latest revision) after 72 hour exposure in 50 PPHM ozone at 104° F. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. Joints shall remain watertight when subjected to a 1.5° axial misalignment. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly. Fittings shall conform to AASHTO M252. Fabricated fittings shall be welded to the interior and exterior at all junctions. Hancor or ADS.

**2.2 PERFORATED PIPE AND FITTINGS**

- A. Shall be smooth interior perforated corrugated polyethylene pipe with AASHTO Type 'S' designation meeting the requirements of AASHTO M252 (pipe sizes 4" – 10"). Provide with manufactured fittings unless otherwise noted on drawings.
- B. Provide with machine-knitted polyester drain envelope, 100-135 burst strength. Equivalent opening size of 30 to 40.

**2.3 AREA DRAINS**

- A. Shall be prefabricated steel, 8-inch or 12-inch square by 24 (minimum) inches deep, 10 gauge minimum, asphalt paint inside and out, 6-inch minimum water seal with hinged lid on trap, outlet (and/or inlet) size as specified on drawings. Cast iron or steel grate with bicycle bars, compliant with ADA standards. Lynch or Gibson.

**2.4 FLEX-TRANSITION COUPLER**

- A. Shall be Fernco, 1000 series. Use fittings manufactured for the specific pipe size and material types being connected.

**2.5 STORM DRAIN TREATMENT STRUCTURE**

- A. Precast 48" Stormfilter manhole, with Perlite media, by Contech Engineered Solutions, LLC. Refer to manufacturer's specifications for general requirements and product specifications. Configuration and depth as required by construction drawings.

**2.6 SADDLE CONNECTION**

- A. Shall be "CB" sewer saddle by Romac Industries, Inc.

**2.7 CONCRETE**

- A. Concrete shall be ready-mixed conforming to Section 033000, CAST-IN-PLACE CONCRETE, and shall have a compressive strength of 3,000 psi at 28 days. Maximum size of aggregate shall be 1½ inches.

**2.8 OTHER MATERIALS**

- A. Recommended by Manufacturer and subject to Engineer's review and acceptance. Provide all materials required to complete and make drainage system operational.

**PART 3 - EXECUTION**

**3.1 EXISTING CONDITIONS**

- A. Prior to starting work of this section, carefully inspect trench, excavations, and pipe bedding to verify that all such work is complete to the point where this installation may properly commence.
- B. Do not install work of this section until unsatisfactory conditions have been corrected. Commencing work implies acceptance of existing conditions.
- C. If field measurements differ slightly from drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to starting work of this section.

**3.2 TRENCHING AND BACKFILL**

- A. Trenching and backfill shall conform to the requirements of Section 312333, TRENCHING AND BACKFILL.

**3.3 PIPE INSTALLATION**

- A. Installation shall be in accordance with the manufacturer's recommendation. All pipe ends and interiors shall be thoroughly cleaned of all foreign matter and shall be kept clean during installation. When work is not in progress, all open ends of pipe and fittings shall be securely closed so that no water, earth, animal life, or other substance may enter.
- B. Cutting pipe shall be done in a neat and workmanlike manner by method which will not damage pipe and as recommended by manufacturer.
- C. Install piping within 0.02 foot of indicated grade and location.
- D. Trim pipe ends flush with manhole and catch basin interior walls.

**3.4 AREA DRAINS**

- A. Construct on compacted 4" minimum depth, 3/4" - 0 crushed rock base level, plumb, and square with adjacent construction. Set rim flush with adjacent finished surfaces unless otherwise noted.

**3.5 STORM DRAIN TREATMENT STRUCTURE**

- A. Contech manhole to be constructed on compacted 4" minimum depth, 3/4"-0 crushed rock base level, plumb and square with adjacent construction. Set rims flush with adjacent finished surfaces unless otherwise noted. Install per manufacturer's recommendations.

**3.6 FIELD QUALITY CONTROL**

- A. Refer to Section 014500 for responsibilities for arranging, supervising, and payment of field quality control requirements.
- B. Field Tests:
  - 1. Deflection Test:
    - a. Conduct deflection tests of flexible pipe. The testing shall be conducted by pulling an approved mandrel through the completed pipeline. The diameter of the mandrel shall be 95 percent of the pipe initial inside diameter. Conduct testing on a manhole-to-manhole basis after flushing and cleaning.
    - b. The mandrel shall be pulled in front of the camera so the deflection testing is clearly recorded on the video tape unless approved by the Engineer.
    - c. A water depth gauge shall be provided, located on the TV camera side of the mandrel. The gauge shall be graduated with marks at 0.50" increments clearly visible during TV inspection. The gauge shall be capable of measuring depth of water in 0.50" increments from 0.50" to 2.5". The gauge shall be designed so it will remain plumb regardless of the rotation of the mandrel or camera.
    - d. Deflection testing shall be conducted and accepted prior to any paving being done.
- C. Field Inspections: Notify Engineer prior to work of this section.
- D. Special Inspections for Code Compliance: Obtain plumbing inspector approvals.

3.7 **CLEANING**

- A. Prior to final acceptance, Contractor shall flush and clean all elements of the completed system. All pipe and structures shall be clean and free of all construction debris, rocks, gravel, mud, sand, silt, and other foreign material, and as directed by the Engineer.
- B. Upon completion of work of this section promptly remove from the working area all scraps, debris, and surplus material.

3.8 **PROTECTION**

- A. Protect all work installed under this section.
- B. Replace, at no additional cost to Owner, any damaged work of this section.

END OF SECTION