



State of Utah

GARY R. HERBERT
Governor

GREGORY S. BELL
Lt. Governor

Department of Administrative Services

KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management

DAVID G. BUXTON
Director

ADDENDUM NO. 2

Date: March 8, 2010

To: Contractors

From: Bob Anderson– Project Manager

Reference: Escalante Heritage Center
Utah Department of Transportation – Escalante, Utah
DFCM Project No. 09018900

Subject: **Addendum No. 2**

Pages	Addendum Cover Sheet	2 pages
	<u>Specification Sections</u>	<u>50 pages</u>
	Total	52 pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

2.1 SCHEDULE CHANGES: There are no Project Schedule changes.

2.2 QUESTIONS/ANSWERS:

2.2.1 Question: “Sheet AE/002 note 26 calls for 6 foot chain link fence around the project, to what extent is this fence?”

Answer: Fencing should follow the “Limits of Work” line shown on LS100, or reference 015000 Temporary Facilities and Controls. 015000 call for around site; site being the buildings that are being constructed.

- 2.2.2 Question: “Sheet AE/102, What is the finish on the restroom floor (colored, sealed)? Note 6 calls out sealed concrete floor.”

Answer: The restrooms floors are clear, sealed concrete. See spec section 033000-4 section 2.7 for liquid floor treatment requirements.

- 2.2.3 Question: “Is any of the lumber in this job fire treated (trusses, etc)? 061053-4, C states that concealed blocking, roof construction, and plywood backing panels are treated.- 061600-2 calls for roof sheathing and concealed sheathing to be treated. -061753-4 calls for roof trusses to be treated.

Answer: Fire treatment of the above items are not required by Code, but are required by the Owner of the project and is an added value to the project.

- 2.2.4 Question: “Detail A3/A3502 notes rough sawn cedar fascia, what is the spec. for the cedar and where does it occur? No specification can we get one?”

Answer: See attached specification section 064010-Exterior Finish Carpentry for rough sawn cedar fascia and section 061323-Heavy Timber Construction (included in specification) for exterior wood on East and West elevations.

- 2.2.5 Question: “Sheet AE/201 note 09 what is it?”

Answer: This is a 2” X 4” tube steel kicker for the pavilion column—it is an architectural element of the column, not a structural member as noted in the drawings.

- 2.2.6 Question : “I am looking for a spec on the crushed stone. Specification section 329000 section 2.5 C says: Crushed Stone: Crushed stone by Engineer. See Section 00 00 00. If you can help me to find what is required here I would appreciate it.

Answer : Please see Section 321540 Crushed Stone Surfacing. This section is attached to this addendum as an addition or revision.

- 2.2.7 Question: “The specs call for 4 add alternates and the bid form calls out only 2. Which is it?”

Answer: Please detail this to the project bid form (1 base bid and 2 additive alternates).

2.3 SPECIFICATION CLARIFICATIONS: Attached are specification sections that are REVISED or are in addition to questions presented.

- 2.3.1 Section 031116 - Cast In Place Concrete
- 2.3.2 Section 064010 - Exterior Finish Carpentry
- 2.3.3 Section 129300 - Site Furnishings
- 2.3.4 Section 321126 - Hot Mix Asphalt
- 2.3.5 Section 321540 - Crushed Stone Surfacing
- 2.3.6 Section 328423 - Irrigation System
- 2.3.7 Section 329000 – Landscaping

Escalante Heritage Center
Escalante, Utah

SECTION 031116 - CAST-IN-PLACE CONCRETE SITE ELEMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete.
- B. Concrete curing.
- C. Concrete finishes.

1.2 RELATED SECTIONS

- A. Section 031113 - Concrete Forms and Accessories.
- B. Section 031116 - Concrete Reinforcement.
- C. Section 033053 - Cast-in-Place Concrete Site Elements.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M6 - Fine Aggregate for Portland Cement Concrete.
 - 2. AASHTO M80 - Coarse Aggregate for Portland Cement Concrete.
 - 3. AASHTO M85 - Portland Cement.
 - 4. AASHTO M154 - Air-Entraining Admixtures for Concrete.
 - 5. AASHTO M157 - Ready-Mixed Concrete.
 - 6. AASHTO M194 - Chemical Admixtures for Concrete.
 - 7. AASHTO T22 - Compressive Strength of Cylindrical Concrete Specimens.
 - 8. AASHTO T23 - Making and Curing Concrete Test Specimens in the Field.
 - 9. AASHTO T119 - Slump of Portland Cement Concrete.
 - 10. AASHTO T152 - Air Content of Freshly Mixed Concrete by the Pressure Method.
- B. American Concrete Institute (ACI):
 - 1. ACI 305R - Hot Weather Concreting.
 - 2. ACI 306R - Cold Weather Concreting.
 - 3. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

1.4 SUBMITTALS

- A. Section 013219 - Submittal Procedures.

Escalante Heritage Center
Escalante, Utah

- B. Mix Design: Submit mix design and information based on batch test results to verify mix design strength at least 5 days prior to placement of concrete.
- C. Delivery Ticket: Furnish delivery ticket to Owner's on site representative for each load of concrete delivered to site with information as follows:
 - 1. Name of batch plant.
 - 2. Name of Contractor and project.
 - 3. Class of concrete and type of cement.
 - 4. Time and date of batching.
 - 5. Cubic yards of concrete.
 - 6. Weights of cement and each size of aggregate.
 - 7. Amount of water added at plant.
 - 8. Amount of any additional water added.
 - 9. Amount of admixtures.
- D. Warranty: Submit before or with final request for payment.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.
- B. Acquire cement and aggregate from same source for all work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store cement protected from moisture.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Hot weather concreting shall comply with ACI 305R, except as modified herein. Concrete temperature, when placed, shall not exceed 90 degrees Fahrenheit (°F). When ambient air temperatures exceed 90°F, moist cure concrete for minimum of 5 days.
- B. Cold weather concreting shall comply with ACI 306R, except as modified herein.
 - 1. When ambient air temperatures are above 45°F, concrete temperature shall be at least that of air temperature, but not greater than 90°F.
 - 2. When ambient air temperatures are between 30°F and 45°F, concrete temperature shall be at least 60°F.
 - 3. When ambient air temperatures are below 30°F, concrete temperature shall be at least 70°F.
 - 4. Concrete shall not be placed when ambient air temperatures are less than 20°F without using blankets and heaters.
 - 5. Concrete shall not be placed against adjacent concrete, foundations, formwork, reinforcing, or other

Escalante Heritage Center
Escalante, Utah

items that are frozen or have surface temperature less than 40°F.

6. When cold weather will be present during placement and curing periods, maintain concrete surface at not less than 50°F for minimum of 5 days following placement. Forms shall be left in place for said period.

1.8 WARRANTY

- A. Provide one year written guarantee to promptly remove and/or repair defective concrete.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: AASHTO M85, Type II, low alkali, portland type.
- B. Coarse Aggregate:
 1. AASHTO M80 as modified herein.
 2. Use gradation per Table 031116-1.
 3. Do not allow material passing No. 200 sieve to exceed 1.75 percent by weight of combined coarse and fine aggregate.
 4. Do not exceed percentages of deleterious substances per Table 031116-2.

Table 031116-1 Gradation - Course Aggregate								
Coarse Aggregate	Percentage Passing (by weight)							
Size	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4
2" to No. 4	100	95-100		35-70		10-30		0-5
1" 1/2" to No. 4		100	95-100		35-70		10-30	0-5
1" to No. 4			100	95-100		25-60		0-10
3/4" to No. 4				100	90-100		20-55	0-10

Escalante Heritage Center
Escalante, Utah

Table 031116-2 Deleterious Substances - Course Aggregate	
Substance	Percent (by weight)
Soft fragments	2.0
Coal and lignite	0.3
Clay lumps	0.3
Other deleterious substances	2.0

C. Fine

Aggregate:

1. AASHTO M6 as modified herein.
2. Use gradation per Table 031116-3.
3. Do not allow material passing No. 200 sieve to exceed 1.75 percent by weight of combined coarse and fine aggregate.
4. Do not exceed percentages of deleterious substances per Table 031116-4.

Table 031116-3 Gradation - Fine Aggregate	
Sieve Size	Percent Passing (by weight)
3/8"	100
No. 4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10

Table 031116-4 Deleterious Substances - Fine Aggregate	
Substance	Percent (by weight)
Clay lumps	0.5
Coal and lignite	0.3
Other Deleterious Substances	2.0

Escalante Heritage Center
Escalante, Utah

- D. Water: Potable.
- E. Color all exposed concrete with, Manufacture: Davis Color, color: Lakeside Brown 6804.
 - 1. Intended for full depth coloration of concrete.
 - 2. Introduce into concrete mix during batching or as recommended by manufacture.

2.2 ADMIXTURES

- A. Air Entrainment: AASHTO M154 including Section 5.
- B. Water Reducers: AASHTO M194, Type A and Type D. Obtain approval prior to use.
 - 1. For low range water reducers, slump requirements on Table 031116-5 may be changed to 1 to 5 inches for all classes of concrete.
 - 2. For high range water reducers, slump requirements on Table 031116-5 may be changed to 4 to 9 inches for all classes of concrete.
- C. Fly Ash: ASTM C618, class F, loss on ignition not to exceed 3 percent, CaO content not to exceed 15 percent. Obtain approval prior to use.
- D. Calcium Chloride: Do not use.
- E. Fibrous Reinforcing: ASTM C1116, 100 percent virgin polypropylene fibrillated, MD graded, fibers containing no reprocessed olefin materials. Minimum application rate shall equal 1.5 pounds per cubic yard. Manufactured by Fibermesh or-equal.

2.3 ACCESSORIES

- A. Curing Compound: ASTM C309, contain pigment or dyes.

2.4 CONCRETE MIX

- A. Determine mix design with required proportions of cement, aggregate, admixtures, and water.
- B. Provide concrete per Table 031116-5:

Escalante Heritage Center
Escalante, Utah

Table 031116-5 Concrete Class and Requirements								
CLASS	Coarse Aggregate Size (inches)	Maximum Water/Cement		Minimum Cement Content (Sacks / C. Y.)	Slump (inches)	Air Content (Percent)	Mix Design Compressive Strength (PSI)	28 Day Minimum Compressive Strength (PSI)
		Gal / Sack	Max Ratio (lb/lb)					
AA(AE)	2" to No. 4	5.0	0.44	6.0	1-3.5	5.0-7.5	5210	4000
	1 1/2" to No.4	5.0	0.44	6.0	1-3.5	5.0-7.5	5210	4000
	1" to No. 4	5.0	0.44	6.5	1-3.5	5.0-7.5	5210	4000
	3/4" to No. 4	5.0	0.44	6.5	1-3.5	5.0-7.5	5210	4000

(AE) = Air-Entrainment

- C. Maximum size of coarse aggregate:
 1. Not larger than 1/5 of narrowest dimension between sides of forms.
 2. Not larger than 1/3 depth of slabs.
 3. Not larger than 3/4 of minimum clear distance between reinforcing bars or between bars and forms, whichever is least.
- D. Mix and deliver concrete in accordance with AASHTO M157.

2.5 COLOR

- A. Colored Concrete: All site elements to include flatwork, sidewalks, walls, stairs, & plaza. Provide 4' x 4' mock-up showing color and finish.
Davis Colors: Concrete Coloring Pigment in Mix Ready Bags Lakeside Brown 6804

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed,

Escalante Heritage Center
Escalante, Utah

positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.
- C. Keep concrete subgrade firm and free from water.
- D. If concrete subgrade is dry, dampen with water prior to placing concrete.
- E. Keep materials concrete is to come in contact with free from frost.

3.3 JOINTS

- A. Make construction joints at necessary intervals.
- B. Make control joints as shown in plans. See LS 103 and LD 201 for detail.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI 318.
- B. Notify Engineer minimum 24 hours prior to placing concrete.
- C. Ensure reinforcement, inserts and embedded parts are not disturbed during concrete placement.
- D. Convey concrete from mixer to place of final deposit by methods that will prevent separation or loss of materials. Use tremies or other approved method. Do not allow concrete to free fall more than 5 feet, or less if separation of materials occur.
- E. Place concrete continuously between predetermined expansion, control, and construction joints.
- F. Do not interrupt successive placement; do not permit cold joints to occur.
- G. After concrete has been conveyed from mixer, do not added water. Adding water to placed concrete will be cause for rejection.
- H. Screed exterior concrete surfaces to slope to drain.

Escalante Heritage Center
Escalante, Utah

3.5 CONCRETE FINISHING

- A. Provide trowel finish for interior slabs. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance.
- B. Provide non-slip broom finish to exterior concrete platforms and slabs. Slightly roughen concrete surface by grooming with fiber-bristle broom.

3.6 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Spray exposed concrete surfaces with concrete curing compound after free water has disappeared. Apply at rate recommended by manufacturer.

3.7 ACCEPTANCE TESTING

- A. Engineer will take minimum of one test for each 50 or less cubic yards, at least once each day, or at least once per concrete placement:
 - 1. Slump test: ASTM C143.
 - 2. Air test: ASTM C231.
 - 3. Strength test: ASTM C31 and C39, cast four cylinders for each test. Test one cylinder after 7 days and three cylinders after 28 days. Strength will be average for 3 cylinders.
- B. Tests shall meet requirements of Table 031116-5.
- C. Air and Slump Tests: Engineer will test as follows.
 - 1. Perform initial air and slump tests on first truck of each day prior to placing concrete in forms.
 - a) If initial air and slump tests are acceptable, proceed with placement of concrete.
 - b) If initial air and slump tests are not acceptable, reject concrete and remove from site or make required corrections to make concrete acceptable.
 - 2. Perform final air and slump tests on middle portion of batch in accordance with ASTM C172.
 - 3. Perform additional tests as needed to verify quality of concrete.

Escalante Heritage Center
Escalante, Utah

- D. If strength test does not meet specification, Engineer may reject concrete and require removal or allow concrete to remain with price reduction.

3.8 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections.

3.9 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replace defective concrete.

3.10 SCHEDULE - CONCRETE TYPES

- A. Structures: Class AA(AE).
- B. Exterior Flatwork, Curb & Gutter, Cross Gutter, Manhole Collars, and Valve Collars: Class AA(AE) with fibrous reinforcing.

END OF SECTION

SECTION 06 Exterior Finish Carpentry 064010 - EXTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior standing and running trim.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for exposed framing.

1.3 SUBMITTALS

- A. Product Data: For each type of product and process indicated and incorporated into items of exterior architectural woodwork during fabrication, finishing, and installation.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of blocking and nailers, including concealed blocking and reinforcement specified in other Sections.
 - 3. Apply WI-certified compliance label to first page of Shop Drawings.
- C. Samples for Verification:
 - 1. Lumber for exterior wood stain finish, not less than 50 sq. in. (300 sq. cm), for each species, with 1/2 of exposed surface finished.
 - 2. Lumber for transparent finish, not less than 50 sq. in. (300 sq. cm), for each species, with 1/2 of exposed surface finished.
- D. Product Certificates: For each type of product, signed by product manufacturer.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of exterior architectural woodwork indicated for construction, finishes, installation, and other requirements.
- B. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- C. Forest Certification: Provide exterior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation of exterior woodwork only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, reinforcements, and other related units of Work specified in other Sections to ensure that exterior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Nonpressure Process: Comply with AWPA N1 using the following preservative for woodwork items indicated to receive water-repellent preservative treatment:

1. Water-Repellent Preservative: Formulation made specifically for dip treatment of woodwork items and containing 3-iodo-2-propynyl butyl carbamate (IPBC) complying with AWPA P8 as its active ingredient.

- B. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and the following:

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
2. Kiln-dry lumber after treatment to a maximum moisture content, respectively, of 15 percent. Do not use materials that are warped or do not comply with requirements for untreated materials.
3. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

- C. Extent of Treatment: Treat blocking and nailers by pressure process and treat other exterior architectural woodwork either by pressure or nonpressure process.

1. Items fabricated from the following wood species need not be treated:
 - a. All-heart western red cedar.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood), exterior type.

1. Fire-Retardant Chemicals: Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
2. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.

3. Kiln-dry materials before and after treatment to levels required for untreated materials.
4. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
5. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

2.4 INSTALLATION MATERIALS

- A. Blocking, Shims, and Nailers: Softwood or hardwood lumber, pressure-preservative treated, fire-retardant treated, where indicated, kiln dried to less than 15 percent moisture content.
- B. Nails: hot-dip galvanized or stainless steel.
- C. Screws: Stainless steel.
- D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts, unless otherwise indicated. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.5 FABRICATION, GENERAL

- A. Wood Moisture Content: 9 to 15 percent.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 1. Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.6 mm).
 2. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
- C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Shop cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and seal with a water-resistant coating suitable for exterior applications.

2.6 EXTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Grade: Custom.

Escalante Heritage Center
Escalante, Utah

- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Assemble casings in plant except where shipping limitations require field assembly.
- D. Wood Species: Western red cedar unless otherwise indicated.
 - 1. Do not use plain-sawn lumber with exposed, flat surfaces more than 3 inches (75 mm) wide.

2.7 SHOP PRIMING

- A. Woodwork for Transparent Finish: Shop seal woodwork for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified in Division 09 painting Sections:
- B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with same grade specified in Part 2 for type of woodwork involved.
- B. Install woodwork true and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

Escalante Heritage Center
Escalante, Utah

- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWWPA M4.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).
- H. Complete finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail and screw holes with matching filler where exposed.
- I. Refer to Division 09 Sections for final finishing of installed architectural woodwork.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; replace woodwork where not possible to repair. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064010

SECTION 129300 – SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this section.
- B. Consult the index to be certain that the set of documents and specifications is complete. Report omissions or discrepancies to the Owner's Authorized Representative before bidding.

1.2 SUMMARY

- A. The Contractor shall visit the site and study all portions of the contract documents prior to submitting a bid.
- B. All site furniture shall be installed as shown on drawings and as per manufacturers' recommendations.
- C. Work included: Provide all labor, materials, and equipment necessary to supply and install the following:
 - 1. Stone Benches: Stone Benches are a Bid Alternate, and should be itemized separately.
 - 2. Trash Receptacles
 - 3. Stone Picnic Tables: Stone Picnic Tables are a Bid Alternate, and should be itemized separately.
 - 4. Jug Filler: See Specification Section 328423 Irrigation.
- D. Workmanship shall be of acceptable quality and performed to the satisfaction of the Owner's Authorized Representative.
- E. Any minor items of labor or materials not specifically noted on the drawings or in the specifications, but necessary for proper completion of the work, shall be considered incidental to and are to be included in the work.
- F. Work under this section shall include coordination with all other sections of these specifications.

1.3 SUBMITTALS

- A. For each product specified, submit the following for approval prior to delivery:
 - 1. Manufacturers' product data with finish samples.
 - 2. Manufacturers' installation instructions.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Handle all components carefully to prevent damage during shipment. Brace and insulate to prevent scratching of finished surfaces and to prevent breakage.
- B. After delivery, store materials carefully to prevent damage. Store on blocks above snow or mud.
- C. When handling, protect materials from abuse or misuse. Broken, scratched, chipped, bent, or otherwise damaged items will not be accepted by the Owner's Authorized Representative.

1.5 QUALITY ASSURANCE

- A. Adhere to manufacturers' recommendations for product handling, assembly, installation, and maintenance.
- B. Manufacturers' original factory finish must be intact for the installation to be accepted by the Owner's Authorized Representative. On-site touch-up will not be accepted.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with Manufacturers' recommendations at all times. Where these may be in conflict, the most stringent shall prevail.
- B. All products shall be supplied as specified, or approved equal.

2.2 STONE BENCHES – BID ALTERNATE ITEM

- A. Manufacturer: Hansen Quarry in Kanab, Utah. Contact Bruce Hansen at 435-644-3073. See Product Cut Sheets attached to this specification for photo.
- B. Rough Dimensions: 6' long x 1.5' wide x 1.5' tall.
- C. Material: Local sandstone from the Hansen Quarry.
- D. Quantity: 4.

2.3 TRASH RECEPTACLES

- A. Manufacturer: Wasautile, 1-800-388-8728
- B. Model: TF1175 with aluminum funnel lid. Liner included.
- C. Finish: B-3, Weatherstone (Sand)
- D. Attachment: As per manufacturer recommendations.

Escalante Heritage Center
Escalante, Utah

- E. Quantity: 2.
- F. See Product Cut Sheets attached to this specification for more information.

2.4 STONE PICNIC TABLES – BID ALTERNATE ITEM

- A. Manufacturer: Hansen Quarry in Kanab, Utah. Contact Bruce Hansen at 435-689-0843. See Product Cut Sheets attached to this specification for photo.
- B. Rough Dimensions: 8' long.
- C. Material: Local sandstone from the Hansen Quarry.
- D. Quantity: 2.

PART 3 - EXECUTION

3.1 COORDINATION

- A. The Contractor shall coordinate his/her work with that of other contractors on site, and shall cooperate to the fullest extent to see that the work is completed in a timely and workmanship like manner.

3.2 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as indicated on manufacturers' product data.
- B. Beginning of installation means acceptance of existing conditions.

3.3 PREPARATION

- A. Verify exact location of site furnishings for installation.

3.4 GENERAL INSTALLATION

- A. Mark location of site furnishings for approval of Owner's Authorized Representative.
- B. Install all manufactured items in accordance with Specifications, Drawings, and Manufacturers' Recommendations. Where these may be in conflict, the more stringent requirement governs.
- C. Surface installations may only be made upon approved surfaces.
- D. All installations shall be plumb, level, and securely and rigidly anchored to surface.
- E. Clean all items prior to Substantial Completion. Remove all metal, wood, and concrete debris; protective wrappings and coverings, and shipping materials from the site. Remove all residues, stains, and marks from the finished product prior to installation inspection. Manufacturers' original factory finish must be intact for the installation to be accepted by the Owner's Authorized Representative. On-site touch-up will not be accepted. Fully restore all areas of the site that were impacted by the installation activities.

3.5 INSPECTION AND ACCEPTANCE

- A. When the site furnishings installation is complete, the Owner's Authorized Representative will, upon request, make an inspection to determine acceptability for Substantial Completion.

Escalante Heritage Center
Escalante, Utah

- B. Where inspected work does not comply with the requirements, replace rejected work. The work will be re-inspected by the Owner's Authorized Representative to determine acceptability for Substantial Completion. Remove rejected site furnishings and materials from the site promptly.

END OF SECTION 129300

Escalante Heritage Center
Escalante, Utah

SECTION 321126 - HOT MIX ASPHALT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Asphalt cutting.
- B. Tack coat.
- C. Hot mix asphalt (HMA).
- D. Prime Coat.

1.2 RELATED SECTIONS

- A. Section 015000 - Construction Facilities and Temporary Controls.
- B. Section 312313 - Excavation and Embankment.
- C. Section 321116 - Untreated Base Course.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Hot Mix Asphalt (HMA):
 - 1. Payment: Includes mix design, tack coat, aggregate, asphalt cement, hydrated lime, hauling, placing, compacting and related work.
- B. Prime Coat:
 - 1. Payment: Includes liquid asphalt, placement.

1.4 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M82 - Cut-Back Asphalt (Medium-Curing Type).
 - 2. AASHTO M140 - Emulsified Asphalt.
 - 3. AASHTO M226 - Viscosity Graded Asphalt Cement.

Escalante Heritage Center
Escalante, Utah

4. AASHTO M303 - Lime for Asphalt Mixtures.
 5. AASHTO M320 - Performance Graded Asphalt Cement.
 6. AASHTO T11 - Amount of Material Finer than 0.075 mm Sieve in Aggregate.
 7. AASHTO T19 - Unit Weight and Voids in Aggregate.
 8. AASHTO T27 - Sieve Analysis of Fine and Course Aggregate.
 9. AASHTO T90 - Determining the Plastic Limit and Plasticity Index of Soils.
 10. AASHTO T96 - Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine.
 11. AASHTO T104 - Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
 12. AASHTO T176 - Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
- B. American Society for Testing and Materials (ASTM):
1. ASTM D6307 - Asphalt Content of Hot Mix Asphalt by Ignition Method.
- C. The Asphalt Institute (TAI):
1. TAI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.

1.5 SUBMITTALS

- A. Aggregate source: If not previously UDOT approved, submit test results showing aggregate meets requirements of Article 2.1 paragraph A.3.
- B. Mix design: Submit at least 10 days before paving begins.
1. Include all test data used to develop mix design.
 2. Indicate single value for percentage of aggregate passing each sieve and asphalt cement content.
- C. Certified Weigh Tickets: Furnish to Owner's on site representative at end of each work day for hot mix asphalt and prime coat.

Escalante Heritage Center
Escalante, Utah

1.7 QUALITY ASSURANCE

- A. Obtain materials from same source throughout.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt concrete pavement when ambient air or base surface temperature in shade is less than 50 degrees F.
- B. Do not place asphalt concrete pavement when base has free surface water or base is over saturated.
- C. Do not place asphalt concrete pavement during adverse weather conditions such as rain.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Asphalt Concrete Pavement:
 - 1. Asphalt Cement: AC-20 in accordance with AASHTO M320.
 - 2. Hydrated Lime: AASHTO M303, use minimum 1 percent of dry weight of aggregate.
 - a. Chemical Limits:
 - 1. Hydrated Alkalinity: Minimum 90 percent by weight CaCOH_2 .
 - 2. Hydrated Lime Content: Maximum 7 percent by weight CaO .
 - 3. Free Water Content: Maximum 3 percent by weight.
 - b. Physical Requirements:
 - 1. Residue Retained on No. 30 Sieve: Maximum 2 percent by weight.
 - 2. Residue Retained on No. 200 Sieve: Maximum 12 percent by weight.
 - 3. Aggregate: Natural gravel, crushed rock, or slag with uniform density and quality. Gradation per Table 321126-4.
 - a. Course Aggregate: Clean, hard, durable, and sound fragments free from organic matter or other detrimental substances.

Escalante Heritage Center
Escalante, Utah

1. Retained on No. 4 sieve.
2. One Fractured Face: Minimum 85 percent by weight.
3. Two Fractured Faces: Minimum 80 percent by weight.
- b. Fine Aggregate: Clean, hard grained, and angular.
 1. Pass No. 4 sieve.
 2. Non-plastic in accordance with AASHTO T90.
 3. Vegetable Matter or Other Detrimental Substances: Maximum 2 percent by weight.
 4. Dry-Rodded Unit Weight: AASHTO T19, minimum 75 pounds per cubic foot.
 5. Wear: AASHTO T96, maximum 40 percent.
 6. Weight Loss: AASHTO T104, maximum 16 percent by weight when subjected to five cycles of sodium sulfate.
 7. Sand Equivalent: AASHTO T176, minimum 40.

Table 321126-1 GRADATION LIMITS FOR MIX DESIGN	
Sieve Size	Percent of Total Aggregate Passing (Dry Weight)
1/2 inch	100
No. 4	60-80
No. 16	28-42
No. 50	11-23
No. 200	5-9

- B. Prime Coat: AASHTO M82, grade MC-70 or MC-250.
- C. Tack Coat: AASHTO M140, grade SS-1H or SS-1, emulsified asphalt.

2.2 EQUIPMENT

- A. Asphalt Paver: Use self-propelled paver with screed unit.

Escalante Heritage Center
Escalante, Utah

- B. Rollers: Use rubber tire and steel self-propelled rollers in sufficient number to keep up with paver. Use release agent other than diesel.

2.3 MIXES

- A. Develop mix design in accordance with TAI MS-2, Marshall Method.
 - 1. Determine optimum asphalt content by test data curves.
 - 2. Use test samples containing 0.5 percent increments of asphalt content.
 - 3. Include minimum of 2 test samples above and below optimum asphalt content.
- B. Mix Design Requirements:
 - 1. Marshall Stability: Minimum 1,800 pounds.
 - 2. Flow (0.01 inch): 10 to 18.
 - 3. Air Voids: 3 to 5 percent.
 - 4. Voids in Mineral Aggregate: Minimum 14 percent.
 - 5. Index of Retained Strength: Minimum 75 percent.
 - 6. Dry Stability: Minimum 200 pounds per square inch.
- C. If material source changes, develop new mix design prior to using new materials.
- D. Mix materials at central mixing plant. Use shortest mixing time needed to uniformly coat aggregate. Do not use material not mixed properly.
- E. Adjust production at mixing plant and delivery to maintain steady paving speed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Do not place asphalt concrete pavement until base course has been accepted.
- B. Locate and reference utility covers prior to paving operations.

Escalante Heritage Center
Escalante, Utah

- C. Where new pavement joins existing pavement, saw cut edge of existing pavement. Provide cut through full depth of pavement and in straight line. If pavement is cracked, broken or deteriorated, make cut so defective area is removed. Remove existing pavement cut off. Apply tack coat to exposed saw cut edge prior to paving. Do not allow traffic or construction equipment to cross cut edges.
- D. Remove dirt, sand, leaves, and other objectionable materials from prepared surfaces.
- E. Apply prime coat on prepared base.

3.2 PLACING ASPHALT PAVEMENT

- A. Place asphalt pavement at temperature between 250 and 325 degrees F with self-propelled laydown machine. Adjust paver speed to match plant production and delivery for continuous paving operation.
- B. Pave full-width where possible. If more than one pass is required, leave straight, vertical edge adjacent to next lane to be paved. Compact each pass and apply tack coat to longitudinal edge before placing adjacent pass.
- C. Place to compacted thickness indicated on typical sections of Drawings.
- D. Compact pavement by rolling to 96 percent of Marshall density. Do not displace or extrude pavement from position.
- E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks. Do not allow rollers to pass over unprotected end of freshly placed pavement. Bevel end of pavement subjected to traffic.
- F. Hand rake only when necessary.

3.3 TOLERANCES

Escalante Heritage Center
Escalante, Utah

- A. Smoothness: Maximum variation of 1/4 inch measured longitudinally, transversely, and at construction joints with 10 foot straight edge or string line. Correct depressions or humps exceeding tolerances.
- B. Compacted Thickness: Not more than 1/2 inch greater nor 3/8 inch less than thickness indicated on Drawings. If thickness is deficient, add minimum thickness of 1 inch asphalt concrete pavement.

3.4 QUALITY CONTROL TESTING

- A. Perform tests required to establish material source and develop mix design.

3.5 ACCEPTANCE TESTING

- A. Will be visual acceptance.

3.6 PROTECTION

- A. Do not allow traffic to cross saw cut edge of existing pavement unless temporary ramp is constructed.
- B. Protect structures, and other objects from being spattered or marred by tack coat or prime coat.
- C. Immediately after placement, protect pavement from mechanical injury until surface temperature is less than 140 degrees F. Prevent traffic from crossing vertical edge of pavement.

END OF SECTION

SECTION 321540

CRUSHED STONE SURFACING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. The work of this section consists of construction of universally accessible crushed stone surfaces on prepared subgrade.

1.3 SUBMITTALS

- A. Submit sieve analysis of proposed material to ensure it meets grading requirements.
- B. Submit sample of crushed stone materials for approval to ensure color will be compatible with project site. Sample shall be sufficiently large to illustrate clearly the functional characteristics, and full range of color and texture of the material.
- C. Sieve analysis and color of crushed stone materials shall be approved by the Owner's Authorized Representative before any material is delivered to the site.
- D. Prepare a sample finished pathway using all specified materials and edging. Sample section shall be full width of path, and length equal to 2 times the width. Sample section shall be approved by the Contracting Officer before construction.

1.4 PROJECT CONDITIONS

- A. Use lightweight hauling equipment. Exercise care in using equipment, avoiding damage to adjacent plant and tree growth.

PART 2 PRODUCTS

2.1 CRUSHED STONE MATERIAL

- A. Clean, hard, durable particles or fragments of select crushed stone material. Preference for local source within 50 mile radius of project site. Fines shall be evenly mixed throughout the aggregate.
- B. Color and texture preferred that blends with existing soil surface of site.
- C. The crushed aggregate screenings shall be free from clay lumps, vegetable matter, and deleterious material.

2.2 GRADING REQUIREMENTS

- A. 100 percent passing through 3/8" mesh.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

- A. Excavate to required depth including base course. Prior to placing crushed stone materials, shape, fill, grade, and compact the subgrade and base course.

3.2 PLACING CRUSHED STONE MATERIAL

- A. Place the crushed stone material on prepared base and rake smooth using a steel tine rake to required grade and cross section. Place to avoid segregation, in one layer of 3 inches minimum thickness.

3.3 COMPACTION

- A. Moisten the area and roll with a heavy lawn roller (minimum 225 pounds and maximum of 30 inches wide) to achieve finish grade after initial compaction. Hand tamp edges around site furnishings or other hard to reach areas. Use a heavy (1 ton minimum) small rider, after having initially used the lawn roller, to obtain the final dense, smooth, uniform texture.
- B. Do not use wackers or vibratory rollers; the mix will not harden for weeks after vibration.

3.4 FINISHING

- A. Feather edges of crushed stone materials 1 foot beyond each edge of pathway to meet finished grade.

3.5 INSPECTION AND ACCEPTANCE

- A. Finished surface shall be smooth and uniform. Loose materials shall not be present on surface initially. After the first year of use, a minor amount of loose material is expected on the surface.
- B. Final thickness of completed surface shall not vary more than ½ inch from dimension indicated. Measurements may be taken by means of test holes taken at random in finished surface. Correct any variations in thickness beyond the allowable ½ inch by repeating the procedures listed above.
- C. When the crushed stone surfacing installation is completed, the Owner's Authorized Representative will, upon request, make an inspection to determine acceptability for Substantial Completion.
- D. Where inspected work does not comply with the requirement, replace rejected work according to the procedures above. The work will be re-inspected by the Owner's Authorized Representative to determine acceptability for Substantial Completion. Remove rejected materials promptly from the project site.

END OF SECTION

SECTION 328423 – IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Section apply to this section.
- B. Consult the index to be certain that the set of documents and specifications is complete. Report omissions or discrepancies to the Owner's Authorized Representative before bidding.

1.2 SUMMARY

- A. The irrigation system will be constructed using the valves, piping, fittings, controllers, wiring, etc., of sizes specified.
- B. Irrigation lines shown on the drawings are essentially diagrammatic. Locations of all valves, piping, wiring, etc. will be modified only with the permission of the Owner's Authorized Representative.
- C. It is the intention of these specifications, together with the accompanying drawings to accomplish the work of installing an irrigation system that will operate in an efficient and satisfactory manner according to the workmanlike standards established for the irrigation industry.
 - 1. Record Irrigation Drawings: Prepare Record Drawings which shall show deviations from the contract documents made during construction affecting the main line pipe, controller locations, remote control valves, and manual drain valves. **These drawings should be updated on a daily basis to assure accuracy.** The drawings shall also indicate and show substitutions of size, materials and manufacturer's name and catalog number that have been approved by the Owner's Authorized Representative. The Contractor will keep a record of all departures from the contract drawings that occur during construction. These shall be kept on a clean set of prints of the contract drawings. The Owner's Authorized Representative will review the Record Drawings to verify that changes are being recorded as construction occurs.
 - 2. Record Drawings shall be furnished to the Owner's Authorized Representative in hard copy at the time of the Systems Inspection before any Substantial Completion Date will be issued.
- D. The work in this Bid Package consists of furnishing and installing an underground and drip irrigation system as shown on the drawings and specifications. Include all labor, equipment and materials and perform all operations in connection with the construction of the irrigation system.
- E. It will be the contractor's responsibility to report to the Owner's Authorized Representative any deviations between the drawings, specifications and the site. Failure to do so prior to the installing of equipment, and resulting in replacing, and/or relocating, will be done at the contractor's expense.

- F. Permits and Fees: Obtain all permits and pay required fees to any governmental agency having jurisdiction over the work. Inspections required by local ordinances during the course of construction shall be arranged as required. On completion of the work, satisfactory evidence shall be furnished to the Owner's representative to show that all work has been installed in accordance with the ordinances and code requirements. See existing utilities paragraph below.
- G. Coordination: Coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible.
- H. Submit Contractor's construction schedule of anticipated work time to facilitate timely visits for review of work.
- H. Inspection of Site: Installer shall acquaint himself with all site conditions. Should utilities not shown on the plans be found during excavations notify the Owner's Authorized Representative. Failure to do so will make installer liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown on plans.
- I. Existing Utilities: Before any trenching, excavation or digging below the surface for any reason is begun, the contractor shall have the area utilities located in order to determine as close as possible the location of all underground utilities. The contractor will conduct his work in such a manner to protect all utilities from damage. It is the responsibility of the contractor to repair or replace any damage incurred by the contractors work or workers at no expense to the owner.
- J. Protection of Existing Site Conditions: The installer shall take necessary precautions to protect site conditions to remain. Should damage be incurred, the Installer shall repair the damage to its original condition at his own expense.
- K. Guarantee: All work shall be guaranteed for compliance with the drawings and specifications for a period of one year after the date of substantial completion. The contractor shall make good any deficiencies at the time he is notified of any faults, and place in satisfactory condition any damage to the buildings or grounds without cost to the owner. All guarantees shall be in writing and approved by the Owner's Authorized Representative before submitting to the Owner.
- L. Any minor items of labor or materials not specifically noted on the drawings or specifications; but obviously necessary for the proper completion of the work, are to be considered as incidental to and are to be included in the contract.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Licensed firms regularly engaged in manufacture of irrigation systems products of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Installer Qualifications: Licensed landscape contracting firm engaged in successful installation of irrigation systems similar to that required for project for a minimum of 5-years.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for irrigation system materials and products.
- B. Maintenance Data: Submit maintenance data and parts lists for irrigation system materials and products.
- C. Suppliers: Provide a list of suppliers where materials will be obtained for use on this project.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe materials installed throughout the system shall be new and in satisfactory condition. After award of the contract and prior to beginning work, the Contractor shall submit for approval a complete list of materials to be installed. No deviations from the specifications shall be allowed, except as provided for in these documents.

2.2 TRENCH BEDDING MATERIAL

- A. Bedding material shall be a sandy material free of rocks over 1 inch in diameter. Where existing soil does not meet this requirement, approved imported material shall be used.

2.3 SLEEVES

- A. Schedule 40 PVC, diameter as specified on plans.

2.4 SOLVENT CEMENT

- A. Solvent and Cement, shall be IPS Weld-On-Line - No. P-70 Primer and No. 711 Cement for PVC socket fittings for use on all pipe and fittings.

2.5 BACKFLOW PREVENTER

- A. Febco 825-YA or approved equal, installed in metal enclosure painted to match architecture. Submit color sample for approval.

2.6 EMITTER LINE FLUSH VALVE

- A. Netafim TLISOV Ball Valve and Netafim TL050MFV-1 Flush Valve, or approved equal.

2.7 AIR/VACUUM RELIEF VALVE

- A. Netafim TLARV Air/Vacuum Relief Valve, or approved equal.

2.8 PIPE AND FITTINGS

- A. All pipe, main and laterals shall be schedule 40 PVC with ratings printed on pipe.
- B. Main and Lateral Pipe Joints: Joints shall be schedule 40 pressure rated Polyvinyl Chloride (PVC).
- C. All quick couplers shall be installed on pre-assembled swing joint with brass threaded insert by Rainbird, Spears, or approved equal.
- D. High Density Polyethylene (HDPE) Pipe: see Section 331116.

2.9 CONTROL VALVE ASSEMBLY

- A. Drip Control Zone Kit Assembly: Hunter ICZ-101-40, or approved equal.
 - 1. Valve: Hunter ICV 1" valve
 - 2. Filter: Hunter HY100 Wye filter with 150 mesh screen.
 - 3. Pressure Regulator: 1" preset pressure regulator set at 40 psi.

2.10 DRIP IRRIGATION EQUIPMENT

- A. Emitter Tubing: Netafim Techline CV TLCV4-18, 0.40 gph emitters spaced 18 inches, or approved equal.
- B. Tubing: Netafim Techline TLCV0 blank tubing, or approved equal.
- C. Tubing Fittings: Netafim fittings compatible with tubing (TL050MA, TLCOUP, TLELL, TLTEE, TLCROS), or approved equal.
- D. Tubing Wire Stake: 12 gauge wire to form a "U" shape, 5 inch legs minimum.

2.11 POINT OF CONNECTION

- A. Stop and Waste Valve: 1" by Mueller Oreseal, or approved equal.

- B. Quick Coupler Valve: shall be Hunter HQ-44C Quick Coupler and installed with brass riser and pre-manufactured swing joint, or approved equal.

2.12 VALVE BOXES

- A. Control valve boxes as manufactured by Carson Industries, Armor Access Boxes, or approved equal.
- B. Valve box lids shall a "I"-type bolt down lid, color to be tan to match adjacent soil areas.
- C. Light colored sharp washed ½ inch diameter gravel used for drainage material.

2.13 ELECTRICAL WIRE

- A. Control wire (from controllers to valves) shall be a direct burial single conductor cable PE insulated type not smaller than #14. The wires shall be UL listed for direct burial in irrigation systems and be rated at 30 VAC minimum.
- B. For all wire connections to remote control valves and all splices of wire in the field, use 3M DBY connectors. All wire splices shall be in a box.
- C. Power wiring shall be type Tray Cable; UL listed, and rated at 600 volts. The cable shall include three conductors color coded to code and electrical standards.

2.14 IRRIGATION CONTROLLERS

- A. Automatic irrigation controller:
 - 1. Controller: Rainbird ESP-8MC wall mounted controller, or approved equal.
 - 2. Rain Sensor: Hunter WRFC wireless rain sensor, or approved equal.

2.15 JUG FILLER – BID ALTERNATE ITEM

- A. Jug Filler: Most Dependable Fountains Model 125 DB Pedestal Jug Filler, Arlington, TN, 1-800-552-6331
 - 1. Finish: Pyrite
 - 2. Attachment: Direct Bury.
 - 3. Quantity: 1.
 - 4. Submit sample of finish for approval.

PART 3 - EXECUTION

3.1 GENERAL

- A. Pipe materials installed throughout the system shall be new and in satisfactory condition. After award of the contract and prior to beginning work, the Contractor shall submit for approval a complete list of materials to be installed. No deviations from the specifications shall be allowed, except as provided for in these documents.
- B. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Owner's Authorized Representative prior to beginning work. Verify locations of underground utilities including any existing irrigation system components and control wires in areas where excavation is to occur.
- C. Layout work as accurately as possible to the drawings. The drawings, though carefully drawn, are generally diagrammatic to the extent that swing joints, offsets and all fittings are not shown. All irrigation lines shall be installed in common trenches where possible. Where possible, all trenching shall occur on soft spaces.
- D. Stake out the irrigation control system. Items staked out are to include: sleeve locations, control wire, meter locations, and electrical power wire routing.
- E. Irrigation system layout review will occur after the layout has been completed. Notify the Owner's Authorized Representative 2 days in advance of review. The Owner's Authorized Representative at this review will identify modifications.
- F. If for any reason complete coverage of all irrigation areas does not occur; irrigation Contractor shall be responsible to contact the Owner's Authorized Representative before continuing with his work.
- G. Any Major Revisions to the irrigation system must be submitted and answered in written form, along with any change in contract price.
- H. Install all irrigation systems as per State and Local codes.

3.2 TRENCHES

- A. Trenches shall be dug as deep and wide as necessary to properly place pipe. All sleeves are to be placed prior to laying of any hard surface. All trenches shall be backfilled and compacted to that of the surrounding material.
- B. The Contractor, in placing the irrigation lines, etc. may uncover material not suitable for finished grading. This material shall be removed from the site. After the installation of the lines, the finished grading shall be smoothed over and restored to its original condition, using additional topsoil where necessary.

3.3 SLEEVE ASSEMBLY

- A. Depth of sleeves to be determined by the type of line that is to be placed in sleeve. In the case of new construction, all sleeves are to be placed prior to laying of any hard surface. In the case of existing construction, the sleeves must be installed by boring under the existing hard surface.
- B. PVC joints shall be glued according to manufacturer's recommendations.

3.4 PIPE ASSEMBLY

- A. The plans show the general arrangement of all piping. Should local conditions necessitate the rearrangement of some piping, or if piping can be run to better advantage, the Contractor, before proceeding with the work, shall prepare and submit drawings of such to the Owner's Authorized Representative and obtain written approval before commencing work shown by these drawings.
- B. A bedding material shall be placed a minimum of 3 inch in all directions around all mainline pipes prior to backfilling. Lateral line pipes shall have a minimum of 3 inches in all directions.
- C. All mainlines, as shown on drawings, shall be installed to a depth of 18 inches minimum.
- D. All lateral lines as shown on drawings shall be installed to a depth of 12 inches minimum.
- E. Lines bordering curbs or sidewalks shall be 12 inches away to allow for maintenance and access to the lines.
- F. PVC joints shall be glued according to manufacturer's recommendations. Glued joints shall set for 24 hours before pressure is applied to lines. Before trenches are backfilled all lines shall be pressurized and checked for leaks.

3.5 BACKFLOW PREVENTER

- A. Install as per state and local codes.

3.6 EMITTER LINE FLUSH VALVE

- A. Install on each drip control valve.
- B. Install at point furthest from drip control valve.
- C. Install as per manufacturer's recommendations.

3.7 AIR/VACUUM RELIEF VALVE

- A. Install at least one per drip control valve area.

- B. Install at each high point in drip control valve area.
- C. Install as per manufacturer's recommendations.

3.8 DRIP SYSTEM

- A. Install drip system as detailed and as per manufacturer's recommendations to provide coverage in landscape areas, as designed.

3.9 FLUSHING AND TESTING

- A. When the pipe lines are connected and the valves are in place the control valves shall be opened and flushed with a full head of water to clean out the system. Main lines shall be tested before backfilling for a period of not less than one hour, and shall have no leakage or loss of pressure.
- B. Testing will be performed after completion of each circuit and after completion of the entire system. At this time any necessary repair work will be done at the Contractor's expense and the entire system will be in good working order prior to the issuance of the Certificate of Substantial Completion.

3.10 PIPING INSPECTIONS

- A. Before any pipes are covered, the Owner's Authorized Representative shall inspect the system for compliance with specifications and drawings. Any required changes will be made at this time at the expense of the Contractor.

3.11 SYSTEM OPERATION

- A. The entire system will be tested in the presence of the Owner's Authorized Representative in order to insure COMPLETE coverage of all areas to be watered, and the automatic operation of the system using the control system. If applicable, any changes required will be made at this time at the Contractor's expense.

3.12 VALVES AND ASSEMBLIES

- A. Stop and Waste Valve: install as per state and local codes.
- B. Quick Coupler Valve: Install one (1) quick coupler at each point of connection.
- C. Ball Valves: Valve shall be installed on the up-stream side of the electric remote control valve as detailed.

- D. Electric Remote Control Valve: Installed as per details on the drawings.
- E. Avoid locating valves in areas of high pedestrian and vehicular circulation.
- F. Each bank or section of control valves shall be enclosed in an adequate size valve box and extensions to allow the disassembly of valves contained within. Valve boxes shall be at finished grade with valve stems 4 inches below top of box and with 4 inch of clean gravel under the valve box. Isolation valves at all valve banks.

3.13 VALVE BOXES

- A. Valve boxes shall be set flush with the finished grade. Valve manifolds shall be set 12 inch below the top of the box including ball valves and quick couplers where called for. Do NOT install more than two (2) electric remote control valves in a single valve box. All valves must have ample room and access for repair.

3.14 IRRIGATION CONTROLLER

- A. Automatic irrigation controller shall be installed according to manufacturer's recommendations.

3.15 ELECTRICAL CONTROL WIRE

- A. Electrical control wires shall be installed in a separate conduit in the same trench as the main line wherever possible. All wire connections at remote control valves and at all wire splices will be left with two feet of wire so that the splice or the valve manifold can be brought to the surface for repairs without disconnecting the wires.
- B. It is important that the joint be absolutely waterproof so that there is no chance for leakage of water and corrosion build-up on the connection. All wiring shall be accomplished with as few splices as possible.
- C. Splices in electric control wires shall be soldered first and then fitted with a 3M DBY Direct Bury Splice Kit. All splices shall be contained in a valve box, preferably in the same box as the electric remote control valves. Do not run short pieces of wire. Consult with the Owner's Authorized Representative if any questions arise as to length or size of wire. Failure to do so will result in the replacement of the wire at the Contractor's expense.
- D. All spare or future wires shall be labeled and have water proof splice kit installed at ends.

3.16 INSPECTION

- A. At the time of final inspection the entire system must then be tested in the presence of the Owner's Authorized Representative. It must operate in a satisfactory manner, with a full coverage of the areas indicated on the plans.
- B. Before the final inspection is complete; the Contractor must furnish Record Drawings. These drawings and maintenance manuals must be submitted at the time of final inspection or in accordance to the general conditions.
- C. Test and demonstrate to the Owner's Authorized Representative, the satisfactory operation of the system, free of leaks.
- D. The Contractor shall supply the Owner's Authorized Representative with written start-up and shut-down procedures, a complete materials list, as well as names and addresses of the Contractors and local distributors of the various materials used.

3.17 MAINTENANCE

- A. The Contractor shall winterize the irrigation system as appropriate using compressed air adjusted to a low pressure, according to manufacturer's recommendations.

3.18 ADJUSTMENT AND CLEAN-UP

- A. After completion of grading, planting, and mulching carefully adjust irrigation system as required.
- B. Remove from the site all debris resulting from work of this section.

3.19 GUARANTEE

- A. Contractor shall guarantee all irrigation piping and components for 1 year from the date of substantial completion.

END OF SECTION 328423

SECTION 329000 – LANDSCAPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The Contractor shall visit the site and study all portions of the contract documents prior to submitting a bid.
- B. The extent of the landscape development work is shown on the drawings and in schedules and includes preparation of landscaped areas, amendment with organic matter, placement of all trees, seeding, crushed stone mulches and pathways, maintenance and guarantee for trees and seeding, and other information shown or specified.
 - 1. Subgrade Elevations: Subgrade elevations shall be provided at plus or minus 2" as shown in the drawings. Landscape grading shall be restricted to preparation of finish grade.
 - 2. Tubelings shall be provided by the Contractor but shall be installed by volunteers.
 - 3. Any minor items of labor or materials not specifically noted on the drawings or in the specifications, but necessary for proper completion of the work, shall be considered incidental to and are to be included in the work.
- C. Work under this section shall include coordination with all other sections of these specifications.
- D. Related Sections:
 - 1. Irrigation 328423
 - 2. Site Furnishings 129300

1.3 SUBMITTALS

- A. Submit Contractor's construction schedule of anticipated work time to facilitate timely visits for review of work.
- B. Submit organic matter soil amendment sample, product data, and analysis to Owner's Authorized Representative for approval before bringing onto site.
- C. Submit product data for each type of product indicated for approval.
- D. Submit source of all plant material to Owner's Authorized Representative for approval.
- E. Submit source of seed to Owner's Authorized Representative for approval.

- F. Provide an analysis of the seed mix as specified.

1.4 RECORD DRAWINGS

- A. The Contractor will keep a record of all departures from the contract drawings that occur during construction. These shall be kept on a clean set of prints of the contract drawings. The Owner's Authorized Representative will review the Record Drawings to verify that changes are being recorded as construction occurs.
- B. The Contractor to deliver to the Owner's Authorized Representative a copy of the Record Drawings in hard copy form prior to final payment.

1.5 QUALITY ASSURANCE

- A. The landscape work shall be done by a single licensed Landscape Contractor specializing in landscape work for a minimum of 5 years. The on site supervisor must have a minimum of three years experience in landscape construction and one year experience in a supervisory role.

1.6 PLANT MATERIAL SOURCE QUALITY CONTROL

- A. General: Ship landscape materials with certificates of inspection as required by governmental authorities. Comply with governing regulations applicable to landscape materials.
- B. The source or supplier for all plant materials shall be furnished to the Owner's Authorized Representative prior to the delivery of any plant materials on site or stored elsewhere.
- C. Provide trees and tubelings grown in a recognized nursery in accordance with good horticultural practice. Provide healthy, vigorous stock grown under climatic conditions similar to the locality of the project and free of disease, insects, eggs, larvae, and defects such as knots, sun-scale, injuries, abrasions, or disfigurement.
- D. Plant materials and other landscape items will be evaluated according to compliance with drawings, schedules, and specifications; as well as overall aesthetic quality, grower or supplier reputation, physical inspection, and American Association of Nurseryman Standards (AANS).
- E. All plant materials are to be inspected and approved by the Owner's Authorized Representative at the time of delivery on site. This approval does not constitute final acceptance of any plant material. All plant materials will be inspected again at time of final inspection and once again at the end of the warranty period. Any plant found to be unacceptable at any of these inspections shall be immediately removed and replaced at no cost to the Owner.
- F. DO NOT MAKE SUBSTITUTIONS. If specified landscape material is not obtainable, submit in writing proof of non-availability from a minimum of three suppliers regularly engaged in the growing and sale of the kind and species of plants specified and a proposal for use of equivalent material for evaluation to be accepted or rejected prior to the bid.

1.7 PLANT MATERIALS

- A. Trees and tubelings: Do not prune prior to delivery. Do not bend or bind-tie in such a manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery.
- B. Deliver plants after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set plants in shade, protect from weather and mechanical damage, and keep roots moist.
- C. Do not remove container-grown stock from container until planting time.
- D. Label at least one plant of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name. Remove labels after substantial completion.
- E. Substitutions: If specified landscape material is not obtainable, submit in writing proof of non-availability from a minimum of three suppliers regularly engaged in the growing and sale of the kind and species of plants specified and a proposal for use of equivalent material for evaluation to be accepted or rejected prior to the bid.
- F. Sizes: Provide plants of the sizes shown or specified. Plants of a larger size may be used pending approval by the Owner's Authorized Representative and if sizes of root balls or containers are increased proportionately, as per American Association of Nurseymen Standares (ANSI Z60).
- G. Obtain seed from the approved source.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at the site.
- B. The Contractor shall check the materials upon delivery to assure that proper material has been received.
- C. Seed: Deliver seed in original containers clearly marked and showing analysis of seed mixture, date and location of packaging, and net weight.
- D. Seed Mixing: If seed is delivered in separate packaging, notify the Owner's Authorized Representative 7 calendar days prior to seed mixing. Mix the different seed varieties to provide and even blend, bag the seed, seal the container, and attached a signed certification from the Owner's Authorized Representative.

1.9 INSPECTION OF THE SITE

- A. The Contractor shall be acquainted with all site conditions. Should utilities not be shown on the plans be found during excavations, immediately notify the Owner's Authorized Representative. Failure to do so will make the Contractor liable for any and all damage thereto arising from his/her operations subsequent to discovery of such utilities not shown on plans.

1.10 ORGANIC MATTER SOIL AMENDMENT

- A. Observe the conditions under which work is to be performed, and notify the Owner's Authorized Representative of unsatisfactory conditions.
- B. Organic Matter Analysis: Furnish an analysis of the organic matter soil amendment made by an independent testing agency stating pH, soluble salts, soil absorption ratio, carbon/nitrogen ratio, and moisture.

1.11 EXISTING UTILITIES

- A. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. The Contractor shall have the utilities located prior to digging. It is the responsibility of the Contractor to repair or replace any damage incurred by the Contractor or the Contractor's employees at no expense to the Owner.

1.12 JOB CONDITIONS

- A. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Owner's Authorized Representative before planting.

1.13 PLANTING SCHEDULE

- A. Prepare a proposed planting schedule for approval by the Owner's Authorized Representative. The Contractor shall coordinate installation of trees during the following planting season and during suitable soil and climatic conditions:

Deciduous and Evergreen Trees: May 1 – October 1

- B. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.

1.14 GUARANTEE

- A. The guarantee specified shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Guarantee trees for one year following substantial completion against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.
- C. Remove and replace trees found to be unacceptable at the time of substantial completion

and once again at the end of the warranty period. Replacements shall be made during the growing season and shall comply with all requirements and specifications. Any delay in the completion of any item of work in the planting operation which extends the planting into more than one season shall extend the guarantee period accordingly.

- D. Seeded areas must have a relatively uniform stand of grass with no bare spots over 8" square at the time of provisional acceptance. Reseed at the rate approved by the Owner's Authorized Representative and fertilize according to specs. All areas failing to vigorously establish within 90 days after germination or one growing season (whichever is longest), for any reason whatsoever, shall be redone at the Contractor's expense.

1.15 MAINTENANCE

- A. Plant maintenance work shall consist of watering, weeding, caring for trees, and performing the following plant establishment work.
 - 1. The entire project shall be satisfactorily maintained until substantial completion of the landscape. The maintenance period will begin when all items of work have been completed as specified in the foregoing articles until substantial completion. If project is not accepted, Contractor shall be required to continue maintenance until project accepted.
 - 2. All areas including sidewalks and plaza shall be clean and free of debris and weeds. All trees shall be live, healthy, free of insect infestations or weeds, and be of acceptable growth for the time of year. The Contractor shall obtain written release from the Owner before ending maintenance.
 - 3. Maintain seeded areas free of weeds through the guarantee period.

PART 2 - PRODUCTS

2.1 ORGANIC MATTER SOIL AMENDMENT

- A. Backfill for tree planting holes shall be amended with organic matter at the rate of 1.5 cubic feet per tree.
 - 1. Organic matter shall be composed of turkey manure that has been composted and is low in salts within the following analysis range. Submit sample, product data, and analysis for approval.

pH	5 - 9
Soluble Salts	less than 10 dS/m
Sodium Absorption Ratio (SAR)	less than 20
C:N Ratio	10:1 – 30:1
% Moisture	25 - 35

2.2 PLANT MATERIALS

- A. Quality: Provide trees and tubelings that comply with the recommendations and requirements of ANSI Z60.1 "Standard for Nursery Stock" and as further specified. The Owner's Authorized Representative reserves the right to refuse plant materials which do not meet the quality required for the project.

- B. Locally Grown Plant Materials: To the extent possible, provide plants and other materials grown within southern Utah. Provide a list of all materials and indicate whether or not they are locally grown.
- C. Deciduous Trees: Provide trees of height and caliper listed or shown and with minimum branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
 - 1. Provide balled and burlapped (B&B) deciduous trees.
 - 2. Container grown deciduous trees will be acceptable in lieu of balled and burlapped deciduous trees and where specified in plant schedule subject to specified limitations of ANSI Z60.1.
- D. Coniferous Evergreen Trees: Provide evergreen trees of the sizes shown or listed. Provide normal quality evergreens with well balanced form complying with minimum requirements for other size relationships to the primary dimension indicated on the Planting Plans.
 - 1. Container grown evergreens will be acceptable subject to the specified limitations for container grown stock.
- F. Tubelings: Provide materials of the species and size indicated and grown according to ANSI requirements.

2.3 SEED MATERIALS

- A. The seed mixture shall meet the minimum tested requirements of any Utah Seed Law. The seed shall be the current year's crop, guaranteed by the supplier. The seed mix is based on a Pure Live Seed (PLS) basis with NO noxious weeds and NO MORE THAN 1/10% weed seed.
- B. Seed mix shall be obtained from seed source authorized by Owner's Authorized Representative.
- C. Seed mix: Supply seed as specified on the landscape plans (Sheet LD 202) in the drawing package.
 - 1. Seed shall be fresh, clean, new, crop seed complying with the tolerance for purity and germination established by Official Seed Analysts of North America. Provide an analysis of the seed mix as specified.
 - 2. Do not use wet, moldy, or otherwise damaged seed.

2.4 HYDRO-MULCH

- A. Mulch material shall be 'Silva-fiber' as manufactured by Weyerhaeuser Company, Silva Products Department, Tacoma, Washington (or approved equal).
- B. Tackifier shall be a dry powder produced from grinding the outer coating (psyllium) of the seed collected from the plant insular plantago (plantago insularis). Tackifier shall hydrate when incorporated in a water slurry and forms a firm, resilient, rewettable membrane on the soil surface. Tackifier shall be organic, non-toxic, and safe for animals and plants

2.5 MISCELLANEOUS MATERIALS

- A. Water: Potable.
- B. Herbicides: EPA registered and approved, of type recommended by manufacturer. Submit product data to the Owner's Authorized Representative for approval.
- C. Crushed Stone
 - 1. See Section 321540 – Crushed Stone Surfacing.
- D. Crushed Stone Mulch: shall be same as Crushed Stone (2.5 C above).
- E. 1 ½" to 2 ½" Graded Stone: shall match the color of Crushed Stone (2.5C above).
- F. Fertilizer for Seeding: Sustane 4-4-4+Fe Bolster Granular or approved equal.

PART 3 - EXECUTION

3.1 COORDINATION

- A. The Contractor shall coordinate his/her work with that of other contractors on site, and shall cooperate to the fullest extent to see that the work is completed in a timely and workmanship like manner.

3.2 PREPARATION FOR PLANTING TREES

- A. The exact locations of all trees must be approved by the Owner's Authorized Representative prior to the digging of any holes. Refer to the drawings for the sizes and preparation of holes. Prepare all holes according to the details on the drawings.

3.4 TREE PLANTING

- A. Prior to planting, fill excavated tree pit with water and allow to percolate out. If, after 24 hours, the water has not percolated out of the pit, notify the Owner's Authorized Representative. Do not plant until the problem has been corrected.
- B. The tree planting holes should be so that the root flare is 2" above the adjacent finish grade. Trees must be placed on undisturbed soil at the bottom of the planting hole. The tree hole depth shall be determined so that the tree may be set at finish grade, using the top of the root flare as a guide.
- C. Set tree on soil, cut wire basket, remove burlap from top 2/3 of ball, and remove ALL twine, wrappings, etc..

- D. All tree holes shall be backfilled in 12-inch lifts and settled and tamped to minimize any settling of the tree.
- E. Upon completion of backfilling operation, thoroughly water the tree to completely settle the soil and fill any voids that may have occurred.
- F. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches. All cuts, scars and bruises shall be properly treated according to the direction of the Owner's Authorized Representative. Proper pruning techniques shall be used. Do NOT leave stubs and do NOT cut the leader branch. Improper pruning shall be cause for rejection of the plant material.
- G. Saucers: Saucer shall be formed at the base and it shall be watered the same day as planting. Install crushed stone mulch around all trees as shown in the planting plans to a uniform depth of 2".

3.5 TUBELING PLANTING

- A. Upon completion of all tree planting operations, remove all undesirable material, including all rocks over the size of 1 1/2" diameter, from the surface of the planting beds, including where tubelings will be planted by volunteers.

3.6 UNIRRIGATED NATIVE GRASS SEED APPLICATION – DRILL METHOD

- A. Grade seeded area and remove debris. Uniform and smooth grades are not required.
- B. Apply Sustane 4-4-4+Fe Bolster Granular (or approved equal) at a rate of 25 lbs per 1000 square feet on top of bare soil immediately prior to seed application.
- C. If a crust has formed on the soil, loosen the ground surface to a depth of one inch. The soil shall be moist enough to permit it to be worked properly. It shall not be so dry it is powdery nor so wet that it will puddle, or become hard when it dries.
- D. Remove all weeds from areas to be seeded. All areas to be seeded shall be weed free at the time of seeding.
- E. The Contractor shall prepare only enough ground that can be seeded within 24 hours thereafter.
- F. No seeding shall be done immediately after a rain, if the soil is frozen, or if the prepared surface has been compacted without first loosening the surface.
- G. Seeding shall take place between October 15th and April 30th.
- H Drill Seeding
 - 1. Notify the Owner's Authorized Representative seven working days before seeding.
 - 2. Apply seed at the rate indicated in plans and specifications.
 - 3. Provide the Owner's Authorized Representative a copy of the drill manufacturer's direction on drill calibration two working days before seeding.

4. Use the drill manufacturer's direction in the presence of the Owner's Authorized Representative. Calibrate the drill to apply seed at the rate indicated.
5. Space drill rows a minimum of six inches and a maximum of eight inches.
6. Fill the seed boxes no more than half full when drilling on a slope.
7. Set depth bands to drill seeds to a one-half inch depth.
8. Drill seed in two applications in perpendicular directions.
9. Maintain the drill at the calibrated setting throughout the seeding operation.
10. Allow the furrows that are created by the drill to remain.

I. Broadcast Seed

1. In small areas where it is not possible to use the drill method, hand broadcast seed and rake into the soil.

J. Hydro-Mulch

1. Complete all grading and seeding before applying mulch.
2. Apply hydro-mulch within 24 after seeding or before precipitation falls. If the mulch is not installed and a precipitation event occurs creating soil erosion, the Contractor shall replace eroded material, rework the soil, and reseed before applying the mulch, at no additional cost to the Owner.
3. Apply hydro-mulch at the following rates per acre:

Mulch:	2,000 lbs.
Tackifier:	150 lbs.
Water:	5,000 gal
4. Mix water, tackifier, and wood fiber mulch in a hydroseeder, following manufacturer's directions.
5. Apply hydro-mulch to form an even cover over the seeded areas.

K. Temporary Water

1. Depending on weather conditions, it may be necessary to hand water with a watering truck to assure good germination. The Contractor shall coordinate with the Owner's Authorized Representative to determine the necessity, timing, and method of application of supplemental, and temporary water.

3.7 CRUSHED STONE MULCH

- A. Complete all required landscape grading and planting before applying crushed stone mulch.
- B. Place crushed stone mulch at 2" around trees as shown in landscape plans in the drawing package leaving an area 4" in diameter free of mulch about the base of the tree.

3.6 INFORMAL DISPLAY AREA

A. Preparation for Compaction

1. When contract operations have been completed to a point where the areas will not be disturbed, subgrade shall be cleaned free of waste material of all kinds. Scarify and pulverize the subgrade to a depth of not less than 6" inches in the Informal Display Area.
2. The surface that is to be compacted shall be firm and free of depressions or undulations of any kind. The surface shall be free of all materials larger than 1/2" in diameter.

B. Use a 100 pound roller minimum to compact the Informal Display Area shown in the drawing package. Other small compactor or vibratory roller may be used with approval of the Owner's Authorized Representative.

C. Make two perpendicular passes with the roller.

3.7 WEED CONTROL

A. Weed control is required around trees and in seeded areas. The extent of control depends on the type, quantity, and stage of weeds. The following are methods that may be used to control weeds. Apply herbicide so no damage to protected vegetation occurs whether inside or outside of the project site. Damage to protected vegetation or vegetation outside the project site will be reimbursed to the Owner or replaced by the Contractor in a manner satisfactory to the Owner's Authorized Representative, and according to the International Society of Arboriculture Method of "Valuation for Landscape Trees, Shrubs, and Other Plants", latest edition. No pre-emergent shall be used on the site.

B. Post Emergent:

1. Use a State Licensed applicator to apply herbicide.
2. Mix and apply postemergent herbicide according to manufacturer's recommendations indicated in the "Weeds Controlled" section of the label, and apply to actively growing vegetation.
3. Apply the spray mixture so that all undesired vegetation is uniformly covered, but avoid causing overspray and drift. Spray target vegetation so that it is wet, but short of run-off.
4. Prune all suckers at the base of any trees to the soil level prior to application.
5. Do not apply postemergent herbicide in any of these conditions: When rainfall is expected within six hours; when there is growth stress as a result of drought, insects, disease, or plant damage; or when there is heavy dust on plants.
6. Do not walk or permit other traffic on treated areas when they are wet from application. Shoes and equipment may track spray solution to areas where vegetation is not to be treated.
7. Repeat application, as necessary to completely eradicate undesired vegetation.

- D. Mechanical Control:
1. Mechanically control the weeds by pulling, cutting, hoeing, or by any other directed means approved by the Owner's Authorized Representative.
 2. Weeds in a dormant stage or other condition which cannot be effectively controlled with postemergent herbicide shall be removed from the site by mechanical methods.
 3. Mechanical control will be necessary in seeded/tubeling areas.

3.8 MAINTENANCE AND ESTABLISHMENT

- A. Maintain trees and seeded areas through the establishment period (1 year after Substantial Completion).
1. Maintain plants by watering, pruning, cultivating, and weeding as required for healthy growth.
 2. Seeded areas must have a relatively uniform stand of grass with no bare spots over 8" square at the time of provisional acceptance. Reseed at the rate approved by the Owner's Authorized Representative and fertilize according to specs. All areas failing to vigorously establish within 90 days after germination or one growing season (whichever is longest), for any reason whatsoever, shall be redone at the Contractor's expense.
- B. The Contractor shall instruct the Owner's Authorized Representative as to the plant watering requirements.
- C. The Contractor shall be responsible for the protection, watering and replacement of any damaged trees until acceptance by the Owner's Authorized Representative. This guarantee shall include repairing of any eroded places and maintaining the plants by watering, and controlling of insects as well as advising the Owner's Authorized Representative of any maintenance or watering procedures necessary to care for and promote plant life. All trees and seeded areas must be in satisfactory condition at the time of the Substantial Completion and at final inspection.
- D. The Contractor shall be responsible to monitor the plant material including irrigation practices for one year following substantial completion. The Contractor must report to the Owner's Authorized Representative any evidences of over-watering, under-watering, or other plant damage.
- E. The Contractor is responsible for weed control for one year following substantial completion. Weeding will be accomplished with spot spray application as needed, and mechanical means.

3.9 CLEANUP AND PROTECTION

- A. During landscape work store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.
- B. Protect landscape areas, work and materials from damage due to operations by other contractors, trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

- C. The Contractor shall keep the site free from accumulation of waste material. At the time of completion, all areas must be swept or washed clean and all rubbish removed to the satisfaction of the Owner's Authorized Representative.

3.10 INSPECTION AND ACCEPTANCE

- A. When the landscape work is completed, the Owner's Authorized Representative will, upon request, make an inspection to determine Substantial Completion.
- B. The guarantee begins from the date of Substantial Completion.
- C. Where inspected landscape work does not comply with the requirement, replace rejected work and continue specified maintenance until re-inspected by the Owner's Authorized Representative and found to be acceptable. Remove rejected plants and materials promptly from the project site.
- D. Record Drawings: Furnish to the Owner's Authorized Representative at the time of the Final Inspection before Certificate of Substantial Completion will be issued.
- E. When the landscape maintenance is completed, the Owner's Authorized Representative will, upon request, make a final inspection to determine acceptability.

END OF SECTION 329000