

Project Manual

MAIN STREET GARDEN PARK Dog Park, Playground & N.W. Corner Renovation Project

Dallas, TX

Project Number- 14135

Construction Issue Set

7/25/2018

CLIENT

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SECTION 011000

SUMMARY

PART 1 GENERAL

1.1 SUMMARY OF WORK

- A. Separate Contracts:
 - 1. The Owner may execute contracts for additional work at the site, that is excluded from the work of this Contract.
 - 2. Cooperate with Owner and separate contractors to accomplish this requirement.

- B. Contractor's Use of Site and Premises:
 - 1. Limit use of site and premises to allow for:
 - a. Work by separate contractors.
 - b. Work by Owner.
 - c. Use of adjacent premises by the public.
 - 2. Coordinate use of site and premises with the Owner.
 - 3. Access site at locations designated by Owner.
 - 4. Locate storage and staging areas in locations designated by Owner.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 012000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 ALTERNATES

- A. Contract Documents contain pertinent requirements for materials and methods to accomplish work described herein.
- B. Provide alternate costs for inclusion in Contract Sum if accepted by Owner.
- C. Alternates will be exercised at the option of Owner.
- D. Coordinate related work and modify surrounding work as required to complete the work, including changes under each Alternate, when acceptance is designated in Owner-Contractor Agreement.

1.2 PRODUCT SUBSTITUTION PROCEDURES

- A. Landscape Architect will not consider substitution requests prior to execution of Contract; Contract is to be based upon products and standard of quality established in Contract Documents.
- B. Within 30 days after award of Contract, Landscape Architect will consider requests from Contractor for substitution of products in place of those specified.
- C. After initial 30 day period, substitution requests will be considered only due to non-availability of specified items if due to lockout, strike, bankruptcy, discontinuation of product, proven shortage, or other similar occurrence. Notify Landscape Architect as soon as non-availability becomes apparent, in time to avoid delays to project; include substantiating data.
- D. Do not substitute Products unless a Substitution Request Form has been approved by Landscape Architect.
- E. Substitution Requests:
 - 1. Contractor is responsible for substantiating acceptability of proposed substitutions. Submit full documentation along with substitution request.
 - 2. Submit electronically in Adobe PDF format.
- F. Representation:
 - 1. In submitting substitution request, Contractor represents that Contractor:
 - a. Has investigated proposed substitution and determined that it is equal or superior to specified product in all aspects.
 - b. Will coordinate installation of accepted substitution into Work, making changes as may be required to complete Work in all aspects.
 - c. Waives all claims for additional costs related to substitution that may subsequently become apparent.
- G. Substitutions will not be considered if:
 - 1. They are indicated or implied on Shop Drawings or other submittals without formal request.
 - 2. Approval will require substantial revision of Contract Documents without additional compensation to Landscape Architect.
- H. Landscape Architect will notify Contractor of approval or rejection of each Substitution Request.

1.3 CONTRACT MODIFICATION PROCEDURES

- A. Supplemental Instructions: Landscape Architect will advise of minor changes in Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract.

- B. Proposal Requests:
 - 1. Landscape Architect may issue a Proposal Request that includes a detailed description of a proposed change with supplemental or revised Drawings and specifications.
 - 2. Contractor shall prepare and submit an estimate of any change to Contract Sum or Contract Time within 7 days.
- C. Contractor Proposed Changes:
 - 1. Contractor may propose a change by submitting request for change to Landscape Architect.
 - 2. Describe proposed change, reason for change, its full effect on Work, and any change to Contract Sum or Contract Time. Document any required substitutions.
- D. Construction Change Directive:
 - 1. Landscape Architect may issue a directive, signed by Owner, instructing Contractor to proceed with a change for subsequent inclusion in a Change Order.
 - 2. Document will describe changes in Work and designate method of determining any change to Contract Sum or Contract Time.
 - 3. Promptly execute change.
- E. Change Orders: Prepare Change Orders for signature of parties as provided in Conditions of the Contract.
- F. Submit electronically in Adobe PDF format.

1.4 UNIT PRICES

- A. Provide unit prices for items listed, for inclusion in Contract, guaranteed to apply for duration of Project as basis for additions to or deductions from Contract Sum.
- B. Take measurements and compute quantities.
- C. Quantities and measurements indicated are for Contract purposes only. Actual quantities and measurements supplied or placed in the Work will determine payment.
- D. Payment includes full compensation for all required labor, Products, tools, equipment, plant, transportation, services, incidentals, and for erection, application, or installation of an item of the Work. Overhead and profit will be added to these costs.

1.5 SCHEDULE OF VALUES

- A. Submit a Schedule of Values to Owner and Landscape Architect at least 20 days prior to submitting first Application for Payment.
 - 1. Upon request of Owner or Landscape Architect, furnish additional data to support values given that will substantiate their correctness.
 - 2. Approved Schedule of Values will be used as basis for reviewing Contractor's Applications for Payment.
- B. Format: Electronic media printout, using table of Contents of Project Manual as basis of format for listing costs of Work.
 - 1. List installed value of component parts of Work in sufficient detail to serve as basis for computing values for progress payments.
 - 2. For items on which payment will be requested for stored materials, break down value into cost of materials, delivered and unloaded, and total installed value.
 - 3. Total of costs listed in Schedule shall equal Contract Sum.
 - 4. Submit electronically in Adobe PDF format.
- C. Review and Resubmittal:
 - 1. After initial review by Owner and Landscape Architect, revise and resubmit if required.
 - 2. Revise and resubmit along with next Application for Payment when a Change Order is issued. List each Change Order as a new line item.

1.6 APPLICATIONS FOR PAYMENT

- A. Format: AIA Document G702 - Application and Certification for Payment, supported by AIA Document G703 - Continuation Sheet, or Contractor's standard format.
- B. Prepare required information on electronic media printout.
- C. Use data from reviewed Schedule of Values. Provide dollar value in each column for each line item representing portion of work performed.
- D. List each authorized Change Order as a separate line item, listing Change Order number and dollar value.
- E. When Owner or Landscape Architect require substantiating information, submit data justifying dollar amounts in question.
- F. Submit electronically in Adobe PDF format.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 PROGRESS SCHEDULE

- A. Submit a Progress Schedule within 15 days after date of Notice to Proceed.
- B. Format:
 - 1. Horizontal bar chart with separate bar for each trade or operation, identifying first work day of each week, in chronological order of beginning of each item of work.
 - 2. Include dates for beginning and completion of each element of construction.
 - 3. Submit electronically in Adobe PDF format.
- C. Updating: Submit updated schedule along with each Application for Payment.
 - 1. Identify changes occurring since previous submission.
 - 2. Indicate progress of each activity to date of submittal and projected completion date of each activity.
 - 3. When appropriate, provide narrative report, including discussion of problem areas, corrective action taken, description of revisions, and other items affecting progress of Work.

1.2 SUBMITTAL PROCEDURES

- A. Shop Drawings:
 - 1. Present in clear and thorough manner.
 - 2. Identify details by reference to sheet and detail numbers or room number shown on Drawings.
 - 3. Maximum sheet size: 30 x 42 inches.
 - 4. Submit electronically in Adobe PDF format.
- B. Product Data:
 - 1. Manufacturer's standard schematic drawings and diagrams; modify and supplement standard information to provide information specifically applicable to work.
 - 2. Submit electronically in Adobe PDF format.
- C. Samples:
 - 1. Sufficient size and quantity to clearly illustrate functional characteristics of product and full range of color, texture, and pattern.
 - 2. Number required: Two of each sample unless otherwise specified in individual specifications.
- D. Quality Control Submittals:
 - 1. Quality control submittals are for information and do not require Landscape Architect's responsive action except to require resubmission of incomplete or incorrect information.
 - 2. Design data and calculations:
 - a. Accuracy of design data and calculations is the responsibility of the Contractor.
 - b. When so specified, prepare design data and calculations under the direction of a professional engineer licensed in the state in which the Project is located.
 - 3. Test reports and certifications:
 - a. Indicate that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - b. Submittals may be recent or previous test results on material or Product, but must be acceptable to Landscape Architect.
 - 4. Manufacturer's installation instructions:
 - a. Submit manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, in quantities specified for Product Data.
 - b. Identify conflicts between manufacturers' instructions and requirements of Contract Documents.
 - 5. Submit electronically in Adobe PDF format.

- E. Contractor's Responsibilities:
1. Review and approve submittals prior to submittal. Verify field measurements, construction criteria, catalog numbers, and similar data.
 2. Coordinate submittals with requirements of work and Contract Documents.
 3. Contractor's responsibility for errors, omissions, or deviations from requirements of Contract Documents is not relieved by Landscape Architect's review, unless Landscape Architect is notified of deviations in writing at time of submittal and gives written acceptance of specific deviations.
 4. On resubmittals, indicate any changes that have been made other than those requested by Landscape Architect.
- F. Landscape Architect's Responsibilities:
1. Review for conformance with design concept of project and information given in Contract Documents.
 2. Landscape Architect is not responsible for verification of field measurements, construction criteria, catalog numbers, and other similar data.
 3. Review of separate item does not constitute review of an assembly in which item functions.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

- A. Individual specification sections contain references to association, trade, or Federal standards. Applicable portions of standards listed that are not in conflict with specification requirements are hereby made a part of Contract Documents. Modifications and exceptions to standards shall be considered as amendments and unmodified portions shall remain in effect.
- B. In case of conflict between standards, or between specifications and standards, most stringent requirement shall govern.
- C. Editions of standards shall be latest edition as of date of Project Manual, including any supplements or amendments thereto.

1.2 MOCKUPS

- A. Assemble and erect specified items, with attachment and anchorage devices, flashings, seals, and finishes.
- B. Erect at project site at location acceptable to Owner and Landscape Architect.
- C. Perform work in accordance with applicable specifications sections.
- D. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been approved by Landscape Architect.

1.3 TESTING LABORATORY SERVICES

- A. Payment:
 - 1. Owner will employ and pay for services of an independent testing laboratory to perform specified testing and inspection.
 - 2. Contractor shall cooperate with the Testing Laboratory to facilitate performance of its work.
 - 3. Employment of Testing Laboratory shall in no way relieve Contractor of his obligations to perform work in accordance with Contract Documents.
- B. Qualifications of Laboratory:
 - 1. Authorized to operate in State in which Project is located.
 - 2. Meet requirements of ASTM C1077, D3666, D3740, E329, and E543 as applicable to services provided.
- C. Laboratory Duties:
 - 1. Cooperate with Owner, Landscape Architect, and Contractor; provide qualified personnel after due notice.
 - 2. Perform specified inspections, sampling, and testing of materials and methods of construction in compliance with specified standards.
 - 3. Ascertain compliance or noncompliance with requirements of Contract Documents.
 - 4. Promptly notify Owner, Landscape Architect, and Contractor of observed irregularities or deficiencies of work or products.
 - 5. Promptly submit report of each test and inspection; submit electronically in Adobe PDF format.
 - 6. Perform additional tests as required by Owner or Landscape Architect.
 - 7. Laboratory is not authorized to:
 - a. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - b. Approve or accept any portion of work.
 - c. Perform any duties of Contractor.

D. Contractor's Responsibilities:

1. Cooperate with Laboratory personnel, provide access to Work, and to manufacturer's operations.
2. When materials require testing prior to being incorporated into Work, secure and deliver to Laboratory adequate quantities of representative samples of materials proposed to be used.
3. Furnish copies of product test reports as required.
4. Furnish incidental labor and facilities.
5. Notify Laboratory sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 TEMPORARY UTILITIES

- A. Temporary Electricity: Provide temporary electrical service of capacity and characteristics required for construction.
- B. Temporary Heat: Provide temporary heating devices required to maintain specified ambient temperatures for construction operations.
- C. Temporary Telephone: Provide temporary telephone service required during construction.
- D. Temporary Water: Provide temporary water required for construction operations.

1.2 CONSTRUCTION FACILITIES

- A. Field Offices and Sheds: Provide temporary field offices and storage sheds required for construction.
- B. Temporary Sanitary Facilities: Provide chemical toilets for use during construction.

1.3 TEMPORARY BARRIERS AND ENCLOSURES

- A. Barriers:
 - 1. Provide barriers to prevent unauthorized entry to construction areas.
 - 2. Provide barricades required by governing authorities for public right-of-ways.
 - 3. Provide temporary fencing for construction operations.
- B. Tree and Plant Protection:
 - 1. Protect existing trees and plants at site that are designated to remain.
 - 2. Replace trees and plants that are damaged or destroyed due to construction operations.

1.4 TEMPORARY CONTROLS

- A. Water Control: Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Erosion and Sediment Control: Provide temporary measures such as silt fences, dikes, berms, settlement basins, and drainage systems to prevent water flow and sedimentation.
- C. Dust Control: Provide dust control materials and methods to minimize dust from construction operations. Prevent dust from dispersing into atmosphere.

1.5 TEMPORARY PROJECT SIGN

- A. Submittals for Review:
 - 1. Shop Drawings: Show content, layout, lettering, colors, structure, sizes, and grades of members.
 - 2. Samples: 3 x 3 inch samples of each paint color.
- B. Materials:
 - 1. Structure and framing: New lumber, structurally adequate.
 - 2. Sign surfaces: Exterior grade plywood with medium density overlay, nominally 3/4 inch thick, standard large sizes to minimize joints.
 - 3. Rough hardware: Galvanized steel or aluminum.
 - 4. Paints: Alkyd type, exterior quality, semigloss sheen.

- C. Fabrication:
 - 1. Provide one sign of following design:
 - a. Area: 32 square feet.
 - b. Bottom edge of sign: 6 feet above ground.
 - c. Content:
 - 1) Project title and logo.
 - 2) Owner's name.
 - 3) Names and titles of Landscape Architect.
 - 4) Name of Contractor.
 - d. Graphic design, colors, and lettering style: As designated by Landscape Architect.
- D. Installation:
 - 1. Install project identification sign within 30 days after date of Notice to Proceed.
 - 2. Maintain signs and supports in good conditions. Repair deterioration and damage.

1.6 REMOVAL

- A. Remove temporary utilities, equipment, facilities, and services when construction needs can be met by use of permanent construction or upon completion of Project.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 BASIC PRODUCT REQUIREMENTS

- A. Products Incorporated Into Work:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type, and quality specified, unless a substitution request has been approved by Landscape Architect.
 - 3. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
- B. Manufacturer's Instructions:
 - 1. When Contract Documents require that installation complies with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in installation.
 - 2. Handle, install, connect, clean, condition, and adjust products in strict accordance with such instructions and in conformance with specified requirements.
- C. Transportation, Handling and Storage:
 - 1. Arrange deliveries of products in accordance with construction schedules; coordinate to avoid conflict with work and conditions at site.
 - 2. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 3. Handle and store products by methods to prevent soiling or damage to products or packaging.
- D. Reuse of Existing Material: Except as specifically indicated or specified, materials, and equipment removed from existing structure shall not be used in completed work.

1.2 PRODUCT OPTIONS

- A. For Products Specified By:
 - 1. Reference standard only: Select any Product meeting the specified standard. Submit Product Data to substantiate compliance of proposed Product with specified requirements.
 - 2. Naming two or more acceptable Products: Select any named Product.
 - 3. Stating that the Contract Documents are based on a Product by a single manufacturer followed by the statement "Equivalent products by the following manufacturers are acceptable":
 - a. Select the specified Product or a Product by a named manufacturer having equivalent or superior characteristics to the specified Product and meeting all requirements of the Contract Documents.
 - b. If the specified Product is not selected, submit Product Data to substantiate compliance of proposed Product with specified requirements.
 - 4. Naming a single Product followed by the statement "or approved substitute": Submit a Substitution Request Form for Products not listed.
 - 5. Naming one or more Products or manufacturers followed by the statement "Substitutions: Under provisions of Division 01": Submit a Substitution Request Form for Products not listed.
 - 6. Naming one Product followed by the statement "Substitutions: Not permitted": Substitutions will not be allowed.
 - 7. Required performance or attributes, without naming a manufacturer or Product: Select any Product meeting specified requirements.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 017000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 CUTTING AND PATCHING

- A. Execute Cutting of Work Required to:
 - 1. Make several parts fit properly.
 - 2. Remove and replace defective or ill-timed work.
 - 3. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
- B. Preparation Prior to Cutting:
 - 1. Provide shoring, bracing, and supports required to maintain structural integrity of work.
 - 2. Provide protection for other portions of project.
 - 3. Provide protection from elements.
- C. Cutting: Execute cutting by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.
- D. Patching: Refinish surfaces as necessary to provide an even finish:
 - 1. Continuous surfaces: To nearest intersections.
 - 2. Assembly: Refinish entirely.

1.2 CLEANING

- A. Progress Cleaning: Maintain areas free from waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Final Cleaning:
 - 1. Execute final cleaning of areas affected by work of this Contract prior to final inspection.
 - 2. Clean surfaces exposed to view; remove labels, stains, and foreign substances.
 - 3. Polish transparent and glossy finishes.
 - 4. Clean debris from drainage systems.
 - 5. Sweep paved areas of site; rake clean landscaped areas.
 - 6. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.3 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed work from construction operations; provide special protection when required in individual specification sections.

1.4 CLOSEOUT PROCEDURES

- A. Submit written certification that Work is complete in accordance with Contract Documents and ready for final inspection.
- B. Submit final statement of accounting showing:
 - 1. Original Contract Sum.
 - 2. Additions and deductions.
 - 3. Retainage withheld from previous payments.
 - 4. Adjusted Contract Sum.
 - 5. Previous payments.
 - 6. Sum remaining due.

- B. Concrete Foundations: Construct according to Section 0330 Cast-in-Place Concrete.
 - 1. Comply with details and manufacturer's recommendations for reinforcing, anchor bolts, nuts, and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.
 - 2. Finish: Trowel and rub smooth parts exposed to view.
- C. Pole Installation: Use web fabric slings (not chain or cable) to raise and set poles.
- D. Fixture Attachment: Fasten to indicated supports.
- E. Lamp fixtures with indicated lamps according to manufacturer's written instructions. Replace malfunctioning lamps.

3.2 GROUNDING:

- A. Ground fixtures and metal poles according to Section 16450 Secondary Grounding.
 - 1. Poles: Install 10-Foot driven ground rod at each pole.
 - 2. Fixtures: Connect to equipment ground conductor within circuit.

3.3 FIELD QUALITY CONTROL:

- A. Inspect each installed unit for damage. Replace damaged fixtures and components.
- B. Test and Observations: Verify normal operation of lighting units after installing fixtures and energizing circuits with normal power source.
- C. Replace or repair damaged and malfunctioning units, make necessary adjustments, and retest. Repeat procedure until all units operate properly.

3.4 ADJUSTING AND CLEANING:

- A. Clean units after installation. Use methods and materials recommended by manufacturer.

END OF SECTION

SECTION 024113

SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removal of designated site construction.
 - 2. Identification of utilities.
- B. Related Sections:
 - 1. Division 01 - Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Indicate areas for demolition, removal sequence and location of salvageable items, and location and construction of temporary work.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work and dust control.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Conform to applicable codes when hazardous or contaminated materials are discovered.

1.4 PROJECT CONDITIONS

- A. Minimize interference with streets, walks, public right-of-ways, and adjacent facilities.
- B. If hazardous materials are discovered, notify Owner and Landscape Architect and await instructions.
- C. If materials or conditions are encountered that differ from those indicated in Contract Documents, cease work immediately, notify Landscape Architect and await instructions.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 PREPARATION

- A. Erect temporary barricades, warning devices, and controls.
- B. Temporarily or permanently disconnect utilities as required.

3.2 DEMOLITION

- A. Remove existing construction to extent indicated and as necessary to join new work to existing. Do not remove more than is necessary to allow for new construction.
- B. Do not damage work designated to remain.

- C. Minimize noise and spread of dirt and dust.
- D. Assign work to trades skilled in procedures involved.
- E. Plug ends of disconnected utilities with threaded or welded caps.
- F. Protect and support active utilities designated to remain. Post warning signs showing location and type of utility and type of hazard.
- G. Store items designated to remain property of Owner where directed by Owner.
- H. Remove and dispose of waste materials off site.

END OF SECTION

SECTION 033053

LANDSCAPE CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete formwork.
 - 2. Concrete reinforcement.
 - 3. Cast-in-place concrete.
 - 4. Concrete finishing.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary requirements.
 - 2. Section 321313 - Landscape Concrete Paving.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. 301 - Structural Concrete for Buildings.
 - 2. 302.1 - Guide for Concrete Floor and Slab Construction.
 - 3. 305R - Hot Weather Concreting.
 - 4. 306R - Cold Weather Concreting.
 - 5. 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International (ASTM):
 - 1. A185 - Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement.
 - 2. A615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 3. C33 - Standard Specification for Concrete Aggregates.
 - 4. C94 - Standard Specification for Ready-Mixed Concrete.
 - 5. C150 - Standard Specification for Portland Cement.
 - 6. C171 - Standard Specification for Sheet Materials for Curing Concrete.
 - 7. C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 8. C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 9. C494 - Standard Specification for Chemical Admixtures for Concrete.
 - 10. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- C. Concrete Reinforcing Steel Institute (CRSI) - Manual of Practice.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Product Data: Descriptive data for color admixture and curing compound.
 - 2. Shop Drawings:
 - a. Include pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
 - b. Show means of leakage prevention for concrete exposed to view in finished construction.
 - c. Show sequence and timing of erection and stripping.
 - 3. Concrete Mix Designs: Submit for each type of concrete.

1.4 QUALITY ASSURANCE

- A. Concrete Mix Designs: In accordance with ACI 301, Method 1 or 2.

- B. Mockup:
 - 1. Construct mockup of concrete wall, minimum 4 feet long x 4 feet high.
 - 2. Illustrate full color and texture range, form ties, joints, corners, and reveals.
 - 3. Locate where directed.
 - 4. Approved mockup may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Mix and deliver concrete to project ready mixed in accordance with ASTM C94.
- B. Schedule delivery so that pours will not be interrupted for over 15 minutes.
- C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Formwork:
 - 1. Forms: Wood, metal, or glass fiber type, tight fitting.
 - 2. Fasteners: Size as required, sufficient strength to maintain forms in place while concrete is placed.
 - 3. Form release agent: Nonstaining, colorless mineral oil that will not absorb moisture, stain concrete, or impair adhesion of coatings to be applied to concrete.
 - 4. Construction joints forms: Formed steel, with keyway.
 - 5. Form ties: Snap off type, adjustable length, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete.
- B. Reinforcement:
 - 1. Bars: ASTM A615/A615M, deformed billet steel.
 - 2. Welded wire fabric: ASTM A185; furnish in flat sheets.
 - 3. Chairs, bolsters, bars supports, and spacers:
 - a. Sized and shaped for support of reinforcement during concrete placement.
 - b. Plastic coated steel for surfaces exposed to weather.
 - 4. Tie wire: Annealed steel, 16 gage minimum.
- C. Concrete Materials:
 - 1. Portland cement: ASTM C150, Type I or III as applicable.
 - 2. Aggregates: ASTM C33, clean, hard, durable, and uncoated.
 - a. Fine: Natural sand, free from silt, loam, and clay.
 - b. Coarse: Crushed stone, maximum size No. 467, Table No. 2.
 - 3. Admixtures:
 - a. Water reducing or water reducing/set retarding: ASTM C494, Type A or D.
 - b. Air entraining: ASTM C260.
- D. Expansion Joint Filler: ASTM D1752, Type 1, non asphaltic.
- E. Non Shrink Grout: Premixed, consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; 7,000 PSI compressive strength at 28 days.
- F. Curing Materials:
 - 1. Curing compound: ASTM C309, Type 1.
 - 2. Curing paper: ASTM C171, waterproof paper or polyethylene film.
- G. Bonding Agent: Two component modified epoxy resin.
- H. Water: Clean and potable.

2.2 MIXES

- A. Proportions: In accordance with ACI 301.
- B. Design concrete to yield following characteristics unless otherwise indicated:
 - 1. Minimum 28 day compressive strength: 3000 PSI.
 - 2. Slump:
 - a. Footings: 4 to 6 inches.
 - b. Other uses: 3 to 5 inches.
 - 3. Air entrainment: Provide air entraining admixture to produce 4 to 6 percent air by volume of concrete.

2.3 FABRICATION

- A. Reinforcing: In accordance with CRSI Manual.

PART 3 EXECUTION

3.1 PREPARATION

- A. Notify Owner, Landscape Architect, and Testing Laboratory minimum 24 hours prior to placing concrete.
- B. Remove water and debris from forms and excavations before concrete is deposited.
- C. Provide devices for conveying concrete to point of deposit to prevent disturbing forms or reinforcing or segregating concrete.
- D. Clean reinforcement of loose rust, mill scale, dirt, oil, and other materials that could reduce bonding.
- E. Prepare previously placed and existing concrete surfaces by cleaning with steel wire brush and applying bonding agent in accordance with manufacturer's instructions.
- F. Where new concrete is doweled to existing, drill holes in existing concrete, insert steel dowels, and pack holes solid with non shrink grout.

3.2 INSTALLATION OF FORMWORK

- A. Construct forms tight to prevent loss of mortar.
- B. Clean contact and screed surfaces of hardened concrete and foreign materials prior to assembly.
- C. Apply form release agent to contact surfaces; follow manufacturer's instructions.

3.3 INSTALLATION OF REINFORCEMENT

- A. Bar Reinforcement: In accordance with ACI 301 and CRSI Manual.
- B. Wire Fabric:
 - 1. Install in longest practical length.
 - 2. Offset end laps in adjacent widths to prevent continuous lap.

3.4 PLACEMENT OF CONCRETE

- A. Place concrete in accordance with ACI 301 and ACI 318.
- B. Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.
- C. Deposit concrete as nearly as possible in its final position to minimize handling and flowing.

- D. Place concrete continuously between predetermined expansion, control, and construction joints.
- E. Do not place partially hardened, contaminated, or retempered concrete.
- F. Do not allow concrete to free fall over 8 feet; provide tremies, chutes, or other means of conveyance.
- G. Consolidate concrete with mechanical vibrating equipment. Hand compact in corners and angles of forms.
- H. Screed slabs to flatness tolerance of 1/4 inch in 10 feet.

3.5 FORM REMOVAL

- A. Remove forming materials in manner that will not damage surfaces of concrete; patch work damaged during form removal operations.
- B. Provide shoring and bracing as required.

3.6 PLACEMENT OF GROUT

- A. Remove loose and foreign matter from concrete; lightly roughen bonding surface. Thoroughly wet concrete surfaces; remove excess water.
- B. Mix grout in accordance with manufacturer's instructions. Do not retemper.
- C. Place grout continuously, by most practical means; avoid entrapped air. Do not vibrate grout.

3.7 FINISHING

- A. Concealed Formed Surfaces: Leave texture imparted by forms.
- B. Exposed Formed Surfaces: While concrete is still green:
 - 1. Patch voids over 1/2 inch in diameter or depth.
 - 2. Remove fins and other protrusions by rubbing with carborundum stone.
- C. Exposed Horizontal Surfaces of Landscape Wall: Smooth troweled surface.
- D. Slabs:
 - 1. Finish surfaces in accordance with ACI 301 and ACI 302.1.
 - 2. Finish surfaces as specified in Section 321313.
- E. Allowable Tolerances: In accordance with ACI 301.

3.8 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. Provide artificial heat to maintain temperature of concrete above minimum specified temperature for duration of curing period.
- D. Keep forms sufficiently wet to prevent cracking of concrete or loosening of form joints.

3.9 CURING

- A. Cure concrete in accordance with ACI 308:
 - 1. Horizontal surfaces: Use either curing paper or curing compound method.
 - 2. Vertical surfaces: Use either wet curing or curing compound method.

3.10 CLEANING

- A. Remove efflorescence, stains, oil, grease, and foreign materials from exposed surfaces.

END OF SECTION

SECTION 040511

LANDSCAPE MASONRY MORTARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mortar for masonry.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 321440 - Stone Paving.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. C144 - Standard Specification for Aggregate for Masonry Mortar.
 - 2. C150 - Standard Specification for Portland Cement.
 - 3. C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 4. C270 - Standard Specification for Mortar for Unit Masonry.
- B. The Masonry Society (TMS):
 - 1. 402 - Building Code for Masonry Structures.
 - 2. 602 - Specification for Masonry Structures.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Samples: 1/2 x 1/2 inch x 3 inch long colored mortar samples.
- B. Quality Control Submittals:
 - 1. Test reports: Indicating mortar compliance with ASTM C270.
 - 2. Delivery tickets: If mortar is delivered to site dry and pre-blended, furnish delivery tickets indicating quantity, mortar type, and date of manufacture.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS 402 and 602.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver cement and lime in manufacturer's original, unopened packages or containers.
- B. Protect materials from moisture absorption and damage; reject damaged containers.
- C. Store aggregate to prevent inclusion of foreign matter.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers - Colorants:
 - 1. Cathay Pigments. (www.cathaypigments.com)
 - 2. Davis Colors. (www.daviscolors.com)
 - 3. Solomon Colors. (www.solomoncolors.com)

- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Portland Cement:
 - 1. ASTM C150, Type I.
 - 2. For exposed surfaces, provide cement from one source throughout project.
- B. Aggregate:
 - 1. ASTM C144, standard masonry type.
 - 2. For exposed surfaces, provide aggregate from one source throughout project.
- C. Lime: ASTM C207, Type S.
- D. Colorant: Pure mineral oxide type.
- E. Water: Clean and free from oils, acids, alkalies, organic matter, and other substances in amounts deleterious to mortar or metals in masonry.

2.3 MIXES

- A. Mortar Mix: ASTM C270, Type N, using the Property Method.
 - 1. Setting mortar: Type N, gray.
 - 2. Pointing mortar: Type N; color to match stone.

2.4 MIXING

- A. Mix mortar in accordance with ASTM C270.
- B. Mix using mechanical mixer. Hand mixing not permitted.
- C. Mix approximately three-quarters of required water, all of cement and lime, and one-half of aggregate for minimum of 2 minutes.
- D. Add remainder of water and aggregate; mix for minimum of 3 minutes.
- E. Provide uniformity of color in exposed mortar.
- F. Colorant may not exceed 9 pounds per 94 pound bag of cement.
- G. Thoroughly mix ingredients in quantities needed for immediate use.
- H. Discard lumpy, caked, frozen, and hardened mixes.
- I. Mortar may be retempered by adding water as required. Use mortar within 2-1/2 hours after initial mixing at ambient temperatures below 80 degrees F and within 1-1/2 hours after initial mixing at ambient temperatures over 80 degrees F.
- J. Do not add accelerators, retarders, water repellents, antifreeze compounds, or other additives without Landscape Architect's approval.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Follow requirements specified in referenced sections.

END OF SECTION

SECTION 040514

LANDSCAPE MASONRY GROUTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Grout for masonry.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 044200 - Landscape Stone Assemblies.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. C150 - Standard Specification for Portland Cement.
 - 2. C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 3. C404 - Standard Specification for Aggregates for Masonry Grout.
 - 4. C476 - Standard Specification for Mortar and Grout for Reinforced Masonry.
- B. The Masonry Society (TMS):
 - 1. 402 - Building Code for Masonry Structures.
 - 2. 602 - Specification for Masonry Structures.

1.3 SUBMITTALS

- A. Quality Control Submittals:
 - 1. Test reports: Indicating grout compliance with ASTM C476.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS 402 and 602.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver cement and lime in manufacturer's original, unopened packages or containers.
- B. Protect materials from moisture absorption and damage; reject damaged containers.
- C. Store aggregate to prevent inclusion of foreign matter.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type I.
- B. Aggregate: ASTM C404.
- C. Lime: ASTM C207, Type S.
- D. Water: Clean and free from oils, acids, alkalis, organic matter, and other substances in amounts deleterious to mortar or metals in masonry.

2.2 MIXES

- A. Grout Mix:
 - 1. ASTM C476, coarse grout.
 - 2. Compressive strength: Minimum 2500 psi at 28 days.
 - 3. Slump: 7 to 8 inches.

2.3 MIXING

- A. Mix grout in accordance with ASTM C476.
- B. Thoroughly mix ingredients in quantities needed for immediate use.
- C. Mix dry ingredients mechanically until uniformly distributed; add water to achieve workable consistency.
- D. Discard lumpy, caked, frozen, and hardened mixes.
- E. Use grout within 2-1/2 hours after initial mixing at ambient temperatures below 80 degrees F and within 1-1/2 hours after initial mixing at ambient temperatures over 80 degrees F.
- F. Do not add accelerators, retarders, water repellents, antifreeze compounds, or other additives without Landscape Architect's approval.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Follow requirements specified in referenced sections.

END OF SECTION

SECTION 044200

LANDSCAPE STONE ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Natural stone assemblies.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 040511 - Landscape Masonry Mortaring.
 - 3. Section 040514 - Landscape Masonry Grouting.
 - 4. Section 079205 - Landscape Joint Sealers.

1.2 REFERENCES

- A. ASTM International (ASTM) A153/A153M - Standard Specification for Zinc-Coating (Hot Dip) on Iron and Steel Hardware.
- B. The Masonry Society (TMS):
 - 1. 402 - Building Code for Masonry Structures.
 - 2. 602 - Specification for Masonry Structures.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Include location and sizes of pieces, arrangement and size of joints, anchorage details, and other details of installation.
 - 2. Product Data: Provide information on anchors including sizes, profiles, materials, and finishes.
 - 3. Samples: 12 x 12 inch stone samples showing each color and surface texture.

1.4 QUALITY ASSURANCE

- A. Fabricator and Installer Qualifications: Minimum 3 years experience in work of this Section.
- B. Obtain each stone from a single quarry and from the same area within the quarry.
- C. Perform Work in accordance with TMS 402 and 602.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store stone off ground; prevent contact with materials that could cause staining or damage.
- B. Protect anchors from corrosion.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install stone when surrounding air or substrate surface temperature is below 40 degrees F or above 90 degrees F during or 48 hours after completion of the work.
 - 2. Do not install stone when wind velocity exceeds 15 MPH or relative humidity exceeds 70 percent.
 - 3. At end of working day and during rainy weather, cover work exposed to weather with waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers - Masonry Accessories:
 - 1. Blok-Lok Ltd. (www.blok-lok.com)
 - 2. Dur-O-Wal. (www.dur-o-wal.com)
 - 3. Heckmann Building Products. (www.heckmannbuildingprods.com)
 - 4. Hohmann and Barnard, Inc. (www.h-b.com)
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Stone:
 - 1. Type, size, color, and surface finish: Refer to Material Legend.
 - 2. Free from defects that could impair its structural integrity or function. Inherent variations characteristic to quarry from which it is obtained are acceptable.

2.3 ACCESSORIES

- A. Mortar: Specified in Section 040511.
- B. Grout: Specified in Section 040514.
- C. Veneer Ties: Wire mesh, 1/4 inch x 23 gage, hot dip galvanized, ASTM A153/A153M, 4 x 8 inches.
- D. Fasteners: Hot-dip galvanized steel, minimum 3/4 inch penetration into substrate.
- E. Cleaner: Type recommended by stone supplier.
- F. Joint Sealers: Specified in Section 079205.

2.4 FABRICATION

- A. Fabricate stone for uniform coloration between adjacent units and over full area of installation.
- B. Form external stone corners to square butt joint profile. Clean jagged corners from stone in preparation for setting.
- C. Fabricate for 3/8 inch beds and joints.
- D. Cut or saw bed and joint surfaces square for full thickness of unit.
- E. Backs: Sawn.
- F. Slope exposed top surfaces of stone and horizontal sill surfaces for shedding water.
- G. Cut drip slot in stone projecting more than 1 inch. Size slot not less than 1/4 inch wide and deep for full width of projection.
- H. Fabrication Tolerances:
 - 1. Variation in width or height: Plus or minus 1/16 inch.
 - 2. Variation in thickness: Plus or minus 1/8 inch.
 - 3. Variation from true plane: Plus or minus 1/16 inch in 3 feet.

PART 3 EXECUTION

3.1 PREPARATION

- A. Establish lines, levels, and coursing. Protect from disturbance.
- B. Clean stone prior to installation. Do not use wire brushes or implements that can mark or damage exposed surfaces.
- C. Wet absorptive stone in preparation for placement to minimize moisture suction from mortar.

3.2 INSTALLATION

- A. Arrange stone pattern to provide color uniformity and constant 3/8 inch joint sizes throughout.
- B. Set stone plumb and level. Align adjacent pieces in same plane.
- C. Set stone in full mortar setting bed; support stone over full bearing surface.
- D. Set stone to bond pattern indicated.
- E. Completely fill beds and joints, then rake out for pointing.
- F. Fill joints with pointing mortar; tool to concave profile.
- G. Veneer Ties:
 - 1. Space ties to provide one tie per 2 square feet at maximum spacing of 16 inches on center horizontally.
 - 2. Locate ties within 3 inches of ends of masonry walls and openings.
- H. Fill void space between stone veneer and concrete backup with grout placed in maximum 8 inch high lifts. Rod or vibrate to consolidate.
- I. Control Joints:
 - 1. Keep joints free from mortar and grout.
 - 2. Install joint backing and joint sealer as specified in Section 079205.
- J. Installation Tolerances; Maximum variation from:
 - 1. Alignment face to face of adjacent units: Plus or minus 1/8 inch.
 - 2. Vertical alignment of head joints: Plus or minus 1/2 inch in 10 feet.
 - 3. True plane of wall: Plus or minus 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
 - 4. Plumb: Plus or minus 1/4 inch in 10 feet noncumulative; 1/2 inch in 20 feet or more.
 - 5. Level coursing: Plus or minus 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch in 30 feet.
 - 6. Joint thickness: Plus or minus 1/8 inch.
 - 7. Cross sectional thickness of walls: Plus or minus 1/4 inch.

3.3 CLEANING

- A. Clean stone with detergent and water applied with fiber brush.
- B. If initial cleaning does not produce acceptable results, apply cleaner in accordance with manufacturer's instructions.
 - 1. Protect adjacent and underlying surfaces and plant materials.
 - 2. Thoroughly rinse surfaces with clean water after completion of cleaning; remove all traces of cleaning solution.

3.4 PROTECTION

- A. Protect stone subject to damage by use of nonstaining sheet coverings.

END OF SECTION

SECTION 055005

LANDSCAPE METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Landscape edgings.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

- A. American Welding Society (AWS) D1.1/D1.1M - Structural Welding Code - Steel.
- B. ASTM International (ASTM):
 - 1. A123/A123M - Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
 - 2. A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Show dimensions, metal thicknesses, finishes, joints, attachments, and relationship of work to adjacent construction.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store steel above ground on platforms, skids, or other supports; separate with wooden separators.
- B. Protect steel from corrosion.
- C. Prevent damage to shop-applied coatings.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Plate: ASTM A283.

2.2 FABRICATION

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

- F. Conceal fastenings where possible.
- G. Welding to conform to AWS D1.1/D1.1M:
 - 1. Use welds for permanent connections where possible. Grind exposed welds smooth.
 - 2. Tack welds prohibited on exposed surfaces.

2.3 FINISHES

- A. Steel: Galvanized, ASTM A123/A123M, to 2.0 ounces per square foot.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install items in accordance with approved Shop Drawings.
- B. Install components plumb, level, and rigid.
- C. Welding: AWS D1.1/D1.1M. Grind and fill exposed welds; finish smooth and flush.
- D. Prevent contact of dissimilar metals by use of zinc rich paint, bituminous coating, or non-absorptive gaskets.

3.2 ADJUSTING

- A. Clean and touch up galvanized coatings at welded and abraded surfaces in accordance with ASTM A780, Annex A2.

END OF SECTION

SECTION 079205

LANDSCAPE JOINT SEALERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Joint sealers for other sections referencing this Section.
 - 2. Joint backup materials.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. C920 - Standard Specification for Elastomeric Joint Sealants.
 - 2. C1193 - Standard Guide for Use of Joint Sealants.
 - 3. C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 - 4. C1472 - Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Product Data: Indicate sealers, primers, bond breakers, and accessories proposed for use.
 - 2. Samples:
 - a. 1/2 x 1/2 x 3 inch long joint sealer samples showing available colors.
 - b. 6 inch long joint backup material samples.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Minimum 2 years experience in work of this Section.

1.5 PROJECT CONDITIONS

- A. Do not apply sealers at temperatures below 40 degrees F unless approved by sealer manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. BASF Building Systems. (www.buildingsystems.basf.com)
 - 2. Dow Corning Corp. (www.dowcorning.com)
 - 3. GE Silicones. (www.siliconeforbuilding.com)
 - 4. Pecora Corp. (www.pecora.com)
 - 5. Sika Corp. (www.sikausa.com)
 - 6. Tremco, Inc. (www.tremcosealants.com)
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Joint Sealer Type 1:
 - 1. ASTM C920, Grade P, multiple component polyurethane type, self-leveling and slope grades.
 - 2. Movement capability: Plus or minus 25 percent.
 - 3. Color: To be selected from manufacturer's full color range.
 - 4. Uses: Joints in horizontal surfaces subject to pedestrian or vehicular traffic.
- B. Joint Sealer Type 2:
 - 1. ASTM C920, Grade NS, single component silicone type, nonstaining, non sag.
 - 2. Movement capability: Plus or minus 50 percent.
 - 3. Color: To be selected from manufacturer's full color range.
 - 4. Uses: Joints in vertical surfaces.

2.3 ACCESSORIES

- A. Primers, Bondbreakers, and Solvents: As recommended by sealer manufacturer.
- B. Joint Backing:
 - 1. ASTM C1330, closed cell polyethylene foam, preformed round joint filler, non absorbing, non staining, resilient, compatible with sealer and primer, recommended by sealer manufacturer for each sealer type.
 - 2. Size: Minimum 1.25 times joint width.

2.4 MIXES

- A. Mix sealers in accordance with manufacturer's instructions.
 - 1. Mix with mechanical mixer; prevent air entrainment and overheating.
 - 2. Continue mixing until color is uniform.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove loose and foreign matter that could impair adhesion. If surface has been subject to chemical contamination, contact sealer manufacturer for recommendation.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Protect adjacent surfaces with masking tape or protective coverings.
- D. Calculate joint dimensions in accordance with ASTM C1472.

3.2 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Install sealers and accessories in accordance with ASTM C1193.
- C. Install joint backing to maintain required sealer dimensions. Compress backing approximately 25 percent without puncturing skin. Do not twist or stretch.
- D. Use bondbreaker tape where joint backing is not installed.
- E. Fill joints full without air pockets, embedded materials, ridges, and sags.
- F. Tool sealer to smooth profile.

G. Apply sealer within manufacturer's recommended temperature range.

3.3 CLEANING

A. Remove masking tape and protective coverings after sealer has cured.

B. Clean adjacent surfaces.

END OF SECTION

SECTION 129300

SITE FURNISHINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Light poles.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Indicate locations, dimensions, attachment, and relationship to adjacent construction.
 - 2. Product Data: Manufacturer's descriptive data.
 - 3. Samples: 3 x 3 inch samples showing each finish.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

- A. Site Furnishings: Refer to Material Legend.

2.2 ACCESSORIES

- A. Anchors: Type recommended by furnishing manufacturer for specific application; stainless or corrosion resistant coated steel with vandal resist heads.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install furnishings in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Set plumb, level, and rigid.

END OF SECTION

SECTION 16520
EXTERIOR LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Furnish all labor, material, equipment, related services and supervision necessary or incidental to the installation of the exterior lighting fixtures, lamps, ballasts, pole standards and accessories as shown or indicated on the Drawings and/or specified.

1.2 RELATED DOCUMENTS:

- A. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 16 Electrical General Provisions and all other sections of Division 16.
- C. All other Divisions of the Contract Documents. Refer to each Division's specifications and drawings for all requirements.

1.3 DEFINITIONS:

- A. Fixture: A complete lighting device. Fixtures include a lamp or lamps and parts required to distribute light, position and protect lamps, and connect lamps to power supply.
- B. Lighting Unit: A fixture or an assembly of fixtures with a common support, including a pole or bracket plus mounting and support accessories.
- C. Luminaire: A fixture.

1.4 SUBMITTALS:

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data describing fixtures, lamps, ballasts, poles, and accessories. Arrange Product Data for fixtures in order of fixture designation. Include data on features, poles, accessories, finishes, and the following.
 - 1. Outline drawings indicating dimensions and principal features of fixtures and poles.
 - 2. Electrical Ratings and Photometric Data: Certified results of independent laboratory test for fixtures and lamps.
- C. Anchor-Bolt Templates: Keyed to specific poles and certified by manufacturer.
- D. Maintenance data for products to include in the operation and maintenance manual specified in Division 1.

1.5 QUALITY ASSURANCE:

- A. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL.
- B. Comply with ANSI C2.
- C. Listing and Labeling: Provide fixtures and accessories specified in this Section that are U.L. listed and labeled for their indicated use and use installation conditions on Project.

1.6 STORAGE AND HANDLING OF POLES:

- A. General: Store poles on decay-resistant treated skids at least 12 inches above grade and vegetation. Support pole to prevent distortion and arrange to provide free air circulation.
- B. Metal Poles: Retain factory-applied pole wrappings until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Product: Subject to compliance with requirements, provide one of the products specified in the Lighting Fixture Schedule on the drawings.
- B. Lamps:
 - 1. Osram/Sylvania
 - 2. General Electric
 - 3. Phillips

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL:

- A. High-Intensity-Discharge (HID) Fixtures: Conform to UL 1572.
- B. Incandescent Fixtures: Conform to UL 1571.
- C. Lamps: Comply with ANSO C78 series that is applicable to each type of lamp. Provide fixtures with indicated lamps of designated type, characteristics, and wattage.

2.3 FIXTURE SUPPORT COMPONENTS:

- A. Wind-load strength of total support assembly, including pole, arms, appurtenances, base, and anchorage, is adequate to carry itself plus fixtures indicated at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of 100 mi./h with a gust factor of 1.3.
- B. Arm, Bracket, and Tenon Mount Materials: Match poles' finish.
- C. Mountings, Fastenings, and Appurtenances: Corrosion-resistant items compatible with support components. Use materials that will not cause galvanic action at contact points.
- D. Pole Bases: Anchor type with galvanized steel anchor bolts, leveling nuts, and bolt covers.

2.4 FINISHES:

- A. Metal Parts: Manufacturer's standard finish, except as otherwise indicated, applied over corrosion-resistant primer, free of streaks, run holidays, stains, blisters, and similar defects.
- B. Other Parts: Manufacturer's standard finish, except as otherwise indicated.

PART 3 – EXECUTION

3.1 INSTALLATION:

- A. Set units plumb, square, level, and secure according to manufacturer's written instructions and approved Shop Drawings.

- C. Final payment will not be made until following closeout submittals have been received from Contractor:
1. Evidence of compliance with requirements of governing authorities.
 2. Project Record Documents.
 3. Operation and Maintenance Data.
 4. Warranties.
 5. Extra stock and maintenance materials.
 6. Evidence of payment and release of liens.
 7. Certificate of insurance for products and completed operations.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents:
1. Maintain at site one working copy of Contract Documents, including:
 - a. Drawings.
 - b. Project Manual.
 - c. Addenda.
 2. Legibly mark during construction to record actual construction:
 - a. Drawings:
 - 1) Location of underground and internal utilities and appurtenances, referenced to visible and accessible features.
 - 2) Field changes of dimension and detail.
 - 3) Changes made by Change Order or other modification.
 - 4) Details not on Contract Documents.
 - b. Project Manual and Addenda:
 - 1) Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2) Changes made by Change Order or other modification.
 - 3) Other matters not originally specified.
 3. Identify each volume with typed or printed title PROJECT RECORD DOCUMENTS, project title and name of Contractor.
 4. Submit electronically in Adobe PDF format.
- B. Operation and Maintenance Data:
1. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
 2. List, with each product, name, address, and telephone number of subcontractor, installer, or maintenance contractor, as appropriate.
 3. Include local source of supply for parts and replacement.
 4. Identify each volume with typed or printed title OPERATION AND MAINTENANCE DATA, project title and name of Contractor.
 5. Prior to final inspection, instruct Owner's operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Submit electronically in Adobe PDF format.
- C. Warranties:
1. Assemble warranties executed by respective manufacturers, suppliers, and subcontractors.
 2. Review each warranty for compliance with requirements of Contract Documents.
 3. Provide complete information for each item:
 - a. Project, Owner, and Contractor.
 - b. Product or work item.
 - c. Name of manufacturer or firm issuing warranty, with address and telephone number.
 - d. Scope, date of beginning, and duration of warranty.
 - e. Proper procedure in case of failure.
 4. Identify each packet with printed title WARRANTIES.
 5. Submit electronically in Adobe PDF format.
- D. Submit documents along with final Application for Payment.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 31 22 16

FINE GRADING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section includes:
 - 1. Furnish all labor, material, equipment, related services and supervision necessary for or incidental to fine grading all disturbed areas within the limits of work as shown or indicated on the Drawings and/or as specified.
- B. Related Documents
 - 1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
 - 2. All other Divisions of the Contract Documents. Refer to each Division's specifications and drawings for all requirements, including but not limited to the following:
 - a. Topsoil – Section 32 91 19.16
 - b. Plants – Section 32 93 10

PART 2 - PRODUCTS

2.1 LIMITS OF WORK:

- A. The areas to be fine graded are all those disturbed areas within the limits of work as defined on the construction documents.

2.2 SEQUENCE OF WORK:

- A. Fine grading will not be attempted until all construction involving heavy equipment and vehicles is complete.
- B. After fine grading is accomplished, it shall be the Contractor's responsibility to protect all fine graded areas from vehicular traffic or other disruptive activities. Damages to the fine graded surfaces will be restored to a satisfactory condition as prescribed herein until the job is completed and accepted by the Architect.

2.3 FINE GRADING OPERATIONS:

- A. The following measures will be executed in the accomplishment of fine grading areas to be planted in turfgrass. The Contractor may elect to use additional or supplemental measures to accomplish fine grading.
 - 1. Fine grading will be executed with any or all of the following or other appropriate machinery: lightweight road grader, tractor box blade, discing machinery, weighted spike harrow, and weighted drags. Bull Dozer blades or front end loader buckets are not acceptable devices for fine grading operations.
 - 2. It is anticipated that some areas of earth embankment and high traffic areas may become overcompacted and resistant to proper grading. Such areas will be loosened and pulverized with discing machinery and will then be recompact to normal density before fine grading. The use of a watering truck to moisten dried and hardened areas may be necessary.

2.4 ACCEPTABILITY:

- A. The Architect will determine if fine graded areas are acceptable. Areas deemed unacceptable will be corrected and re-graded until they are acceptable.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Examine areas and conditions under which fine grading is to be performed and notify Owner/Architect of conditions detrimental to the proper and timely completion of the work.

3.2 PREPARATION:

- A. Provide adequate protective measures of shoring, bracing, piling, planking and cribbing to protect existing adjacent construction.
 - 1. Protect all reference points, benchmarks and monuments from dislocation or damage.
 - 2. Replace or repair immediately any points damaged, destroyed, or dislocated.
 - 3. Sprinkle and dampen all dusty material from the beginning of work to its completion.
 - 4. Protect and maintain all conduits, drains, inlets, sewers, pipes and wires that are to remain.
 - 5. Provide, erect and maintain all lights, barricades, warning signs and guards as necessary.
- B. The Contractor shall layout all work required and is responsible for all elevations, dimensions and verification of actual conditions. Refer discrepancies to the Architect for interpretation or required modifications.
- C. Remove grass, weeds, trees, shrubbery, roots and other vegetation from the areas to be fine graded. Tree roots of protected trees shall not be disturbed. Contractor shall remove vegetation and organic matter by hand labor in tree root zone areas
- D. Coordinate work with Architect in tree root zone areas.

3.3 PUMPING AND DRAINAGE:

- A. Keep fine graded areas free from water, ice and snow at all times. Prevent water from interfering with progress or quality of the work.

3.4 RECONDITIONING FINISHED GRADE:

- A. Where approved grades are compacted or disturbed by Contractor's subsequent operations or adverse weather, the finished grades shall be scarified and re-graded as specified herein prior to further construction thereon.

3.5 GRADING:

- A. Establish grades by means of grade stakes placed as required. Hold down subgrade to allow depths required for topsoil placement.
- B. Fine grade to the elevations required by the drawings.
- C. Imported topsoil, if required, will be furnished by the Contractor and installed in landscape planting and lawn turf areas as indicated on the landscape plan. Native topsoil will be placed in the areas from which they were salvaged from as per the drawings.
- D. Finish grade to the elevations required by the drawings and for proper drainage. At intermediate points, for which finish grades are not indicated, the finish grade shall be of uniform level of slope between points for which elevations are given. Round any abrupt changes in elevation.
- E. Laser grade athletic fields to be precision graded using laser leveling equipment to achieve a tolerance of 1/10 of an inch.

3.6 ADJUSTMENTS AND CLEANING:

- A. Settlement or washing that occurs in fine graded areas prior to acceptance of work shall be repaired and grades re-established to the required elevations and slopes.
- B. Clean up all debris caused by the work of this section, keep the site clean and neat at all times.

END OF SECTION

SECTION 321313

LANDSCAPE CONCRETE PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Landscape concrete paving.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 033053 - Landscape Cast-in-Place Concrete.
 - 3. Section 079205 - Landscape Joint Sealers.

1.2 REFERENCES

- A. ASTM International (ASTM) D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 2 years experience in work of this Section.
- B. Mockups:
 - 1. Provide mockups of concrete paving, minimum 10 x 10 feet.
 - 2. Show:
 - a. Paving color.
 - b. Each Finish.
 - c. Control and expansion joints.
 - 3. Locate where directed.
 - 4. Approved mockups may remain as part of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: As specified in Section 033053 except:
 - 1. Formwork:
 - a. Metal forms: Free of deformities, furnished in maximum practical lengths.
 - b. Wood forms: Good grade lumber, sound and free of warp, minimum 2 inch nominal thickness except where extremely short radii of curves require thinner forms.
 - 2. Dowels: Plain round bar dowels, conforming to reinforcing steel requirements.

2.2 ACCESSORIES

- A. Joint Filler: Non asphaltic type, ASTM D1752, with removable strip providing recess for joint sealer.
- B. Joint Sealer: Specified in Section 079205.

2.3 MIXES

- A. Mix concrete In accordance with Section 033053.

PART 3 EXECUTION

3.1 CONSTRUCTION OF FORMS

- A. Construct formwork in accordance with Section 033053.
- B. Set forms accurately to required grades and alignment.
- C. Brace forms to withstand loads applied during concrete placement.
- D. Install flexible or curved forms of wood or metal for curves with radius of 300 feet or less.
- E. Align straight and curved sections at true tangent points without broken curves.
- F. Form curves uniform and smooth, to radius indicated.
- G. Leave forms in place for minimum 12 hours after completion of finishing operation.
- H. Provide expansion joints where paving abuts other construction, and at maximum 30 feet on center unless otherwise indicated on Drawings.
 - 1. Shape joint filler to concrete cross section and fasten in place.
 - 2. Provide holes for dowel bars maximum 1/8 inch larger than bar diameter.
 - 3. Provide 24 inch long No. 4 reinforcing bars or smooth steel dowels spaced maximum 24 inches on center, centered on expansion joint. Wrap one end of bars or dowels with two layers PVC tape.

3.2 PLACING REINFORCING

- A. Install reinforcement in accordance with Section 033053.
- B. Place reinforcing in middle third of flatwork.
- C. Stop alternate bars of reinforcing steel at control joints.
- D. Provide dowels at maximum 12 inches on center at expansion joints. Wrap one end of dowel in building paper or felt. Stop reinforcement on both sides of joint.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with Section 033053.
- B. Place concrete continuously between predetermined expansion and control joints. Do not interrupt successive placement such that cold joints occur.
- C. Shape curbs and gutters to cross section indicated on Drawings.
- D. Strike off flatwork with screed, then float to uniform surface.
- E. Tool expansion joint edges and other exposed edges to smooth, dense surface with 1/8 inch radius.
- F. Seal expansion joints as specified in Section 079205.
- G. Provide control joints at maximum 10 feet on center unless otherwise indicated on Drawings. Saw joints within 24 hours after concrete placement, to width of single blade x 1/4 of slab depth.
- H. Installation Tolerances: Surfaces true to plane, in longitudinal direction to required grade, within plus or minus 1/4 inch in 10 feet, noncumulative.

3.4 FINISHING

A. Sandblasted Finish:

1. Steel trowel surfaces to uniform surface.
2. After concrete has cured sufficiently to prevent damage, sandblast to uniform medium texture.
3. Match approved mockup.

END OF SECTION

SECTION 321440

STONE PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Stone pavers on mortar setting bed.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 040511 - Landscape Masonry Mortaring.
 - 3. Section 079205 - Landscape Joint Sealers.

1.2 REFERENCES

- A. The Masonry Society (TMS):
 - 1. 402 - Building Code for Masonry Structures.
 - 2. 602 - Specification for Masonry Structures.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Samples: 12 x 12 inch stone samples showing colors and surface textures.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 2 years experience in work of this Section.
- B. Obtain each stone from a single quarry and from the same area within the quarry.
- C. Perform Work in accordance with TMS 402 and 602.
- D. Mockups:
 - 1. Size: Minimum 4 x 8 feet.
 - 2. Show: Paver sizes, colors and surface textures, maximum color range, and paver pattern.
 - 3. Locate where directed.
 - 4. Approved mockups may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store stone off ground; prevent contact with materials that could cause staining or damage.

1.6 PROJECT CONDITIONS

- A. Do not install mortar when surrounding air or substrate surface temperature is below 40 degrees F or above 90 degrees F during or 48 hours after completion of the work, or when wind velocity exceeds 15 MPH or relative humidity exceeds 70 percent.
- B. At end of working day and during rainy weather, cover work exposed to weather with waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Stone Pavers: Refer to Material Legend.

- B. Mortar: Specified in Section 040511.

2.2 ACCESSORIES

- A. Joint Sealers and Accessories: Specified in Section 079205.
- B. Cleaner: Type recommended by stone supplier.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Set paver units in full mortar bed minimum 1-1/2 inches thick, to support pavers over full bearing surface.
- B. Place pavers in pattern indicated from straight reference line. Maintain 3/8 inch joints between pavers and abutting vertical surfaces and protrusions.
- C. Rake out joints to 3/8 inch depth.
- D. Fill joints with pointing mortar. Pack and work into voids. Tool joints to flush profile.
- E. Fill expansion joints with joint sealer as specified in Section 079205.
- F. Allowable Tolerances: Surfaces true to level or indicated slopes with plus or minus 1/4 inch in 10 feet tolerance.

3.2 CLEANING

- A. Protect adjacent and underlying surfaces and plant materials.
- B. Apply cleaner in accordance with manufacturer's instructions.
- C. Thoroughly rinse surfaces with clean water after completion of cleaning; remove all traces of cleaning solution.

END OF SECTION

SECTION 321500

AGGREGATE SURFACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Decomposed granite
 - 2. Gravel surfacing.
 - 3. Filter fabric.
 - 4. Herbicide.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

- A. ASTM International (ASTM) D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Samples:
 - a. 1 pint of each proposed aggregate illustrating color, size, and gradation.
 - b. 12 x 12 inch filter fabric samples.

1.4 QUALITY ASSURANCE

- A. Furnish each aggregate from single source throughout Work.
- B. Mockups:
 - 1. Provide mockups showing each aggregate surfacing size and color range, surface texture, and overall workmanship.
 - 2. Size: Minimum 4 x 4 feet.
 - 3. Locate where directed.
 - 4. Approved mockups may remain as part of the Work.

1.5 PROJECT CONDITIONS

- A. Do not place aggregate on soft, muddy, or frozen surfaces.
- B. Do not install aggregate during precipitation or at temperatures below 40 degrees F.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate: Refer to Material Legend.

2.2 ACCESSORIES

- A. Filter Fabric: Geosynthetic fabric manufactured specifically for use under paving.
- B. Herbicide: Pre-emergent, non-selective type.

PART 3 EXECUTION

3.1 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying and reshaping.
- B. Compact subgrade to minimum 85 percent of ASTM D698 standard Proctor maximum dry density at or near optimum moisture content.
- C. Apply herbicide in accordance with manufacturer's instructions. Allow vegetation to die before proceeding.

3.2 INSTALLATION

- A. Place filter fabric over subgrade; install in accordance with manufacturer's instructions.
- B. Spread aggregate over subgrade to minimum compacted thickness indicated. Where overall thickness exceeds 4 inches, place aggregate in two lifts of equal thickness.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Water aggregate to full depth without flooding and runoff.
- E. When aggregate is capable of supporting compaction equipment without damage, roller compact to minimum 95 percent relative density.
- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- G. Where aggregate surfacing abuts other paving types, align top surface of aggregate to within 1/4 inch of adjacent surfaces after compaction.
- H. Final surface to be firm, stable, free of cracks, and slip-resistant.
- I. After compaction, apply herbicide in accordance with manufacturer's instructions.
- J. Tolerances:
 - 1. Maximum variation from flat surface: 1/2 inch in 10 feet.
 - 2. Maximum variation from thickness: 1/2 inch.
 - 3. Maximum variation from elevation: 1/2 inch.

END OF SECTION

SECTION 321813

SYNTHETIC GRASS SURFACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Synthetic grass surfacing.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Indicate surfacing locations, seaming plan, method of joining seams, and direction of surfacing in each area.
 - 2. Samples: 12 x 24 inch surfacing samples.
 - 3. Warranty: Sample warranty form.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 2 years experience in work of this Section.

1.4 WARRANTIES

- A. Furnish manufacturer's standard warranty providing coverage against:
 - 1. Defective materials and workmanship.
 - 2. Excessive wear.
 - 3. Damage due to exposure to ultraviolet light.

1.5 MAINTENANCE

- A. Extra Materials: 10 square feet of extra surfacing.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Synthetic Grass Surfacing: Refer to Material Legend.

2.2 ACCESSORIES

- A. Seaming Materials: As recommended by surfacing manufacturer.
- B. Spikes: Landscape spikes, 6 inches long, hot-dip galvanized steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subbase construction, compaction, and profile are acceptable to surfacing manufacturer.

3.2 INSTALLATION

- A. Install surfacing in accordance with manufacturer's instructions.

- B. Lay out surfacing so that seams will be minimized and as inconspicuous as possible.
- C. Lay surfacing tight and flat on substrate, with uniform appearance. Provide monolithic color, pattern, and texture match within any area.
- D. Form seams flat, tight, and straight, free from ridges, gaps, and fraying.
- E. Fit surfacing tight to abutting surfaces and penetrations without gaps.
- F. Mechanically attach surfacing at perimeter and around penetrations.

END OF SECTION

SECTION 321819

PLAYGROUND PROTECTIVE SURFACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Poured-in-place playground surfacing.
 - 2. Bonded rubber playground surfacing.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements..

1.2 REFERENCES

- A. ASTM International (ASTM) F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.
- B. International Playground Equipment Manufacturers Association (IPEMA) - Certification Program.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Product Data: Indicate composition, sizes, and material characteristics.
 - 2. Samples:
 - a. 12 x 12 inch poured-in-place surfacing samples showing available colors.
 - b. 12 x 12 inch bonded mulch samples showing available colors.

1.4 PROJECT CONDITIONS

- A. Do not place surfacing on soft, muddy, or frozen surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Poured-in-Place Playground Surfacing:
 - 1. Description: Colored EPDM rubber granules over black recycled SBR rubber shreds cushion layer mixed with liquid binder.
 - 2. Comply with ASTM F1292.
 - 3. Certified by IPEMA.
 - 4. Comply with applicable accessibility code.
 - 5. Color: To be selected from manufacturer's full color range.
- B. Bonded Rubber Playground Surfacing:
 - 1. Description: Organically pigmented recycled SBR rubber mulch.
 - 2. Color: To be selected from manufacturer's full color range.

PART 3 EXECUTION

3.1 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying and reshaping.

- B. Compact subgrade to minimum 95 percent of ASTM D698 standard Proctor maximum dry density at or near optimum moisture content.
 - 1. Uniformly grade areas to smooth surface at required grades and elevations. Make grade changes gradually. Blend slopes into level grades.
 - 2. Tolerances: Within plus or minus 1 inch of required elevation.

3.2 INSTALLATION

- A. Install playground surfacing in accordance with manufacturer's instructions.
- B. Final overall compacted depth: As indicated on Drawings.
- C. Tolerances: Within plus or minus 1/2 inch of required elevation.

END OF SECTION

SECTION 32 91 19.16

TOPSOIL

PART 1- GENERAL

1.1 SUMMARY:

- A. Section Includes
 - 1. This section specifies all soil material designated as "Topsoil" on the drawings or in the specifications.
- B. Related Documents
 - 1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Divisions 1 Specification Sections, apply to this Section.
 - 2. All other Divisions of the Contract Documents. Refer to each Division's Specifications and drawings for all requirements, including but not limited to the following:
 - a. Fine Grading – Section 31 22 16
 - b. Planting – 32 93 10

1.2 SUBMITTALS:

- A. Samples
 - 1. Provide 1-quart samples for each soil unit making up the topsoil source.
 - 2. Each sample to be a composite of five to seven (5-7) sub-samples taken the full depth of proposed source. On stockpiles, discard upper 6 inches of soil before sampling.
 - 3. Place samples in plastic bags, seal, and place in second paper bag, and label.
- B. Test Reports
 - 1. Prior to starting work, submit 2 certified copies of soil test reports to the Architect for approval.
 - 2. Costs of all tests to be borne by the Contractor.

1.3 QUALITY ASSURANCE:

- B. All soil samples and testing shall comply with procedures specified in:
 - 1. U.S.D.A. Ag. Handbook 60: Diagnosis and Improvement of Saline and Alkali Soils.
- C. Testing Laboratories
 - 1. Certified facilities normally engaged in agronomic soil testing shall be utilized.
 - 2. Approval by the Owner's representative.
- D. Required Topsoil Tests
 - 1. Chemical analysis indicating:
 - a. Fertility: pH, nitrate nitrogen, ammonia nitrogen, phosphate phosphorous, potassium, calcium, magnesium, zinc, iron, and manganese.
 - b. Suitability: total salinity, boron, sodium, potassium, calcium, magnesium, chloride, and sulfate.
 - 2. Physical properties include:
 - a. Organic content
 - b. Particle size distribution

PART 2 - PRODUCTS

2.1 TOPSOIL:

- A. Topsoil for the work shall conform to the requirements included in this Section
 - 1. A natural, friable, loamy soil, typical of local topsoil which produces heavy vegetative growth, free from subsoil, weeds, sods, stiff clay, stones larger than ½ inch, toxic substances, debris, or other substances which may be harmful to plant growth.
 - 2. The pH range shall be 6.5 to 7.5.
- B. Grading Analysis: Two inch sieve, 100 percent passing. Number 4 sieve, 90 percent minimum passing. Number 10 sieve, 80 percent minimum passing.
- C. Sand, silt and clay content:

1. Sand: 20 to 75 percent.
 2. Silt: 10 to 60 percent.
 3. Clay: 5 to 30 percent.
- D. All topsoil shall be free from all herbicides and insecticides which may adversely affect growth of lawn or planting, or which may contain toxic materials.
- E. Do not deliver in muddy condition.
- F. The Contractor shall not use materials which do not conform to these criteria. At the discretion of the Landscape Architect, such material can either be amended to meet these requirements, or will be removed from the site and replaced with suitable material as specified.

PART 3 – EXECUTION

3.1 Not Used

END OF SECTION

SECTION 32 93 10

PLANTING

PART 1 – GENERAL

1.1 SUMMARY:

- A. Section Includes:
 - 1. Furnish all labor, material, equipment, related services and supervision necessary for or incidental to the installation of the trees, plants and groundcovers as shown or indicated on the Drawings and/or as specified.
 - 2. Work Included:
 - i. Trees
 - ii. Shrubs
 - iii. Groundcovers
 - iv. Steel Edging
 - v. Mulching
 - vi. Bed Preparation
- B. Related documents
 - 1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
 - 2. All other Divisions of the Contract Documents. Refer to each Division's specifications and drawings for all requirements, including but not limited to the following:
 - i. Fine Grading - Section 31 22 16
 - ii. Turf and Grasses - Section 32 92 10
 - iii. Planting Irrigation - Section 32 94 00
 - iv. Planting Maintenance - Section 32 95 10

1.2 REFERENCE STANDARDS:

- A. American Standard for Nursery Stock, Edition approved April 14, 2014 by American National Standards Institute, Inc. – plant material.

1.3 SUBMITTALS:

- A. Delivery Receipts and Invoices: Submit original delivery receipts and invoices for materials used.
- B. Product Data: Submit manufacturer's product data sheets for proprietary products in accordance with Section 01 33 00.
- C. Samples:
 - 1. Submit three samples each of small trees and shrubs for the Architect's approval. When approved, tag and maintain as representative samples for finally installed plant materials. Samples may be used to complete installation provided they remain tagged until final acceptance of entire installation.
 - 2. Submit photos of trees and source nursery information to the Architect for review prior to tree tagging. Architect will tag trees at source nursery prior to project delivery.
 - 3. Submit for approval sufficient representative quantities of sandy loam, composted organic material, steel edging, mulch, peat moss and crushed rock. Samples shall be approved by the Architect before use on project.
- D. Soil Fertility Test Reports:
 - 1. Submit analysis, test results and corrective recommendations to Architect.
 - 2. Two tests required of existing soil taken at different locations on the project site as directed by the Architect.
 - 3. One test required of the specified composted organic material mixed in equal parts with the existing topsoil.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver packaged materials in containers showing weight, analysis and name of manufacturer.
- B. Protect materials from deterioration during delivery and while stored at the site.

1.5 PROJECT CONDITIONS:

- A. Site Inspection:
 - 1. It is the bidding contractor's responsibility to review all site conditions, as they relate to the proposed project, prior to submission of a bid.. Any issues or concerns will be submitted to the Architect prior to bidding. Submission of a bid will indicate that the bidding contractor has made a site inspection.
- B. Utilities:
 - 1. Determine locations of underground utilities and perform work in a manner which will avoid possible damage. Do not permit heavy equipment such as trucks to damage utilities. Hand excavate, as required to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is directed.
 - 2. Coordinate with irrigation work to prevent damage to temporary risers of underground sprinkling system and obstruction of work located in landscape areas.
- C. Protections:
 - 1. Do not move equipment over existing or newly placed structures without the Architect's approval.
 - 2. Provide board roading as required to protect paving and soft soil.
 - 3. Protect other improvements from damage, with protection boards, ramps and protective sheeting as required.
 - 4. Locate and stake irrigation heads, valve risers and equipment prior to beginning soil preparation work.
 - 5. During work and maintenance period, maintain topsoil and prepared soil in place at established grades. Replace topsoil, prepared soil and mulch due to erosion.
- D. Delivery and Storage:
 - 1. Store materials in area covered with protective sheeting.
 - 2. If balled plants cannot be planted within 24 hours after delivery to site, protect root balls by heeling in with sawdust or other approved material.

1.6 SUBSTANTIAL COMPLETION & PROJECT CLOSEOUT:

- A. A Certificate of Substantial Completion will be issued when the Work performed under the Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion thereof is also the date of commencement of applicable guarantees as specified.
- B. A list of items to be completed or corrected will be attached to the Certificate of Substantial Completion. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.
- C. The Contractor will complete or correct the Work on the list of items within a specific number of days as shown on the Certificate of Substantial Completion.
- D. Upon completion and re-inspection of all corrected items listed, the Architect will recommend to the Owner that the work of this Section is ready for final acceptance.

1.7 QUALITY ASSURANCE:

- A. General: Comply with applicable Federal, state, county and local regulations governing landscape materials and work.
- B. Installer Qualifications: The bidding company will specialize in landscape installation with 5 years documented experience. The contractor will staff the project with a competent superintendent and the necessary assistants as approved by the Architect. The superintendent will not be changed

except with the consent of the Architect and Owner. The superintendent must have a minimum 5 years experience with similar projects.

- C. Personnel: Employ only experience personnel who are familiar with the required work. Provide adequate supervision by a qualified foreman.

1.8 GUARANTEE:

- A. Guarantee plants and trees for one year after date of Final Acceptance which is described in paragraph 1.7.D. Replace dead materials and materials not in vigorous, thriving condition as soon as weather permits and on notification by the Architect. Replace plants, including trees, which have partially died thereby damaging shape, size or symmetry.
- B. Replace plants and trees with same kind and sizes as originally planted, at no cost to the Owner. At direction of the Architect, trees may be replaced at start of next year's planting or digging season. In such cases, remove dead trees immediately. Protect irrigation system and other piping, conduit or other work during replacement. Repair damage immediately.

1.9 PROGRESS MEETINGS:

- A. Contractor shall attend all progress meetings as requested by the Architect/Owner during installation.

1.10 QUANTITY VERIFICATION:

- A. The bidding contractor is responsible for the inclusion of all materials, labor, and equipment as outlined in the plans and specification. The plant list is provided to the bidding contractor as a convenience and the quantities are approximate.
VERIFICATION OF ALL QUANTITIES IS THE SOLE RESPONSIBILITY OF THE BIDDING CONTRACTOR. Any discrepancies must be reported to the Landscape Architect prior to submittal of bid.
- B. The Contractor is required to install the specified type and quantity of composted organic material purchased from the specified supplier. Soil Building Systems will e-mail the Architect, as orders are being placed, for verification that the specified material, quantity and supplier are being used.

PART 2 – PRODUCTS

2.1 PLANTS:

- A. General: Plants shall be well-formed No. 1 grade or better nursery stock in accordance with requirements of reference standards, subject to the Architect's approval. Listed plant heights are from tops of plant balls to the nominal tops of plants.
- B. Shrubs and Groundcovers: Nursery grown, healthy, vigorous, bushy, well branched, of normal habit of growth for species, free from disease, insects, eggs and larvae. Specified sizes shall be before pruning, and plants shall be measured with their branches in normal position. The Architect prior to installation will approve all plants.
- C. Ornamental and Shade Trees: Healthy, vigorous, full branches, well shaped, trunk diameter and height requirements as specified. Balls shall be firm, neat, slightly tapered and well burlaped. Trees with loose or broken balls at time of planting shall be rejected. Each tree will be approved by the Architect prior to installation. Balls shall be 10 inches in diameter for each 1 inch of caliper. All balled and burlaped trees and shrubs will be dug and stored for a minimum of 60 days prior to planting on this project. All trees shall have excess soil removed from the top of the root ball so the root flare is exposed.
- D. Caliper: Trees 4 inches and less are measured 6 inches above top of root ball. Trees over 4 inches are measured 12 inches above top of root ball.
- E. Trees connected to stakes at the nursery are not acceptable and will be rejected.

2.2 SOIL PREPARATION MATERIALS:

- A. Sandy Loam: Fertile, dark sandy loam free of rubble, stones, lumps, plant roots and reasonably free of weeds. Loam containing nut grass or Dallisgrass shall be rejected.

- B. Commercial Fertilizer: Complete fertilizer, uniform in composition, dry and free flowing. Deliver to site in original unopened containers, each bearing manufacturer's guaranteed statement of analysis. Lesco 14-14-14 landscape and ornamental fertilizer with micronutrients.
- C. Composted Organic Material: Soil Building Systems 'Ph Balanced' Compost with a pH of 5.5 to 6.5 and shall be free of treated or used lumber, pine bark or mushroom compost waste. 97% Of the material shall pass through a .5 inch screen and 100% shall pass through a .75 inch screen.

2.3 MISCELLANEOUS MATERIALS:

- A. Crushed Rock: Washed .75 inch to 1.5 inches in diameter.
- B. Tree Staking: Arbor Stakes LLC (www.arborstakes.com) (214) 810-6678
- C. Mulch: Partially decomposed dark brown fine shredded hardwood bark mulch.
- D. Filter Fabric: Mirafi 140N by Celanese Fibers Marketing Co. or equal.
- E. Fertilizer Tablets: BioPlex Planting Tablets, 15 gram, 12-8-8. BioPlex @ 1-800-441-3573
- F. Steel Edging: 1/8 inch x 4 inch, 10 gauge, 16" tapered steel stakes, 30" O.C. with a painted finish to be black powder coat paint electro statically applied and oven baked. The J.D. Russell Company @ (800) 580-6872 or approved equal.
- G. 4 inch PVC pipe and cap CUA 55 200.
- H. Water: Provided by Owner.
- I. Technical Concentrate and Plant Enhancer: BioPlex @ 1-800-441-3573
- J. Pre-Emergent Herbicide: Barracade or Pre-M.

PART 3 – EXECUTION

3.1 EXAMINATION AND PREPARATION:

- A. Examine sub-grade and other related construction for defects that adversely affect Work.
- B. Do not proceed until unsatisfactory conditions have been corrected.
- C. Plant trees and shrubs during normal seasons for such work in the project location and only when weather conditions are suitable.
- D. Plant trees and shrubs after final grades are established and prior to planting of lawns.
- E. Additional soil amendments may be required per soil test results.

3.2 BED PREPARATION:

- A. When grassy or broadleaf weeds are present, spray with Roundup, a non-selective systemic herbicide, for 100% control. When Nut Sedge is present, spray with Manage, a selective post emergent herbicide, for 100% control. Application of post emergent herbicides is to be performed by a licensed applicator.
- B. Layout and stake beds for Architect's approval prior to installation of steel edging and planting.
- C. Excavate existing soil from beds as needed to allow for installation of the specified compost and mulch. Excavated materials will be removed from the site as required by the Architect and Owner.
- D. Provide 4 inches of composted material in shrub and groundcover beds.
- E. Till to a depth of 8 inches.
- F. Add commercial fertilizer at 7 pounds per 1,000 square feet of bed area and apply prior to application of mulch.
 - 1. The fertilizer type and rate specified herein is applicable unless countermanded by the soil fertility test corrective recommendations, in which case they will be applicable.
- G. Grade beds to allow for free flow of surface water to the bed edge and away from buildings. Beds will be mounded 2 inches to 3 inches and tapered at the edges to meet existing grade.

3.3 SHRUB AND GROUND COVER SPACING:

- A. Place plants in position on bed areas before containers have been removed. Obtain approval from Architect. Do not remove burlap from shrubs.
- B. Plant where located, setting plants with tops of balls even with tops of beds, and compact soil carefully around each plant ball.
- C. Remove binding materials (such as twine, nylon cord, and wire) from plant trunk.
- D. Water each plant thoroughly with hoses to eliminate air pockets.
- E. Carefully prune plants to remove dead or broken branches and hand-rake bed areas to smooth, uneven surfaces.
- F. Architect reserves the right to interchange or shift locations of plants prior to planting.
- G. Apply pre-emergent herbicide, at the recommended rate, three weeks after plant installation has been completed and prior to mulch installation.

3.4 PLANTING:

- A. Ornamental Trees and Large Shrubs:
 - 1. Plant trees and shrubs in pits 3 times greater in diameter than root ball. Top 1/3 of backfill will be 20% compost mixed with 80% native soil. Bottom 2/3 of backfill will be 100% native soil. Carefully settle by watering to prevent air pockets.
 - 2. Add fertilizer tablets at the rate of four (4) per 1 inch caliper for trees and four (4) per 24 inches of height for large shrubs. Follow label directions for placement of tablets.
 - 3. Carefully prune trees to remove dead and broken branches.
 - 4. Place root ball in the center of the hole. Do not handle tree by the trunk to place in hole. Scarify and roughen sides of hole where glazed by mechanical excavation.
 - 5. Make sure the root flare is 2 inches higher than the adjacent soil elevation. The top of the terminal roots at the outer edge of the root ball should be even with or slightly higher than the adjacent soil elevation. Set root ball on undisturbed soil.
- B. Shade Trees:
 - 1. Plant trees in pits 3 times greater in diameter than root ball. Top 1/3 of backfill will be 20% compost mixed with 80% native soil. Bottom 2/3 of backfill will be 100% native soil. Carefully settle by watering to prevent air pockets.
 - 2. Add four (4) fertilizer tablets per caliper inch. Follow label directions for placement of tablets.
 - 3. Carefully prune trees to remove dead and broken branches.
 - 4. Place root ball in the center of the hole. Do not handle tree by the trunk to place in hole. Scarify and roughen sides hole where glazed by mechanical excavation.
 - 5. Make sure the root flare is 2 inches higher than the adjacent soil elevation. The top of the terminal roots at the outer edge of the root ball should be even with or slightly higher than the adjacent soil elevation. Set root ball on undisturbed soil.
- C. Shrubs Outside of Beds:
 - 1. Plant shrubs in pits as sized below. Backfill mix will be 50% existing soil and 50% compost. Excess excavated material will be removed from the site as required by the Landscape Architect and Owner. Set root ball on undisturbed soil.

<u>Container Size</u>	<u>Pit Size</u>
1 Gallon	10" Diameter x 8" Depth
2 Gallon	14" Diameter x 10" Depth
3 Gallon	16" Diameter x 12" Depth
5 Gallon	20" Diameter x 14" Depth
7 Gallon	24" Diameter x 16" Depth

- 2. Add fertilizer tablets at the rate of four (4) tablets per 24 inches of plant height. Place tablets. Follow label directions for placement of tablets..
- 3. Carefully prune plants to remove dead and broken branches.

3.5 SUMMER DIGGING & TRANSPLANTING:

- A. To minimize transplant shock, plant decline, defoliation or loss to all balled and burlaped plants.
 - 1. Apply Technical Concentrate and Plant Enhancer to plants 24 to 96 hours prior to digging or transplanting.

2. Apply with both a foliar and root drench at identical dilutions of 1.0 fl. oz. (low stress conditions) to 3.0 fl. oz. (high stress conditions) per inch of trunk diameter or each 24 inches of plant height. Mix into 5 to 10 gallons of water for each 1 inch of trunk diameter and 24 inches of plant height.
3. Re-apply in 15 to 30 days or sooner if extreme environmental stress requires. Re-apply at either a rate of 1 to 3 fl. oz. per inch of trunk diameter or 5 to 7 fl. oz. per 5 to 10 gallons of water.

3.6 TREE SUMPS:

- A. Perform percolation test for each tree pit and install sump detail only when satisfactory drainage does not occur within 24 hours.
- B. Excavate sump pit to a minimum depth of 4 feet 6 inches below bottom of root ball and a minimum of 12 inch diameter.
- C. Install 4 inch diameter PVC pipe and cap. The portion of pipe in crushed rock is to be perforated.
- D. Place crushed rock per tree planting detail.
- E. Place filter fabric over top of crushed rock and 12 inches up side of tree pit.
- F. Paint PVC cap, color to be selected. Drill 5/8 inch diameter hole in top of cap.

3.7 GUYING TREES:

- A. Guy trees immediately after planting as shown on planting details.
- B. All conifer and juniper variety of trees will be guyed per the tree planting detail.
- C. All container grown and containerized trees will be guyed per the tree planting detail.
- D. All balled and burlaped trees are not required to be guyed but maybe guyed with the Architects approval.
- E. It will be the Landscape Contractor's responsibility to maintain trees in a plumb position through the warranty period whether they are guyed or not.
- F. The landscape contractor will remove and dispose of tree guying materials at the end of the one year guarantee period.

3.8 MULCHING:

- A. After planting has been completed and approved by Architect, cover all bare soil around plants. The depth shall vary depending on the plants being mulched. Large plants will receive a 2 inch depth and plants in 4 inch pots and smaller will receive a 1 inch depth. At no time will mulch come in contact with the stems of plants. Delay mulching in shrub beds until after application of pre-emergent herbicide and near substantial completion of the project.

3.9 STEEL EDGING:

- A. Install steel edging. Anchor with steel stakes, 16 inches in length minimum, spaced not more than 30 inches on center and driven at least 1 inch below top of edging. The top of edging will be 1 inch above the adjacent turf elevation

3.10 CLEANUP:

- A. During work, keep premises neat and orderly including organization of storage areas. Trash, including debris resulting from removing weeds or rocks from planting areas, preparing beds, or planting plants, shall be removed from site daily as work progresses.
- B. Keep sidewalks, streets and courtyard areas clean by sweeping or hosing.

3.11 MAINTENANCE:

- A. Water will be provided by the Owner. Provide necessary hoses and other watering equipment required to complete work.
- B. Until Final Acceptance, maintain plantings and trees by watering, cultivating, weeding, spraying, cleaning and replacing as necessary to keep the landscape in a vigorous, healthy condition and rake bed areas as required.

C. Follow landscape maintenance procedures outlined in Specification Section 32 95 10 – Planting Maintenance.

3.12 PLANT SCHEDULE:

A. Refer to schedule on drawings.

END OF SECTION

SECTION 32 94 40

ARBORSTAKES™

PART 1- GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Information, materials, and methods for the installation of belowground staking apparatuses, and products as manufactured by **arbor stakes, llc**. All specifications are subject to change. Contact manufacturer for details.
- B. Related Sections:
 - 1. Division 01 – Administrative, procedural, and temporary work requirements
 - 2. Section 32 90 00 – Planting
 - 3. Section 32 91 00 – Planting Preparation
 - 4. Section 32 93 00 – Trees, Shrubs and Ground Cover

1.2 REFERENCES

- A. International Society of Arboriculture (ISA)
- B. ISO 7827; 17556
- C. ANSI Z60.1-2014 American Nursery & Landscape Association (ANLA)

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Contractor shall submit Product Data Sheet. Field / shop-fabricated and / or homemade apparatuses are not permitted and shall be rejected.
 - 2. Product Data Sheet: Manufacturer's descriptive data, installation, and performance characteristics.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Contract Documents (drawings, details, specifications) are based on products by:
ARBOR STAKES, LLC. (www.arborstakes.com)
- B. Substitutions: Not Permitted per TX State Chapter 252.022(a)(7) 'Sole Source Exemption'

2.2 MATERIALS

- A. Biodegradability
 - 1. 99.9% of apparatus components shall have the ability of being decomposed by biological / microbial / fungal inoculant soilborne activity.
- B. Biodegradable Stake
 - 1. Quantity as specified (per tree basis)
 - 2. Wooden dowel rods meeting >6% moisture content. ASTM D4442
 - 3. Length 40" (inches)
 - 4. Diameter 22.2mm (millimeters)
- C. Biodegradable Lock
 - 1. (1) per Biodegradable Stake (above)
 - 2. TOTAL HEIGHT NOT TO EXCEED 1" FROM TOP OF ROOT BALL

PART 3 – EXECUTION

3.1 PREPARATION

- A. Planting
 - 1. Install landscape root ball mass into planting pit per ISA Recommended Planting Details <http://bit.ly/UrbanTreePlanting> OR as previously specified in SECTION 32 9300, OR as per drawings / details.
 - 2. Backfill with placement of specified topsoil mixture and compact to firmly hold root ball against surrounding soil.
- B. Verify / Adjust
 - 1. Verify placement, direction and verticality.
 - 2. Adjust as necessary.
 - 3. Re-compact surrounding soil.
- C. Prepare Root Mass
 - 1. Remove loose and extra soil, mulch etc. from top-of root ball mass to a point where density is equal to point of delivery.
 - 2. Ensure root mass crown is free from burlap, wire mesh, nylon straps and any other foreign material.

4.1 INSTALLATION

- A. Stakes
 - 1. Install specified quantity of stakes (minimum 3**) vertically through root ball mass.
 - 2. Spacing, or Angular distance between stakes shall not exceed 120° degrees and shall be equally proportionate to the quantity of stakes specified.
 - 3. Lateral distance shall not be less-than 6" from the trunk, root flare, or outer edge of root mass.
 - 4. Insertion shall extend completely through the root mass with a minimum of 6" of penetration depth into underlying parent material**.
 - 5. Do not drive stake completely flush with root mass. Maintain stake position to a minimum amount of 1.5"-2" for lock installation (below).
 - 6. Remove excessive splintered and/or mushroomed material from top of stake.
 - 7. Install locks (below).
 - 8. Remove excess stake material after lock installation (below).

****note: soil conditions vary, and upon approval of landscape architect, quantity of stakes may be adjusted when minimum penetration depth cannot be achieved.**
- B. Locks
 - 1. Place (1) lock on each stake.
 - a. Lock shall be oriented perpendicular to the trunk, root flare, and outer edge of root mass.
 - b. Ensure placement does not restrict performance of irrigation emitters and/or components.
 - c. Ensure neck / collar placement as to minimize gaps and/or distorted relationship between components.
- C. Mulch / Watering Saucer
 - 1. Construct Watering Saucer per ISA Recommended Planting Details <http://bit.ly/UrbanTreePlanting> OR as previously specified in SECTION 32 9300, OR as per drawings / details.
 - a. Ensure root flare remains uncovered & fully exposed
 - 2. Cover** remaining bare soil, staking system, and Watering Saucer with a minimum of 2" layer of approved mulch.

****note: it is the intent that the entire staking system be covered and buried, as to promote microbial degradation and rapid decay of components.**

END OF SECTION

SECTION 32 95 10

PLANTING MAINTENANCE

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Landscape Maintenance Contractor shall furnish all labor, equipment, chemicals and fertilizer necessary to maintain newly planted landscaping leaving plants in a vigorous, healthy state through the end of the stated maintenance period. Maintenance shall consist of watering, weeding, fertilizing, disease and insect pest control, pruning, aerating, protective spraying and any other procedures consistent with good horticultural practice necessary to insure normal, vigorous and healthy growth of all landscape materials under this contract. Trash and debris will be removed from the project during each regular site visit. Maintenance shall begin following final acceptance of the landscape installation.
- B. The Landscape Maintenance Contractor shall be responsible for the use of all his/her materials, labor and equipment. Injury to plant material caused by such maintenance, labor and equipment shall be corrected and repaired by the Landscape Maintenance Contractor at his/her expense. This includes both reseeding areas damaged by tractor treads when mowing is conducted at an inappropriate time, as determined by the Owner or his/her agent, and replacement of any plants, hardscape, or other amenities on the site when damaged by the Contractor's equipment, materials or agent(s).

1.02 RELATED DOCUMENTS:

- A. Planting – Section 32 93 10
- B. Planting Irrigation - Section 32 94 00

1.03 INSURANCE:

- A. Contractor shall provide to the Owner, at his own expense, evidence of adequate Workman's Compensation, General Liability and Property Damage Liability, subject to approval of the Owner.

1.04 CLEAN UP:

- A. All debris, tools, surplus materials, equipment, etc. shall be removed after each regular visit from the maintenance crew. The site shall be left in a neat, acceptable condition such as to meet the approval of the Owner.

1.05 LICENSE REQUIREMENTS:

- A. Pesticide: The Contractor shall be a licensed pesticide applicator or employ a licensed certified pesticide applicator for the treatment of insects and diseases as required by the Texas Pesticide Laws and Regulations of the Texas Department of Agriculture. The Owner may require documentation of such certification as necessary for his records.
- B. Herbicide: The Contractor shall possess a permit or employ a person who possesses a permit to apply herbicide as required by the Texas Herbicide Law of the Texas Department of Agriculture. The Owner may require documentation of such certification as necessary for his records.
- C. Irrigation: The Contractor shall possess an irrigator's license issued by the State of Texas and the Texas Board of Irrigators or employ such a licensed irrigator to perform the irrigation system maintenance. The irrigation system shall be maintained under the supervision of the licensed irrigator who shall be on the site at all times during this work. The Owner may require documentation of such license for his records. The Contractor shall verify and adhere to the requirements and codes of any controlling utility authorities.

PART 2 - PRODUCTS

2.01 COMMERCIAL FERTILIZER:

- A. Complete fertilizer, uniform with composition, dry and free flowing, delivered to site in original unopened containers, each bearing manufacturer's guaranteed statement of analysis.
 - 1. Shrubs & groundcover at 10-20-10 analysis
 - 2. Turf at 15-5-10 analysis
 - 3. Turf at 21-0-0 analysis
 - 4. Trees at 32-7-7 analysis (Injecto-Feed)
 - 5. Trees at 0-4-4 analysis (Agri-Plex)

2.02 SOIL FERTILITY TEST:

- A. The Contractor will be required to furnish the Owner with two (2) soil fertility reports including corrective recommendations.
- B. The exact location of each soil sample taken will be provided by the Architect or Owner.
- C. Soil fertility testing will be conducted by a laboratory specializing in this type of testing and approved by the Architect or Owner.

2.03 MULCH:

- A. Partially decomposed dark brown, fine shredded hardwood bark mulch.

2.04 WATER:

- A. Water will be supplied by the Owner.

2.05 PLANT REPLACEMENT:

- A. It will be the responsibility of the Landscape Maintenance Contractor to replace any and all plant material that is dead or damaged due to non-performance of the contracted scope of work, un-supervised personnel or un-supervised subcontractors.

2.06 PESTICIDES AND HERBICIDES:

- A. Pesticides and herbicides shall be of the type that is commercially available.

PART 3 - EXECUTION

3.01 TREE, SHRUB AND GROUND COVER MAINTENANCE:

- A. The Scope of Work for plant maintenance includes all possible means required to preserve the plants and vegetative material existing within the site in a healthy and vigorous growing condition to insure their successful establishment. Plant maintenance shall include, as a minimum, the following items.
 - 1. Pruning: All trees and shrubs, within the limits of landscape maintenance, shall be pruned by the Contractor to the satisfaction of the Owner. Pruning shall be done in accordance with accepted pruning practices as set forth by the National Arborist Association in Pruning Standards for Shade Trees (current edition). Dead or damaged limbs on trees and shrubs, including sucker-growth on trunks of trees, are to be removed. Crape Myrtles will be pruned in late winter to remove seed heads and dead wood. Suckers will be removed as needed throughout the year. All pruned materials shall become the property of the Contractor and shall be disposed of in a manner acceptable to the Owner. Unless directed differently in the contract documents, pruning shall be accomplished once during the term of this contract.

2. Insect, Disease, and Animal Control: The Contractor shall inspect the plants and planted areas once each two (2) weeks or as approved by the Owner. The Contractor shall be required to notify the Owner in writing of problems with insects, diseases, or animals as such problems arise. The Contractor also shall recommend corrective measures in writing.
3. The Contractor shall treat the plants and/or the planted areas in accordance with accepted methods of horticultural practices and the Texas Department of Agriculture guidelines regarding the use of pesticides. The Contractor also shall follow the manufacturer's instructions for the use and application of any pesticides.
4. Bed Maintenance: The Contractor shall maintain the plant basins and beds free of weeds and grass or other material detrimental to the growth of the plants or appearance at the site. Herbicides, when used by the Contractor, will under no circumstances be used on days where the wind could cause drift hazard to desirable plants. The Contractor shall also follow the manufacturer's instructions for the use and application of any herbicide. Two pre-emergent herbicide applications will be made per year along with manual weeding and post emergent herbicide applications as required. All shrub and groundcover beds shall be fertilized two (2) times per year at a rate of 2 lbs. Per 1,000 square feet. Hardwood mulch shall be maintained to a minimum depth of two (2) inches, in all bed areas.
5. Re-staking, re-guying, and re-bracing of Plants: Any damaged or destroyed stakes, guys or braces shall be replaced by the Contractor. This shall include any adjustment to the staking or guying to prevent girdling of plants. Adjustment will be made to tighten wires and cables as required.
6. Tree Mulching and Fertilization:
 - a. Maintain a 2" layer of shredded hardwood mulch over all tree root balls in turf areas. Add new mulch as required.
 - b. Deep root fertilize all trees with a combination of Injecto-Feed 32-7-7 and Agri-Plex 0-4-4 with 2 percent magnesium, 2 percent water soluble magnesium, 3 percent sulfur, .02 percent boron, 5 percent iron, .5 percent manganese and .5 percent zinc. Mix 20 pounds of Injecto-Feed and 1 gallon of Agri-Plex in 100 gallons of water. Apply this solution at the rate of 5 gallons per inch trunk diameter measured at breast height. Space injection points at 2.5 foot intervals starting 2 feet beyond the drip line. Apply .5 gallon of solution per injection site. Soil injections should be made 6 to 8 inches deep using an injector probe at 150 to 200 PSI. Keep fertilizer solution agitated during application. Where trees are closely spaced and have overlapping treatment areas, inject only once in those areas. Do not double inject these areas. For trees growing in wells surrounded by concrete, water or other hard surfaces, drench the top of the root ball with 10 to 15 gallons of fertilizer solution.

3.02 IRRIGATION SYSTEM OPERATION AND MAINTENANCE:

- A. The scope of work for the operation and maintenance of the permanent irrigation system shall consist of the monitoring, adjustment, repair and proper operation of the existing irrigation system as required to insure adequate moisture to the plant material existing on the project. The existing condition of the system and any known deficiencies will be corrected by the Contractor upon approval by the Owner. The Contractor shall insure that all irrigation zones, rain sensors and freeze sensors are operating correctly. Include seasonal draining and winterizing of irrigation system when required.
- B. System repairs will include monitoring of the system on a year round bi-weekly basis and reporting of all damaged or trouble areas to the Owner. The Contractors personnel shall repair any damage that may have occurred during the mowing cycle and set automatic systems to correct time requirements. Any damage not the fault of the Landscape Maintenance Contractor shall be assessed and brought to the attention of the Owner with an estimate of the subsequent costs to make the repairs. In the event the irrigation system fails due to the Contractor's actions or neglect, the Contractor shall furnish plant irrigation by a method and quantity approved by the Owner.

END OF SECTION

SECTION 334300

LANDSCAPE DRAINAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Area drains.
 - 2. Drain lines.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - 2. D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - 3. D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Show layout of drainage fittings and lines, including locations, elevations, slopes, pipe sizes, and accessories.
 - 2. Product Data: Manufacturer's data for drain fittings showing physical properties and installation procedures.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Drainage Pipe:
 - 1. ASTM D2729, polyvinyl chloride (PVC) material, bell and spigot style solvent sealed ends, non-perforated.
 - 2. Fittings: PVC.
 - 3. Joints: ASTM D2855, solvent weld type with ASTM D2564 solvent cement.
- B. Drain Fittings: Refer to Material Legend.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Trench for drainage pipe.
- B. Hand trim excavations to required shape and elevations.
- C. Remove large stones and obstructions.

3.2 INSTALLATION

- A. Install drainage pipe and fittings in accordance with manufacturer's instructions, at required flow line and grade.

- B. Provide minimum 1/4 inch per foot slope. Solvent weld joints.
- C. Place drain fittings in accordance with manufacturer's instructions.
- D. Backfill and compact without damage to pipe or fittings.

3.3 FIELD QUALITY CONTROL

- A. Test drain fittings and drainage lines for free flow prior to covering.
- B. If free flow is not present, remove obstructions and repeat test.

END OF SECTION

SECTION 334600

SUBDRAINAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subdrainage system.
 - 2. Filter fabric and drainage fill.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - 2. D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - 3. D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.3 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Show layout of drainage lines, including locations, elevations, slopes, pipe sizes, and accessories.
 - 2. Product Data: Manufacturer's data for filter fabric and drainage pipe, showing physical properties and installation procedures.
 - 3. Samples: 12 x 12 inch filter fabric samples.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Drainage Pipe:
 - 1. ASTM D2729, polyvinyl chloride (PVC) material, bell and spigot style solvent sealed ends, perforated, diameter as indicated on Drawings, with filter fabric wrap.
 - 2. Fittings: PVC.
 - 3. Joints: ASTM D2855, solvent weld type with ASTM D2564 solvent cement.

2.2 ACCESSORIES

- A. Filter Fabric: Open weave polyolefin or polyester, free draining.
- B. Drainage Fill: Washed crushed stone or gravel, graded from 3/4 to 1-1/2 inches.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Trench for drainage pipe.
- B. Hand trim excavations to required shape and elevations.
- C. Remove large stones and obstructions that could perforate filter fabric.

3.2 INSTALLATION

- A. Place filter fabric in trench, extending up and over sides. Lap ends 6 inches minimum and secure.
- B. Place drainage fill to level of bottom of pipe, minimum 6 inch depth. Shape to required cross section and flow line. Hand or machine compact.
- C. Install drainage pipe and fittings in accordance with manufacturer's instructions, at required flow line and grade.
- D. Place pipe with perforations facing down. Provide minimum 1/8 inch per foot slope. Solvent weld joints.
- E. Fill around sides and over top of pipe with drainage fill, minimum 6 inches thick. Fold filter fabric over top of drainage fill from both sides; lap and secure.
- F. Backfill and compact without damage to filter fabric.

3.3 FIELD QUALITY CONTROL

- A. Test drainage lines for free flow prior to covering.
- B. If free flow is not present, remove obstructions and repeat test.

END OF SECTION