

- 1. LOCATE UTILITIES PRIOR TO COMMENCING LANDSCAPE OPERATIONS. ALL TREES SHALL BE FIELD POSITIONED AS TO AVOID CONFLICTS WITH EXISTING AND PROPOSED UTILITIES. NOTIFY LANDSCAPE ARCHITECT OF ANY CONFLICTS OR OBSTRUCTIONS.
- 2. CONTRACTOR SHALL STAKE ALL PLANTING AREAS IN THE FIELD PRIOR TO PLANTING FOR APPROVAL OF THE OWNER OR THEIR REPRESENTATIVE.
- 3. CONTRACTOR SHALL VERIFY ALL PLANT QUANTITIES PRIOR TO PLANTING. ANY DISCREPANCIES WITH THE PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT. THE PLAN QUANTITIES SHALL SUPERCEDE SCHEDULED QUANTITIES.
- 4. ALL PLANT MATERIAL SHALL BE SPECIMEN QUALITY AND SHALL COMPLY WITH RECOMMENDATIONS AND REQUIREMENTS OF ANSI Z60.1 THE 'AMERICAN STANDARD FOR NURSERY STOCK'.
- 5. ALL PLANTING BEDS & NATIVE GRASS STANDS SHALL BE EDGED AS SHOWN IN PLAN.
- PREPARE PLANTING BEDS AND INCORPORATE AMENDMENTS ACCORDING TO PLANS.
- 7. SHREDDED HARDWOOD MULCH, PER SPECIFICATIONS SHALL BE USED AS A THREE INCH (3") TOP DRESSING IN ALL PLANTING BEDS AND AROUND ALL TREES. SINGLE TREES AND SHRUBS SHALL BE MULCHED TO THE OUTSIDE EDGE OF THE SAUCER OR LANDSCAPE ISLAND.
- 8. ALL TREES SHALL BE STAKED PER DETAIL.
- 9. ALL PLANT MATERIAL SHALL BE INSTALLED TO ALLOW A ONE FOOT (1') CLEARANCE BETWEEN PLANT AND ADJACENT PAVEMENT.
- 10. THE LANDSCAPE CONTRACTOR SHALL NOT COMMENCE WORK UNTIL THE SITE IS FREE OF DEBRIS CAUSED BY ON-GOING CONSTRUCTION OPERATIONS. REMOVAL OF DEBRIS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. LANDSCAPE WORK SHALL NOT BEGIN UNTIL THE LANDSCAPE ARCHITECT AND OWNER HAVE GIVEN WRITTEN APPROVAL FOR SUCH. THERE SHALL BE NO DELAYS DUE TO LACK OF COORDINATION FOR THIS ACTIVITY.
- 11. THE LANDSCAPE ARCHITECT AND OWNER SHALL APPROVE GRADES AND CONDITION OF SITE PRIOR TO SODDING/SEEDING OPERATIONS.
- 12. ALL AREAS DISTURBED DURING CONSTRUCTION AND NOT DESIGNATED FOR OTHER PLANTINGS OR HARDSCAPE SHALL BE SODDED WITH TURF TYPE FESCUE.
- 15. ALL LANDSCAPE AREAS SHALL BE IRRIGATED. TURF AREAS SHALL BE IRRIGATED BY SPRAY OR ROTOR. PLANT BEDS SHALL BE IRRIGATED BY DRIP IRRIGATION. IRRIGATION SYSTEM SHALL INCLUDE AUTOMATIC RAIN-SENSOR DEVICE. IRRIGATION SHOP DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR FOR APPROVAL PRIOR TO CONSTRUCTION.

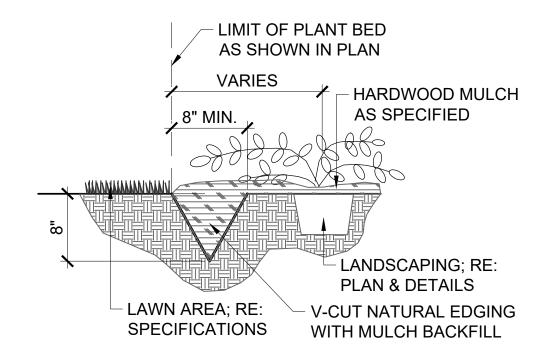
PRUNE OUT ANY DEAD OR BROKEN BRANCHES. CUT ANY GIRDLING ROOTS OFF CLOSE TO THE CROWN. PRY LONG ROOTS OUT TO DIRECT INTO NEW SOIL - PLACE SHRUB SO CROWN IS AT SOIL LEVEL - INSTALL 3" OF HARDWOOD MULCH THROUGHOUT PLANTING BED. LEAVE A 6" BARE CIRCLE AT BASE OF PLANT FILL PLANTING HOLE WITH AMENDED SOIL MIX ACCORDING TO SPECIFICATIONS. CONSTRUCT RING AROUND PLANTED SHRUB TO FORM SAUCER **SCARIFY PIT** BOTTOM (MIN. 6") CONTAINER SECTION

- 1. REFER TO SPECIFICATIONS FOR TOPSOIL BACKFILL MIX.
- CONTRACTOR TO WATER THOROUGHLY AFTER PLANTING
- 3. INSTALLATION TO BE IN ACCORDANCE WITH PLANTING **SPECIFICATIONS**

SHRUB PLANTING DETAIL - NTS

### NOTES:

- 1. CONTRACTOR SHALL LOCATE AND MARK ALL PLANTBED LOCATIONS PRIOR TO EXCAVATING FOR FINAL APPROVAL BY OWNER OR LANDSCAPE ARCHITECT.
- 2. TRANSITION TO MULCH CONTAINMENT DETAIL AT ALL LOCATIONS ADJACENT TO CURBS & SIDEWALKS. RE: DETAIL, THIS SHEET.
- 3. CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS PRIOR TO TRENCHING OR LANDSCAPE INSTALLATION.



V-CUT NATURAL EDGE DETAIL - NTS

## NOTES:

- 1. TREES THAT DO NOT MEET THE SIZE REQUIREMENT WILL BE REJECTED 2. TREES SHALL BE INSPECTED BY OWNERS REPRESENTATIVE PRIOR TO
- INSTALLATION.

3 x ROOT BALL DIA.

SECTION

PRUNE OUT ANY DEAD OR BROKEN BRANCHES AND REMOVE DEBRIS FROM SITE.

SECURE TREE TO STAKES WITH STRAPS (RE: SPECS). STRAPS SHALL BE LOOSE ENOUGH TO ALLOW SOME MOVEMENT OF THE TRUNK WITH THE WIND

SET TREE WITH TOP OF ROOT BALL FLUSH WITH GRADE. TRUNK FLARE MUST BE VISIBLE AT THE TOP OF ROOT BALL. REMOVE EXCESS SOIL TO TOP OF LATERAL ROOTS.

- MIN. 6' LONG STEEL STAKES SECURED INTO UNDISTURBED SOIL. PLACE NORTH AND SOUTH OF TREE.

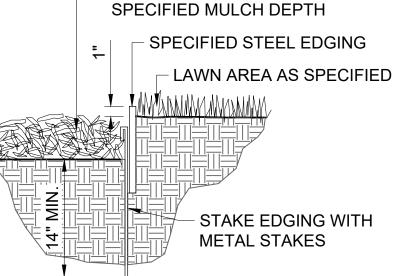
- 3" MULCH PER SPECIFICATIONS. DO NOT PLACE ON TRUNK OR TRUNK FLARE. BERM AT OUTER EDGES OF RING TO CREATE A SAUCER FORM.

 REMOVE TWINE AND CAGE FROM ROOT BALL AND TRUNK. PEEL AND REMOVE BURLAP FROM TO 1/3 OF THE ROOT BALL.

PLANTING HOLE SHALL BE AT LEAST 3 TIMES WIDER THAN THE SPREAD OF ITS ROOTS, BUT NO DEEPER. PLACE ROOT BALL ON UNDISTURBED SOIL WITH ROOT FLARE EVEN WITH OR 1" ABOVE GRADE. SCARIFY SIDES AND BOTTOM OF PIT.

AMEND SOIL ACCORDING TO SPECIFICATIONS.

DECIDUOUS TREE PLANTING DETAIL - NTS



PLANTING BED WITH

- 1. EDGING PER SPECIFICATION L03 2.07 A. SET ALL EDGING 1" ABOVE FINISH GRADE (TURF) SURFACE AS SHOWN.
- 2. EDGING SHALL ABUT ALL CONCRETE CURBS AND WALKS PERPENDICULAR AND FLUSH WITH TOP OF CONCRETE.
- 3. ALL JOINTS SHALL BE SECURELY STAKED. 4. FINISH SHALL BE POWDER COAT; COLOR: GREEN. CONTRACTOR SHALL SUBMIT COLOR SAMPLE TO OWNERS
- 5. CONTRACTOR SHALL LOCATE AND MARK ALL PLANT BED LOCATIONS PRIOR TO INSTALLATION OF STEEL FOR FINAL APPROVAL BY OWNER OR LANDSCAPE ARCHITECT.



Transformer



Clustered Boxes

UTILITY BOXES SHALL BE CLUSTERED AS MUCH AS POSSIBLE

TYPICAL UTILITY BOX SCREENING DETAILS - NTS

Free Standing

Small Box

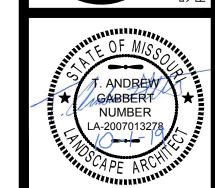
STEEL EDGING DETAIL - NTS

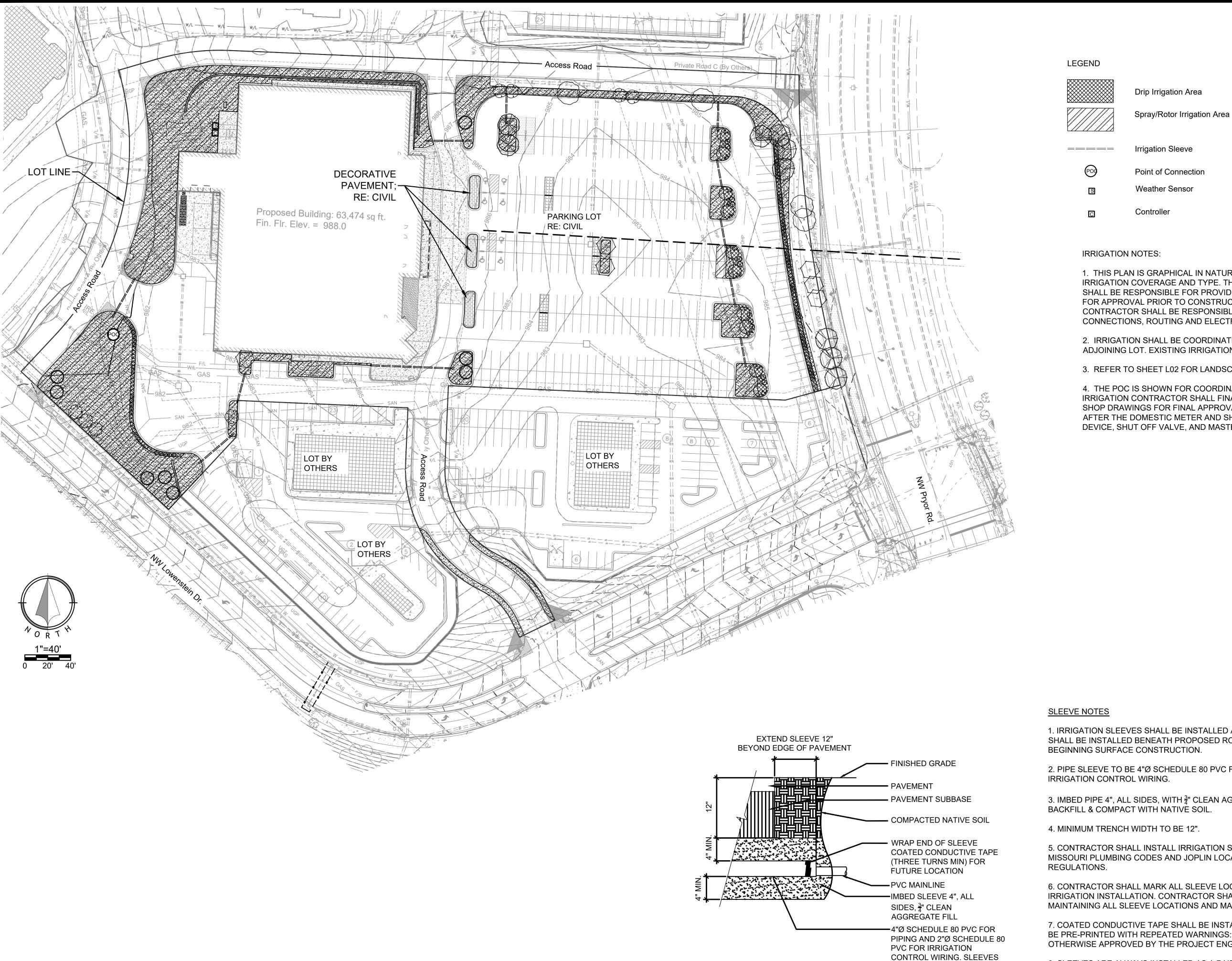
REPRESENTATIVE PRIOR TO PURCHASE.

Sheet

L02







- 1. THIS PLAN IS GRAPHICAL IN NATURE AND ONLY REPRESENTS THE IRRIGATION COVERAGE AND TYPE. THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN IRRIGATION SHOP DRAWING FOR APPROVAL PRIOR TO CONSTRUCTION. THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IRRIGATION TAPS, CONNECTIONS, ROUTING AND ELECTRICAL SUPPLY.
- 2. IRRIGATION SHALL BE COORDINATED WITH EXISTING IRRIGATION ON ADJOINING LOT. EXISTING IRRIGATION IS NOT TO BE DISTURBED.
- 3. REFER TO SHEET L02 FOR LANDSCAPE NOTES & DETAILS.
- 4. THE POC IS SHOWN FOR COORDINATION PURPOSES ONLY. IRRIGATION CONTRACTOR SHALL FINALIZE LOCATION ON IRRIGATION SHOP DRAWINGS FOR FINAL APPROVAL. THE POC SHALL BE LOCATED AFTER THE DOMESTIC METER AND SHALL CONSIST OF A BACKFLOW DEVICE, SHUT OFF VALVE, AND MASTER CONTROL VALVE.

- 1. IRRIGATION SLEEVES SHALL BE INSTALLED AS A PAIR OF SLEEVES AT EACH LOCATION AND SHALL BE INSTALLED BENEATH PROPOSED ROADWAY AND PARKING AREAS PRIOR TO
- 2. PIPE SLEEVE TO BE 4"Ø SCHEDULE 80 PVC FOR PIPING AND 2"Ø SCHEDULE 80 PVC FOR
- 3. IMBED PIPE 4", ALL SIDES, WITH  $\frac{3}{4}$ " CLEAN AGGREGATE FILL. ALLOW 48 HOURS TO SETTLE;
- 5. CONTRACTOR SHALL INSTALL IRRIGATION SLEEVES IN ACCORDANCE WITH APPLICABLE MISSOURI PLUMBING CODES AND JOPLIN LOCAL UTILITY AND WATER MANAGEMENT DISTRICT
- 6. CONTRACTOR SHALL MARK ALL SLEEVE LOCATIONS AT EACH END TO AID FUTURE IRRIGATION INSTALLATION. CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND MAINTAINING ALL SLEEVE LOCATIONS AND MARKERS DURING THE CONSTRUCTION PERIOD.
- 7. COATED CONDUCTIVE TAPE SHALL BE INSTALLED DIRECTLY ABOVE THE SLEEVE AND SHALL BE PRE-PRINTED WITH REPEATED WARNINGS: "CAUTION WATER LINE BURIED BELOW", OR AS OTHERWISE APPROVED BY THE PROJECT ENGINEER.
- 8. SLEEVES ARE ALWAYS INSTALLED AS A PAIR.

ALWAYS INSTALLED AS PAIRS

9. CONTRACTOR SHALL COORDINATE WITH EXISTING IRRIGATIONS SYSTEM AND NEW CONSTRUCTION AREAS TO ENSURE ALL LANDSCAPE AREAS ARE COVERED WITH IRRIGATION. Sheet L03





## PART 1 - GENERAI

1.01 <u>SUMMARY</u>:

- A. This Section includes the following: 1. Furnishing trees, shrubs & plants.
- 2. Preparation of planting pits and beds, including excavation, backfilling, and disposal of surplus and unsuitable
- 3. Planting of plants (trees, shrubs, groundcovers, vines & perennials), including fertilizing, mulching, trimming,
- guying, and wrapping. 4. Maintenance of plants.
- 1.02 <u>REFERENCE</u>:
- B. Applicable Standards:
- 1. American National Standards Institute (ANSI): a. Z60.1 Nursery Stock.

#### 1.03 SUBMITTALS:

A. General: Upon completion of the installation, deliver to Landscape Architect the following in accordance with the Conditions of the Contract and Division I Specification Sections.

## B. Include, but not limited to, the following:

- 1. Product Certification: Certificate of inspection as may be required by governing authorities. For standard products, submit manufacturer's certified analysis. For other materials, submit analysis by a recognized laboratory made in
- accordance with methods established by Association of Official Agricultural Chemists, wherever applicable. 2. Manufacturers Literature: Submit three (3) copies of fertilizer manufacturer's literature along with schedule of maintenance program spanning the life of the guarantee and three (3) copies of a recommended post guarantee
- 3. Label data substantiating that trees and shrubs comply with specified requirements
- 4. Materials List: Within 15 days after award of contract, and before any materials are delivered to the job site, submit to Landscape Architect a complete list of all plants including the sizes ordered and the type of equipment to be used on this project.
- 5. As-Built Drawings: During course of installation, carefully record in red line on a print of the planting drawings all changes made to the planting system layout during installations; approved by the Landscape architect.
- 6. Planting Schedule: Proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of Substantial Completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- 7. Maintenance Instructions: Typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).
- D. Product Data: Submit product data, supplier sources and small sample of the following:
- 1. Shredded Hardwood Mulch
- 2. Fertilizer Planting Tablets
- 3. Steel Edging
- 4. Filter Fabric 5. Herbicide and Pre-emergent
- 6. Imported Topsoil & Analysis 7. Decorative Gravel
- 1.04 QUALITY ASSURANCE

- A. Installers Qualifications: Engage a single firm specializing in landscape work with a minimum of 5 years experience who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment.
- 1. Installers Field Supervision: Require installers to maintain an experienced full-time Supervisor on the project site during times that landscaping is in progress.
- B. Source Quality Control. 1. General: ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
- 2. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Landscape Architect, together with proposal for use of equivalent material.
- 3. Topsoil: ASTM 5268, pH range 5.5 to 7. Free of stones 1-inch or larger in any dimension and other extraneous materials harmful to plant growth. All topsoil used in planting operations shall meet standards as defined in this
- 3.1. Before delivery of topsoil, furnish Landscape Architect with written statement giving location of properties
- from which the topsoil is to be obtained, names and addresses of owners, depth to be stripped and crops grown during the past 2 years. 4. Plant Material: Provide plant material of quantity, size, genus, species, and variety shown and scheduled for
- landscape work and complying with recommendations and requirements of (ANSI Z60.1-1986) "American Standard for Nursery Stock" for number one grade nursery stock as adopted by the American Association of Nurserymen. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, and disfigurement.
- a. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size. Measure main body of tree or shrub for height and spread; do no measure branches or roots tip-to-tip.
- b. Plants shall be true to species and variety and shall conform to measurements specified in the plant schedule. Larger plants may be used if approved by the landscape architect, however, if approved shall not increase the contract price
- 5. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
- Inspection: The Subcontractor shall notify the Landscape Architect of the location of plant materials to be used and allow the Landscape Architect the opportunity to inspect them either at the place of growth or at the site before planting, for compliance with requirements for genus, species, variety, size, and quality. The Owner retains the right to further inspect trees and shrubs for size and condition of root balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from the project site.
- C.1. Landscape Contractor shall provide a minimum of 72 hours prior notice of readiness for landscape material
- D. Preinstallation Conference: Subcontractor to conduct conference at Project Site prior to installation.

- A. In addition to normal progress observations, schedule, and conduct the following formal observations to verify compliance with the specifications, giving the Landscape Architect at least 24 hours prior notice of readiness for
- B. Plant Material: The Landscape Architect shall observe the plant material at site before planting for compliance with
- requirements for genus, species, variety, size, and quality 1. If the Subcontractor requests, the Landscape Architect may observe plant materials at place of growth or storage. 2. The Subcontractor shall notify the Landscape Architect 72 hours in advance of when plant material is to be
- delivered and shall furnish an itemized listing of the actual quantities and size of plant materials to be observed at 3. Landscape Architect retains the right to further observe plant material for size and conditions of balls and root
- systems, insects, injuries, and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected plants immediately from project site and replace at the Subcontractor's expense
- 4. Landscape Architect further retains the right for:
- a. Observation of labels and the condition of all items delivered to the site.
- b. Observation of any repairs or replacements necessary.
- c. Observe the staking for all trees and shrubs prior to planting. d. Observation of bed preparation prior to planting of trees and shrubs.
- e. Observation of plant material at end of plant warranty period.

## DELIVERY, STORAGE, AND HANDLING:

- A. Provide freshly dug trees and shrubs. Do not prune prior to delivery. Provide adequate protection of root systems and balls from drying winds and sun. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery. Do not drop balled and burlapped stock during delivery.
- B. Packaged Material: Deliver packaged materials to the site in their original container with all labels showing weight, analysis, and name of manufacturer intact and legible. Use all means necessary to protect all materials from deterioration before and during deliver, and while stored on site. Protect the installed work and materials of all other
- C. Deliver plant material after preparations for planting have been completed, and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage,
- and keep roots moist as follows: 1. Heel-in bare root stock. Soak roots in water for 2 hours if dried out.

conditions, or obstructions, notify Landscape Architect before planting

- 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust or other acceptable material. 3. Do not remove container-grown stock from containers until planting time.
- 4. Periodically water root systems of trees and shrubs stored on site using a fine mist spray. Water as often as necessary to maintain root systems in a moist condition.
- C. Replacements: In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Landscape Architect and at no additional cost to the Owner.

A. Utilities: determine location of underground utilities and perform work in a manner which will avoid possible damage.

- Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties B. Excavation: When conditions detrimental to plant growth are encountered, such as pebble fill, adverse drainage

C. Sequencing an Scheduling:

responsibility for all such plantings and operations.

1. Planting Time: Proceed with, and complete landscape work as rapidly as portions of site become available, working

conditions unless otherwise approved by the Landscape Architect. The Subcontractor assumes full and complete

- within seasonal limitations for each kind of landscape work required 2. All planting shall be performed during favorable weather conditions. The planting operations shall not be performed during times of extreme drought, when ground is frozen, or during times of other unfavorable climatic
- 3. Dig, ball and burlap deciduous plants only when dormant (before March 15 and after October 15). Such plants may be planted at any time during the same year, subject to the other requirements of the specification.
- 4. Recommended dates for tree and shrub planting shall be March 15 May 31 and September 15 October 31st or as approved by the Landscape Architect.
- D. Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to the Landscape Architect. If planting of trees and shrubs occur after lawn Work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- E. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion. F. Coordination: All planting work shall be coordinated with all other work included in this contract and with work being

#### 1.08 PROJECT WARRANTY:

- A. General Warranty: Warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Subcontractor under requirements of the Contract Documents.
- B. Special Warranty: Warrant the following living planting materials for a period of one (1) year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond the Subcontractor's control.
- 1. Trees 2. Shrubs/Grasses/Vines
- 3. Perennials
- C. Immediately prior to plant warranty observation, the Subcontractor will be responsible for the removal of all staking
- D. Replacement Plants: The Subontractor shall replace once, without cost to Owner, and as soon as weather conditions permit, and within a specified planting period, all dead plants and all plants not in a vigorous, thriving condition as determined by the Landscape Architect during and at the end of the warranty period. The plants shall be free of dead or dying branches and branch tips, and shall bear foliage of a normal density, size, and color.
- E. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in the Specifications.
- F. The Subcontractor shall make all necessary repairs to other site and project features due to plant replacements. Such repairs shall be done at no cost to the Owner.
- G. Materials and Operations: All replacements shall be plants of the same kind and size specified in the plant schedule. They shall be furnished and planted as specified. The cost shall be borne by the Subcontractor. After Substantial Completion replacements resulting from the removal, loss, or damage due to occupancy of the project site by others, vandalism, or acts or neglect on the part of others, or physical damage by animals, may be approved and paid for by the

### PART 2 - PRODUCTS

#### 2.01 <u>GENERAL</u>:

- A. Provide nursery-grown trees and shrubs, grown in a recognized nursery in accordance with good horticultural practice, with healthy root systems developed by transplanting or root pruning. Provide only healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the Project and free of disease, insects, eggs, larva, and defects such as knots, sun scald, injuries, abrasions, or disfigurement.
- B. Provide trees and shrubs of the sizes indicated in planting list and in accordance with dimensional requirements of ANSI Z60.1 for kind and size of trees and shrubs required. Trees and shrubs of larger size than indicated may be used if acceptable to Landscape Architect.
- C. Label each tree and shrub with a securely attached waterproof tag bearing legible designation of botanical and common
- D. Nomenclature: Scientific and common names used for plants are generally in conformity with "Standardized Plant
- Names." The names of varieties are generally in conformity with the names accepted in nursery trade.
- E. Plant material size and measurements shall conform to the "American Standard for Nursery Stock", ANSI Z60.1-1986.
- F. Digging, wrapping, and shipping: 1. Plants shall be dug up and prepared for shipment in a manner that will not cause damage to the branches, shape and future development of the plants after replanting. All plant material being transferred more than two miles shall be covered.

#### 2.02 <u>TREES</u>:

- A. Trees shall not be pruned before delivery. Trees, which have a damaged or crooked leader or multiple leaders, unless otherwise specified, will be rejected. Trees with abrasion of bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 1 inch in diameter which have not completely calloused will be rejected.
- 1. Plants shall be measured when branches are in a normal position. If a range of size is given, no plants shall be less than the minimum size and not less than 50% of the plants shall be as large as the upper half of the range specified. pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between
- 2. Plants shall be true to species and variety and shall conform to measurements specified in the Plant Schedule except that plants larger than specified may be used if approved by the Landscape Architect. Use of such plants shall not increase the contract price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant according to ANSI Z60.1-1986.
- B. Balled and Burlapped Plants: 1. All plants designated "B&B" in the Plant Schedule shall be adequately balled with firm natural balls of earth of a diameter and depth no less than that specified in ANSI 60.1-1986. Balls shall be firmly wrapped with burlap. All plants which are 2" in caliper or over shall be drum laced. No balled plants shall be planted if the ball is cracked or broken either before or during the process of planting.
- 2. Container grown plants will be acceptable in lieu of balled and burlapped deciduous plants subject to specified limitations of ANSI Z60.1 for container stock.
- C. Protection against drying: 1. Root balls shall be adequately protected at all times from sun and from drying winds. All balled and burlapped plants which cannot be planted immediately upon delivery shall be set on the ground and well protected with soil or
- other acceptable material. Plants shall not remain unplanted for longer than 3 days after delivery. D. Where shade trees are required, provide single stem trees with straight trunk and intact leader, free of branches to a point about 50% of their height for the size and kind of trees required.
- E. Where small trees of upright or spreading type are required, provide trees with single stem, branched or pruned naturally according to species and type:
- 1. Where indicated as "multi-stem," provide trees with three canes starting from the ground. F. Except as otherwise specified or indicated, provide bare root trees. Where indicated as "B&B," provide balled and
- 1. Container-grown trees will be acceptable in lieu of balled and burlapped deciduous trees, subject to the specified limitations for container stock.

## 2.03 SHRUBS & GRASSES:

- A. Provide shrubs of height and size indicated or specified.
- B. Provide with not less than the minimum number of canes required by ANSI Z60.1 for the type and height of shrub
- C. Except as otherwise specified or indicated, provide container grown shrubs.

2.04 CONTAINER PLANTS

height and spread will be rejected.

- A. Provide plants in containers as sized or specified. B. Plants shall show a vigorous root system, visible when container is removed.
- C. Root system shall not show excess signs of overgrowth.
- D. Plants shall appear healthy, with no broken limbs. Leaves shall appear full with no apparent sun or wind scald.

## 2.05 <u>TOPSOIL</u>:

- A. Soil Mix: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1/2 inch or larger in any dimension, subsoil, clay lumps, roots, brush, weeds, weed seed, and other extraneous or toxic materials harmful to plant growth. Contents of the soil should contain no more than 15% Silt and 15% clay. Soil should also contain no less than 40% sand. Mix shall contain maximum soluble salts of 500 PPM.
- B. Soil Source: Reuse surface soil stockpiled on the site where available. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

- A. Spaghnum Peat Moss: Peat moss shall be Canadian Sphagnum Peat Moss, which is a light brown, fluffy material. Do not use hypnum, Michigan, or reed sedge peats.
- B. Commercial Fertilizer: Fertilizer shall be of the grade, type and form specified below and shall comply with the rules of
- the local governing authority and the following requirements: 1. The grade of fertilizer will be identified according to the percentage of nitrogen (N), percent available phosphoric acid (P2O5) and percent water soluble potassium (K2O), in that order and approval will be based on that
- 2. Fertilizer shall be of a type that can be uniformly distributed either by hand or application equipment. 3. Fertilizer shall be furnished in dry form.
- 4. Fertilizer may be either homogenized or natural organic with at least 25 percent of the total nitrogen in a
- 5. Deliver fertilizer in original, unopened and undamaged containers showing weight, analysis and name of manufacturer. Store in manner to prevent wetting and deterioration.
- D. Fertilizer applications shall be provided as follows:

- 1. For trees and shrubs: Fertilizer shall be Agriform 20-10-5 Planting Tablets or approved equal, and shall be incorporated according to the manufacturer's directions and at the following rates:
  - a. Trees: Use 1 21-gram tablet for each 1/2-inch of trunk diameter for each foot of height or spread. Insert 21-gram tablets around the dripline
  - b. Shrubs: Use 1 to 2 tablets for each 1 foot of height or spread of shrubs and large perennial grasses.

#### 2.07 MISCELLANEOUS MATERIALS:

a. "Cinch Ties"

- A. Steel Edging: Commercial steel edging fabricated in sections with loops pressed from or welded to face to receive stakes. Edging to be Col-Met Steel Landscape Edging (or approved equal), Collier Metal Specialties, Inc., Atlanta, GA., 1-800-829-8225; 1/8" thick x 4" wide x 10' lengths, hot rolled low carbon steel (ASTM-A-36, ASTM-A-283, ASTM-A-569), treated with rust preventative and factory finished, (submit sample). Provide minimum 12" integral anchor stakes.
- B. Shredded hardwood mulch: Double ground aged brown hardwood mulch.
- C. Tree Wrap: Material used in wrapping tree trunks shall be waterproof crepe paper or burlap strips as made and sold for
- this purpose and shall not be less than 4" or more than 8" wide having qualities to resist insect infestation. Twine for tying shall be a lightly tarred medium or coarse sisal yarn or approved equal. D. Pre-Emergent Herbicide. Provide pre-emergent herbicide Pre M 60 DG (granular). The Landscape Architect will
- consider an "equivalent" of the brand name specified. Provide the Landscape Architect with a complete description, literature, test reports, etc. on the proposed "equivalent". The burden of proof regarding the "equivalent" is upon the Subcontractor. The Landscape Architect will accept the pre-emergent herbicide based on brand name and visual inspection for condition.
- E. Tree Stakes and Guys: 1. All trees shall be staked with a minimum of 2 metal "T" posts. Stakes shall be approximately 2" wide and 6-6.5 feet long. Stakes are to be driven a minimum of 2 feet into undisturbed stable earth.
- 2. Tree Ties: An acceptable tree tie is one that is easily adjustable, strong in all weather, and is easily attached and removed. Hose and wire are not acceptable for staked trees. Provide the following or approved equal:
- b. "Adj.-A-Tye". Heavy weight only, a plastic chain twist tie, OR "Plastic Binder Tye", tie with tapered beads that
- c. Other tree tying materials may be accepted upon submitting a sample, product information, and plant tying methods to the Landscape Architect for approval.
- F. Water: Upon request of the Subcontractor, the Owner may approve the use of water from existing hydrants or working irrigation system for this work. The Owner may pay for the cost of the water. The Subcontractor shall provide all needed hose, sprinkler heads and other appurtenances. If the Subcontractor provides his own water, it shall not contain material injurious to plant growth.
- G. Anti-Erosion Mulch: Provide clean, dry straw of winter wheat, rye, oats, or barley. H. Anti-Desiccant: Emulsion type, film-forming agent designed to permit transpiration, but retard excessive loss of

and applied per manufacturer's recommendation. Myke Mycorrhizae or approved equal.

- moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's I. Biostimulant: The Subcontractor shall utilize an organic, biological fungi for soil prep. The material shall be granular
- J. All other materials, not specifically described but required for a complete and proper installation or construction, shall be as selected by the Subcontractor subject to the approval of the Landscape Architect.

## PART 3 - EXECUTION

# 3.01 SURFACE CONDITIONS

- 1. Prior to all landscape installation, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- 2. Weeds that have emerged or persisted shall be removed or eradicated. 3. Verify that planting may be completed in accordance with the original design and the referenced standards.
- B. Discrepancies:
- 1. In the event of discrepancy, immediately notify the Landscape Architect. 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

### 3.02 PREPARATION FOR PLANTING OF TREES, SHRUBS AND PLANT BEDS:

- A. Planting Soil Preparation:
- 1. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

4. Grade planting areas to a smooth, uniform surface place with loose, uniformly fine texture. Roll, rake and remove

- 2. Loosen subgrade of planting areas to a minimum of 8 inches. 3. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within two (2) days.
- ridges/depressions to meet finish grades. 5. Schedule of Plantings Soil Mixture Requirements
- a. For planting beds, provide not less than the following quantities of specified materials: (1) Loose peat humus by volume: 1part
- (2) Well-rotted composted manure by volume: 1 part
- (4) Fertilizer: Incorporate 3 lbs/100sf
- b. For backfill for trees provide specified materials in not less than the following quantities: (1) Loose peat humus by volume: 1 part
- (2) Well-rotted cow manure by volume: 1 part

(3) Topsoil (as defined in this specification): 2 parts

- (3) Topsoil (as defined in this specification): 3 parts
- (4) Place Agriform tablet (or approved equal) in bottom of tree pit. B. Unless directed by the Landscape Architect, the indication of a plant on the Planting Plan is to be interpreted as

including the prepping the landscape bed, digging of a hole, furnishing of a plant of the specified size, the work of

- C. Planting Coordination:
- planting, wrapping and other activities where called for.
- 1. Consult the Plant Schedule for type and size of plants.
- 2. The Subcontractor shall be responsible for selection and tagging at nurseries stocking the specified materials. 3. Subcontractor shall inform the Landscape Architect three (3) days in advance of when planting will commence, and of anticipated delivery date of material and will furnish an itemized listing of actual quantities of plant materials to be delivered. Failure to notify the Landscape Architect in advance, in order to arrange proper scheduling, may result
- in loss of time or removal of any plant or plants not installed as specified or directed. D. Plant Location Staking: 1. The Subcontractor shall stake on the ground the beginning and ending points of all straight rows of plant materials.
- Rows will be parallel to adjacent walks, walls, or curbs. 2. The Subcontractor will stake locations of each plant in all random arrangements of plant materials (with the exception of groundcovers, and annual and perennial flowers) or may set the plants in their intended location,
- according to the arrangements shown on the plans. 3. The Landscape Architect will observe all plant locations. The Subcontractor shall not begin excavating plant pits until plant locations have been approved.

#### 4. In case underground obstruction or utilities are encountered, locations shall be changed under the direction of the Landscape Architect without extra charge to the Owner.

3.03 EXCAVATION FOR TREES AND SHRUBS A. Holes for trees and shrubs shall be per the detail. Thoroughly spade slice the walls and the floor of all planting pits.

B. Testing Plant Materials Holes: If stone, underground construction work, tree roots, poor drainage or obstructions are

- encountered in the excavation of plant pits, alternate locations may be selected by the Landscape Architect. Where locations cannot be changed as determined by the Landscape Architect, submit cost required to remove the obstructions to a depth of not less than 6 inches below the required pit depth. C. Excavate pits, beds, and trenches with vertical sides and with bottom of excavation slightly raised at center to provide
- proper drainage. Loosen hard subsoil in bottom of excavation:
- 1. For bare-root trees and shrubs, make excavations as detailed.
- 2. For balled and burlapped trees and shrubs, make excavations as detailed. 3. For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width
- 4. Obstructions: If rock, underground construction, or other obstructions are encountered in excavation for planting of trees or shrubs, notify Landscape Architect. New locations may be selected by Landscape Architect, or Change Order may be issued to direct removal of obstructions to depth of not less than 6 inches below required planting

## 3.04 TREE, SHRUB & VINE PLANTING:

planting soil within a few days.

- A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.
- D. Setting and Backfilling: 1. Set balled and burlapped stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides and tops of balls, but do not remove from under balls. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill to eliminate voids and air pockets. When excavation is approximately two-thirds full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after

B. Mix soil amendments and fertilizers with topsoil. Delay mixing of fertilizer if planting will not follow placing of

placing final layer of backfill. 2. Set container grown stock as specified for balled and burlapped stock, except cut cans on two sides. Carefully remove containers so as not to damage root balls.

C. For pit- or trench-type backfill, mix planting soil prior to backfilling and stockpile at site.

3. Train vines to climbing surface.

- 4. Move or set large specimen trees with crane or other recognized tree moving equipment.
- a. Around the perimeter of the plant pit, build a watering saucer 4 inches above the crown of the plant and shape and slope the surface away from the top of the saucer, approximately 18 inches wide down to existing grade.
- b. Treat entire plant pit or bed with Treflan in accordance with manufacturer's recommendations. 6. Mulching: Apply the specified mulch to a depth as shown on plans, evenly spread over the entire area of each soil
- basin or plant bed area. 7. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, and twigs for
- foliage. If deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting. 8. Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice. Prune shrubs to retain
- natural character and accomplish their use in the landscape design. Required shrub sizes indicated or specified are
- 9. Remove and replace excessively pruned or misformed stock resulting from improper pruning. 10. Paint cuts over 13 mm (1/2 inch) in size with standard tree paint or compound, covering all exposed, living tissue. Use paint which is waterproof, antiseptic, adhesive, elastic, and free of kerosene, coal tar, creosote, and other
- substances harmful to plants. Do not use shellac.
- 11. Guy and stake trees immediately after planting and as indicated. 12. Wrap tree trunks of 50-mm (2-inch) caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning, and insect infestation. Take corrective

### 3.05 PERENNIALS/ANNUAL PLANTING:

- A. Prepare soil as stated in section 3.02
- B. Set out and space plants in triangular spacing as shown in plan
- C. Dig holes large enough to allow for spreading of roots D. Work soil around roots to eliminate air pockets

measures required before wrapping.

E. Water thoroughly after planting F. Apply shredded hardwood mulch over the entire area of each plant bed location using caution to not cover, bend, break or smother newly installed plants.

## 3.06 INSTALLATION OF MISCELLANEOUS MATERIALS:

- A. Shredded Hardwood Mulch:
- 1. Apply shredded hardwood mulch over the entire area of each soil basin, on all exposed soil surfaces within the
- perimeter of groupings or rows of trees or shrubs.
- 2. The Subcontractor shall determine his own quantities based on the area, the work and site investigations. 3. Provide a minimum depth per plans for all trees and shrubs.
- B. Edging: Install specified edging at the locations indicated on the plans. 1. Trenched Edge shall be dug to 8" Depth and 8" Width.
- 2. Backfill Trenched Edge with shredded hardwood mulch to grade. 3. Steel Edging per manufacture's recommendations.

### 3.07 MAINTENANCE:

- A. Begin maintenance immediately after planting. Maintenance shall continue until time of Substantial Completion, but in
- no case for less than a period of 90 days after Substantial Completion B. Maintain trees and shrubs by pruning, watering, cultivating, mulching, and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free from disease and insects. Plants shall be inspected at least once per week by the Subcontractor and needed maintenance
- C. Remove and replace trees and shrubs found to be dying, dead, or in unhealthy condition during the warranty period. Make replacements during the growth season following end of warranty period. Replace trees and shrubs which are in
- A. During landscape work, keep pavements clean and work area in an orderly condition. Properly dispose of all resultant dirt, debris, and other waste material. B. Protect landscape work and materials from damage due to landscape operations, operations by other subcontractors and

trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace

damaged landscape work as directed by the Landscape Architect at no additional cost, unless damage is the result of

C. Disposal of Surplus and Waste Materials: Remove surplus soil and waste material, including excess subsoil, unsuitable

3.08 CLEAN-UP AND PROTECTION

doubtful condition at end of warranty period.

soil, trash, and debris, and legally dispose of it off the Owner's property. 3.09 OBSERVATION AND ACCEPTANCE

portion of work offered for observation is complete, including maintenance.

- A. When landscape work is completed, including maintenance, Landscape Architect will, upon request, make an observation to determine acceptability. 1. Landscape work may be observed for acceptance in portions as agreeable to Landscape Architect, provided each
- B. When observed landscape work does not comply with requirements, replace rejected work and continue specified maintenance until approved by Landscape Architect and found to be acceptable. Remove rejected plants and materials C. Trees, shrubs, groundcover, and all other specified plants are to be inspected to certify that all plants have been installed according to plans and are acceptable. Upon satisfactory completion of all replacements and repairs requested

Landscape Architect shall certify granting of Substantial Completion. The warranty will begin on the date of

Substantial Completion. Subcontractor to continue maintenance of all plants for 90 days following Substantial

Completion. Final Acceptance will be granted after all maintenance periods have ended. At end of twelve (12) month

warranty period, Landscape Architect will inspect plants upon written request by Subontractor. Any plant that is dead,

#### or not in satisfactory health as determined by the Landscape Architect will be replaced by the Subs at no cost to the Owner. The Subcontractor will not be responsible for vandalism or theft.

END OF SECTION 329300

Sheet L04

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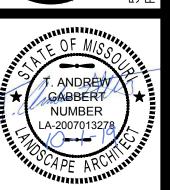
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#### 1.1 SUMMARY

- A. This Section includes the following areas of Work:
- 1. Fine grading and preparing lawn areas.
- 2. Furnishing and applying topsoil.
- 3. Furnishing and applying limited soil amendments.
- 4. Sodding new lawn areas.
- 5. Reconditioning existing lawn areas.
- 6. Replanting unsatisfactory or damaged lawns.
- 7. Maintenance.
- B. Related Work Specified Elsewhere:
- 1. Trees and Shrubs: SECTION 329300

### 1.2 REFERENCES

- A. Applicable Standards:
- 1. American Society for Testing and Materials (ASTM) Equivalent AASHTO standards may be substituted as approved.

- 1.3 SUBMITTALS
- must be sod quality and is to be gold tag standards with 0% other crop seed and 0% weed seed. B. Certification of each seed type for Native Grass mixture identifying the seed source, including name and telephone number of

A. Certification of each seed mixture for sod, identifying the sod source, including name and telephone number of supplier. Seed for sod

- C. Landscape Architect has final approval of sod grower, no exceptions.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other
- E. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
- 1. Agronomic and biological analysis of existing surface soil.
- 2. Agronomic and biological analysis of all imported topsoil.
- F. Maintenance instructions recommending procedures to be performed by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications: A qualified subcontractor shall employ or provide a qualified installation manager who meets any or all of the
- 1. Bachelor of Science Degree in Horticulture, Botany, Soil Physics, Agronomy, General Agriculture, Agricultural or Biological Engineering, or a related field.
- 2. An individual with field experience as approved by the Landscape Architect or Registered Engineer.
- B. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful turf establishment.
- 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times
- that turf planting is in progress. C. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Landscape Architect's
- satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work. D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter
- by Loss on ignition, inorganic matter (proportion of silt, clay, and sand), deleterious material including biological contamination, pH, mineral and plant-nutrient content of topsoil, and cationic exchange capacity.
- 1. Report suitability of topsoil for grass growth from horticulturist. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Sod: Harvest, deliver, store, and handle sod according to the requirements of the Turfgrass Producers International (TPI) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."
- B. Native Seed: Delilver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

## 1.6 COORDINATION AND SCHEDULING

- A. Planting Season: Install sod during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion.
- B. Native Seed Planting Season: Spring Planting Season: April 1st June 1st; Dormant Planting Season: December 15th March 31st. Planting at any other time will require the use of a cover crop to be approved by Owner or Landscape Architect.
- C. Weather Limitations: Proceed with work only when existing and forecast weather conditions are suitable for work.

## 1.7 MAINTENANCE

- A. Lawns/turf areas: Begin maintenance of turfgrass immediately after each area is planted and continue until acceptable establishment, but for no less than the following periods:
- 1. Sodded Lawns: 90 days after date of Substantial Completion.
- 2. Seeded Lawns: 90 days after date of Substantial Completion.
- 3. Native Grass Areas: 12 Months after date of Substantial Completion.
- B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting and other operations per this Specification.
- C. Watering- Subcontractor shall be responsible of watering the sod as required by this Specification. Subcontractor may use irrigation system to accomplish watering. Subcontractor shall be responsible for coordinating with irrigation contractor for scheduling of irrigation system to provide required water needs.
- D. Post-fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.

#### PART 2 - PRODUCTS 2.1 TOPSOIL

- A. Standard Topsoil: ASTM 5268, pH range 5.5 to 7. Free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.
- B. Compost Soil Blend: As located in plan, areas denoted as Compost Soil Blend shall be provided as 50% Standard Topsoil or Native Topsoil and 50% Compost for a depth of 12". pH range shall be 5.5 to 7.
- 1. Topsoil Source: Reuse surface soil stockpiled on the site where available. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Imported topsoil shall meet the requirements of this specification for composition. Clean all topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
- 2. Compost Soil Blend shall have a minimum infiltration rate between 0.25" to 0.5" per hour.

## 2.2 LIMITED SOIL AMENDMENTS

- A. Herbicides: EPA registered and approved, of type recommended by manufacturer and approved by the Landscape Architect.
- B. Compost: Well-composted, stable and weed-free organic matter, pH range of 5.5-8; moisture content 35-55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content less than 4 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.
- C. Water: Potable.
- 2.3 SOD
- A. Sod: Certified turfgrass sod complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted.
- 1. Species: Provide sod of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on the following Schedule. The seed used will be of gold tag quality.
- 2. If gold tag is not available then seed must be of the highest quality blue tag certified available.
- 3. Landscape Architect has final approval, no exceptions.

- 4. All Turf-Type Fescues shall have a minimum 70% average endophyte level.
- 5. Sodded lawn areas to have a blend of 90% Turf-Type Tall Fescue and 10% Kentucky Bluegrass or approved equal.
- B. Provide sod in uniform thickness of 16 mm (5/8-inch), plus or minus 6 mm (1/4-inch), measured at time of cutting and excluding top growth and thatch. Strips shall be of supplier's standard size of uniform length and width with maximum 5% allowable deviation in either length or width. Broken or torn pads, or pads with uneven ends are not acceptable.
- C. Sod pads shall be capable of supporting their own weight and retaining size and shape when pad is suspended vertically from a firm grasp on upper 10% of pad.
- D. Handle sod with care to prevent loss of native soil from roots.
- 2.4 GRASS SEED:
- A. Provide fresh, clean, new crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America and as required below.
- B. Be labeled according to the U.S. Department of Agriculture Federal Seed Act and shall be furnished in containers with tags showing seed mixture, purity, germination, weed content, name of seller, and date on which seed was tested.
- C. Seed Mix: 10% Bluegrass & 90% Turf-Type Tall Fescue, composed of an equal mix of three or four compatible species of bluegrass and one or two species of fescue. The mixture shall not include any varieties of the slower growing "Dwarf" fescue types.
- 1. Fescue Varieties, or approved equal
- Apache, Arid, Austin, Bonanza, Carefree, Cheiftan, Cimmaron, Cochise, Falcon, Guardian, Houndog, Jaguar II, Maverick II, Mustang, Olympic, Phoenix, Rebel II, Rebel 3D, Safari, Shenandoah, Thoroughbred, Titan, Tribute, Vegas
- 2. Bluegrass Varieties, or approved equal Asset, Kenblue, Midnight, Nassau, Ruby II, Troy
- 3. Moldy seed or seed that has been damaged in storage shall not be used.
- 4. Engineer shall have final approval of all seed blends and mixtures.
- D. Cover Crop: As approved by Landscape Architect, Contractor shall submit mix for approval.
- 2.5 NATIVE GRASSES (When Required by Plan)
- D. Fresh, clean, dry, pure-live seed complying with Kansas Department of Agriculture laws for purity, germination, and noxious weed
- 1. Seed Components: Provide seed of grass and forb species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section. Seed lots, unblended, shall be provided to horticulturist in original unopened containers for agro-histological determination and re-testing. The Master label shall be produced by the horticulturist, and shall be sealed according to the appropriate laws and regulations
- 2. All seed must be tested by a registered seed technologist per AOSA methods and meet all requirements established by the Missouri Department of Agriculture. The contractor will provide documentation with the seed shipment for the following information:
- a. State of Origin
- b. Year of Harvest
- c. Genus species Identification
- d. Seed Lot #
- e. Packaged Quantity
- f. Identification of Seed Supplier g. Supplier Certification Number
- h. State of Supplier Registration
- i. Percent PLS Per Seed Lot
- j. Percent Germination k. Percent Hard Seed
- 1. Percent Foreign Matter
- m. Percent Weed Seed
- n. Identification of Noxious Weed Seed o. Date of Seed Testing
- p. Identification of Seed Testing Company
- 3. Landscape Architect has final approval, no exceptions.
- 4. Seed Source: Shall be submitted to Landscape Architect for approval.
- B Native Seed Mix (Or Approved Equal): 2 lbs / 1 000 Sf

B. Native Seed Mix (Or Approved Equal): 2 lbs / 1,000 Si			
<u>S</u>	cientific Name	Common Name	% of M
1.	Bouteloua gracilis	Blue Grama	20
2.	Buchloe dactyloides	Buffalo Grass	20
3.	Bouteloua curtipendula	Sideoats Grama	10
4.	Schizachyrium scoparium	Little Bluestem	30

## C. Native Seed Cover Crop

5. Sporobolus heterolepsis

- 1. The use of a Cover Crop to help with the establishment of Native Grasses shall be approved by the Landscape Architect prior to use. Contractor shall submit Cover Crop seed mixes prior to installation.
- 2.6 FERTILIZER (Turfgrass only, do not fertilize Native Seed areas)
- A. Commercial fertilizer of neutral character, with some elements derived from organic sources, containing not less than 4 lbs. of actual nitrogen per 1,000 square feet of lawn area. Provide nitrogen in form that will be available to the lawn under the following products or approved equal. During the maintenance period the following fertilizers shall be used or approved equal:
- 1. Starter Fertilizer: Dyna Green Starter 12-20-06 with Fertil Blend. Total nitrogen: 7.83% ammoniacal, 4.17% urea; Phosphate: Ammonium phosphate 20%; Potash MOP: 6%; Iron: 1%; SGN 200
- 2. Spring Fertilizer Dyna Green Long Lasting 22-0-8 with 50% UMAXX, 1,757% Viper & Fertil Blend. Total nitrogen: 22% urea with slowly available nitrogen from 50% UMAXX®; Potash MOP: 8%; Iron: 1%; SGN 200. Apply March to June.
- 3. Fall Fertilizer: Dyna Green Winterizer 18-0-9 with 1.434% Surge & Fertil Blend. Total nitrogen: 18% urea; Potash MOP: 8%; Iron: 1%; SGN 200. Apply September to October.
- B. Deliver to site in labeled bags or containers
- 2.7 MYCORRHIZAL INOCULANT
- A. The Subcontractor shall utilize an organic, mycorrhizal inoculant for soil prep. The material shall be granular and applied per manufacturer's recommendation. M-Roots w/ Mycorrhiza or approved equal. For exact finish, insert names of coating manufacturers and products.
- 2.8 STRAW MAT
- A. Provide a biodegradable single net, two sided organic straw mat with functional longevity of 10-12 months by Greenfix Amerca, Product WS072 Double Net Straw or Approved Equal.
- B. Utilize Straw Mat within Native Seed areas on slopes greater than 4:1. PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas to receive lawns for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways
- 3.3 SOIL PREPARATION
- A. Dispose of any growth, rocks, or other obstructions which might interfere with tilling, seeding, sodding, or later maintenance operations. Remove stones over 38 mm (1 1/2 inches) in any dimension and sticks, roots, rubbish, and other extraneous matter.
- "Compost Soil Blend", shall be loosened and amended to a depth of 12 inches C. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges and fill depressions to meet finish grades. Limit fine grading to areas which can be planted within immediate future.

B. Thoroughly loosen and pulverize topsoil to a depth of at least 100 mm (4 inches) for all standard turfgrass areas. Areas denoted as

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry off before planting of lawns. Do not create a muddy soil condition.

F. Spread top soil mixture to depth required to meet thickness, grades, and elevations indicated after light rolling and natural settlement.

E. Restore prepared areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

- G. Allow for sod thickness in areas to be sodded
- H. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavation, grading, or stripping operations, prepare soil for lawn planting as follows:
- 1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.
- 2. Till surface soil to a depth of at least 6 inches. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.
- 3. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.

- 3.4 SEEDING NEW LAWNS:
- A. Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.
- B. Sow seed with a Brillion type seeding machine or where applicable and restricted by steep slopes or other areas not accessible to the seeding machine, broadcast or drop seed methods may be used. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other, and 3 directions in high maintenance areas, as directed by the Engineer.
- C. Sow not less than rate of 4 pounds per 1,000 square feet.
- D. Rake seed lightly into top 1/8\_inch of soil, roll lightly, and water with fine spray.
- E. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.
- F. Protect seeded slopes exceeding 1:6 against erosion with erosion-control blankets installed and stapled according to manufacturer's recommendations.
- G. Protect seeded areas with slopes less than 1:6 against erosion by spreading mulch as specified after completion of seeding operations. Spread uniformly to form a continuous blanket over seeded areas. Spread by hand, blower, or other suitable equipment.
- H. Protect seeded areas against hot, dry weather or drying winds by applying peat mulch within 24 hours after completion of seeding operations. Soak and scatter uniformly to a depth of 3/16 inch thick and roll to a smooth surface.
- - 1. Perform seeding only during the following seasons:
  - a. Fall Seeding: August 15th to October 1st. b. Spring Seeding: March 15th to May 15th
- c. Recommend seeding when temperatures ranging from 50 degrees Fahrenheit to 70 degrees Fahrenheit for a minimum 6 week period.
- J. Methods of Application:
- 1. Dry Seeding: Spreader or seeding machine.
- 2. Hydroseeding: Mix seed, fertilizer and pulverized mulch with water and constantly agitate. Do not add seed to water more than 4 hours before application: a. On slopes of 2 horizontal to 1 vertical or flatter, apply seed separately from fertilizer. Cover seed with soil to an average
- depth of 13 mm (1/2\_inch) by raking or other approved methods.
- b. On slopes steeper than 2 horizontal to 1 vertical, seed and fertilizer may be applied in a single operation. Incorporation into the soil will not be required.

## 3.5 SODDING NEW LAWNS

3.6 RECONDITIONING LAWNS

lawn areas where indicated.

- A. Do not place sod during a drought or during the period from June 15 to September 15, except as authorized by the Landscape
- B. Lay sod within 24 hours from time of stripping. Do not lay dormant sod or if ground is frozen.
- C. Sod shall be moist at the time it is placed.
- D. Lay sod strips along contour lines, by hand, commencing at the base of the area to be sodded and working upward:
- 1. Carefully lay sod to produce tight joints. Butt ends and sides of sod strips; do not overlap.
- 2. Stagger transverse joints of sod strips.
- 3. Work from boards to avoid damage to subgrade or sod.
- to avoid smothering adjacent grass. E. Water sod with fine spray immediately after planting. During first week, water daily or more frequently as necessary to maintain moist soil to depth of 100 mm (4 inches).

4. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod, removing excess

- A. Recondition lawn areas damaged by construction operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required. Recondition other existing
- B. Provide fertilizer, sod, and soil amendments as specified for new lawns and as required to provide satisfactorily reconditioned lawn. Provide new planting soil as required to fill low spots and meet new finish grades.
- C. Cultivate bare and compacted areas thoroughly to provide a good, deep planting bed.
- D. Remove diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Subcontractor's operations including oil drippings, stone, gravel, and other construction materials. Replace with new topsoil. E. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or, if extensive, apply selective chemical weed killers as required. Apply a
- seed-bed mulch, if required, to maintain moist condition. F. Water newly planted areas and keep moist until new grass is established.

- SEEDING COVER CROP & NATIVE GRASSES: A. Sow seeds using seed drill (Truax-type) that accurately meters the seed types and mixes all seeds uniformly during seeding. It should have, at the minimum, two seed boxes to separate fine seeds from large/fluffy seeds. This seed drill should also be equipped with disc furrow openers and a no-till trash plow assembly, which will compact the soil directly over the drill rows. The maximum row spacing for drill seeding should be 8 inches. Fine seeds shall be dropped onto the ground from the fine seed box, while large/fluffy seed should be placed to obtain final planting depth of 1/4-1/2". The path of the drill seeding shall be done at a right
- 3.8 PROTECTION: A. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout

3.9 MAINTENANCE (SEED & SOD):

A. Mow grass to a height of 3 inches as soon as there is enough top growth to cut with mower. Remove no more than 30% of grass leaf

- growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted.
- B. Remove weeds by pulling or chemical treatment.
- 2. Maintain sod in good live condition. Replace any sod not in good growing condition with fresh live sod.

1. Thoroughly water daily for a period of 15 days after placing and to a minimum of 1-inch per week thereafter.

- 1. Thoroughly water seeded areas daily to keep seeds moist until germination. After seeds have germinated, continue watering daily until the first mowing. Watering shall be in amounts enough to wet seeds and surrounding soil, but not cause erosion or
- 2. Repair any portion of the seeded surface which becomes gullied or otherwise damaged. Reseed as required.
- 3.10 MAINTENANCE (NATIVE GRASSES) (When Required by Plan)
- A. Begin maintenance of native grass areas immediately after each area is planted and continue until established and accepted, but for not less than the following periods:
- B. Native grass: 12 MONTHS after date of Substantial Completion

- 1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage. B. Protect all native grass areas on slopes 4:1 and greater using straw mat erosion control blanket installed and stapled according to manufacturer's recommendations
- maintenance period until lawn is established.

angle to that of the drainage patterns.

- C. Perform maintenance throughout the 90 day maintenance period.
- 3. Water thoroughly whenever sod evidences excessive drying.
- disposition of seeds.
- F. Apply second fertilizer application after first mowing and when grass is dry. Use fertilizer which will provide not less than 1 lbs of actual nitrogen per 1,000 square feet of lawn area.
- 1. The Installer shall be responsible for the proper care until verification that all plant materials are present in the density and health to ensure self-maintenance.

- 2. Maintain and establish native grasses by mowing, weeding, trimming, replanting, and other operations as stated below. Re-grade erosion rills, replant bare or eroded areas, and re-mulch to produce a uniform prairie
- 3.11 ACCEPTANCE OF LAWNS:
- A. When lawn Work is Substantially Complete, including maintenance, Landscape Architect and Owner will, upon request, make an inspection to determine acceptability
- 1. Lawn Work may be inspected for acceptance in parts agreeable to Owner, provided Work offered for inspection is complete,
- B. Replant rejected work and continue specified maintenance until re-inspected by Landscape Architect and Owner and found to be
- C. Sodded lawns will be acceptable provided requirements, including maintenance, have been complied with and healthy, well-rooted, even-colored, viable lawn is established free of weeds, open joints, bare areas, and surface irregularities.
- D. Native Grass Stands (When Required by Plan)
- 1. An acceptable native grass stand will contain no less than 5 healthy mature or developing plants per square foot with a population distribution per 10,000 square feet representative of ratios in the original blend. The result of maintenance shall be that weeds are being controlled through competition with the desired plants, and that mowed bio-mass is not accumulating in such a manner to be detrimental to existing plant materials as determined by the Landscape Architect.
- 2. An acceptable native grass stand shall control erosion through root mass development. The occurrence of rills and gullies shall be unacceptable.

#### 3.11 CLEANUP:

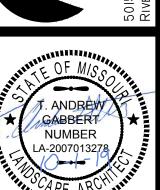
A. Promptly remove soil and debris created by lawn Work from paved areas. Clean wheels of vehicles prior to leaving Site to avoid tracking soil onto surfacing of roads, walks, or other paved areas.

END OF SECTION 329200

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F. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2004 G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during B. Irrigation Main Piping: Downstream from backflow preventer to water distribution piping to, and including, control valves. coverage per layout. Actual locations may vary per field installation, it shall be the responsibility of the irrigation contractor B. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties, unless B. Shop Drawings: Irrigation Contractor shall provide design documentation for approval prior to installation. Shop drawings diagrams, plant and landscaping features, site structures, schedule of fittings, zone and system calculations, drawing scale & E. As-Built Drawings: Irrigation Contractor shall submit as-built drawing showing valves, quick coupler & main line routing 3. All like products shall be from a single supplier as listed, for example, if netafim dripline is used, all dripline in project C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of expierence. A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end

A. Coordinate timing of installation, location and installation of all sleeves under sidewalks or drives. Owner shall not be responsible for boring due to lack of coordination of this requirement. B. Coordinate power requirements and connection of controller as required. C. Coordinate existing water supply requirements. D. Coordinate with landscape installation E. Irrigation Contractor to attend on-site meeting at both project kick-off and prior to installation after approved shop drawings. PART 2 - PRODUCTS 2.01 MANUFACTURERS: A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection: 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified. All

products of type shall be from a single manufacturer as listed. 2.02 PIPES, TUBES, AND FITTINGS: A. Refer to Part 3 "Piping Applications" Article for installation of pipe, fitting, and joining materials. B. PVC, Pressure-Rated Pipe: 1. ASTM D2241, CL 200 SDR-21 C. Pipe Risers at Valves: 160 psi PVC pipe. D. PVC Socket fittings, CL 200, ASTM D2467. 2.03 JOINING MATERIALS: A. Solvent Cement (PVC Piping): 1. Primer and solvent conforming to ASTM D2564-02. 2.04 OUTLETS for optimum throw. Provide Head to Head coverage C. Drip Specialties 1. Drip Zone Control Kit:

2) Filtration provided by either:

E. Sleeve Material: PVC - Schedule 80, Minimum size shall be 2 times the irrigation pipe diameter with a minimum size 2.5"

A. Rotary Type Sprinkler Head: Pop-up type with screens; fully adjustable for flow and pressure; size as indicated; with letter or

symbol designating degree of arc and arrow indicating center of spray pattern. Provide Head to Head coverage B. Spray Type Sprinkler head: Pop-up type with in-stem pressure regulator system. Pop-up height shall vary with location. Provide nozzel with spray pattern as required to minimize waste. Adjustable patterned nozzels shall be set by the contractor

a. Factory assembled kit for controlling low-flow irrigation zones comprised of the following components:

1) Medium-flow remote control valve with 'double knife' diaphragm (1/2-inch diameter seat), double-filtered pilot flow, external bleed and internal bleed for manual operation. 1) Pressure regulator with plastic body capable of maintaining outlet pressure of 30 psi.

2)a. Inline Wye Filter of heavy-duty glass-filled nylon material with 150-mesh filter screen Inline Basket filter with threaded top section containing an indicator changing from green to red to

ndicate when the filter is full. Provide with factory-installed 150 mesh filter minimum. a. Rainbird, Toro, Hunter, Netafim, Approved Equal

3. Landscape Dripline a. Flexible PE tubing with pre-installed pressure-compensating emitters with dual outlet ports, 16 mm (0.630 inch) outside diameter. Flow rate shall be 0.6 gallons-per-hour.

b. Manufactures: As listed above c. Warranty: 5 years free from original defects in materials and workmanship and 7 years for environmental stress cracking.

4. Compression Fittings: a. UV-resistant ABS fittings with Buna rubber seal capable of accepting 1/2-inch poly tubing from 16 to 18 mm outside diameter.

b. Manufacturers: As listed above 5. Air Vacuum Relief Valve: a. Plastic housing with rustproof materials designed for use with dripline tubing. b. Manufactures: As listed above

6. Flush Valve: a. Plastic ball valve featuring PVC body and ball construction, EPDM Seat Seals and O ring, rated to 150 psi at 73°F. b. Manufacturers: As listed Above

2.05 SHUTOFF & GENERAL-DUTY VALVES: A. Cast Brass Gate Valves: Resilient-seated, nonrising-stem, cast brass body and bonnet (ASTM B584) gate valve; with brass

1. Maximum Working Pressure: 200 psig. 2. End Connections: Threaded ends 3. Handle: Brass cross.

a. Matco-Norca 514. b. Approved Equal. 5. Operating Wrenches: Furnish total of two (2) steel, tee-handle operating wrench(es) with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

B. Plastic Automatic Control Valves: The electric remote control valve shall be a normally closed 24 VAC 50/60 Hz (cycles/second) solenoid actuated globe/angle. The valve pressure rating shall not be less than 150 PSI. The valve body and bonnet shall be constructed of high impact, weather resistant PVC with stainless steel screws. The valve shall have manual open/close control (internal bleed) for manually opening and closing the valve without electrically energizing the solenoid. The valve's internal bleed shall prevent flooding of the valve box. The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing, and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 VAC minimum at 150 psi. At 24 VAC, average inrush current shall not exceed 0.41 amps. Average holding current shall not exceed 0.28 amps. The valve shall have a flow control stem for accurate manual regulation and/or shut off of outlet flow. The valve must open or close in less than 1 minute at 150 PSI, and less than 30 seconds at 20 PSI. The valve must match the demand required by the proposed zone.

1. Manufacturers: PGA Series by Rain Bird Sprinkler Mfg. Corp., Approved Equal C. Valve Box and Cover: Box and cover, with open bottom and openings for piping; designed for installing flush with grade. Include size as required for valves and service.

a. Shape: Round b. Sidewall: PE, ABS, or FRP c. Cover Material: PE, ABS, FRP, Green in color

4. Manufacturers:

1. General Duty Valves

a. Shape: Rectangular

2. Remote Control Valves

b. Sidewall: PE, ABS or FRP c. Cover Material: PE, ABS or FRP, Green in color 3. Speciality Valve Boxes

a. Shape: Box and cover, with open bottom and openings for piping; designed for installing flush with grade. Include size as required for valves and service b. Sidewall: PE, ABS or FRP

c. Cover Material: PE, ABS or FRP, Green in color 4. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4"-inch minimum to 1 inch maximum. A. Quick-Couplers: Factory-fabricated, brass, two-piece assembly. Include coupler water-seal valve; removable upper body

with spring-loaded or weighted, locking rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key. 1. Locking-Top Option: Vandal-resistant, single-lug locking feature. Include two matching keys. 2. Manufacturers:

a. 33DLRC by Rain Bird Sprinkler Mfg. Corp. b. 075-SLVC by The Toro Company c. Approved equal.

B. If required, Controller shall be provided meeting the following requirements.

A. Existing controller may be used if space and functions allow. Irrigation contractor shall verify the existing controller for location, space and scheduling requirements prior to shop drawing approval

A. Install control wire in same trench as irrigation piping as approved with shop drawings. Provide conductors of size not

3.09 AUTOMATIC-CONTROL SYSTEM INSTALLATION:

4. Shall be capable of providing watering cycles by day of week, odd, even and cyclic.

6. Shall have 12-hour AM/PM or 24 hour clock with a midnight day change over

10. Shall be capable in running off time based program or ET based programming

13. Controller shall be capable of being located in the same location as the existing location.

and time for 10 years. Shall provide notification of lost power.

9. Controller shall have programmable rain shut off threshold

11. The controller shall be EPA WaterSense labeled

2.08 CONTROL WIRE (REMOTE VALVE TO CONTROLLER)

epoxy resin moisture seal; suitable for direct burial

B. All sensors shall be capable of interfacing with approved controller.

4. All connectors shall be 3M DBR connectors only

2.10 MISCELLANEOUS SPRINKLER EQUIPMENT:

B. Gravel: Clean washed gravel ¾" nominal diameter.

stem or valve wire within valve box.

3. Sleeves: 18 inches Minimum.

B. Route piping to avoid conflicts with other work

the responsibility of the contractor.

B. Trench shall accommodate grade changes

B. Install piping free of sags and bends.

2-inches and debris. Topsoil shall be placed as noted on the plans.

C. Maintain trenches free of debris, material or obstructions that may damage pipe.

C. Install groups of pipes parallel to each other spaced to permit valve servicing.

G. Lay piping on solid subbase, uniformly sloped without humps or depressions.

A. Underground Gate Valves: Install in round valve box with top flush with grade.

B. Control Valves/Master Valves: Install in rectangular control-valve box.

shop drawings. Flush all lines prior to installation of drip lines.

C. Quick Couple Valves: Install in round valve box.

D. Install fittings for changes in direction and branch connections.

E. Install dielectric fittings to connect piping of dissimilar metals.

F. Install underground thermoplastic piping according to ASTM D2774.

B. Construct mechanical joints per manufacturer's recommendations:

A. Install components having pressure rating equal to or greater than system operating pressure.

12. Shall offer manual watering of all zones

14. Manufacturer's

a. Rainbird

b. Approved Equal

coded per the following

b. Control Wire - Red

2.09 RAIN/TEMPERTURE SENSOR

low temperature events.

2.11 POINT OF CONNECTION

PART 3 - EXECUTION

3.02 PREPARATION:

prior to excavation.

3.04 PIPING APPLICATIONS:

3.05 PIPING INSTALLATION:

3.06 JOINT CONSTRUCTION:

3.07 VALVE INSTALLATION:

3.08 OUTLET INSTALLATION:

installed.

3.01 <u>GENERAL</u>:

a. Common Wire - White

c. Spare Common Wire - Green

d. Spare Control Wire - Blue

active watering schedule notification

5. Shall have a display capable of displaying each zones schedule start days and watering windows in the same screen with

7. Shall have 365 day calendar backed up against power interruptions by an internal lithium battery that will maintain date

8. Shall be capable of communicating with the existing on-site weather sensor that measure site temperature and rainfall.

A. General: UL 493, Type UF, single conductor, with solid-copper conductor and PE insulation; suitable for direct burial

1. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color

2. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and

A. Automatic rain shutoff sensor shall be capable of sensing precipitation/temperature and interrupting irrigation during rain and

A. Valve Identification Tags: Pre-printed plastic tags with minimum text height of 1 inch, capable of being attached to valve

A. Irrigation Contractor shall be responsible for providing all point of connection taps, back flow devices, valves, vaults &

1. Install piping sleeves by boring or jacking under existing paving if possible. No open cutting of pavement shall be

2. Irrigation Contractor shall coordinate sleeve locations under new construction during early construction stages to avoid

A. Set stakes to identify locations proposed irrigation system. Obtain owners approval before excavation. Locate all utilities

C. Unless otherwise installed, bore for sleeves under existing pavement as indicated on plans. Employ equipment and methods

1. Sleeves shall be installed prior to pavement installation. All additional costs for boring sleeves shown in the plan shall be

A. Trench and backfill with subsoil excavated on-site. Fill material shall be free of lumps larger than 3-inches, rocks larger than

A. Location and Arrangement: To be determined by shop drawing approval. Drawings shall indicate irrigation type to be

H. Install PVC piping in dry weather when temperature is above 40°F (5°C). Allow joints to cure at least 24 hours at

1. Provide adequate joint restraint at all mechanical joints through thrust blocking or mechanical restraints.

A. Construct solvent-weld joints per ASTM D2855 and Butt Heat Fusion (HDPE Piping) per ASTM D3261 & ASTM D2657

A. Drip line Installation: Install drip lines per manufacturer's recommendations in areas shown on the plans and the approved

B. Rotary/Spray Head Installation: Install rotary/spray heads per manufacturer's recommendations in areas shown on the plans and approved shop drawings. Heads shall be installed flush with finish grade. Flush all lines prior to installation of irrigation

temperatures above 40°F (5°C) before testing unless otherwise recommended by manufacturer.

3. Each wire path shall be grounded using a Rain Bird MSP-1 surge protector, or approved equal

C. Contractor shall field locate for optimum performance. Location shall be approved prior to installation.

B. Irrigation Contractor shall show in the provided shop drawings the point of connection for approval.

C. Irrigation Contractor shall provide a Master Valve for the proposed irrigation system.

A. Install piping and wiring in sleeves under sidewalks, roadways, and parking lots.

boring where possible; Refer to Sheet LS200 for sleeve locations.

B. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 18 inches below finished grade to top of pipe.

2. Circuit (Lateral) Piping: Minimum depth of 12 inches below finished grade to top of pipe.

1. Shall include a base unit with expansions slots to accommodate zones required for working system. smaller than recommended by controller manufacturer. Install wire in separate sleeve under paved areas if irrigation piping 2. Shall be capable of operating two 24 VAC solenoid valves per zone plus a mater valve. 3. Shall operate on 120VAC +/- 10% at 60Hz B. Connect to Controller and accessories per manufacturers recommendations

3.10 CONNECTIONS

A. Make all electrical connections in conformance with local code requirements. Provide waterproof connectors for all underground electrical connections.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.11 LABELING AND IDENTIFYING A. Provide valve tags at each remote control valve as shown on the approved shop drawings.

B. Install Warning Stakes per detail

3.12 FIELD QUALITY CONTROL:

A. Perform the following field tests and inspections and prepare test reports: 1. Hydrostatic Test: After installation and prior to backfillling, utilize quick-couple valves to charge mainline with

a. Owner's representative must be in attendance during test. b. Provide a minimum of 48 hours notice prior to scheduled test. c. Hydrostatic test results obtained without Owner's representative present will be rejected and Contractor will be

pressurized air to 100 psi. System will be able to maintain pressure with no more than 5 psi loss in one hour.

required to re-test with representative in attendance. 2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to

confirm proper system operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. B. Remove and replace defective units and retest as specified above until all requirements are met.

3.13 STARTUP SERVICE

A. Verify that controller is installed and connected according to the Owners direction. B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Complete startup checks according to manufacturer's written instructions.

3.14 <u>ADJUSTING</u> A. Adjust settings of controller and provide initial watering schedule per Owner's requirements.

B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

3.15 CLEANING:

A. Flush dirt and debris from piping before installing sprinklers and other devices.

A. Schedule a complete demonstration and system walk-through with the Owner's representative. Final Payment will not be

made until all items noted during demonstration and walk-through have been made by Irrigation Contractor and verified by 1. Irrigation Contractor, Owner and Landscape Architect shall each certify that the system performs as designed and there

are no unacceptable areas of overspray on adjacent pavements, buildings or other site elements or fixtures. 3.17 MAINTENANCE

A. Irrigation Contractor shall maintain and coordinate system for plant establishment throughout 90 day maintenance period. At end of maintenance period, contractor shall set system for standard operation based on zone requirements. Any continued plant establishment or over watering necessary for continued plant establishment shall be given to the owner as a written

B. Provide one complete spring start-up and a fall shutdown by installer, at no extra cost to Owner. The Contractor shall provide this schedule at the end of the maintenance period.

A. Irrigation Contractor shall warranty irrigation system for a minimum of 12 months starting from the date of Substantial Completion. Warranty shall be for all installed equipment and workmanship of installation.

B. Irrigation Contractor shall be responsible for all system leaks due to quality of installation.

3.19 <u>DOCUMENTATION</u>

A. Provide a complete operations and maintenance manual to the Owner in a three-ring binder with the following items, separated by tabbed dividers for clear organization.

1. Provide a label on the spine of the binder clearly stating "IRRIGATION SYSTEM OPERATION AND MAINTENANCE".

2. Table of Contents.

3. Cut-sheets or manufacturer's data for all installed equipment including:

a. Remote Control Valves. b. Quick Couple Valves.

c. Controller 4. Operations Data from manufacturers documenting diagnostic, repair and replacement procedures for all items "a" through "c" identified above.

5. Complete description of spring start-up operations including:

a. Valve inspection.

b. Controller programming guidelines for spring, summer and fall watering schedules. c. Controller battery replacement (As Required).

d. Rain Sensor Battery replacement (As Required)

B. Provide an as-built drawing at the same size and scale as the design drawings with the following information clearly shown: 1. Location of all sleeves with coordinates.

2. Location of mainline and lateral pipe runs with sizes clearly indicated with coordinates. 3. Location of all valves with coordinates.

4. Location of controller and rain sensor (As Required)

5. Utilize standard industry symbols and notations for all equipment.

C. Provide a copy of the Maintenance/Operations Manual and As-Built Drawing to the owner for review and approval. 1. Contractor shall make all revisions noted and required by the owner.

2. Contractor is required to demonstrate completion of all revisions, which may include providing a revised copy for additional review at the discretion of the owner

D. Maintenance/Operations Manual and As-Built Drawing shall be completed and turned over to the owner before Final

Payment will be made to the Irrigation Contractor.

END OF SECTION 328400

Development 18-028 Final

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