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## ADDENDUM #5

State Office Building  
New Parking Garage  
Hartford, Connecticut

DCS Project Number: BI-2B-381

August 30, 2017

Prepared by Amenta|Emma Architects, PC

This addendum is issued to show corrections, revisions and clarifications to the Contract Document Submission for the *State Office Building - New Parking Garage*, dated June 15, 2017.

### Clarifications:

- N/A

### Modifications to the Drawings:

Sheet LP-101

- Revise LEGEND to replace 'No Mow Grass' with 'Sod'; and add 'Limits of Irrigation' and 'Corten Steel Ridge on Landform' as indicated in the Legend on LP-101
- Revise both landforms and the surrounding context in the Northwest corner of the site to replace 'No Mow Grass' with 'Sod' as indicated in the Landscape Plan.
- Add 'Limits of Irrigation for Sod at the Landform' and 'Corten Steel Ridge on Landform' to both landforms and the surrounding context in the Northwest corner of the site as indicated in the Landscape Plan.

### Modifications to the Specifications:

1. **REPLACE** Section 32 92 00 Turf and Grass in its entirety, 8 pages in length.
2. **REPLACE** Section 32 95 00 Irrigation Systems in its entirety, 14 pages in length.

Division 32, Section 32 92 00 TURF AND GRASS

1. **UPDATE** Specification Section 32 92 00 Turf and Grass to include Sod as indicated in the following sections, 1.2 – A – 2, 2.2 – A, 2.2 – A – 1.

## Division 32, Section 32 95 00 IRRIGATION SYSTEMS

1. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete the design and installation for the pumps from stormwater collection tanks and irrigation system in compliance with ASIC Standards as indicated in the following section, 1.2 – A – 1.
2. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete the piping to supplement stormwater collection system as indicated in the following section, 1.2 – A – 2.
3. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete the installation of two frost proof lawn hydrants as indicated in the following section, 1.2 – A – I.
4. **UPDATE** Specification Section 32 95 00 Irrigation Systems to include Section 32 92 00 Turf and Grasses as a related section for soils and planting to be irrigated as indicated in the following section, 1.2 – E – 1.
5. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete stormwater collection system as indicated in the following section, 2.2 – A.
6. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete providing an additional connection with a backflow preventer to city water as indicated in the following section, 2.2 – B.
7. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete drippers and dripline and replace with sprinklers as indicated in the following section, 2.4.
8. **UPDATE** Specification Section 32 95 00 Irrigation Systems to delete lawn hydrants as indicated in the following section, 2.17.
9. **UPDATE** Specification Section 32 95 00 Irrigation Systems to include installation of sprinkler requirements as indicated in the following section, 3.3.

**Attachments:**

## SPECIFICATION SECTIONS:

- Section 32 92 00 TURF AND GRASS
- Section 32 95 00 IRRIGATION SYSTEMS

## DRAWINGS:

- Civil Drawings: LP-101

End of Addendum

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## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

- A. This Section includes the following:

1. Providing and grading topsoil. ▲ 1 ADDENDUM #5
2. Seeding or hydroseeding and sodding.
3. Mulching.
4. Lawn and grass renovation.

- B. Related Sections include the following:

1. Division 01 Section "Temporary Erosion and Sedimentation Control" for temporary seeding and control measures.
2. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
3. Division 31 Section "Site Earth Moving" for excavation, filling and backfilling, and rough grading.
4. Division 32 Section "Planting & Structural Soils" for planting soils.

### 1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of topsoil.
- B. Lawn: Newly graded areas to be seeded, or established turf or grass areas to be reseeded.
- C. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath topsoil.
- D. Topsoil Mix: Native or imported topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

### 1.4 SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  1. Certification of each seed mixture for turfgrass and sod, identifying source, including name and telephone number of supplier.
- B. Product Certificates: For soil amendments, fertilizers, and mulch signed by product manufacturer.

- C. Qualification Data: For landscape Installer.
- D. Material Test Reports: For existing surface soil and imported topsoil.
- E. Planting Schedule: Indicating anticipated planting dates for each type of planting.
- F. Topsoil and Amendments Chemical Analysis
  - 1. Obtain one composite sample for every 500 cubic yards of soil/material with at least three samples for each soil/material type from each borrow source location. Analyze each for pesticides (EPA Method 8081), Chlorinated Herbicides (EPA Method 8151), Polyaromatic Hydrocarbons (EPA Method 8270), Total Petroleum Hydrocarbons (CTETPH method), Total RCRA 8 Metals (EPA Method 6010 / 7421 / 7470), Volatile Organic Compounds (EPA Method 8260), and Polychlorinated Biphenyls (EPA Method 8082). Based on the results of this testing, additional Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characteristic Leaching Procedure (TCLP) testing may be required at the discretion of the Engineer. The Owner reserves the right to reject material based on the results of this testing.
    - a. Satisfactory soil/material shall not exceed laboratory detection limits for concentrations of Pesticides, Chlorinated Herbicides, Polyaromatic Hydrocarbons, Total Petroleum Hydrocarbons, Volatile Organic Compounds, and Polychlorinated Biphenyls.
    - b. Satisfactory soil/material shall not exceed naturally occurring background levels for concentrations of RCRA-8 Metals in native soils on site.
    - c. In no case shall soil/material exceed any GB pollutant mobility criteria (GB PMC) or residential direct exposure criteria (RES DEC) established in Sections 22a-133k-1 through 22a-133k-3 of the regulations of Connecticut state agencies.
  - 2. Soil/Material Origin: Provide a description for each originating off-site location or project from which imported soil/material is obtained, including known historical activities occurring on the site, and any possible releases that have occurred.
    - a. The following are not acceptable :
      - 1) Soils/materials originating from sites subject to any Federal or State remediation program.
      - 2) Soils/materials that have undergone any treatment process for one or more chemical constituents listed within the Connecticut Remediation Standard Regulations (CT RSRs).

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.
  - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory topsoil.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed, Lime, and Fertilizer: Deliver in original sealed, labeled, and undamaged containers.

#### 1.7 SCHEDULING

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  1. Spring Planting: April 1 to June 1 – use hulled seed.
  2. Fall Planting: August 15 to October 15 – use unhulled seed.
- B. If special conditions exist which may warrant variance in above planting dates, written request shall be submitted to Landscape Architect stating special conditions for proposed variance. Permission for variance will be given if warranted in opinion of Landscape Architect. Regardless of time of seeding, Contractor shall be responsible for full growth of grass.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

### PART 2 - PRODUCTS

#### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances. Seed shall not contain in excess of 2.5% weed seed. Seed containing prohibited or restricted noxious weeds will not be accepted, and shall comply with state laws governing noxious weeds. The following noxious weeds are prohibited from any mix: Bindweed, Canada Thistle, Quackgrass, Hedge Kind Weed, Horse Nettle, Wild Garlic, Bermuda Grass, cheat, Wild Onion, Johnsongrass, Perennial Sweet Sudan Grass, Sorghum hybrids.

1. Seed Mixture for Finished Lawn Areas:

50%	Creeping Red Fescue
30%	Transist 2600 Intermediate Ryegrass
10%	Kentucky Bluegrass
10%	Chewings Fescue

Seed may be mixed by an approved method on the site. If the seed is mixed on the site, each variety shall be delivered in the original containers, which shall bear the dealer's guaranteed analysis.

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#### 2.2 SOD

- A. Sod: Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

1. Sod of grass species as follows or approved equal:

- 25% Shamrock Kentucky Bluegrass
- 25% Midnight Kentucky Bluegrass
- 25% Shadow II Chewings Fescue
- 25% Gotham Hard Fescue

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### 2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
  - 1. Provide lime in form of dolomitic limestone, Class S, with a minimum of 95 percent passing a No. 100 sieve.
- B. Perlite: Horticultural perlite, soil amendment grade.
- C. Sand: Clean, washed, natural or manufactured, free of toxic materials.

### 2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 de-cisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.
    - a. State of Connecticut, Department of Environmental Protection approved when derived from food and agricultural residues, animal manures, and sewage sludge.
- B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

### 2.5 PLANTING ACCESSORIES

- A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

### 2.6 FERTILIZER

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 18 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

## 2.7 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

## 2.8 TOPSOIL MIX

- A. Topsoil Mix: Mix topsoil with soil amendments and fertilizers in quantities required by the topsoil test report and per section 329115 Planting Soils.
  1. Thoroughly blend stockpiled soil with soil amendments before spreading.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after 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 operations.
  1. Protect adjacent and adjoining areas from hydroseeding overspray.
- 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 LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter. Dispose of debris. Stockpile excess earthen material on-site in areas indicated on the plans.
  1. Spread topsoil mix to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if topsoil or subgrade is frozen, muddy, or excessively wet.
- C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

- D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

### 3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
- B. Sow Finished Lawn seed at the rate of 6lb/1000 sq. ft.
- C. Landform Structure mix shall be sodded between late August and late September. Any deviation from this planting schedule must have the approval of the Owner's Representative.
- D. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.
- E. Protect seeded areas with slopes exceeding 1:2.5 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- F. Protect seeded areas with slopes not exceeding 1:3 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acret to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
  - 1. Bond straw mulch by spraying with non-asphaltic tackifier at manufacturer's recommended rate. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

### 3.5 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
  - 1. Mix slurry with nonasphaltic tackifier.
  - 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acredry weight but not less than the rate required to obtain specified seed-sowing rate.

### 3.6 LAWN RENOVATION

- A. Renovate existing lawn.
- B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
  - 1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
- C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil. Stockpile earthen material on-site in areas indicated on the plans.



- D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil. Contractor is responsible for disposal of these materials off of Owner's property in accordance with all Local, State, and Federal regulations, at no cost to the Owner.
- E. Mow, dethatch, core aerate, and rake existing lawn.
- F. Remove weeds before seeding.
- G. Remove stones larger than 1 inch in any dimension. Remove waste and foreign materials, including sticks, roots, trash, and other extraneous matter, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- I. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new topsoil to fill low spots and meet finish grades.
- J. Apply seed and protect with straw mulch as required for new lawns.
- K. Water newly planted areas and keep moist until new lawn is established.

### 3.7 SATISFACTORY LAWNS

- A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 3 by 3 inches.
- B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

### 3.8 CLEANUP, PROTECTION, AND REPAIR

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from construction, and vehicular and pedestrian traffic. Maintain barricades throughout maintenance period and remove after lawn is established. Provide temporary protection to ensure work is without damage or deterioration a time of final acceptance. Replace damaged seeded areas prior to acceptance.
  - 1. Where seeded areas have been compacted or young plants damaged, rework soil to a suitable seedbed, reseed and reblanket with full amounts of the specified materials.
- C. Remove erosion-control measures after grass establishment period.

### 3.9 LAWN MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until satisfactory lawn is established, but for not less than the following periods:
  - 1. Seeded Lawns: 60 days from date of Substantial Completion.
    - a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

- B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.
  - 1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
- C. Watering: Keep lawn uniformly moist to a depth of 4 inches.
  - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Prevent walking over muddy or newly planted areas.
  - 2. Water lawn at a minimum rate of 1 inch per week.
- D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain grass height of 2 to 3 inches.
- E. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
  - 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to lawn area.

END OF SECTION 329200

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Provide all equipment and materials, and do all work necessary to furnish and install complete irrigation system, in **ALL LANDFORM AREAS** and as shown on the Drawings:

1. Contractor shall be responsible for complete Irrigation system design and engineering, extent as shown in Drawings, including sizing all piping, calculating system hydraulics, testing, and all other work required for a complete operable system and providing guarantees as specified. ~~Design and install pump(s) from stormwater collection tanks and irrigation system in compliance with ASIC Standards.~~ System shall include high efficiency irrigation controller.

2. ~~Piping to supplement stormwater collection system shall be installed to connection point provided by the building plumbing contractor.~~

3. Complete landscape irrigation system shall include, but not be limited to:

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- a. All piping, including mains, laterals, fittings, connections, tees, risers, clamps, and swing joints.
- b. All control, gate, globe, pressure reducing, quick coupling and other valves; including valve boxes, markers, connections, operators and other accessories.
- c. Complete automatic control system: including controllers, control wiring connections and electric supply, conduit.
- d. All drip irrigation emitters and lines and all other appurtenances and accessories for proper operations at all areas except turf.
- e. Provide pop-up sprinkler heads at turf areas.
- f. Connections of piping to the supply sources as shown on Drawings.
- g. Install pumping or pressure system if needed.
- h. All excavation, sitework, relocation or replacement of utilities, backfill and restoration of all disturbed areas.
- i. Provide complete and operable system for irrigating all landscaped areas on project site. Drawings and these specifications are intended to include all items obviously necessary and requisite for proper irrigation of entire landscape. This in no way relieves Contractor of his responsibility to furnish any additional labor, materials and equipment required for a proper system.
- j. Adjust emitter location, type and size, and any other system components to distribute required water to planting specified on Drawings.
- k. Supply, deliver, store, and protect all equipment and materials including pipe and fittings, emitters, valves, controllers, wire, and all other component parts necessary for complete installation of fully automatic irrigation system as indicated in Drawings and specifications. Ad-

equate security of materials on site shall be provided by Contractor at all times at his expense

- I. Frost proof all piping and installation of two (2) frost proof lawn hydrant that will operate even if irrigation is shut down.

B. Site conditions

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1. Contractor shall carefully investigate structural and finished conditions affecting all Work and plan his work accordingly, furnishing such offsets, fittings, and sleeves as may be required to meet such conditions.
2. Work shall be installed in such manner as to avoid conflicts between underground utilities, plantings, and other existing utilities and architectural features. Deviations shall be brought to Architect's attention.
3. All Work required for complete system shall be furnished and installed whether or not specifically mentioned in specifications.
4. Contractor shall not willfully install irrigation system when it is obvious that obstructions, grade differences, or discrepancies in area dimensions exist that might not have been known during engineering. Such obstructions or differences should be brought to Architect's attention. If that notification is not performed, Contractor shall assume full responsibility for any revision necessary.
5. Prior to trenching, Contractor shall verify location of all underground utilities as are commonly encountered underground. Contractor shall take proper precaution not to damage or disturb said improvements.
6. If Architect assesses that workmanship furnished by the Contractor is incompetent, unskilled, or unreliable, his equipment inadequate, improper or unsafe, or if Contractor fails to continuously and diligently prosecute any part of Work, Architect shall instruct Contractor in writing to remove all such causes of noncompliance and Contractor shall promptly comply.
7. Contractor shall be responsible for full and complete coverage of all irrigation areas. Architect shall be notified of any necessary adjustments. Any revisions to irrigation system must be submitted and answered in written form, along with any change in contract price.

C. Installation

1. Inspection of Site: Contractor shall acquaint themselves with all on-site conditions. Should utilities not shown on Drawings be found during excavations, Contractor shall promptly notify Architect for instruction as to further action. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown on Drawings.
2. Protection of Property: Contractor shall be responsible for preservation and protection of all site conditions from damage due to this work. If damage does occur, all damaged areas shall be completely repaired to their original condition, at no additional cost to Owner.
3. Trenching: All trenching or other work under leaf canopy of any and all trees shall be done by hand or by other methods so that no branches, and minimal root systems are damaged in any way.
  - a. Trenching around existing plant material shall be done by hand so as to minimize root disturbance.
  - b. Buildings, walks, walls, and other property shall be protected from damage. Open ditches left exposed shall be flagged and barricaded by Contractor by approved means. Contractor shall restore disturbed areas to their original condition.
4. Protection and Repair of Underground Utilities: Contractor shall be responsible for requesting the proper utility company to stake exact location of any underground lines including but not limited to electric, gas, telephone service, water, and cable.

- a. Contractor shall take whatever precautions are necessary to protect these underground lines from damage. If damage does occur, all damaged areas shall be completely repaired to their original condition, at no additional cost to Owner.

E. Related Sections:

1. Section 329200: "Turf and Grasses" for soils and planting to be irrigated.

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1.3 SUBMITTALS

- A. Submit shop drawings of irrigation system equipment indicating details of construction, including fittings and materials. Where appropriate, and when approved by Architect, manufacturer's product data may be substituted for shop drawings.
- B. Submit complete materials list indicating name of manufacturer, with model numbers of proposed irrigation system equipment and accessories.
- C. Submit piping diagram showing sizes, zone valves, and valve box final locations in relationship to planting material and hard surficial site elements for approval by Landscape Architect.
- D. After completion of installation, furnish complete as-built drawings showing locations of all drip lines, valves, drains, and piping to scale, with dimensions where required or necessary.
- E. Submit two (2) copies, in three ring binder, of irrigation system data including: operating instructions, seasonal shutdown procedures, maintenance instructions, and replacement parts list with catalogue numbers. Also furnish one reduced copy of as-built drawings laminated in plastic, and mounted inside the controller cover. Note valve number on drawings and include same number on tag attached to valve, or engrave on outside cover of valve box.

1.4 LAWS, CODES, AND ORDINANCES

- A. Irrigation system shall be installed in accordance with latest laws, ordinances, rules, and regulations of all local, state, and federal authorities having jurisdiction.

1.5 INSTRUCTIONS TO OTHER PERSONNEL

- A. In addition to all guarantees stated in these specifications, Contractor shall provide one seasonal shutdown of irrigation system and one seasonal start up. Contractor shall provide all labor and incidental materials required to do this work. Contractor shall also instruct Owner's designated personnel in shutdown and start up procedures of irrigation system.

1.6 WARRANTY

- A. Contractor will be held strictly responsible for all parts of his work. If irrigation system or appurtenances fail within one (1) year from date of final approval and acceptance of Work, Contractor shall be required to replace all faulty materials at no additional cost to Owner.
- B. Labor and materials to fulfill requirements of this warranty shall be furnished by Contractor. All labor shall include premium time to correct any faulty material or workmanship.

1.7 QUALITY ASSURANCE

- A. All applicable ANSI, AWWA, and ASTM Standards and Specifications, and all applicable building codes and other public agencies having jurisdiction shall apply upon Work.

- B. Contractor shall be responsible for constructing entire system in complete accordance with all local codes, ordinances and laws. Any modification made to conform with said codes, laws and ordinances shall be completed at no additional cost to Owner.
- C. Protection of Existing Plants and Site Conditions: Contractor shall take necessary precautions to protect site conditions to remain. If damages are incurred, Contractor shall repair damaged item and area to its original condition at his own expense. Any disruption, destruction, or disturbance of any existing plant, tree, shrub, or turf, or any structure shall be completely restored to the satisfaction of the Owner, at no additional cost to Owner.
- D. Permits and Fees: Obtain all permits and pay required fees to any governmental agency having jurisdiction over Work. Inspection required by local ordinances during construction shall be arranged as required. On completion of Work, satisfactory evidence shall be furnished to Architect to show that all work has been installed in accordance with ordinances and code requirements.
- E. Contractor shall provide full coverage in all irrigated areas and shall be responsible for additional emitters and components as required, installed at no additional cost to Owner.
- F. On-Site Observation: At any time during installation of irrigation system, Owner and Architect may visit site to observe work underway. Upon request, Contractor shall be required to uncover specified work as directed by Owner or Designer at no additional cost to Owner. Should material, workmanship or method of installation not meet standards specified herein, Contractor shall replace the work at no additional cost to Owner.
- G. Workmanship: All work shall be installed by skilled personnel, proficient in trades required, in neat, orderly, and responsible manner with recognized standards of workmanship. Contractor shall have had considerable experience and demonstrated ability in installation of drip irrigation systems of this type.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Irrigation System: Irrigation system drip emitters, components and systems shall be provided by one of the following manufacturers or equal as approved by Architect:
  - 1. Rain Bird Sales, Inc.
  - 2. Hunter Industries.
  - 3. The Toro Company.

### 2.2 PUMP/ BACKFLOW PREVENTER

- A. Provide pump to provide water from stormwater collection system at pressure required to sustain irrigation system needs.
- ~~B. Provide additional connection with backflow preventer to city water for use during times where stormwater collection is inadequate.~~

### 2.3 PIPE AND FITTINGS

- A. Polyvinyl chloride (PVC) plastic pipe shall be continuously and permanently marked with following information: Manufacturer's name, pipe size, type of pipe and material, SDR number, ASTM number, and NSF (National Sanitation Foundation) seal.
- B. Main Lines (irrigation line on supply side of system up to the zone control valves).

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1. Pipe 4 in. diameter and less shall be Schedule 40 polyvinyl chloride (PVC) plastic pipe 1120 or 1220, NSF approved, conforming to ASTM D 1785.
  2. Pipe larger than 4 in. diameter shall be polyvinyl chloride (PVC) plastic pipe, SDR 21, 1120 or 1220, conforming to ASTM D 2241, with a minimum pressure rating of 200 psi.
  3. Plastic pipe fittings shall be polyvinyl chloride (PVC) molded fittings manufactured of same material as pipe and shall be suitable for solvent weld, slip joint ringtite seal (Schedule 40) conforming to ASTM D 2466, or threaded connections (Schedule 80) conforming to ASTM D 2464.
  4. Slipfitting socket taper shall be sized so that dry unsoftened pipe end conforming to these specifications may be inserted no more than halfway into socket. Plastic saddle and flange fittings shall not be used. Only Schedule 80 pipe may be threaded.
- C. Lateral Lines (irrigation lines from the control valves to driplines).
1. Pipe 1/2 in. diameter shall be polyvinyl chloride (PVC) pipe, SDR 13.5 conforming to ASTM D 2241 with minimum pressure rating (PR) of 315 psi.
  2. Pipe 3/4 in. diameter to 2 in. diameter shall be polyvinyl chloride (PVC) plastic pipe, SDR 21 conforming to ASTM D 2241, with minimum pressure rating (PR) of 200 psi.
  3. Pipe larger than 2 in. diameter shall be polyvinyl chloride (PVC) plastic pipe, SDR 26 conforming to ASTM D 2241, with minimum pressure rating (PR) of 160 psi.
  4. Pipe 2 in. diameter and less shall be polyethylene (PE) pipe, SDR 9, Class 160, Type III, Grade 3, Class C conforming to ASTM D 2239, with minimum pressure rating (PR) of 160 psi.
  5. Polyethylene pipe fittings shall be PVC or nylon type fitting recommended by pipe manufacturer. Fittings shall conform to NSF Standards, supplied by Harvard, Liverpool, NY, or approved equal. Joints 1-1/4 in. and greater shall be double clamped with stainless steel clamps.
- D. Copper tubing: Hard, straight lengths of domestic manufacture only Type "K" conforming to ASTM B 88. No copper tube of foreign extrusion or thin wall copper tubing shall be used.
1. Where necessary, joints shall be made with cast brass three-part compression coupling or flared tube fittings conforming to ANSI B16.26.
- E. Sleeves
1. For Control Wires: Schedule 40 PVC pipe or Schedule 40 galvanized steel pipe.
  2. For Water Lines: Schedule 40 PVC or Schedule 40 galvanized steel pipe.
  3. Sleeve size shall be at least twice the diameter of the pipe line.
- F. Adapters
1. All adapters shall be provided as required by the manufacturer, and are required to construct the proposed system.

1 ADDENDUM #5

2.4 SPRINKLERS

A. Medium Gear Driven Rotary Sprinkler

1. The gear driven rotary sprinkler head shall be designed for inground installation. The sprinkler shall be capable of covering 50 foot to 77 foot radius depending on the exact size of the nozzle. The sprinkler shall apply 5.1 to 31.3 gallons per minute of water at 40 to 100 pounds per square inch of pressure and have a recommended operating pressure of 60 PSI.

2. Water distribution shall be via two screw-in nozzles mounted in a 4 inch high pop-up nozzle turret. Nozzles shall be colored coded for easy identification.
3. An arc memory feature shall return arc to previous setting if nozzle is turned beyond setting.
4. A rubber cover shall be a standard feature on the sprinkler head.
5. Gear-drive shall be of a bi-directional, planetary, water-lubricated design and be housed in body.
6. The sprinkler shall apply water at a precipitation rate of 0.20 inches to 0.63 inches of water per hour.
7. The sprinkler shall have a 100 percent warranty for 5 years against defects and workmanship.

B. Small Gear Driven Rotary Sprinkler

1. Gear driven rotary sprinkler shall use 1 to 9 gpm at 25 to 100 psi with the recommended operating pressure at 55 psi.
2. All adjustments can be made from the top of the sprinkler. The arc adjustment can be easily seen with a red band. The top shall have a left arc indicator.
3. The nozzle turret shall have the "X-Flow" shut-off device.
4. Radius reduction shall be adjustable up to 25 percent.
5. Nozzle Height: Plus/minus 5 inches when in operation. Retraction shall be achieved by a stainless steel spring. The nozzle shall be smooth, plastic or stainless steel with an over-molded riser wiper seal shall prevent the sprinkler from having foreign materials enter the body. The top shall have a rubber cover.
6. The arc shall be either full circle or adjustable part circle adjustable from 30 to 360 degrees. The body shall be constructed of noncorrosive heavy duty plastic with a basket filter screen at the base. The top shall have a dry mode pull up slot. A continuous unidirectional rotation provides uniform coverage when set at 360 degrees. Available with a standard reversible rubber check valve.
7. Each sprinkler shall have a color coded nozzle.
8. Trajectory adjustment from 5 to 25 degrees allows for easy fine tuning.
9. The gear drive shall be planetary design. The head shall have an arc memory that returns the sprinkler to previously set arc if the head is vandalized. A slip clutch assures no damage to the gears if vandalized.

2.5 WARNING AND DETECTOR TAPE



A. Detector tape shall be solid aluminum foil core running full length and width of tape and encased in protective, high visibility, color coded inert plastic jacket. Detector tape shall be as follows:

1. Plastic jacket shall be impervious to alkalis, acids, and other chemicals in soil.
2. Foil core shall have a minimum thickness of 0.35 mils.
3. Overall thickness of the tape shall be 5.5 mils, minimum.
4. Tensile strength shall be 5,000 psi, minimum.
5. Tape width shall be 3 in., minimum.
6. Color of tape shall be "Safety Precaution Blue."
7. Tape shall be imprinted with the following legend: "Caution Buried Irrigation Line Below".

2.6 AUTOMATIC REMOTE CONTROL VALVE AND BOX



- A. Automatic remote control valves shall be pressure regulating electric remote control valves by approved manufacturer. Valve size shall not be less than size of lateral piping served.
- B. Provide one valve box for each remote control valve:
  - 1. Valve box for planter locations shall be impact resistant cyclolac plastic with locking cover and shall be black in color.
- C. Remote control valve tags shall be yellow with thermofused numbers.

#### 2.7 GATE VALVE AND BOX

- A. Gate valves 2 in. and smaller shall be cast iron body, bronze mounted with non-rising stem and working pressure rating of 200 psi.
- B. Gate valves larger than 2 in. shall be mechanical joint or flanged cast iron with non-rising stem and working pressure rating of 200 psi.
- C. Gate valves for above grade or pit use shall be supplied with wheel handles.
- D. Gate valve for underground use shall be supplied with 2 in. square operating nut.
- E. Provide one valve box for each gate valve:
  - 1. Valve box shall be impact resistant cyclolac plastic. Cover color shall be black.

#### 2.8 DRAIN VALVE AND BOX

- A. Drain valves shall be all bronze construction manual angle valves installed at low points in system.
- B. Provide one valve box for each drain valve:
  - 1. Valve box shall be impact resistant cyclolac plastic with locking cover, similar to those manufactured by Ametek, Sheboygan, WI 53081. Cover color shall be green.

#### 2.9 AIR PRESSURE DEVICE

- A. Air pressure device shall be 1 inch quick coupling valve installed on triple swing joint assembly suitable for use to purge irrigation system with compressed air.

#### 2.10 CONTROL AND GROUND WIRE

- A. Control and ground wiring shall be minimum Type "UF", #12 wire, 600 volt, solid copper, single conductor wire with PVC insulation and shall bear UL approval for direct underground burial feeder cable.
- B. Insulation shall be 1/64 in. thick, minimum, covering of ICC-100 compound for positive waterproofing protection. Control or "hot" wires shall be of one color and all common or "ground" wires shall be of another color or colors.
- C. Minimum of one extra wire for each direction of run to last valve shall be supplied. Extra wire shall be a fugitive color, loop at each valve.
- D. Wire types, connectors, splices, and installation procedures shall conform to applicable local codes.
- E. Multi conductor cable will not be acceptable.

- F. Wire splices shall be made with "scotch lock connectors" or "snip snap caps" (per title connectors) or other approved method.

2.11 QUICK COUPLING VALVES

- A. Quick coupling valves shall be 1 inch heavy duty cast brass construction, two-piece body design, with locking rubber cover. Furnish to Owner three hollow coupler keys and three swivel hose ell adapters.
1. Since this system uses non-potable water, locking rubber cover shall have molded-in warnings of "DO NOT DRINK" in English and Spanish.

2.12 AUTOMATIC CONTROLLER

- A. Controller shall be by manufacturer selected from list above.
- B. General Description: Receiver provides ET (Evapotranspiration) based information to irrigation controller. Local weather stations collect data on solar radiation, temperature, relative humidity, and wind. Paging system communicates that data directly to Weather Reach receiver that is connected to the irrigation controller. Based on project criteria, rainfall data collected on-site from rain sensor, and weather station data, Weather Reach Receiver adjusts irrigation controller to deliver the optimum amount of irrigation.
1. Provide ET based Receiver and controller.
  2. Provide external enclosure for outdoor installation.
  3. Provide pre-paid one year service.
  4. Provide Wireless Tipping Bucket Rain Gauge.

2.13 PRESSURE GAUGE

- A. Pressure gauge shall be specially constructed, hermetically sealed gauge, with neoprene, water-tight cover, with molded-in diaphragm and 2 in. shatterproof face. Gauge shall be available in six standard configurations:

0 to 15 psi	0 to 100 psi
0 to 30 psi	0 to 200 psi
0 to 60 psi	0 to 400 psi

2.14 CRUSHED STONE

- A. Crushed stone for manual drain sump and at base of valve boxes shall be durable crushed rock, free from loam, clay, or deleterious materials, and uniformly graded within following limits:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1 in.	100
3/4 in.	90-100
1/2 in.	10-50
3/8 in.	0-20
No. 4	0-5

2.15 THRUST BLOCKS

- A. Concrete for thrust blocks shall be 2500 psi, minimum, air-entrained concrete.

2.16 IRRIGATION CONTROL WIRE

- A. All electrical control and ground wire shall be irrigation control cable. All wiring used for connecting the automatic remote control valves and hydrometers to automatic independent station controllers shall be Type "UF", 600 volt, solid copper, single conductor wire with PVC insulation and bear UL approval for direct underground burial feeder cable. Insulation shall be 4/64 in. thick minimum covering of an approved thermoplastic compound for positive waterproof protection of the following sizes:
1. Control wire from independent station controllers to electric valves shall be AWG Size 14/1.
  2. Any major controller wire splices (10-12 wires) shall be in junction box.
    - a. Verify all wire types and installation procedures conform to local codes.

~~2.17 LAWN HYDRANT (IF REQUIRED)~~

- ~~A. Frost proof lawn hydrant shall be provided by one of the following manufacturers or equal as approved by Architect:~~
- ~~1. 813 LF Series by Simmons Manufacturing Company.~~
  - ~~2. Woodford Manufacturing Company.~~
  - ~~3. Merrill Manufacturing.~~

PART 3 - EXECUTION

 ADDENDUM #5

3.1 GENERAL

- A. Stake locations for each run of pipe, emitter line, valve, and valve box for review by Landscape Architect prior to trenching.
- B. Coordinate all installation with landscape planting work, especially plant locations, fine grading, and soil preparation for planting areas.
- C. Excavation required for the installation of irrigation system shall conform to ASTM F 690.
1. Trenches shall be straight and true with bottom uniformly sloped to low points.
  2. Unless otherwise required or indicated, all irrigation system lateral lines shall be installed with 18 inches minimum cover to top of pipe and all main lines with 24 inches minimum cover.
  3. Pipe crossing roadways or parking areas shall have 36 inches minimum cover.
  4. Wiring shall be installed to depth of main lines. Provide 18 inches minimum cover for wiring where not in same trench as irrigation main.
- D. Installation of polyethylene (PE) pipe by vibratory plow method shall be subject to approval by Architect.
- E. Provide sleeves where irrigation lines penetrate through walls or are installed under pavements, and where indicated on the Drawings. Sleeves shall extend 24 inches minimum beyond edge of pavement and face of wall.
1. Provide separate sleeves for water and control wire wherever possible.

3.2 PIPE, CONTROL VALVE, AND CONTROL WIRE INSTALLATION

- A. Deliver plastic pipe to site in manufacturer's packaging, stacked in such a manner as to provide adequate protection from compression and deformation of pipe ends. Protect pipe from exposure to direct sunlight.
- B. Clean pipe interior thoroughly of all dirt and foreign matter before lowering pipe into trenches. Keep pipe interiors clean during pipe installation with plugs or other approved methods. Piping shall not be installed in water or mud. Ends of pipe shall be securely closed when work is not in progress to prevent water and foreign matter from entering lines.
- C. Cut PVC pipe with hand saw or hack saw with assistance of square in sawing vise or other manner to ensure square cuts. Remove burrs at cut ends prior to installation so that smooth unobstructed flow will be obtained.
- D. Installation of plastic pipe shall conform strictly to manufacturer's recommendations and to ASTM F 690.
  - 1. Metallic fittings shall not be supported by PVC pipe. Metallic fittings shall be supported by concrete block or cradle.
  - 2. Replace plastic pipe if damaged by cutting out entire damaged area and replacing with same Schedule, Class, and type of pipe, or heavier, at no additional cost to Owner. Plastic pipe shall be thoroughly dry when replacement is made.
- E. Snake pipe in trench from side to side to allow for expansion and contraction.
- F. Threaded Joints for Plastic Pipes:
  - 1. Use Teflon tape on threaded PVC fittings except where Marlex fittings are used.
  - 2. Use strap-type friction wrench only: Do not use metal-jawed wrench.
  - 3. When connecting plastic to metal, male adapters shall be used. Male adapter shall be hand tightened, plus one turn with strap wrench. Joint compound shall be Teflon tape or equal upon approval.
- G. Threaded Joints for Galvanized Steel Pipes:
  - 1. Factory-made nipples shall be used wherever possible. Field-cut threads in pipes may be permitted only where absolutely necessary and approved by Architect; where field threading, cut threads accurately on axis with sharp dies.
  - 2. Use pipe joint compound or Teflon tape on male threads only.
- H. Joints for Polyethylene Pipes:
  - 1. Double-clamp all connections 1-1/4 inches diameter and greater.
  - 2. Make all connections between polyethylene pipes and metal valves or pipes with threaded fittings using male adapters.
- I. Connections between plastic pipe and metal valves or steel pipe shall be made with threaded fittings using plastic toe nipples or shall be made with adapters and nonhardening pipe compound applied to male threads.
- J. Solvent weld joints shall be made according to manufacturer's instructions. Joints shall be tight and inseparable. Joints shall be allowed to cure 24 hours at temperatures over 40°F before testing.
  - 1. Solvent shall be compatible with plastic material of drip lines, pipe, and fittings.
- K. Remote control valve shall be installed in valve box with locking lid. Valve box size shall be determined from following clearance requirements:

1. Clearance between top of valve and underside of valve box lid shall be 2 inches minimum and 4 inches maximum.
  2. Clearance between top of the piping and bottom of valve box and valve box knock-outs shall be 2 inches minimum. Valve box shall not rest on piping.
  3. Clearance between valve body and sides of the valve box shall be 3 inches minimum.
- L. Control wire splices shall be made at electric valve locations. Make no splices between controller and remote control valve. Lay wiring alongside pipeline. Provide looped slack at valves and snake wires in trench to allow for expansion/contraction. Tie wires in bundles at 10 foot intervals. Control wires crossing under pavements shall be installed in conduit.
1. Install minimum of one extra control wire to control valve located at greatest distance from controller in each direction and label each end.
  2. Install tag to valve wire before making final connection.
  3. Separate color coding of control wires by satellite if required.

### 3.3 INSTALLATION OF SPRINKLERS

- A. Sprinklers shall be installed per manufacturer's specifications and recommendations.

### 3.4 AUTOMATIC CONTROLLER

 ADDENDUM #5

- A. Install controller per local code, manufacturer's published instructions.
- B. Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
- C. All controllers shall be fully grounded in strict conformance with manufacturer's published grounding instructions and have full manufacturer-approved lightning protection.

### 3.5 QUICK COUPLERS

- A. Pre-assemble quick coupler swing joint using brass nipples and fittings. Use Teflon tape for all threaded joints.
- B. Discard nipples and fittings with damaged threads.
- C. Test swing joint and quick coupler by pressuring to specified main line pressure. Joints shall withstand pressure while still flexible.
- D. Glue pre-assembled quick coupler and swing joint to main line and stack quick coupler.

### 3.6 GATE VALVES

- A. Install isolation and branch gate valves directly on main for each planting zone.
- B. Where gate valves isolate branch mains of smaller size, size valve to largest main and add reducing fittings downstream of valves.
- C. Install valve and valve box to finish grade in locations approved by Architect.

3.7 SLEEVES

- A. Furnish and install sleeves in locations approved by Architect. Sleeves shall be of size specified herein, and shall extend 24 inches beyond edge of walls or pavements, as applicable.

3.8 CONTROL WIRE INSTALLATION

- A. Install control wires 18 inches minimum below finish grade and lay alongside main line. Provide 24 inches minimum of looped wire slack at valves and snake wires in trench to allow for contraction of wires. Tie color-coded wires in bundles at 10 foot intervals. Lay wire in trench prior to pipe installation. Wire shall be beneath and 6 in. to side of main line pipe.
- B. All underground splices shall be made at electric valves in valve boxes. Solder splices and coat with elastomeric waterproof cement. Wrap with electrical tape and coat again with elastomeric waterproof cement.
- C. All wire passing under existing and future paving and construction shall be encased in Schedule 40 PVC conduit extending 12 inches minimum beyond edges of paving and stabilized for construction. All wire in plant beds shall be placed in 3/4 inch Class 160 PVC with 18 inches minimum cover. Installation procedures shall conform to all local codes.
- D. Electrical connections to electrical control devices shall be made with RAINBIRD Pen-Tite connectors, or equal.

3.9 VALVE AND VALVE BOX INSTALLATION

- A. Gate Valves: Install in locations approved by Architect.
- B. Quick Coupler Valves: Shall be installed on main line pipe in locations approved by Architect. Connection between main line and quick coupler valve shall be with threaded Schedule 40 PVC pipe and triple swing joint.
- C. Electric Control Valves: Shall be installed in specified valve boxes. Valve shall have 6 inches of 3/4 inch pea gravel installed below bottom of valve. If valve box does not extend to base of valve, valve box extension shall be installed. Electric control valves shall be installed in locations approved by Architect and grouped together where practical. Contractor shall place no valve closer than 36 inches to walk edges, buildings and walls. Contractor shall adjust the valve to provide flow rate and rated operating pressure required for each dripline circuit.
- D. Valve Boxes: Prior to installation meet with Landscape Architect on site to review final placement of valve boxes.

3.10 THRUST BLOCK INSTALLATION

- A. Install thrust blocks at tees, bends, and at ends of all main line pipe. Care shall be taken to install concrete on the fittings and away from joints of pipe. Control, power and valve wires must be kept free of concrete and placed outside and away from thrust block. Thrust blocks shall be poured against undisturbed ground. No precast thrust blocks will be allowed.

3.11 PAINT

- A. Designated equipment shall be painted black. Contractor shall provide paint sample for approval prior to execution of painting work.

3.12 TESTING AND COMPLETION

- A. Test irrigation system for leakage prior to backfilling of piping. Leakage test shall be at 100 psi pressure at furthest point of system being tested for one hour minimum period. System shall be accepted only if no leakage or loss of pressure occurs.
  - 1. Main lines consisting of gasketed pipe, 2 in. diameter and greater shall be pressurized for 12 to 14 hours to test for leakage.
- B. Contractor shall instruct Owner's designated personnel in proper operation of irrigation system, including programming controller and valves.

3.13 BACKFILL AND COMPACTING

- A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of debris.
- B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95% density under pavements, 85% under planted areas.
- C. Dress off all areas to finish grades.

3.14 PRESSURE SETTING

- A. Prior to final inspection Contractor shall adjust each remote control valve to an agreed operating pressure by installing temporary pressure gauge on schrader valve and making necessary adjustments while valve is operating.

3.15 SEASONAL SHUTDOWN

- A. At end of first irrigation season, Contractor shall fully drain system by use of compressed air (600 CFM or larger; do not exceed 50 psi) and shutdown for season.
- B. Electro-Mechanical Controllers: A.C. power shall remain on at controller and place manual/automatic switch in manual position.
- C. Solid State Control Systems: Winterize in accordance with manufacturer's printed instructions for geographic area.
- D. Contractor shall instruct Owner's designated personnel in proper seasonal shutdown procedures.

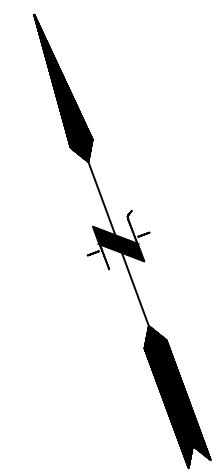
3.16 SEASONAL START UP

- A. Prior to start of second irrigation season, Contractor shall restart, check, and repair system as required. This start up procedure shall include but not be limited to:
  - 1. Testing of all system components, (valves, drip lines, controllers, quick coupling valves, piping, etc.) for proper working order.
  - 2. Adjustments, repair, and replacement of all system components that are not in proper working order.
  - 3. Instruction of Owner's designated personnel in proper seasonal start up procedures.

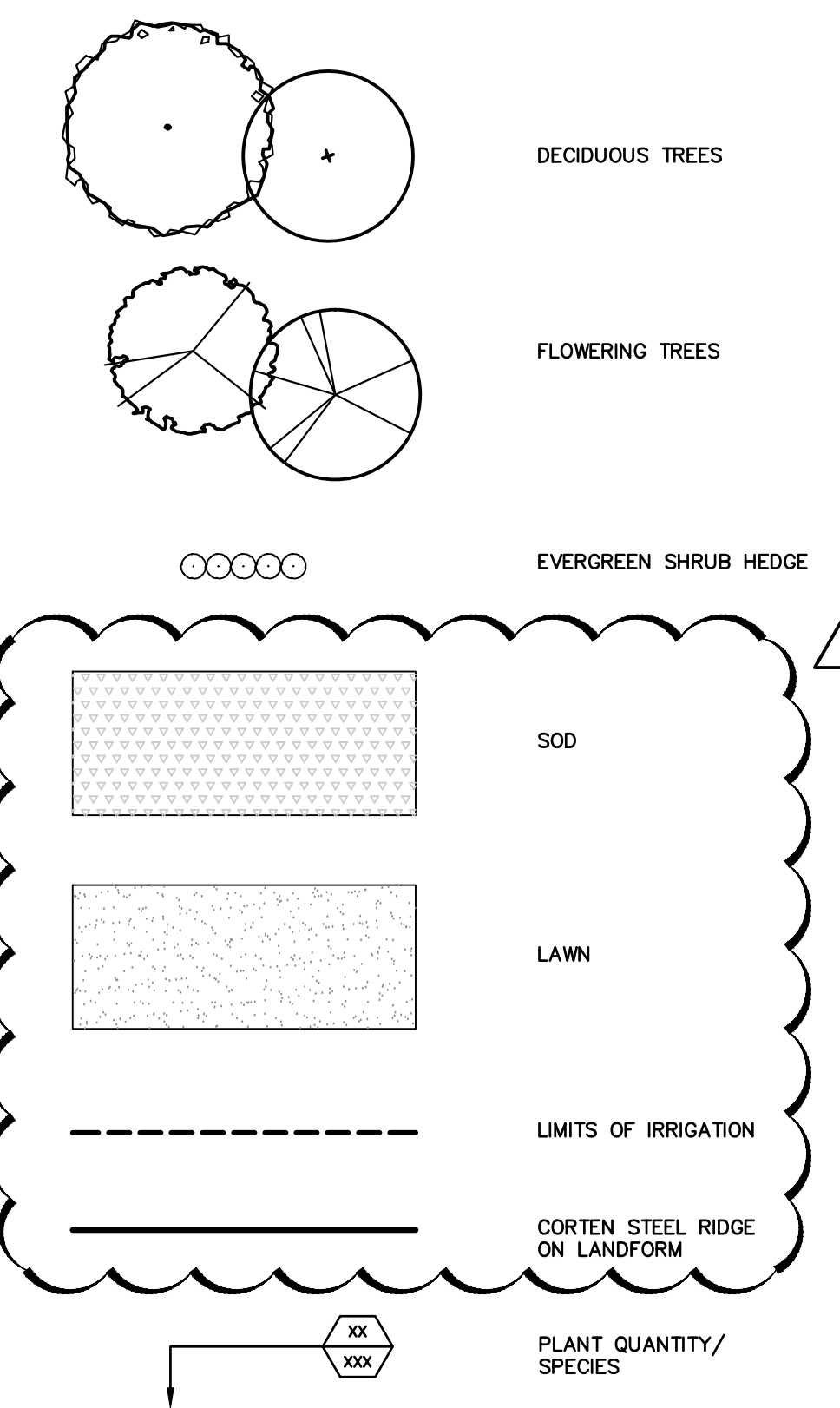
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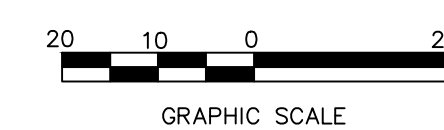


**PLANTING NOTES:**

- ALL PLANTING MATERIAL TO BE NURSERY GROWN STOCK SUBJECT TO A.A.N. STANDARD.
- THE CONTRACTOR SHALL SUPPLY ALL PLANTS IN QUANTITIES SUFFICIENT TO COMPLETE THE WORK SHOWN ON THE DRAWINGS AND LISTED IN THE PLANT LIST. IN THE EVENT OF A DISCREPANCY BETWEEN QUANTITIES SHOWN IN THE PLANT LIST AND THOSE REQUIRED BY THE DRAWINGS, THE LARGER NUMBER SHALL APPLY.
- ALL PLANTS SHALL BE APPROVED PRIOR TO INSTALLATION AND SHALL BE LOCATED ON SITE BY THE CONTRACTOR FOR THE APPROVAL OF THE LANDSCAPE ARCHITECT. ANY INSTALLATIONS WHICH WERE NOT APPROVED BY THE LANDSCAPE ARCHITECT AND WHICH ARE SUBSEQUENTLY REQUESTED TO BE MOVED WILL BE DONE AT THE CONTRACTOR'S EXPENSE.
- PREPOSE LOCATION OF ITEMS NOT DIMENSIONED ON THE PLAN ARE TO BE FIELD STAKED BY THE CONTRACTOR AND SHALL BE SUBJECT TO THE REQUIREMENTS SPECIFIED IN THE PREVIOUS NOTE.
- ALL SHRUB MASSINGS AND TREE PITS SHALL BE MULCHED TO A DEPTH OF 3" WITH SHREDDED PINE BARK MULCH.
- TREES SHALL NOT BE STAKED UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGED VEGETATION AND SHALL REPLACE OR REPAIR ANY DAMAGED MATERIAL AT HIS OWN EXPENSE. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 PRIOR TO CONSTRUCTION.
- ALL SHRUB AND GROUND COVER PLANTING AREAS SHALL HAVE CONTINUOUS BEDS OF TOPSOIL 12" DEEP. ALL SOD AND HYDROSEED AREAS SHALL HAVE A MINIMUM TOPSOIL BED OF 6".
- THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES IN THE FIELD. WHERE PLANT MATERIAL MAY INTERFERE WITH UTILITIES, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT TO COORDINATE THEIR INSTALLATION.
- FOR PLANTING SOIL MIX, SEE SPECIFICATIONS.
- ALL EXISTING RILL, GULLY OR CHANNEL EROSION SHALL BE FILLED WITH APPROPRIATE BACKFILL MATERIAL, FINE RAKED, SCARIFIED AND STABILIZED WITH APPROPRIATE VEGETATIVE MATERIAL AND / OR APPROPRIATE SEDIMENTATION AND EROSION CONTROL MEASURES.
- ADJUSTMENTS IN THE LOCATION OF THE PROPOSED PLANT MATERIAL AS A RESULT OF EXISTING VEGETATION TO REMAIN SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE REPAIR AND REPLACEMENT OF PLANT MATERIAL AS REQUIRED, FOR THE DURATION OF THE PROJECT AND SUBSEQUENT WARRANTY PERIOD.
- PLANTINGS INSTALLED IN THE DRY SUMMER MONTHS AND / OR LAWN SEEDED OUT OF SPRING OR FALL PERIODS, IF ALLOWED BY OWNER, WILL REQUIRE AGGRESSIVE IRRIGATION PROGRAMS AT THE CONTRACTOR'S EXPENSE, UNLESS OTHERWISE DIRECTED BY THE OWNER.
- UPON COMPLETION OF PLANTING, REMOVE FROM SITE ALL EXCESS SOIL, MULCH, AND MATERIALS AND DEBRIS RESULTING FROM WORK OPERATIONS. CLEAN UP SHOULD BE COMPLETED AT THE END OF EACH WORKING DAY. RESTORE TO ORIGINAL CONDITIONS ALL DAMAGED PAVEMENTS, PLANTING AREAS, STRUCTURES AND LAWN AREAS RESULTING FROM LANDSCAPE OPERATIONS.
- CONTRACTOR SHALL SURVEY, LOCATE, AND PROTECT ALL TREES WITHIN AREAS SHOWN AS "EXISTING VEGETATION TO REMAIN" WITHIN THE DEVELOPMENT ENVELOPE FOR REVIEW BY L.A. PRIOR TO CLEARING OPERATIONS.
- CONTRACTOR TO RESEED ALL DISTURBED AREAS.

**PLANT LIST**

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
<b>TREES</b>				
CC	CERCIS CANADENSIS	EASTERN REDBUD	2	2" - 2.5" CAL.
CF	CORNUS FLORIDA 'CONSTELLATION'	FLOWERING DOGWOOD	5	2" - 2.5" CAL.
GB	GINKGO BILOBA 'PRESIDENTIAL GOLD'	GINKGO	6	3.5" - 4" CAL.
NS	NYSSA SYLVATICA	BLACK TUPELO	5	3.5" - 4" CAL.
<b>SHRUBS</b>				
TM	TAXUS X MEDIA 'HICKSI'	HICKSI YEW	52	3 GAL.
<b>PERENNIALS/GRASSES/GROUNDCOVERS</b>				
AT	AMSONIA TABERNAMONTANA 'SHORT STACK'	DWARF BLUE STAR	170	1 GAL.
BM	BRUNNERA MACROPHYLLA	SIBERIAN BUGLOSS	6	1 GAL.
HF	HOSTA 'FIRE ISLAND'	FIRE ISLAND PLANTAIN LILY	12	1 GAL.
PA	PENNISETUM ALOPECUROIDES 'HAMEL'	DWARF FOUNTAIN GRASS	30	1 GAL.
PL	PENNISETUM ALOPECUROIDES 'LITTLE BUNNY'	MINIATURE FOUNTAIN GRASS	28	1 GAL.
SN	SALVIA NEMEROSA 'MARCUS'	COMPACT MEADOW SAGE	50	1 GAL.
SS	SEDUM SPECTABILE 'BRILLIANT'	BRILLIANT STONECROP	56	1 GAL.



drawing title <b>LANDSCAPE PLAN</b>		STATE OF CONNECTICUT DEPARTMENT OF ADMINISTRATIVE SERVICES DIVISION OF CONSTRUCTION SERVICES	
HISTORY OF SUBMISSIONS		drawing prepared by <b>FUSS &amp; O'NEILL</b> 146 HARTFORD ROAD MANCHESTER, CT 06040	
mark	date	description	date
	1.01.2017	EARLY RELEASE DEMONSTRATION	06.15.2017
	2.15.2017	EARLY RELEASE PRECAST/ASPH EX	
	6.15.2017	ISS DOCUMENTS	scale 1"=20'
1	6.30.2017	ADDENDUM 1	drawn by
EARLY PACKAGE REVISIONS		project	approved by
		STATE OFFICE BUILDING RENOVATIONS AND NEW PARKING GARAGE	
		165 CAPITOL AVENUE HARTFORD, CT 06103	drawing no.
		project no. 20130583_LND01 BI-2B-381	<b>LP-101</b>