

**WOLFEBORO PUBLIC LIBRARY
FRONT PLANTING
WOLFEBORO, NH
JULY 2024**

TECHNICAL SPECIFICATIONS

PREPARED FOR: WOLFEBORO PUBLIC LIBRARY

Horsley Witten Group
Sustainable Environmental Solutions



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SECTION 31 10 00 - SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Removing surface debris.
 - 2. Clearing and grubbing lawn area as indicated on Drawings.
 - 3. Excavating and stockpiling topsoil.
- B. Related Sections:
 - 1. Section 31 25 00 - Erosion and Sediment Control

1.2 QUALITY ASSURANCE

- A. Conform to applicable permits, codes and regulations for environmental requirements, disposal of debris and soil removal from the Project Site.
- B. Prior to the commencement of work, obtain the Owner's approval of the limit of work and staging and stockpile area.

PART 2 PRODUCTS (not applicable)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Contractor shall walk the site with a Library representative to verify existing plants designated to be removed, remain, or relocated

3.2 PREPARATION

- A. Dig Safe at 1-888-DIG-SAFE (1-888-344-7233) or Call Local Utility Line Information service not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Prior to altering any utilities, obtain consent of utility service provider.
 - 1. Arrange with the utility service providers to shut off utilities to be disturbed as indicated on the Drawings and inform Owner and/or Engineer of anticipated interruption.

3.3 PROTECTION

- A. Locate, identify, and protect utilities from damage.
- B. Protect existing trees, plant growth, and features designated to remain.

3.4 CLEARING AND GRUBBING

- A. Remove lawn areas as indicated on Drawings.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain.
 - 2. If necessary, cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct new construction.
- B. Fill depressions created by clearing and grubbing operations.

3.5 REMOVAL

- A. Remove and properly dispose of cleared material.
- B. Remove all surplus soil and unsuitable soil.
- C. Remove all cleared debris from site.
- D. Continuously clean-up and remove trash, construction debris and waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave the site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Remove sod/grass before excavation of topsoil.
- B. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded, to the depths encountered without mixing with underlying soils and foreign materials for use in finish grading.
 - 1. Remove trash, debris, weeds, roots, and other waste materials from stockpiled topsoil.
 - 2. Do not excavate wet topsoil.
- C. All topsoil to remain on site. Transport topsoil and place in small stockpiles in locations requiring placement of topsoil.
- D. As necessary, stockpile in area designated by the owner on site to a height not exceeding 8 feet and protect from erosion.
 - 1. Stockpile soil on impervious surface.
 - 2. Do not stockpile within the tree root zones.
 - 3. Do not intermix with subsoil or other construction material stockpiled on site.
 - 4. If deemed necessary by the Owner, Cover to prevent windblown dust contamination by air borne weed seed.
 - 5. Install temporary erosion control barriers for all stockpiled soil to protect adjacent properties and/or resource areas.
- E. Do not remove excess topsoil from the Project site without prior owner approval.

END OF SECTION

SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary to install proper control measures to prevent erosion, siltation and sedimentation of the Project site and adjacent and off-site areas.
- B. Related Sections:
 - 1. Section 31 10 00 - Site Clearing.
 - 2. Section 32 16 13 – Granite and Fieldstone
 - 3. Section 32 91 19 - Landscape Grading.
 - 4. Section 32 92 19 – Seeding.

1.2 SUBMITTALS

- A. Product Data: Product Data: Submit data on siltation fence, tubular sediment barrier, erosion control blanket, erosion control turf reinforcement matting, Bonded fiber matrix, Catch basin inserts, each type of proprietary erosion control devices, geotextile.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with requirements of Section 31 10 00 and Section 32 91 19.
- B. Perform Work in accordance with the requirements of all town, state, and federal requirements for stormwater treatment and protection.

PART 2 PRODUCTS

2.1 MATERIAL

- A. Silt Fence: Prefabricated unit consisting of the following:
 - 1. Requirements:

a. Grab Tensile Strength (lbs./in.)	90	ASTM D1682
b. Elongation at Failure (%)	50	ASTM D1682
c. Mullen Burst Strength (psi)	190	ASTM D3786
d. Puncture Strength (lbs)	70	ASTM D751
e. Equivalent Opening Size	40-80	US Std Sieve CW-02215
f. Ultraviolet Radiation Stability (%)	90	ASTM G26
 - 2. Manufacturers:
 - a. Tencate - Mirafi Envirofence
 - b. Contech
 - c. Propex Geotex
- B. Tubular Sediment Barrier: Tubular netting filled with water permeable compost material meeting the following requirements:
 - 1. Compost:

- a. Derived from a well-decomposed source of organic matter.
 - b. Free of weeds, refuse, contaminants, or other materials toxic to plant growth. Non-composted products will not be accepted.
2. Tubular Netting:
- a. One continuous barrier.
 - b. 12 inches in diameter.
 - c. Equal to the following:
 - 1) Silt Soxx Natural + by Filtrexx
 - 2) FilterMitt by Groundscape Express, Inc.
 - 3) Approved Equal
- C. Stakes: Natural wood. Length, size, and diameter as required in Drawings.
- D. Catch basin Inserts: permeable geotextile fabric that mounts under the grate of catchbasins.
1. ACF Environmental Silt Sack
 2. UltraTech International, Inc. Ultra-Drain Guard
 3. Enpac 1341 Catch Basin Insert
- E. Permanent Seeding Materials
1. Seeding: as specified in Section 32 92 19.
- F. Hydro Mulch: as specified in Section 32 92 19.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify compacted subgrade granular base stabilized soil is acceptable and ready to support devices and imposed loads.
- B. Verify gradients and elevations of base or foundation for other work are correct.

3.2 PREPARATION

- A. Install control measures prior to construction to prevent erosion, siltation and sedimentation of construction areas, adjacent areas, and off-site areas in the following work areas:
 1. Soil stockpiles, storage, and staging areas.
 2. Cut and fill slopes and other stripped and graded areas.
 3. Constructed and existing swales and ditches.
 4. Bioretention areas, detention ponds, infiltration basins and other stormwater controls.
 5. As indicated on Drawings
- B. Provide additional means of erosion and sediment control as required for continued or unforeseen erosion problems.

3.3 GENERAL

- A. Install and maintain site erosion and sediment controls as indicated on Drawings

3.4 SILT FENCING

- A. Excavate a trench along the upstream side of the desired fence location as indicated on Drawings.
- B. Install fence, staked at a maximum 4-foot intervals in locations indicated on Drawings.
- C. Lay silt fence into the trench as indicated on Drawings. Backfill trench and compact.
- D. Overlap joints in silt fencing, as indicated on Drawings, to prevent leakage of silt at seams.

3.5 TUBULAR SEDIMENT BARRIER

- A. See Drawings and manufacturer's recommendations for installation.

3.6 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Provide appropriate temporary stabilization of any disturbed area on which activity has ceased and which will remain exposed for more than 14 days.
 - 1. Provide temporary seed mix with application rates according to the State of New Hampshire DOT Standard Specifications.
 - a. Water the seeded areas as required until satisfactory establishment.
 - 2. During non-germinating periods, apply mulch at recommended rates.
- D. Provide permanent stabilization of disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with permanent seeding specifications or as indicated on Drawings with one of the following:
 - 1. Application of Bonded Fiber Matrix hydroseed seed mix as specified.
 - 2. Placement of erosion control blanket as indicated on Drawings.
- E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.7 CATCHBASIN INSERTS

- A. As indicated on Drawings and/or manufacturer's recommendations for installation.

3.8 FIELD QUALITY CONTROL

- A. Inspect erosion and sediment control devices and stabilized slopes on a weekly basis and after each rainfall event of .25 inch or greater. Make necessary repairs of identified problems within 24 hours to ensure erosion and sediment controls are in good working order. Reset or replace materials as required.
- B. When field visits indicate Work does not meet specified requirements, repair and/or replace Work.
- C. Any deviation from the requirements provided must be approved by the Owner.

3.9 CLEANING

- A. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment barrier or device, remove, and dispose of sediment.
- B. Do not damage the structures or device during cleaning operations.
- C. Do not permit sediment to erode into construction or site areas or natural waterways.
- D. Clean channels when depth of sediment reaches approximately one-half channel depth.

3.10 PROTECTION

- A. Do not permit construction traffic over stabilized areas.
- B. Protect Project site stabilization from elements, flowing water, or other disturbance until vegetation established.

END OF SECTION

SECTION 32 16 13
GRANITE CURB AND STEPPINGSTONES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Granite curbs
 - 2. Steppingstones Pavers
- B. Related Requirements:
 - 1. Section 31 20 00 – Earth Moving.

1.2 COORDINATION

- A. Coordinate the Work with pavement placement for road, parking areas and sidewalks.

1.3 SUBMITTALS

- A. Product Data: Submit unit configuration, dimensions, and installation instructions.
- B. Shop Drawings: Indicate layout of curbs, dimensions of paved areas, elevations, and affected adjacent construction.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver and protect in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

2.1 GRANITE CURB

- A. Curb to be vertical granite in the locations shown in the Drawings
- B. Match existing curb as to color, appearance, and dimensions.
- C. Furnish curbs with sawed top, split face and ends. Straight pieces to be a minimum of 3 feet long. Curb segments on curves with radius of 100 feet or less to be shaped to the required curvature, with the ends split on radial lines.
- D. Indicated dimensions for curb segments to not vary more than 2 inches for depth and 1 inch for width.
- E. Top and front surfaces to be true planes at right angles to each other, as seen with a straight edge. No projection greater than 3/4 inch or depression greater than 1/2 inch on the split surfaces will be acceptable. Top surface to not vary more than 1/8 inch.
- F. Drill holes will not be permitted in exposed curb surfaces.

G. Curb Foundation and footing: As indicated on Drawings.

2.2 CONFIGURATION

- A. Nominal Size: 18 inches high, 4 inches wide.
- B. Profile: Rectangular cross section with sloped vertical faces, square ends.

2.3 CEMENTITIOUS MATERIALS

- A. Portland Cement: ASTM C150 Type I, grey color.
- B. Sand: ASTM C33; sharp, coarse, clean, screened sand, free of organic material.
- C. Premixed Grout Mortar
- D. Water: Potable, not detrimental to mix.
- E. Color: Mineral type, non-fading.

2.4 MIXES

A. Cementitious Bed: Portland cement mix conforming to the following:

Property	Value
Compressive Strength (28 day)	3000 psi
Slump	3 to 4 inches
Air Entrainment	5 to 7 percent

B. Joint Mortar: Portland cement mix conforming to the following:

Property	Value
Compressive Strength (28 day)	3000 psi
Slump	1 to 2 inches
Air Entrainment	5 to 7 percent

- C. Add admixtures to cementitious mixes.
- D. Thoroughly mix ingredients in quantities needed for immediate use.
- E. Use cementitious mixes within two hours after mixing. Do not re-temper.

2.5 STEPPINGSTONES

- A. Steppingstones to be locally sourced and of a natural color endemic to the area
- B. Dimensions: As shown in the Drawings.
- C. No walking surface shall have variations no greater than 1/4" across the face of the stone.
- D. Steppingstone Foundation and footing: as indicated on Drawings.

EXECUTION

2.6 PREPARATION

- A. Confirm subbase has been properly compacted to 95% compaction.

2.7 CURB INSTALLATION

- A. Install curb as indicated on Drawing.
- B. Set curb to line and grade on a foundation of one cubic foot dense grade gravel for each linear foot of curb installed or as shown in the Drawings. Ram all spaces under the curb so that it is completely supported throughout the entire length.
- C. Provide curb expansion joints at 5' O.C.
- D. Butt curb joint sections together to provide a tight joint. Carefully fill the joints between curbstones (both front and back) or edging with cement mortar and neatly point on the top, front and back. After pointing the curbstones or edging, clean all excess mortar forced out of the joints.
- E. Maximum joint width tolerance: 3/8 inches to 1/2 inches.
- F. Install subbase material as shown in the Drawings.
- G. Install joint sealer where curb abuts existing walls, posts, buildings, and fixed structures or appurtenance.
- H. All curbs are to be installed at the reveal and slope as shown in the Drawings.
- I. Install transition curb at all curb endings as indicated on Drawings.
- J. Install units without damaging the shape or finish. Replace or repair damaged units.

2.8 STEPPINGSTONES INSTALLATION

- A. As indicated on the Drawings.
- B. Maximum surface tolerances between individual stones: 3/8 inches to 1/2 inches.
- C. Install units without damaging the shape or finish. Replace or repair damaged units.

END OF SECTION

SECTION 32 91 19 - LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Final grade topsoil for finish landscaping.
- B. Related Sections:
 - 1. Section 31 00 00 – Site Clearing.
 - 2. Section 31 25 00 – Erosion and Sediment Controls.
 - 3. Section 32 92 19 - Seeding.
 - 4. Section 32 93 00 – Plants.

1.2 REFERENCES AND STANDARDS

- A. AOAC: Association of Official Agricultural Chemists.
- B. ASTM International: American Society of Testing Materials International.
- C. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- D. ASTM International:
 - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m^{3 - 2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m^{3 - 3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).}}

1.3 SUBMITTALS

- A. Topsoil
 - 1. Soil Analysis:
 - a. Reports indicating and interpreting test results for complete topsoil and soil components.
 - b. All Tests performed in accordance with current standards of the Association of Official Agricultural Chemists or other testing laboratory as approved by the Landscape Architect. See Section 1.4 Quality Assurance for soil sampling procedures
 - c. Testing reports to include the following for the stockpiled topsoil and finished planting soil that may or may not be amended in order to meet the specifications:
 - 1) Mechanical gradation (sieve analysis) and USDA soil classification
 - 2) Percent organic matter
 - 3) Chemical analysis for the following elements:
 - a) Soluble salts.
 - b) Carbon: nitrogen ratio
 - c) Potassium
 - d) Phosphorus
 - e) Magnesium

- f) Calcium
 - g) Acidity (pH)
 - h) Testing for the following heavy total metals as required by the USEPA
 - (1) Lead, Nickel, Cadmium, Zinc, Copper, arsenic and selenium.
2. Soil analysis to include amendment recommendations for the following:
- a. Turf/Lawn
 - 1) Lawn-New Establishment
 - b. Home Grounds, Gardens, & Landscaping
 - 1) Deciduous Trees, Shrubs & Vines-New Establishment
 - 2) Needle Leaf Trees & Shrubs-New Establishment
3. Submit reports at least one (1) month before any delivery of materials.
4. Submit topsoil soil analysis results to the following for confirmation of recommended soil amendments:
- a. Landscape Architect
 - b. Owner
 - c. Landscape Contractor
 - d. Seed supplier

B. Samples:

- 1. Topsoil: Submit 2 lb. sample of topsoil to the Landscape Architect.

C. Materials Source: Submit name of imported materials source.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work.

B. Prior to delivery or spreading, submit a minimum of two (2) approved sample test results of planting soil from each proposed location or source.

- 1. Mix and obtain composite topsoil samples for testing to ensure the topsoil conforms to the specifications. Collect composite samples from the stockpiles and source or material to be delivered to the site. Submit prototype topsoil mixes to Laboratory at least 30 days before intended use on site, to allow for reformulation and retesting if test results are rejected.
- 2. Provide samples to both Landscape Architect and testing laboratory and have testing report sent directly to the Landscape Architect.

C. Do not order or deliver materials until required samples, certifications, manufacturers' literature, and test results have been reviewed by the Landscape Architect or Engineer. Delivered materials must be from the same source as the submitted samples.

D. The Landscape Architect **or** Engineer may compare each soil delivery to the site with submission samples. Any deviations from the approved materials identified will require resubmission and further testing be performed. The Landscape Architect or Engineer reserves the right to reject on or after delivery any material that does not meet specifications or match approved samples. Use of unapproved topsoil will result in rejection and removal.

E. When tests indicate materials do not meet specified requirements, change material and retest.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Weather Limitations: Proceed with grading only when existing and forecasted weather conditions permit.

PART 2 PRODUCTS

2.1 MATERIAL

- A. Topsoil Source:
1. Reuse surface soil stockpiled on-site if adequate stockpile areas are available.
 2. Supplement with imported topsoil from off-site sources when on-site reusable quantities are insufficient.
 3. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least four inches deep; do not obtain from agricultural land, bogs, or marshes.
- B. Topsoil:
1. Reusable excavated and /or Imported borrow
 - a. Fertile, friable, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds, and roots.
 2. USDA Textural Classification: Sandy Loam.
 3. Acidity range (pH) of 5.5 to 7.0.
 4. Containing the minimum of 4 percent and maximum of 10 percent inorganic matter by weight.
 5. Soluble salt content (Electrical Conductivity):
 - a. Conductivity not to exceed 900 ppm (0.9 mmhos/cm) in soil.
 - 1) Naturally, Stripped Topsoil: .01-.25 mmhos/cm
 - 2) Loam borrow manufactured from organic compost: not to exceed levels recommended for the specific plantings (.01-.75 mmhos/cm)
 - b. Salt content will lower the longer the soil is spread on site, with rain and aging of the organic component. If salt content of the topsoil is too high, as determined by the Landscape Architect or Engineer, the salt content must be within approved ranges by the time the soil is spread on site and plants installed, or planting will be delayed, or soil rejected and will require replacement with an approved planting soil.
 6. Nutrient Ranges:
 - a. Magnesium: 60-200 ppm
 - b. Phosphorus: 10- 100 ppm.
 - c. Potassium to exceed 120 – 300 ppm.
 7. Reasonably free of roots, rocks larger than 1/2-inch, subsoil, debris, large weeds, and foreign matter.
 - a. Screening: Single screened.
 8. Free of other extraneous materials harmful to plant growth.
- C. Organic matter proposed as a soil amendment: Natural or manufactured mature, composted organic material
1. Produced by an approved composting vendor of material originating from mature leaf compost, mature composted animal manure, other aged, composted vegetable materials such as brewer's waste, or chemically tested toxin-free processed sludge products (biosolids), composted with wood products, safe for plants, humans, and soil organisms (Class A or Type I).

2. Organic matter manufactured from sludge and other biowaste materials or manure to be aged for at least one (1) year without exception and have no objectionable biowaste odor.
3. Do not use raw (uncomposted or unprocessed) or incompletely composted organic matter. Refer also to requirements included in Section 32 93 00 – Plants for Soil Amendments for Planting Soil.

2.2 SOURCE QUALITY CONTROL

- A. Prior to delivery, analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- B. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.
- C. All topsoil delivered to the site must match the samples approved by the Landscape Architect or Engineer. Additional testing of topsoil delivered to the site will be required if it does not appear to be consistent with previously tested samples.
- D. When tests indicate materials do not meet specified requirements, change material and retest.
- E. Furnish materials of each type from the same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of rough grading has been contoured and compacted before starting work.
- B. Verify compliance with requirements and conditions affecting performance of work of this Section prior to starting any work. Report any defect, such as incorrect grading, incorrect subgrade elevations, improper compaction, or drainage problems, to the Landscape Architect or Engineer prior to beginning Work. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of Work indicates acceptance of filled subgrade areas and responsibility for Work.
 1. When conditions detrimental to work are encountered including, but not limited to, incorrect grading, adverse drainage conditions, poor soil conditions, or invasive species problems, immediately notify the Owner and/or Landscape Architect or Engineer before beginning any Work.
- C. Verify the location of the irrigation system and protect during operations.

3.2 PREPARATION

- A. Coordinate topsoil placement with other Work of this contract being performed on the Project site.
- B. Protect landscaping and other features remaining as final Work.
- C. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.
- D. Immediately notify Landscape Architect or Engineer if adjustments in grades and alignments are necessary to avoid interference with unforeseen conditions encountered.

- E. Protect subgrade areas scheduled for planting or stormwater infiltration systems from traffic and erosion.

3.3 SUBGRADE PREPARATION

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size.
- C. Remove contaminated subsoil.
- D. Scarify surface to depth of 6 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

- A. Place topsoil in areas where seeding and planting is required. to nominal depth of 6 inches. Place topsoil during dry weather. Do not spread if either the topsoil or subgrade is frozen, muddy, compacted or excessively wet.
- B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade. Fill depressions caused by settlement with additional topsoil and regrade and rake until a smooth and even finished grade is created.
- C. Remove roots, weeds, rocks, and foreign material while spreading.
- D. Manually spread topsoil close to plant material, building, and walkways to prevent damage.
- E. Lightly compact placed topsoil.
- F. Remove surplus subsoil and topsoil from site.
- G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 COMPACTION

- A. Planting areas to be drill seeded or hydroseeded: Roll and compact bed before seeding. Compact with a roller or other suitable means to achieve a maximum dry density of 88 to 90% for the placed loam in accordance with compaction standards of ASTM D1557, Method D.
- B. Areas to be hand seeded: Smooth surface to meet finished grades with raking and broadcast seed according to requirements specified. Compact with rolling after seeding.
- C. Do not over compact, or loosening and re-rolling of the soils will be required. Adjust the compaction of the soil by soil type within the required maximums, with less compaction preferred in finer soils.

3.6 TOLERANCES

- A. Top of Topsoil: Plus or minus 1/2 inch.
- B. Evenly grade slopes with smooth lines and grades.

3.7 PROTECTION OF INSTALLED WORK

- A. Prohibit construction and foot traffic over topsoil.

END OF SECTION

SECTION 32 92 19 - SEEDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing.
 - 2. Seeding.
 - 3. Hydroseeding.
 - 4. Mulching.
 - 5. Maintenance.

- B. Related Sections:
 - 1. Section 32 91 19 - Landscape Grading.
 - 2. Section 32 93 00 - Plants.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

1.3 DEFINITIONS

- A. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SUBMITTALS

- A. Seed Mix: No seed may be sown until the Contractor has submitted the following:
 - 1. Materials Source: Submit name of seed source.
 - 2. Product Data: Submit data for the following:
 - a. Seed mixes
 - b. Fertilizer
 - c. Mulch
 - d. Lawn herbicides and pesticides (only if required)
 - e. Other amendments

- B. Manufacturer's Certificate: Certify Seed mix meet or exceed specified requirements for the following:
 - 1. Seed mixes
 - a. Guaranteed percentage of purity, weed content and germination of the seed, and the net weight and date of shipment and pounds per acre sowing rate.
 - b. Fertilizer

- C. Maintenance Schedule: Provide watering, fertilizing and mowing schedule to the Owner and Landscape Architect for approval.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.6 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.
- B. If required, only use herbicides, pre-emergents, fertilizers, fungicides, and pesticides reviewed and approved by the Landscape Architect. Application to be performed by a licensed professional according to manufacturer's recommendations.
- C. Select compatible products where options are provided

1.7 QUALIFICATIONS

- A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing work of this section with a minimum of 5 Year experience and with a record of successful grass establishment.
 - 1. Installer to provide an experienced supervisor on the project site during all times that landscape construction is in progress. Provide written qualification data for firms and persons to be responsible for Work, to demonstrate their capabilities and experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Planting Restrictions: Plant during one of the following periods:
 - 1. Mown lawns
 - a. Spring: April 1 - June 1
 - b. Fall: August 15 – October 15
 - 2. Conservation
 - a. Spring: April 1 - June 1
- B. Seeding before or after the above referenced planting dates will increase the likelihood of grass seed establishment failure. Any deviation from the above referenced planting dates is undertaken at sole risk of the contractor and it is the responsibility of the contractor to provide any additional maintenance and watering which may be required to ensure satisfactory plant and seed establishment.
- C. Seeding outside of season to occur only with permission of the Landscape Architect and may result in reseeding the following season until satisfactory seed establishment is provided. Acceptance will not be given to areas seeded outside of season until satisfactory grass has been established. Out-of-season seeding during hot weather will require additional watering and shade mulching with netted hay-type erosion control fabric.
- D. Seeding under frozen conditions in either the spring or fall will not be permitted.

1.10 GRASS ESTABLISHMENT

- A. Satisfactory Seeded Grass: A healthy, uniform close stand of grass free of surface irregularities with coverage exceeding 90 percent over any 10 sq. ft. scattered bare spots, none of which are larger than 72 square inches, will be allowed up to a maximum of 2% of any lawn area.
- B. Upon completion of the minimum maintenance period, request, in writing, an inspection by the Landscape Architect to determine whether satisfactory seed growth has been established. If the seeded areas and workmanship are determined to be satisfactory as defined in the specifications, written notice will be given by the Landscape Architect to the Contractor and Owner.
- C. If the grass is determined to be unsatisfactory as defined in the specifications at the time of inspection, repair and/or reseed areas are determined to be unacceptable.

1.11 MAINTENANCE PERIOD

- A. Initial maintenance period:
 - 1. Maintain seeded areas until satisfactory seeded grass is established and accepted by the owner.
 - 2. Extend the maintenance period for all seeded areas until satisfactory grass growth is established.
- B. Maintenance includes the watering, weeding, fertilizing, mowing, repairing, and/or reseeding of all seeded areas.
- C. In the event that seeding operations are completed too late in the Fall for adequate germination, continue maintenance into the following Spring and Fall and reseed, as necessary, for satisfactory seeded grass establishment.

PART 2 PRODUCTS

2.1 SEED MIXTURE

- A. Grass Seed to be of the previous year's crop and the weed seed content is not to exceed 1% by mass.
- B. Use only low maintenance seed mixes appropriate for cut and fill slopes, detention basins, and disturbed areas as listed below.
- C. Suppliers:
 - 1. Ernst Seed
 - 2. Colonial Seed
 - 3. Nature's Seed
- D. Seed Mixture:
 - 1. Seed Mix 1: Fine Fescue Blend

Grasses	
Festuca rubra	25 percent
Festuca rubra subsp. commutata	25 percent
Festuca brevipila	25 percent

Festuca ovina	25 percent
Application rate of 8 lbs. / 1,000 SF	

2. The seed mixes to be a low maintenance seeding, and appropriate for cut and fill slopes, detention basins, and disturbed areas adjacent to environmental resource areas.

2.2 SOIL AMENDMENTS

- A. Fertilizer: Granular commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil, as indicated in analysis.
 1. Consist of slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
 - a. Manufacturers:
 - 1) Sustane™
 - 2) Or approved equivalent.
- B. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.
- C. Lime: Ground limestone, dolomite type, containing a minimum 89 percent calcium carbonate equivalent.
 1. Its value is based on chemical composition (calcium carbonate equivalent) and degree of fineness. Ground agricultural limestone is available as calcium carbonate (calcite) or as a mixture of calcium and magnesium carbonate (dolomite). Standard ground agricultural limestone contains a minimum of 89 percent calcium carbonate equivalent calcium carbonate plus (magnesium carbonate × 1.19).
 2. 95 percent passing a 20-mesh sieve, 60 percent passing a 60-mesh sieve, and 50 percent passing a 100-mesh sieve.
- D. Water: Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of grass. Includes hose and all other watering equipment required for the Work.
- E. Erosion Fabric: If necessary, use jute matting, open weave to protect newly seeded areas from erosion.

2.3 HERBICIDES

- A. Herbicide: DO NOT USE.

2.4 ACCESSORIES

- A. Hydromulch: Specially prepared green-dyed and air-dried wood-cellulose fibers, containing no growth or germination inhibiting substances, in packages not exceeding 100 pounds gross, with net weight shown on the package, and meeting the following requirements:
 1. Fiber processed from whole wood chips manufactured specifically for standard hydraulic mulching equipment. Not produced from recycled material such as sawdust, paper, or cardboard.
 2. Moisture content of hydromulch not to exceed 10%, plus or minus 3% as defined by the pulp and paper industry standards.
 3. Water holding capacity of not less than 900 grams water per 100 grams fiber.
 4. Nontoxic to plant life or animal life.

5. Non petroleum based organic tackifier and a green dye to allow for easy visual metering during application and noninjurious to plant growth.
6. Fiber to be dispersed into uniform slurry when mixed with water.

B. Stakes: Softwood lumber, chisel pointed.

C. String: Inorganic fiber.

2.5 SOURCE QUALITY CONTROL

- A. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of topsoil testing. See Section 32 92 19.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify prepared soil base is ready to receive the Work of this section.
- B. Verify compliance with requirements and conditions affecting performance of work of this Section prior to starting any work. Report any defect, such as incorrect grading, incorrect subgrade elevations, improper compaction, or drainage problems, to the Landscape Architect prior to beginning Work. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of Work indicates acceptance of filled subgrade areas and responsibility for Work.
 1. When conditions detrimental to work are encountered including, but not limited to, incorrect grading, adverse drainage conditions, poor soil conditions, or invasive species problems, immediately notify the Owner and/or Landscape Architect before beginning any Work.

3.2 PREPARATION

- A. Refer to Section 32 91 91 – Landscape Grading.
- B. Correct any grading and drainage problems. Restore areas if erosion has occurred or Project site has been disturbed.
- C. Moisten prepared grass areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.3 FERTILIZING

- A. Apply lime at the application rate recommended by soil analysis. Work lime into top 4 inches of soil.
- B. Apply fertilizer at application rate recommended by soil analysis., but not in excess of 20 pounds per 1000 square feet.
- C. Apply after smooth raking of topsoil and prior to roller compaction.
- D. When applying, avoid spreading the fertilizer onto hard surfaces where it will wash into local surface water through the storm sewer system. Sweep and remove fertilizer that lands on the

sidewalk/driveway onto place onto the lawn area. Over-spreading fertilizers onto hard surface (sidewalks, driveways and streets) adds to surface water pollution.

- E. Do not apply fertilizer at same time or with same machine used to apply seed.
- F. Spread and thoroughly mix fertilizer thoroughly into upper 3 inches of topsoil by harrowing or as part of hydroseed slurry.
- G. Do not apply fertilizers in water protection areas or in wetland buffer areas under any circumstances.
- H. Lightly water soil to aid dissipation of fertilizer. Irrigate the top level of soil uniformly.
- I. Use no or minimal fertilizer in native grass, wildflower areas or meadow, conservation mix seeding areas and only per the soil analysis recommendations. If the soil testing determines the topsoil does not contain appropriate levels of nutrients for establishment of these native species, fertilize these areas at the rates recommended by the test results.

3.4 HYDROSEEDING

- A. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Mix specified seed, fertilizer, and premium wood 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 tackifier.
 - 2. Apply the hydroseeding in the form of slurry consisting of organic soil amendments, commercial fertilizer, and any other recommended additives.
 - 3. Apply slurry uniformly to all areas to be seeded in a one-step process. Spray the area with a visible uniform coat, using the dark color of the cellulose fiber as a visual guide. Apply the slurry in a downward drilling motion via a fan stream nozzle. Ensure that all of the slurry components enter the mix with the soil.
 - 4. Ensure the uniformity of the hydroseed application at a minimum rate of 1,500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
 - 5. Exercise special care to prevent any of the slurry from being sprayed onto any hardscape areas including paved surface, fences, walls, buildings, etc. Remove all slurry sprayed onto these surfaces at their own expense.
 - 6. Save all seed and fertilizer tags and fiber mulch bags for the Landscape Architect to verify compliance with the Drawings and Specifications.

3.5 MAINTENANCE

- A. All dead or unsatisfactory grass areas are to be weeded, top-dressed, repaired, fertilized, and/or bed prepared and re-seeded until satisfactory growth with intended species has occurred, as a condition of completion of all Work at final inspection.
- B. Mow grass at regular intervals to maintain at maximum height of 2-1/2 inches. Do not cut more than 1/3 of the grass blade at each mowing. Perform the first mowing when seedlings are 40 percent higher than desired height.
- C. Neatly trim edges and hand clip where necessary.
- D. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.

- E. Water to prevent grass and soil from drying out.
 - 1. Provide all labor and water required to establish all grass areas. Water as required, during maintenance period to ensure the seed bed is thoroughly and evenly watered with a fine spray to penetrate the soil to a depth of at least 4 inches.
 - 2. Keep seeded areas evenly moist until germination and satisfactory establishment.
 - 3. Water in a manner to provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment.
- F. Roll surface to remove minor depressions or irregularities.
- G. Control growth of weeds.
 - 1. Apply herbicides only as necessary and as approved by the Landscape Architect. Remedy damage resulting from improper use of herbicides.
- H. Immediately reseed areas showing bare spots.
- I. Repair washouts or gullies.
- J. Protect seeded areas with warning signs during maintenance period.
- K. Take immediate action to identify potential problems and undertake corrective measures in areas where a decline in the condition of grass seed areas is observed.

3.6 CLEAN UP

- A. Promptly remove soil and debris created by grass work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove erosion-control measures after satisfactory grass establishment and site stabilization is complete

3.7 SCHEDULE

- A. Front Seeded Area: Grass seed mixture specified 3 inches topsoil.
- B. Rear Seeded Area: Grass seed mixture specified except substitute Clover for Kentucky Blue Grass, 2 inches topsoil.

END OF SECTION

SECTION 32 93 00 - PLANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish all labor, material, equipment, and services required to install and maintain all plant material as specified. Section Includes:
 - 1. Preparation of subsoil and topsoil.
 - 2. Trees, plants, and ground cover.
 - 3. Mulch.
 - 4. Fertilizer.
 - 5. Plant tagging.
 - 6. Staking.
 - 7. Pruning.
 - 8. Edging.
 - 9. Maintenance.

- B. Related Sections:
 - 1. Section 31 20 00 – Earth Moving
 - 2. Section 32 91 19 - Landscape Grading
 - 3. Section 32 92 19 - Seeding

1.2 REFERENCES

- A. AAN: "American Standard for Nursery Stock," ANSI Z60.1, latest edition.

- B. TCIA: Pruning Standards: "Standards for Pruning Shade Trees" and "Standards for Pesticide Application Operations" latest editions.

- C. USDA: Agricultural Research Service, "USDA Plant Hardiness Zone Map," Miscellaneous Publication No. 1475, latest edition.

- D. ANSI A300 - Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices.

- E. Forest Stewardship Council:
 - 1. FSC Guidelines - Forest Stewardship Council Guidelines.

1.3 DEFINITIONS

- A. Vegetative species other than specified species to be established in a given area.

- B. Plants: Living trees, plants, and ground cover specified in this Section.

1.4 SUBMITTALS

- A. Product Data: Submit list of plant material sources, data for fertilizer and other accessories.

- B. Plant Materials:

1. Labels and nursery certificates substantiating that plants, trees and shrubs materials comply with specified requirements set by AAN and others and were grown within USDA hardiness zones specified.
 2. Provide complete list of quantity, size, genus, species, variety of trees and shrubs and supplier as indicated on Drawings.
- C. Tagging and planting schedule: Proposed dates for tagging plants at nurseries, and for planting each type of planting, with consideration for fall-hazard species, work coordination, etc.
- D. Samples:
1. Bark Mulch: Two-pound sample and source for review.
 2. Edging: one four-foot min. section with stakes.
- E. Maintenance:
1. Provide watering schedule to the Owner for approval.
 2. Instructions: Submit recommended procedures for routine year-round maintenance of plantings. Submit instructions as a condition of Substantial Completion of the Project.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Include pruning objectives, types, and methods; types, application frequency, and recommended coverage of fertilizer.

1.6 QUALITY ASSURANCE

- A. Tree Pruning: ANSI A300 Pruning Standards for Woody Plants.
- B. Maintain an experienced supervisor on the project site during all times that landscape construction is in progress.
- C. All plants to comply with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock." latest edition, published by the American Nursery and Landscape Association Inc.
- D. Locate plant material sources and ensure that plants are shipped in a timely fashion for installation. Plant trees during the same planting season they are dug. Do not use balled and burlapped and potted plant materials from cold storage.
- E. Plants to be grown under climatic conditions similar to those in the locality of the project for at least two (2) years. Use healthy nursery grown plants, free of disease, insects, and pests. Eggs or larvae and have a well-developed root system.
- F. To the extent possible, supply each plant material species or variety from single source.
- G. Measurements: Measure trees 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, and 12 inches above ground for larger sizes. Measure the main body of tree for height and spread; do not measure branches or roots tip-to-tip.
- H. If required, use only herbicides, pre-emergents, fertilizers, fungicides, and pesticides reviewed and approved by the Landscape Architect and permitted by state and local agencies. Applications to be applied by licensed personnel according to manufacturer's recommendations.

- I. Do not use tree paint or tree wound dressing of any type on tree wounds. Allow wound to heal and weather naturally, after trace cutting ragged or loose damaged bark back to live cambium.

1.7 QUALIFICATIONS

- A. Nursery: Local Company specializing in growing and cultivating plants with five years' experience.
- B. Installer: Company specializing in installing and planting plants with 5 years experience in Landscape Work similar in materials, design, and extent to that indicated for this project and with a record of successful landscape establishment. Provide written qualification data for firms and persons to be responsible for Work, to demonstrate their capabilities and experience. Include lists of completed projects, with project names, addresses, phone numbers, and names and address of designers and clients.
- C. Tree Pruner: Company specializing in performing work of this section with minimum five years experience.
- D. Maintenance Services: Performed by installer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not order or deliver materials until the required samples, certifications, manufacturers' literature, and test results have been reviewed by the Landscape Architect. Delivered materials must closely match the samples, as determined by the Landscape Architect. If any deviations from specified plant materials are proposed, submit a written request explaining differences and reasons for request.
- B. Wrap tree trunks with protective fabric during transport and delivery to storage. Remove wrap after planting to avoid accumulation of moisture on bark, which increases susceptibility to hidden insect infestation, and mold.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- D. Protect and maintain plant life until planted.
- E. Deliver plant life materials immediately prior to placement. Plant within one (1) week of delivery. If plants are to be stored at the site prior to planting, the contractor is responsible for ensuring they are properly maintained, watered, and remain healthy. Set stored planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Set balled stock on ground and cover the ball with soil, peat moss, sawdust, or other acceptable material.
- F. Trees: Deliver freshly dug trees. Do not prune before delivery, except as directed by the Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering during delivery. Do not drop trees during delivery.
- G. Handle balled and burlapped stock by the root ball.
- H. Plant material damaged because of delivery, storage or handling will be rejected.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. Submit to the Landscape Architect in writing the proposed planting schedule. Obtain approval of planting schedule from the Landscape Architect prior to performing any work.
- B. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.
- C. Do not install plant life when wind velocity exceeds 30 mph.
- D. Planting Restrictions: Plant during one of the following periods unless otherwise approved by the Landscape Architect. This includes the planting of tublings.
 - 1. Spring: April 15 to June 1
 - 2. Fall: September 15 to November 15
- E. Planting under frozen conditions in either the spring or fall will not be permitted. Planting before or after the above referenced planting dates will increase the likelihood of plant or grass seed establishment failure. Any deviation from the above referenced planting dates is undertaken at sole risk of the contractor and it is the responsibility of the contractor to provide any additional maintenance and watering which may be required to ensure satisfactory plant and seed establishment.
- F. Summer digging of trees is not permitted. Coordinate schedule for planting, so that summer digging and substitutions of species that are fall hazards (fall digging/planting) does not occur.
- G. Spray evergreens planted in April or July-August, or out of season with anti-desiccant twice during the guarantee period, once at planting and once in mid-winter.
 - 1. Spring Planting: April 15 to June 1
 - 2. Fall Planting: September 15 to November 15

1.10 COORDINATION

- A. Coordinate installation of planting materials to assure installation during normal planting seasons for each type of plant material required and as specified in planting schedule. Plant species designated as "Fall Hazard" by Nursery in the Spring, indeterminate of other site and project schedules. Show this information on the planting schedule required by Section 1:12 where applicable.
- B. Coordinate planting Work with other Work of this contract being performed on site, or work being performed by others.

1.11 WARRANTY

- A. Furnish one year manufacturer warranty for trees, plants, and ground cover against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, or abnormal weather conditions unusual for warranty period. The date of final acceptance of all completed planting work establishes the end of installation and initial maintenance period and the commencement of the guarantee period.
- B. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

- C. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at the end of warranty period.

1.12 MAINTENANCE PERIOD

- A. Maintain plant life for one year after Date of Substantial Completion.
- B. Maintenance includes:
 - 1. Cultivation and weeding plant beds and tree pits.
 - 2. Irrigating sufficiently to saturate root system.
 - 3. Pruning, including removal of dead or broken branches.
 - 4. Disease control.
 - 5. Maintaining wrapping, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.
 - 6. Replacement of mulch.

PART 2 PRODUCTS

2.1 TREES, PLANTS, AND GROUND COVER

- A. Planting Stock:
 - 1. Species: In accordance with Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.
 - 2. Identification: Label individual plants or each bundle of plants when tied in bundles.
 - 3. Plants: No. 1 Grade conforming to "American Standard for Nursery Stock" of American Association of Nurserymen (AAN); well-branched, vigorous, and balanced root and top growth; free from disease, injurious insects, mechanical wounds, broken branches, decay, and other defects.
 - 4. Trees:
 - a. Furnish with reasonably straight trunks, well balanced tops, and single leader.
 - b. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.
 - c. All trees within 5'-0" of walkways and sidewalks to have a 6'-8" standard branching height.
 - d. Provide balled and burlapped trees, unless otherwise indicated on Drawings.
 - 5. Deciduous plants: Furnish in dormant state, except those specified as container grown.
- B. Trees Plants and Ground Cover: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

2.2 SOIL MATERIALS

- A. Topsoil: As specified in Section 32 92 19

2.3 SOIL AMENDMENT MATERIALS

- A. When soil tests indicate soil amendment, apply soil conditioners or slow release (6 month minimum) fertilizers to amend soil to specified conditions.
 - 1. Tree Fertilizer: Containing fifty percent of elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil, as indicated in analysis.

- B. Sand: Clean, washed, natural or manufactured sand free of toxic materials.
- C. Peat Moss: Do not use.
- D. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.
- E. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.
- F. Water: Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of plants.

2.4 CHEMICALS AND INSECTICIDES

- A. Do Not use without owners review and approval.

2.5 MULCH MATERIALS

- A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs meeting the following requirements.
 1. Shredded pine bark aged at least six (6) months and not longer than two (2) years.
 2. Dark brown in color, free of chunks and pieces of wood thicker than one quarter inch, stringy material over four (4) inches in length, and chunks over three (3) inches in width.
 3. Does not contain an excess of fine particles, overly composted or soggy compost material, as determined by the Landscape Architect.
 4. Does not have an unpleasant odor nor have any evidence of fungus growth.
- B. Do not use Hemlock or dyed mulches.

2.6 ACCESSORIES

- A. Wrapping Materials: Burlap.
- B. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches
- C. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches (50 by 50 mm) by length indicated, pointed at one end. Use hardwood stakes installed as indicated in the Drawings.
- D. Guying and Anchoring Material: Brown or black, heavy duty woven poly-corded guying tape manufactured specifically for tree guying.
 1. Do not use cable encased in hose.
- E. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.
- F. Edging:
 1. Formed Galvanized steel edging
 2. Dimensions: 6" x 1/8" x 5' min length
 3. Powder coated Black
 4. Staked every 24"
 5. Double staked at all ends/corners.

2.7 PLANT SOIL MIX

- A. Use topsoil and existing subsoils.

2.8 SOURCE QUALITY CONTROL

- A. Test and analyze topsoil. See Section 32 92 19.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Utilities: Contact all relevant utility companies, public or private, prior to beginning work. Review the locations of utilities with the Landscape Architect before proceeding. Report any conflicts to the Landscape Architect and the Owner before excavating. Perform all work in a manner which will avoid damage to above and below grade utilities. Hand excavate as required.
- B. Determine the full extent of Work required, including but not limited to the potential need for storing and maintaining plants temporarily and re-handling plants prior to final installation.
- C. Inspect all areas to be planted before starting any landscape Work and report any defect, such as incorrect grading, incorrect subgrade elevations, or drainage problems, etc., to the Landscape Architect prior to beginning Work. Do not proceed with installation until all unsatisfactory conditions have been corrected. Commencement of Work indicates the Contractor's acceptance of site conditions and filled subgrade material in areas to be planted, and the Contractor assumes responsibility for Work.
- D. Verify required underground utilities are available, in proper location, and ready for use.

3.2 PREPARATION OF SUBSOIL

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. Scarify subsoil to depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- D. Dig pits and beds three times wider than plant root system.
- E. Maintain grade stakes until removal is approved by the Landscape Architect.

3.3 PLANTING SOIL PREPARATION

- A. Before mixing, remove plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth from topsoil.
- B. Mix soil amendments and fertilizers with topsoil as specified in the soil analysis. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

- C. The planting soil amendments Schedule is based upon the soil analysis.
- D. For tree pit or planting bed backfill, mix planting soil as specified in the soil analysis before backfilling and stockpile at site.
- E. Place planting soil into pits and beds intended for plant root balls, to minimum depth as indicated on Drawings.
- F. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- G. Grade to eliminate rough, low, or soft areas, and to ensure positive drainage.

3.4 PLANTING PREPARATION

- A. All plant layout and actual planting locations are to be field verified by Landscape Architect prior to planting. Notify the Landscape Architect at a minimum of 48 hours in advance prior to scheduling any field inspections.

3.5 PLANTING-BALL AND BURLAP

- A. Set balled and burlapped stock plumb and in center of pit or trench with top of ball to match the finish grade within one (1) inch.
- B. Remove burlap and wire baskets from tops of balls and from top half of rootball as indicated on Drawings. Remove pallets, if any, before setting.
- C. Do not use planting stock if ball is cracked or broken before or during planting operation.

3.6 PLANTING – POTTED PLANTS

- A. Remove the plant from the pot and loosen or score the roots before planting to promote outward root growth into the soil.

3.7 PLANTING – PLUGS

- A. Plant upright and not at an angle.
- B. Dig planting holes large enough and deep enough to accommodate the entire root mass.
- C. Plant plugs with no twisted or balled roots and with no roots exposed above the grade line.
- D. Hand pack the soil around the entire plug root mass.

3.8 PLANTING

- A. Plant all trees, shrubs, and groundcovers as indicated on Drawings and as specified below.
- B. Place plants for best appearance for review and final orientation by Landscape Architect.
- C. Dig the planting hole to the same depth as the root ball and two to three times wider.

- D. Score all sides of the hole, place the plant in the hole so the top of root ball is even with soil surface.
- E. Set plants vertical.
- F. Place stock on setting layer of compacted planting soil.
- G. Place backfill around plant roots in layers, gently tamping to settle backfill and eliminate voids and air pockets. If soil is extremely poor, replace backfill with good quality topsoil. Amend the soil, as necessary.
- H. Place bare root plant materials so roots lay in natural position. Backfill soil mixture in 6-inch layers. Maintain plant life in vertical position.
- I. Saturate soil with water when pit or bed is half full of soil and again when full. Repeat watering until no more is absorbed. Water again after placing and tamping the final layer of backfill.
- J. Create a 2" to 4" saucer around the edge of planting hole with the remaining soil.
- K. Remove all plant tags and flags from the plants.

3.9 PLANT RELOCATION AND RE-PLANTING

- A. Relocate plants as directed by Landscape Architect.
- B. Ball or pot removed plants when temporary relocation is required.
- C. Place backfill around ball in layers, gently tamping to settle backfill and eliminate voids and air pockets.
- D. Place bare root plant materials so roots lay in natural position. Backfill soil mixture in 6-inch layers. Maintain plant life in vertical position.
- E. Saturate soil with water when pit or bed is half full of soil and again when full. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill
- F. Create a 2" to 4" saucer around the edge of planting hole with the remaining soil.

3.10 PLANT SUPPORT

- A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:

Tree Caliper	Tree Support Method
1 inch	1 stake with one tie
1 - 2 inches	2 stakes with two ties
2 - 4 inches	3 guy wires with eye bolts and turn buckles
Over 4 inches	4 guy wires with eye bolts and turn buckles

- B. Use caution when installing wood stake anchors for trees; ensure that stakes do not penetrate utility lines or structures. Installed stakes as indicated on Drawings, securely anchored in undisturbed or compacted subgrade.

- C. Install woven tape tree guys according to manufacturer's instructions, with ties that allow for tree growth (specified, expandable knots) and to allow for some movement and to avoid girdling.
- D. Securely fasten guys to wood stakes with appropriate knots, at an angle to keep guys tight. Install three guys per tree.
- E. If guys are above ground, affix safety flags at four feet typical above finished grade.
- F. Install the tree guying and anchoring systems securely so that tree ball does not rock, and tree trunk and canopy remain plumb or nearly plumb in the wind, without holding tree so tight or at such an angle and height that there could be rubbing or structural damage to trunk in strong winds. Install to allow for tightening after installation and during the one-year maintenance period.

3.11 MULCHING

- A. Mulch backfilled surfaces of pits, beds, planted areas, and other areas indicated on Drawings.
- B. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades.
 - 1. Thickness: 2-3 inches (minimum).
- C. Do not place mulch against trunks or stems.

3.12 CLEANUP AND PROTECTION

- A. During landscape work, keep pavement clean and work area in an orderly condition.
- B. Protect landscape work from damage due to landscape operations and site work by others. Maintain protection during installation and maintenance periods. Repair or replace damaged landscape work as directed by the Landscape Architect.
- C. Repair damage to site or structures to restore them to their original condition.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil and waste material, including excess topsoil, subsoil, plant material, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

3.14 FIELD QUALITY CONTROL

- A. Plants will be rejected when the ball of earth surrounding roots has been disturbed or damaged prior to or during planting.
- B. All plant layout and final plant locations are to be field verified by the Landscape Architect prior to planting.
- C. During the landscape work periodic field visits are to be performed by the Landscape Architect at specific installation milestones as agreed upon during the pre-construction meeting or as indicated in the Drawings.

3.15 ACCEPTANCE OF LANDSCAPE WORK

- A. Submit a written request for review of the completed work to the Landscape Architect at least 48 hours before the anticipated dates of requested field visits.
- B. Request an acceptance of the landscape work only after all aspects of landscape operations are completed and maintained according to specifications, all test results are completed and acceptable, irrigation system is operating properly (if applicable), and all extraneous equipment, materials and debris are removed from the Project Site.
- C. Do not request a field visit for partially completed work.
- D. The Landscape Architect is to review the work with the Contractor present. If in the Landscape Architect's opinion, a substantial amount of planting, materials or landscape work is deficient, the Contractor's maintenance period of all work is extended until plant replacements are made, or other deficiencies are corrected.
- E. A written report, or "punch list," is issued by the Landscape Architect indicating remedial items to be corrected before Final Acceptance is authorized.
- F. Acceptance: Acceptable plants are those that are to size and species as indicated on the Drawings or accepted by the Landscape Architect and meet the following requirements:
 - 1. At least 85% live growth with actively growing or possessing live buds.
 - 2. No indication of injury, disease, insect infestation, or decline due to environmental or other factors.
 - 3. Properly planted and installed plumb.
 - 4. Properly mulched.
 - 5. Properly staked and guyed (if just planted).
 - 6. Rootballs moist.
- G. All unsatisfactory plants are to be removed promptly. Replacement plants must conform in all respects to specifications for the originals and must be planted and maintained in the same manner until initial acceptance is made.
- H. Repeat field visit request and procedures only when all remedial items included on the "punch list" are completed.
- I. The end of the installation and initial maintenance period and commencement of guarantee is established upon the date of final acceptance of completed remedial work.

3.16 PLANT ESTABLISHMENT PERIOD, GUARANTEE, AND FINAL INSPECTION

- A. Upon commencement of the guarantee period, it should be agreed upon by the Contractor, Owner and Landscape Architect who will be responsible for the oversight of the one (1) year guarantee period as outlined in the specifications.
- B. Complete all items on the "punch list" to the satisfaction of the Landscape Architect and the Owner before the initiation of the one-year plant establishment period (guarantee period) can commence. Guarantee specified herein does not deprive the Owner of other rights it may have under other provisions of Contract Documents and is in addition to, and runs concurrent with, other warranties made by Contractor under requirements of Contract Documents.

- C. The guarantee period for the plants is for one (1) year after owner acceptance. During the guarantee period, make monthly inspections of plant material during April through November to document the condition of plants and to provide remedial measures. Continue maintenance as specified. Submit inspection reports to the OWNER. Dead plants and plants with less than 85% live wood noted in inspections are to be replaced with new plants of same size and species within one (1) month or in first month of next growing season, whichever comes first. Install replacement plants according to the Drawings and Specifications.
- D. Notify the Owner at least ten days in advance of requested date of inspection at end of one-year guarantee period. Submit to the Owner, before inspection, a list of plants replaced during the guarantee period with species, location, and replacement dates.
- E. All plants will be inspected by the Owner with the Contractor present one year after final acceptance. All plants must be alive and with satisfactory growth at the end of that time. Reset or replace trees which have settled out of plumb.
- F. The following must be completed at the end of the guarantee period:
 - 1. Remove all guying material from plants.
 - 2. Flatten all saucers.
 - 3. Re-mulched and weed, as necessary.
 - 4. Prune and remove plant dead wood.
 - 5. Install plant replacements.
- G. All dead or unsatisfactory grass areas are to be weeded, top-dressed, repaired, fertilized, and/or bed prepared and re-seeded until satisfactory growth with intended species has occurred, as a condition of completion of all Work at final inspection.

END OF SECTION