PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. References:

1.2 SUMMARY

A. Provide all labor, materials and equipment required or inferred from the plan documents and this section to complete the indicated work. Section includes:
   1. Preparation, materials delivery and installation, and maintenance as indicated on drawings and specified herein. This Section includes seeding and planting related to:
      a. Zone 1: Emergent Planting Zone
      b. Zone 2: Wetland Planting Zone
      c. Zone 3: Mesic Planting Zone
      d. Zone 4: Turf Planting Zone
      e. Trees and Shrubs
      f. Topsoil
   B. The performance of this work shall be judged by the establishment of appropriate ground cover, as specified, in the indicated areas. The Contractor shall be responsible for the watering, mowing, and other proper care of the seeded areas until final acceptance.

1.3 DEFINITIONS

A. Flat: A plastic tray that contains 32 OR 38 cells for individual plants.
B. Bulb, corm, tuber (BCT): Various types of underground stems, but does not include rhizomes.
C. Rhizome: A horizontal underground stem.
D. Dormant: Plant materials that are in an overwintering condition that are cold hardy, and not actively producing new leaf or stem tissues. Dormancy shall not be defined by proposed planting dates or windows.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Seeding and Planting Ordering:
   1. Plant Supplier: Within one (1) week following notification to proceed, submit for approval to the Owner’s Representative a written description of the seed mixes indicating the following:
      a. Name, address, and phone number of each seed supplier.
      b. Estimated seed per pound (or seed per ounce) of each species.
c. Quantity of each species to be installed shall be submitted eight (8) weeks prior to delivery to project site.

2. For delivery, storage, and handling documentation, record and submit the following:
   a. Date of receipt of seed.
   b. Date of receipt of seed test results.
   c. Vendor’s invoice for each shipment of seed material shall show botanical name, common name, quantities by species and composition of each mixture.

C. Herbivore Protection Measures: The contractor shall submit eight (8) weeks prior to installation, standard shop drawing details of proposed herbivory-prevention structures for use around floating aquatic and emergent plantings.

D. Certificates:
   1. Phytosanitary Certification: All plant material inspection and certificates required by federal, state, or other governing authorities will accompany each shipment.
   2. Certification of Seed: From seed vendor for each seed mixture stating the botanical and common name, geographic origin and harvest date of each species, date tested, 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.
   3. For each type of manufactured product, signed by product manufacturer, and complying with the following:
      a. Manufacturer’s certified analysis for standard products.
      b. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

E. Qualification Data: For Landscape Installer.

F. Work Plan: Within four (4) weeks after contract award, Contractor shall provide a written work plan for approval by the Owner or its representative that describes proposed methodology, timing, and proposed equipment to be utilized to successfully implement the requirements of this Section including, planting bed preparation for each of the planting zones and establishment maintenance to meet required performance standards as provided in this Section. If supplemental watering is necessary to meet the required performance standards, then watering shall be provided as part of the scope of services to fulfill the requirements of this Section. Any deviations from work plan shall be provided in writing to Owner's Representative prior to commencement of proposed deviation. Contractor shall not proceed until receipt of Owner or its representative approvals. Approval of work plan by Owner or its representative shall not absolve Contractor's responsibility of meeting the prescribed Warranty Performance Standards of this Section.

H. Invoices: Vendor or grower’s invoice for each shipment of plants shall show botanical name, common name, size, quantity by species, location where grown, and root treatment of plants.

I. Planting Schedule: Indicate anticipated installation dates for naturalized landscape plantings described here within.

K. Equipment: Identify type of equipment to be used for drill seeding and provide initial calibration tests prior to commencement of seeding operations as well as daily calibration results during seeding operation described here within.
SEEDING AND PLANTING

L. Installation Conditions: Date and conditions at time of installation, including weather (temperature, winds, precipitation, etc.) and soil conditions.

M. Maintenance Records: Maintenance work performed, area repaired or reinstalled, and diagnosis for unsatisfactory establishment of native landscape plant/seed material. Maintenance records shall include dated timesheet for maintenance operations.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A contractor with a minimum of five (5) years experience specializing in planting and seeding, and maintenance procedures for native herbaceous and tree species installation of similar species and maintenance requirements, and of similar size and scope.
   1. Installer’s Field Supervision: A qualified, experienced, English-speaking full-time supervisor shall be on site during all planting and maintenance operations.
   2. Landscape Contractor shall provide documentation of successful completion of projects of similar nature and scope to this project, including references of project experience that include project contact names and phone numbers, and size and type of project.
   3. Owner or its representative will review and approve all contractor qualifications prior to contract award.
   4. The Contractor shall comply with all federal, state and local ordinances, and permits issued for the project.

B. All relevant materials and work shall comply with applicable sections of the following references unless waived in writing:

C. Seed Material:
   1. All seed shall comply with and where specified, be tested in accordance with applicable sections of the following:
      b. Acceptance shall be based on receipt and approval of certification covering tests for each seed lot supplied. The Contractor shall be responsible for testing for seed viability using a test acceptable by the Owner or its representative upon receipt of seed from a supplier.
   2. Source quality control: All seed shall be provided in the supplier's sealed containers labeled in accordance with the Illinois Seed Law.
   3. Native seed shall be from a native genotype of plant with its genetic origin from southwestern Michigan (as defined by Voss and Reznicek and UM).
   4. Native landscape seed mix shall be stratified prior to a spring sowing.
   5. Substitutions: Must be approved in writing by the Owner or its representative following proof of non-availability and proposal for use of equivalent material. For proof of non-availability, submit a list of sources queried.

D. Plant Material: Provide quality, size, genus, species, and variety of herbaceous plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock”.
   1. All landscape materials shall be from stock sources with its genetic origin from northeastern Illinois (as defined by Swink and Wilhelm).
2. Substitutions: Must be approved in writing by the Owner or its representative following proof of non-availability and proposal for use of equivalent material. For proof of non-availability, submit a list of sources queried.

3. Plants shall be supplied at the sizes specified. Plants of larger size may be used if acceptable to the Owner or its representative and if sizes of containers or root balls are proportionately increased.

E. Observation: Owner or its representative may observe tree either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Owner or its representative retains right to observe tree further for size and condition of ball and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected tree immediately from project site.

F. Pre-installation Conference: Conduct pre-installation conference at Project site.

G. Approval and Selection of Materials and Work: The selection of all materials and the execution of all operations required under the specifications and drawings are subject to the approval of the Owner or its representative. He/she has the right to reject any and all materials and any and all work, which, in his/her opinion, does not meet the requirements of the contract documents at any stage of the operations. The Contractor shall remove rejected work and/or material from job site and replace promptly.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Notify Owner’s Representative 48 hours in advance of all delivery times.
   2. Notify Owner’s Representative at least three (3) days in advance prior to seed installation.
   3. Contractor shall be responsible for the guarding and safekeeping of all plant material prior to installation.

B. Plant Materials:
   1. Transport plant material in closed vehicles or in open vehicles with the entire load properly covered for protection from drying winds, heat, freezing or other exposure that may be harmful. Make arrangements to have plant material watered during shipment as necessary to avoid excessive stress. Plant material may be rejected if not properly shipped. Plant material shall not be shipped when temperatures are below 20 degrees Fahrenheit.
   2. Labels: Shipment of plants shall be clearly identified with durable and legible, waterproof labels stating correct botanical plant name (genus and species) and size of plant securely attached to individual plants or to bundles of like variety and size.

C. Seed:
   1. Deliver seed in original sealed, labeled, and undamaged containers, in accordance with standard commercial practice.
   2. All seed shall be kept dry and protected from temperature extremes to maintain dormancy and viability while in transit, storage, and during installation operations.

D. Shipping shall be scheduled to minimize on site storage of seed/plants. Deliver seed material/plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants in shade,
protect from weather and mechanical damage, and keep roots moist.

1. Plants shall not be bent, stacked, or bound in a manner that damages or breaks stems, or destroys natural shape.
2. Handle planting stock by root ball.
3. Cover root balls of trees with soil and mulch.
4. Water root systems of all plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.
5. Do not remove container-grown stock from containers until planting time.
6. If it is necessary to store seed material after arrival to the project site, it shall be stored in an approved cool, dry, waterproof building in such a manner as to protect the seeds from deterioration and to permit easy access for inspection. Seed shall be stored with the seed or plant material.

E. Seed and plant material shall be inspected upon arrival at the project site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five (5) months or older shall be rejected.

F. Packaged Materials: Deliver packaged materials in original, unopened containers, showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.

1.7 COORDINATION

A. Planting Schedule: Within one (1) week following contract award, submit description of work and schedule for seed and plant and maintenance. Planting Schedule shall include dates for each of the following items of work and shall be provided to the Owner’s Representative:
   1. Seed and Plant Order Verification.
   2. Delivery of Seed and Plant Materials to the Project Site.
   4. Substantial Completion.
   5. Maintenance period.
   6. Final acceptance.

B. Installation Seasons and Conditions: Contractor shall prep and install native landscapes during the first available growing season. Consult the Owner’s Representative for a detailed construction schedule that indicates the timeframes during which all planting must be completed. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion. The following outlines the recommended installation timeframe provided the construction schedule is completed on a timely basis.
   1. Seed installation: Fall dormant seeding after November 1st, but prior to snow cover or spring sowing prior to May 15th.
   2. Plant installation: Sequence installation with completion of seeding, and erosion blanket installation where applicable. Herbaceous material installation shall occur in spring no later than May 31st.
   3. If special conditions exist which warrant installation outside these proposed planting timeframes, submit a written request to the Owner or its representative describing conditions and stating the proposed variance. If approved, the installation contractor may be responsible for the supplemental watering at a frequency and duration for proper vegetation establishment and development.
C. Project Site Conditions:
   1. Prior to beginning work, the contractor shall examine and verify the acceptability of the project site and notify the Owner or its representative in writing of unsatisfactory conditions. Do not proceed with any work until unsatisfactory conditions have been corrected or resolved in writing with the Owner’s Representative.
   2. Where seeding and planting occurs in close proximity to other site improvements, adequate protections shall be given to all features prior to commencement of work. Any items damaged during planting operations shall be promptly repaired to their original condition at no cost to the owner.
   3. Contractor shall have all underground utilities located by servicing agencies prior to beginning work. In the vicinity of utilities, hand excavate to minimize possibility of damage to underground utilities.

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. Do not plant when weather conditions are unfavorable such as during high winds, or extremely wet or dry, or muddy conditions.
   1. When conditions detrimental to plant growth are encountered such as adverse drainage conditions or obstructions, notify the Owner's Representative prior to planting.

E. Coordination with Other Work:
   1. Proceed with and complete work as rapidly as portions of project site become available working within the seasonal limitations for each kind of work required.
   2. Herbaceous plant material shall be planted following seed and erosion blanket installation within those areas that are to receive erosion blanket as indicated on plan documents, unless otherwise coordinated with and accepted by the Owner's Representative.

1.8 WARRANTY

A. Warranty Period: Warrant all seed and plant material for the warranty period indicated against defects including death, disease or infestation, and unsatisfactory growth, except for defects resulting from neglect, or abuse by Owner, or incidents that are beyond Contractor’s control.
   1. Warranty Period for Native Seeding covered under this Section: Two (2) full growing seasons from date of Substantial Completion. If seeded prior to May 15th, and accepted as substantially complete, the year installed shall constitute the first full growing season. Otherwise the first full growing season will be the year subsequent to installation.
   2. Warranty Period for Herbaceous Plants: Two (2) full growing seasons from date of Substantial Completion. If planted prior to May 31st, and accepted as substantially complete, the year installed shall constitute the first full growing season. Otherwise the first full growing season will be the year subsequent to installation.

B. Replacements within Warranty Period:
   1. At end of warranty period replace naturalized landscape plants that are more than 25 percent dead or in an unhealthy or unsightly condition or for woody material that have lost their natural shape due to dead branches.
   2. Remove dead plant material immediately. Replace immediately unless required to plant in the succeeding planting season.
   3. Replacement plants and planting operations shall be in accordance with the original plans and specifications. Fully restore areas damaged by replacement operations to their original and specified condition.
4. The guarantee of all replacement plants shall extend for an additional period of one (1) year from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of said extended guarantee, the Owner’s Representative may elect subsequent replacement or credit for that item.

5. Reseed areas that do not conform to the requirements of this Section as determined by the Owner or its representative. Reseeding shall follow the procedures and requirements of this Section.

C. Warranty Performance Standards:
1. At the end of the Warranty Maintenance Period and at the time of final acceptance the following performance standards shall be met prior to post construction maintenance, monitoring, and management:
   a. Satisfactory Seeded Native: At the end of the Warranty Maintenance Period, there shall be no bare spots greater than one-half (0.5) square meter; ground cover shall consist of no less than 60% coverage of seeded and native, non-weedy species. There shall be no solid stands of non-native vegetation or native weedy vegetation of more than one half (1/2) square meter within all native seeded areas as covered under this Section.
      1) 50% of the seeded species within each corresponding native planting zones shall be alive and growing in a healthy condition at the end of the specified warranty maintenance period.
      2) At the end of the Warranty Maintenance Period the following conditions shall be met:
         a) None of the three (3) most dominant plant species within the mesic prairie planting zone shall include Field Thistle, Reed Canary Grass, Burdock, Common Buckthorn, Eurasian honeysuckles, sweet clovers, teasels, cattails, or other noxious weeds.
   b. 95% of the herbaceous plugs and plant material shall be alive and growing in a healthy condition at the end of the second full growing season.

1.9 MAINTENANCE, MONITORING, AND MANAGEMENT

A. Post construction maintenance, monitoring, and management will be conducted under separate contract; a five (5) year plan with performance standards will be developed and implemented.

PART 2 - PRODUCTS

2.1 GENERAL

A. Warrant all plant material to be true to botanical name and specified size. Any repercussions resulting from incorrect supplied materials (i.e. removal/replacement) will be borne by the contractor.

2.2 SEED AND PLANT MATERIAL

A. Native Seed: Reference drawings and coordinate with Owner or its representative for placement of native seed mix. A cover crop shall be incorporated into the mix at the time of seeding as specified. For fall dormant seeding, cover crop applications rates shall be doubled.
  1. Seed shall be fresh, clean, dry new-crop seed provided in original sealed packages
bearing the producer’s guaranteed analysis for purity, germination, hard seed, and weed seed content.

2. Seed mixtures shall be proportioned by weight in PLS (Pure Live Seed) for graminoid species. Mixing of the individual varieties of seed to form such mixtures shall be performed under the supervision of the Owner’s Representative or shall be completed by the seed supplier, who shall provide documentation of the percentage of each species used to form the mix.

3. All legumes shall be inoculated with rhizobium bacteria at the rate specified by the manufacturer.

4. Seed that shall be installed for a spring sowing shall be stratified.

B. Plant Material: All plant material shall be nursery grown for at least one (1) growing season. Provide nursery propagated stock in accordance with best horticultural practice. Collected stock or nursery grown wild plants will not be permitted. Plants shall be free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, or disfigurement. They shall be sound, healthy and vigorous of uniform growth typical of the species and variety, well formed, and free from irregularities. All stock shall be free of seed and vegetative propagules of Phragmites australis (Common Reed), Lythrum salicaria (Purple Loosestrife), Phalaris arundinacea (Reed Canary Grass), Typha X glauca (hybrid cattail), and Myriophyllum spicatum (Eurasian Water-milfoil).

1. Plug Material:
   a. Plants designated as plugs shall be, at a minimum, grown in 2 1/2 inch diameter containers with sidewall grooves, ribs, or slits.
   b. Plugs shall be propagated and grown in cells and not as bedded plants. The size and dimensions of the plugs shall be as specified on the plans for each species.
   c. All specified plug material for the emergent zone shall have a minimum stem height that is taller than the depth of the water column at the time of planting.
   d. Plants furnished in containers shall have roots well established in the soil mass and shall exhibit root growth that holds soil together when pulled from the container. Containers shall be large enough to provide earth-root mass of adequate size to support the plant tops being grown. Plants over-established in the container, as evidenced by pot-bound root ends, will not be accepted.

2. All emergent planting stock shall be pre-weighted before installation. Review proposed weighting methods with Owner’s Representative prior to proceeding with installation.

3. Refer to plan documents for planting locations for plant material. The attached tables identify the proposed wetland species per planting zone.

B. All plant material shall be subject to final approval by the Owner’s Representative at the project site prior to installation.

C. It is the sole responsibility of the Contractor to ensure that all plant propagules possess the ability to readily break dormancy and grow when properly installed.

2.3 MYCORRHIZAL (LEGUME) INOCULANT

A. Mycorrhizal inoculant shall be used with seed mixtures. The inoculant shall be applied at a rate of 40lbs/acre.

B. All inoculant shall meet requirements of the Michigan Seed Law.

C. Avoid exposure of the culture or inoculated seed to the sunlight, and in no case shall any exposure exceed 1/2 hour.

D. Seed shall be sown as soon as possible after inoculation. Seed that has been standing more than 24
hours after inoculation shall be reinoculated before sowing. If seeds are applied by a hydraulic seeder, three times the normal amount of inoculant shall be used.

2.4 TOPSOIL

A. Refer to Topsoil for Seeding and Planting Specification.

2.5 EROSION CONTROL BLANKET

A. Refer to Soil Erosion and Sediment Control Specification.

2.6 MULCH

A. Straw Mulch: Clean, weed free oat straw mulch furnished in air-dry condition and with a consistency for installation with commercial mulch-blowing equipment. Mulch shall be free from mold or other deleterious materials.

B. Mulch seeding areas unless otherwise designated otherwise in the contract documents. For disturbed areas that are mulched only, scarify area to a 3 inch depth prior to mulching.

C. The required mulching shall be performed with hydraulic seeding or immediately after seeding. The mulch shall be applied uniformly over the restoration areas. The type and rate shall be as specified on the drawings or as shown on an attachment to this specification. The mulch, except for hydraulically placed mulch, shall be anchored. Anchoring of the mulch shall be performed by application of a commercially available tackifier at the rate recommended by the manufacturer, a mulch anchoring tool, tandem disk weighted and set nearly straight, track type tractor, or by installation of mulch netting. Mechanical anchoring shall be performed in a manner that creates ridges perpendicular to flow of water.

D. Straw Mulch – Distribute evenly and uniformly and anchor it into the soil. Use an application rate for reasonably dry material of approximately 1.5 tons per acre of dry cereal straw, native grass straw, or other approved material, depending on the type of material furnished.
   a. In all accessible mulched areas, anchor mulch into the soil using mulch anchoring equipment with a minimum of two passes. Operate equipment along the contour. Use crawler type or dual wheel tractors for mulching operation. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross section.
   b. Crimp/tuck straw to a minimum of 2 inches below ground surface.
   c. Do not operate mulch-blowing equipment on slopes steeper than 2.5:1 or on slopes that may rut. Use blower attachments to apply mulch without traversing slopes.
   d. Do not mulch when wind velocities are greater than 15 mph.

E. Hydraulic Mulches – Apply at no less than 3,000 pounds per acre using standard hydraulic mulching equipment, unless specified otherwise in the contract documents.
   e. If using with hydraulic seeding, apply as a separate operation.

2.7 FERTILIZERS

A. Do not apply fertilizers unless coordinated with and approved by the Owner or its representative.

2.8 PESTICIDES
A. Do not apply pesticides unless coordinated with and approved by the Owner or its representative.

PART 3 - EXECUTION

3.1 PROCUREMENT

A. Immediately following contract award, the installing contractor shall begin native landscape planting material procurement. During the procurement period, the contractor shall locate sufficient quantities of specified materials and set up growing contracts, if necessary, to ensure that the quantities and quality of native landscape plant material will be available during the specified installation period. Contractor shall provide the Owner or its representative with this information as soon as possible.

3.2 GENERAL PREPARATION

A. General.
   1. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.
   2. The newly prepared site shall be protected with barricades as required from traffic, compaction, and erosion.

3.3 EXAMINATION

A. Examine areas to seed and plant material for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected. Areas to be seeded and planted shall conform to the limits shown on the construction plans and contract documents.
   1. For all planting areas covered under this section, coordinate with Owner or its representative to determine if spot herbicide treatment of any weed growth is needed prior to seed/plug installation. If chemical treatment of weed growth within the wetland zone is required, a glyphosate-based herbicide (Rodeo or approved equivalent) shall be used by a licensed applicator. Follow manufactures recommended application rates and wait period before proceeding with installation.

3.4 EQUIPMENT AND CALIBRATION

A. A Truax 3-box seeder or approved equivalent shall be used for the native seed installation.

B. Immediately prior to commencement of seed installation, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer’s specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during operation. The calibration test results shall be documented and provided to the Owner's Representative within one (1) week of testing.

3.5 LAYOUT
A. Woody Planting:
   1. Individual tree and shrub locations shall be staked on the project site by the contractor and approved by the Owner or its representative before any planting pits are dug. Placement of tree and shrub shall follow locations presented on the plans. The Owner or its representative reserves the right to adjust plant material locations prior to planting to meet field conditions without additional cost to the owner. Installation of woody plantings shall follow details presented in the plans. Any deviation from the procedures presented on those details must be approved by the Owner or its representative.
   2. The Owner or its representative reserves the right to adjust layout to meet field conditions without additional cost to the owner.

B. Native Seeding:
   1. For all native seed application refer to plan documents for planting zone locations. Flag and review areas to be seeded with Owner or its representative prior to installation. The contractor shall supply all equipment, materials, and items necessary for clear layout according to the plans. Review course of action with Owner or its representative prior to proceeding with this part.
   2. The Owner or its representative reserves the right to adjust layout to meet field conditions without additional cost to the owner.

C. Herbaceous Plug Planting:
   1. Contactor shall coordinate layout of prairie enhancement plugs with Owner or its representative.
   2. Contractor shall layout teaching garden plugs as indicated on the landscape plan documents. The Owner or its representative reserves the right to make field adjustments without any additional cost to the owner.

D. Turf Planting:
   1. Refer to plan documents for planting zone locations. Flag and review areas to be seeded with Owner or its representative prior to installation.

3.6 PLANTING BED PREPARATION

A. Comply with appropriate section for topsoil placement.
   1. The depth of the topsoil shall follow the plan documents.
   2. Soil lifts within the planting zones shall follow the specifications presented on the details in the plan set.

B. Un-graded Planting Bed Preparation: Area(s) unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
   1. Remove existing herbaceous cover. Do not mix into surface soil.
   2. Loosen surface soil to a depth of at least of 6 inches.
   3. Remove sticks, roots, trash, and other extraneous matter larger than 1 inch in any dimension.
   4. Legally dispose of waste material, including grass, vegetation, and turf off Owner's property.
   5. The entire area to be seeded shall be reasonably smooth and all washes and gullies shall be filled to conform to the desired cross-section before actual seedbed preparation is begun. Scarify subsoil areas perpendicular to water flow before they are filled. The seedbed preparation operation shall be suspended when the soil is too wet.
or too dry. On side slopes steeper than 3:1, the 3 inch minimum depth of seedbed preparation is not required, but the soil shall be worked enough to insure sufficient loose soil to provide adequate seed cover.

C. Graded Planting Bed Preparation Areas: altered or disturbed by excavating, grading, stockpiling, construction traffic, or surface soil stripping operations, prepare planting bed as follows:
1. Do not begin naturalized landscape installation until areas with soil compaction have been alleviated, to a depth of twelve inches, minimum. Alleviation of compaction may be completed by the following, depending on depth of compaction, soil moisture, and soil type:
   a. Rototiller.
   b. Chisel plow.
   c. Soil Ripper. Based on conditions, approved equipment includes:
      a. Parabolic or Semi-Parabolic ripper
      b. Swept shank
      c. Straight shank

Contractor to submit information on tine spacing and configuration prior to work being completed.
2. Machinery used to pull the equipment shall be track machinery only.
3. Based on site conditions, contractor to submit an action plan for work, include type of machinery to be used, speed of machinery to effectively eliminate compaction, area of site to be worked, pattern of movements, and coordination with other construction activities.
4. Fine grade planting area to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus/minus 1/2 inch of finish elevation. Lightly roll and rake area, remove ridges, and fill depressions to meet finish grades.
5. Remove from native landscape planting zones foreign objects larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
6. Prior to spreading topsoil, subsoil should be tilled if it has become hardened or caked, to ensure proper bonding of soils.
7. Topsoil shall be placed to match the grade as shown on the Drawings and shall be a minimum depth of 12 inches. Topsoils shall not be spread if they are frozen or muddy or when subsoil is frozen or muddy.
8. The surface of the seed bed shall be prepared such that it is free of clods larger than 1.5-inch, weeds, sticks, crusts, and gullies.
9. No seed shall be sown until the seed bed has been approved by the Engineer.

3.7 SEED INSTALLATION

A. Native Seed Installation. Uniformly seed all areas with their appropriate mixes at their designated rates.
1. Mesic Seed Zones. The native seed mix shall be uniformly installed. Prior to seeding, methods shall be coordinated and approved by the Owner or its representative for each of the designated planting zones. Based on approved installation method(s) by Owner or its representative, the following drill and broadcast seed requirements shall be followed.
   a. Broadcast Seed:
      1) Prior to installation, uniformly mix seed with approved slightly dampened
inert material, e.g. vermiculite, perolite, #2 torpedo sand, etc.

2) Seed shall be uniformly broadcast at the specified rates.
3) Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
4) Area shall be raked/rolled to ensure adequate seed-soil contact.
5) The prepared seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. Apply seed at the specified rate and roll or cultipack after seeding. Equipment shall be as follows:
   a) Broadcast seeders may be hand-held, tractor drawn, or tractor mounted. The seed shall drop through an adjustable flow regulator onto a rotating, horizontal disk or fan.
   b) Drop seeders shall be pulled by mechanical means, have an adjustable gate opening providing uniform flow of width adapted to the work, and drop the seed directly into place on the prepared seedbed. The seeder may be of a type mounted on cultipacker rollers which covers the seed and rolls the seedbed in one operation.
   c) The roller or cultipacker shall have rollers at least 12 inches in diameter and shall be of sufficient weight to pulverize the clods of soil. A double gang style shall be used.

b. Drill Seed:
   1) For drill seed application, install one half (1/2) the specified cover crop rate of application per acre with the native seed mix via the drill seeder. The remaining portion of cover crop shall be hand broadcast across the drill seeded area to uniformly seed cover crop between the drill seed rows. Hand broadcast as specified above immediately following drill seed installation.
   2) Seed shall be uniformly drilled to a maximum of 1/4 inch depth at the specified rates using equipment with drills a maximum seven (7) inches apart and equipped with rollers. At a minimum, no seeded rows shall be greater than seven (7) inches apart.
   3) Half the total rate of seed application shall be drilled in one direction, with the remainder of the seed rate drilled at 45 degrees from the first direction.
   4) Drilling equipment shall be maintained with half full seed boxes during the seeding operations.

c. Hydroseed:
   1) Seed may be applied using no more than 125 pounds of solids per 100 gallons of water. If legume seed is hydroseeded, triple the recommended rate of inoculant. Rate of application shall not be less than 1,000 gal of slurry per acre. When using a hydraulic seeder, the inoculant and seed required shall be applied in a single operation. Hydraulic seeding equipment shall include a pump rated and operated at no less than 100 gal/min (375 L/min) and no less than 100 psi (690 kPa) pressure. The tank shall have a mechanical agitator powerful enough to keep the seed and fertilizer in a uniform suspension in the water.

B. Do not use wet seed or seed that is moldy or otherwise damaged.

C. Do not fertilize seeded areas.

3.8 EMERGENT AND WETLAND PLANTINGS

A. Planting Zones.
1. The emergent and wetland planting zones shall have forb species randomly distributed that ensures a variety of plant species throughout the designated planting. Graminoid species (grasses, sedges, bulrushes) shall be evenly distributed across the area and individuals of same species planted in clumps of 3 across the planting zone. The spacing for the wetland planting zone shall follow the plan documents. No emergent plants shall be installed in water depths greater than six (6) inches unless approved by the Owner or its representative.

B. Plug Material
1. Remove plugs from containers of cells, loosen roots and install in prepared soil.
2. Individual plugs shall be planted in the soil at least one (1) inch deeper than grown in the nursery and to a depth that will ensure the top of the BCT, rhizome and the attached root mass lies at least one (1) inch below the soil surface. The maximum planting depth shall be two (2) inches deeper than grown in the nursery.
3. Plants shall be moist at the time of planting. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
4. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

C. Individual Stock:
1. Dormant Bareroot BCT and Rhizomes: Each individual plant shall be planted so the top of the BCT or rhizome is at a minimum depth of two (2) inches and a maximum depth of three (3) inches below the soil surface. The entire BCT, rhizome, and root system shall be placed below the soil surface.
2. Nondormant Bareroot BCT and Rhizomes: Each individual plant shall be planted so the top of the BCT or rhizome is at a minimum depth of one (1) inch and a maximum two (2) inches below the soil surface. The entire stock and root system shall be placed below the soil surface.

D. Wetland Seed Installation. Wetland seed mix shall be installed only within those portions of the designated planting area that have exposed mud flat conditions at the time of installation. Uniformly seed specified wetland seed matrix as indicated on plan documents. The Wetland planting zone shall be seeded as follows:
1. Broadcast Seed: Seed shall be uniformly broadcast at the specified rate. Thoroughly mix all seed with slightly dampened carrier such as vermiculite.
2. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
3. Area shall be raked/rolled to ensure adequate seed-soil contact.
4. Do not use wet seed or seed that is moldy or otherwise damaged.

E. Do not fertilize or mulch wetland area.

F. Install herbivore exclosures to protect emergent and wetland plantings.

3.9 STRAW MULCH INSTALLATION

A. For all native seeded areas that are not protected with specified erosion blanket they shall have straw mulch applied at a rate of 2000 pounds per acre, one-fourth of inch thick uniformly across the native seeded landscape.

B. Straw mulch shall be crimped in place to a depth of 3 to 4 inches.
C. Straw mulch shall not be placed in the emergent of wetland planting zones.

3.10 HERBACEOUS PLANTING

A. Install herbaceous plant material within specified timeframe as provided in part 1.7 of this Section.

B. Restore planting beds if eroded or otherwise disturbed after seeding, and remove any accumulated debris, trash, or other extraneous materials within the planting zones before planting.

C. For those areas that shall receive enhancement plugging where erosion blanket is specified on the plan documents, plant after seeding and placement of erosion control blanket. Contractor will be required to carefully slit installed erosion control blanket for plug installation. Contractor shall ensure minimal disturbance to the erosion control blanket.

D. Remove plugs from containers of cells, loosen roots and install in prepared soil.

E. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Plant to a depth to sufficiently cover all roots.

F. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

G. Plants shall be moist at the time of planting. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

H. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

1. Do not fertilize planted areas.

3.11 ACCEPTANCE

A. Substantial Completion: Notify the Owner's Representative in writing of the completion of exterior planting.
   1. Within 10 days after notification of completion of work, the Owner's Representative and Owner or its representative will inspect the work and prepare a Notice of Substantial Completion, along with a list of items the require completion or correction.
   2. Issuance of the "Notice of Substantial Completion" shall constitute the start of the Warranty Maintenance Period for any portion accepted.

B. Periodic inspections will be made from time to time by the Owner or its representative to review the quality and progress of the work. Work found to be unacceptable must be corrected within 15 calendar days.

C. Final Acceptance Inspection: The final inspection of all exterior plantings will be made by
the Owner’s Representative and Owner or its representative. Before final acceptance shall be made, the terms of the warranty shall be met.

1. Acceptance of all native landscape plantings will be granted after warranty conditions and warranty performance standards are met and all materials are viable and vigorous, free of insects and diseases, firmly rooted and reflect industry standards of appearance.

D. If all of the above and the warranty conditions are met, the work will be accepted. If not accepted and the work is deemed by the Owner or its representative to be an installation failure, the contractor shall replant/reseed the appropriate zones at no additional cost to the owner.

3.12 CLEANUP AND PROTECTION

A. All materials, equipment and procedures used on the site shall conform to all federal, state, and local ordinances, regulations, and laws. Excavated materials unsuitable to backfilling, as well as debris and other refuse materials shall be disposed of off site in compliance with local codes and ordinances.

B. During planting operations, keep adjacent areas clean and the work area in an orderly condition.
   1. Strictly limit hauling operations and construction site traffic on all native planting areas that have been previously seeded and/or planted.
   2. Excess and waste material shall be removed daily during construction.

C. Repair, to original condition, any damage to existing landscape, paving, or other such features as a result of work related to this contract. Work to be completed at no additional cost to owner.

D. Protection: Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after vegetation establishment.
   1. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, trespassers, vandalism and herbivory. Maintain protection during installation and maintenance periods. Treat, repair, or reseed/replant as directed by the Owner or its representative.

E. Repair: Any damage to existing landscape or other features as a result of work related to this contract shall be repaired by the responsible contractor to its original condition.

3.13 DISPOSAL

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off owner's property.

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION

A. The work under this Section includes the furnishings of all labor, equipment, supplies and materials for
   loaming (on-site topsoil or imported loam).

B. Contractor shall utilize reclaimed topsoil previously stripped from on-site locations unless specifically
directed by the Owner or its representative. On-site topsoil will not be used only in the event that it is found
to be unsuitable due to its composition, the inclusion of invasive plant material or seeds, or the presence of
undesirable substances.

C. In the event that on-site topsoil is found to be unusable or the quantities are found to be inadequate, the
   Contractor shall supply acceptable clean, weed-free topsoil from off-site sources or create topsoil by mixing
   on-site topsoil and mineral soil. The Contractor shall be responsible for the determination of the quantities
   of off-site topsoil required.

1.2 SCOPE OF WORK

A. The Work of this Section shall include the handling, sorting, placement, grading, shaping, conditioning, and
   fertilizing of topsoil from previously stripped and stockpiled on-site sources to all areas where fill is placed,
   excavations made, or existing vegetation is disturbed. The typical final thickness of the topsoil layer shall be
   minimum six (6) inches.

1.3 SUBMITTALS

A. The Contractor shall submit to the Owner for review and approval, the following information a minimum of
   five (5) days in advance of starting any topsoil operations: Composition, test data, Manufacture’s
   information, and/or source of topsoil material. See Testing Requirements, Part 2, Section 2.1 (K).

PART 2 – PRODUCTS

2.1 TOPSOIL

A. The topsoil shall consist of natural topsoil, free from subsoil. Remove to a depth of 1-ft or less if subsoil is
   encountered. Topsoil shall be of uniform quality free of hard clods, stiff clay, hardpan, sods, partially
   disintegrated stone, lime, cement, ashes, debris, trash, slag, concrete, tar residues, tarred paper, boards,
   chips, sticks, stumps, rocks, weeds, brush, and all other undesirable material and substances toxic to plant
   growth.

B. The topsoil shall be classified as a sandy loam by the USDA textural classification system determined by sieve
   and pipette or hydrometer analysis. The topsoil shall contain less than 70 percent sand by weight and less
   than 35% clay by weight. The fine to medium sand fraction (0.10 to 0.50 mm in diameter) shall comprise at
   least 90 percent of the sand fraction. No more than 3 percent of the soil shall be gravel (>1 mm <1-in in
   diameter).

C. Organic soils, such as peat or muck, shall not be used as topsoil material. Soluble salts shall not exceed 500
   ppm. Sodium adsorption ratio shall be less than 12.

D. New imported topsoil shall contain a minimum of 2.5 percent and maximum 12 percent of organic matter
   as determined by the Loss on Ignition Test, Association of Official Agricultural Chemists, with not more than
50 percent clay and not more than 55 percent sand as determined in accordance with ASTM D 482, "Particle-Size Analysis of Soils". To adjust organic matter content, the soil may be amended, by the addition of composted leaf mold or peat moss. Use of organic amendments is acceptable only if random soil sampling indicates thorough incorporation. Soil shall be capable of supporting and germinating vegetation.

E. The topsoil reaction (pH) shall be between 6.0 and 7.5.

F. Topsoil shall be uncontaminated with arsenic at concentrations greater than 5,800 micrograms per kilogram (ug/kg).

G. Topsoil shall be uncontaminated with perfluoroctane sulfonate (PFOS) at concentrations greater than 350 ug/kg or perfluorooctanoic acid (PFOA) at concentrations greater than 0.22 ug/kg.

H. Topsoil shall be uncontaminated with pesticides at concentrations greater than the lowest MDEQ Part 201 Residential Soil Clean Up Criteria for each pesticide.

I. Topsoil shall be graded within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Finer by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-in</td>
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<tr>
<td>1/4-in</td>
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<tr>
<td>No. 10</td>
<td>90</td>
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<tr>
<td>No. 100</td>
<td>40 to 60</td>
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J. Do not destroy topsoil structure through excessive and unnecessary handling and compaction. Inappropriate handling leading to the compaction or deterioration of soil structure will result in rejection of topsoil for use.

K. Testing Requirement: Submit samples to assure topsoil fulfills specified requirements regarding textural analysis, organic matter content, pH and fertility as follows:

1. Provide one 20lb sample of topsoil to Owner or its representative from each site that will be used as a topsoil borrow area. Submit samples at least 5 days prior to beginning stripping operations or commencing topsoiling operations on the site.

2. All topsoil shall, at the Contractor’s expense, be subjected to a Standard Soil Test with Organic Matter which shall include reporting of the following parameters: pH, Buffer pH, Extractable Nutrients, Extractable Heavy Metals (e.g. Lead), Cation Exchange Capacity, Percent Base Saturation, Percent Organic Matter, and Total Soil Nitrogen. The laboratory test results shall provide recommendations for nutrient and pH adjustments.

3. A minimum of one test shall be performed on each distinct on-site topsoil or off-site loam source. A standard soil test shall be performed for every 500 CY of topsoil or loam used at the site.

4. Soil testing shall be performed at an approved accredited testing laboratory.

PART 3 - EXECUTION

3.1 TOPSOIL

A. Topsoil shall be amended in accordance with the recommendations of the Testing Laboratory provided in their report and in accordance with these specifications.

B. Topsoil shall be spread so as to form a cover of topsoil in all areas to be seeded, sodded, or otherwise vegetated to a minimum depth of six (6) inches unless otherwise shown on the drawings or directed.
by the Owner or its representative.

C. Prior to spreading topsoil, the areas shall be cleared, grubbed, and brought to final sub-grade elevation. Areas designated for covering with topsoil shall be scarified or otherwise roughened to a depth of 2 inches, just prior to the application of topsoil.

D. After the spreading of topsoil, all stiff clods, hard lumps, large stones, trash, stakes, wood, brush, stumps, roots, or other objectionable material shall be gathered and removed from topsoiled area through screening, raking, or similar means. Moderate compaction may be accomplished by the use of a lawn roller commonly used for this work. Disposal of materials screened from topsoil and/or loam shall be considered incidental to the work of this Section.

E. Promptly fertilize, seed, lightly compact, mulch, or otherwise cover, and stabilize through tracking with suitable equipment.

END OF SECTION
**Grasses, Sedges, and Rushes**

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>PLUGS/ACRE</th>
<th>PLUGS PER SQ FT</th>
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**Forbs**

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**SUBTOTAL** 2904

**TOTAL** 5480

Install a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre. May also plant sporadic supplemental buttonbush (Cephalanthus occidentalis).
Grasses, Sedges, and Rushes

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<tr>
<th>ACRONYM</th>
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<th>COMMON NAME</th>
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<th>LB/acre</th>
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<tr>
<td>SENHEB</td>
<td>Senna hebecarpa</td>
<td>WILD SENNA</td>
<td>1,400</td>
<td>1.0000</td>
<td>0.06</td>
</tr>
<tr>
<td>CHEGLB</td>
<td>Chelone glabra</td>
<td>TURTLEHEAD</td>
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<tr>
<td>EUPPER</td>
<td>Eupatorium perfoliatum</td>
<td>COMMON BONESET</td>
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<tr>
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<td>COMMON GRASS-LEAVED GOLDENROD</td>
<td>350,000</td>
<td>0.5000</td>
<td>0.03</td>
</tr>
<tr>
<td>EUTMAC</td>
<td>Eutrochium maculatum</td>
<td>SPOTTED JOE PYE WHEAT</td>
<td>95,000</td>
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<td>Helium autumnale</td>
<td>SNEEZEWEED</td>
<td>130,000</td>
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</tr>
<tr>
<td>HIBLAE</td>
<td>Hibiscus laevis</td>
<td>HALBERD-LEAVED ROSE MALLOW</td>
<td>2,800</td>
<td>6.0000</td>
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<td>IRIVIS</td>
<td>Iris virginica shrevei</td>
<td>BLUE FLAG</td>
<td>1,000</td>
<td>24.0000</td>
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<tr>
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<td>Lobelia siphilitica</td>
<td>GREAT BLUE LOBELIA</td>
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<td>LYTALA</td>
<td>Lythrum alatum</td>
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<td>MIMRIN</td>
<td>Mimulus ringens</td>
<td>MONKEY FLOWER</td>
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<td>0.02</td>
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<tr>
<td>PENSED</td>
<td>Penthorum sedoides</td>
<td>DITCH STONECROP</td>
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<td>0.03</td>
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<td>SILPER</td>
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<td>0.03</td>
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<td>Solidad rigidiflora</td>
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<td>2.0000</td>
<td>0.13</td>
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<tr>
<td>SYMNOV</td>
<td>Symphyotrichum nova-angliae</td>
<td>NEW ENGLAND ASTER</td>
<td>65,000</td>
<td>6.0000</td>
<td>0.38</td>
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<tr>
<td>VERFAS</td>
<td>Vernonia fasciculata</td>
<td>COMMON IRONWEED</td>
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<td>6.0000</td>
<td>0.38</td>
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<tr>
<td>VERHAS</td>
<td>Verbena hastata</td>
<td>BLUE Vervain</td>
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<td>6.0000</td>
<td>0.38</td>
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Supplemental Plug Species

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>PLUGS PER ACRE</th>
<th>PLUGS PER SQ FT</th>
<th>NUMBER OF PLUGS</th>
</tr>
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<tbody>
<tr>
<td>CXSTRI</td>
<td>Carex stricta</td>
<td>COMMON TUSSOCK SEDGE</td>
<td>1307.00</td>
<td>0.030</td>
<td>162</td>
</tr>
<tr>
<td>SENHEB</td>
<td>Senna hebecarpa</td>
<td>WILD SENNA</td>
<td>1307.00</td>
<td>0.030</td>
<td>162</td>
</tr>
<tr>
<td>DOEUMB</td>
<td>Doellingeria umbellata</td>
<td>FLAT-TOP ASTER</td>
<td>1307.00</td>
<td>0.030</td>
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</tr>
<tr>
<td>ELEACI</td>
<td>Eleocharis acicularis</td>
<td>NEEDLE SPIKE RUSH</td>
<td>1307.00</td>
<td>0.030</td>
<td>162</td>
</tr>
<tr>
<td>FILRUB</td>
<td>Filipendula rubra</td>
<td>QUEEN OF THE PRAIRIE</td>
<td>1307.00</td>
<td>0.030</td>
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<tr>
<td>GENARD</td>
<td>Gentiana andrewsii</td>
<td>BOTTLE GENTIAN</td>
<td>1307.00</td>
<td>0.030</td>
<td>162</td>
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<tr>
<td>JUNTOR</td>
<td>Juncus torreyi</td>
<td>TORREY’S RUSH</td>
<td>1307.00</td>
<td>0.030</td>
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</tr>
<tr>
<td>LIASP</td>
<td>Liatris spicata</td>
<td>MARSH BLAZING STAR</td>
<td>1307.00</td>
<td>0.030</td>
<td>162</td>
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<tr>
<td>LOBCAR</td>
<td>Lobelia cardinalis</td>
<td>CARDINAL FLOWER</td>
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<td>0.030</td>
<td>162</td>
</tr>
</tbody>
</table>

Install a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre.
**ZONE 2 - WETLAND PLANTING ZONE (SEED MIXTURE AND PLUGS)**

<table>
<thead>
<tr>
<th></th>
<th>Seed/Plant Name</th>
<th>Common Name</th>
<th>Price</th>
<th>Quantity</th>
<th>Coverage</th>
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<tbody>
<tr>
<td><strong>LYCAME</strong></td>
<td><em>Lycopus americanus</em></td>
<td>COMMON WATER HORSEHOUND</td>
<td>1307.00</td>
<td>0.03</td>
<td>162</td>
</tr>
<tr>
<td><strong>MENARV</strong></td>
<td><em>Mentha arvensis villosa</em></td>
<td>WILD MINT</td>
<td>1307.00</td>
<td>0.03</td>
<td>162</td>
</tr>
<tr>
<td><strong>ONOSEN</strong></td>
<td><em>Onoclea sensibilis</em></td>
<td>SENSITIVE FERN</td>
<td>1307.00</td>
<td>0.03</td>
<td>162</td>
</tr>
<tr>
<td><strong>PEDLAN</strong></td>
<td><em>Pedicularis lanceolata</em></td>
<td>FEN BETONY</td>
<td>1307.00</td>
<td>0.03</td>
<td>162</td>
</tr>
<tr>
<td><strong>PHYVIV</strong></td>
<td><em>Physostegia virginiana</em></td>
<td>OBEDIENT PLANT</td>
<td>1307.00</td>
<td>0.03</td>
<td>162</td>
</tr>
</tbody>
</table>

**TOTAL** 2265

Install a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre.
### Grasses, Sedges, and Rushes

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>SEEDS/OZ</th>
<th>OZ/ACRE</th>
<th>LB/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOUCUR</td>
<td>Bouteloua curtipendula</td>
<td>SIDE-OATS GRAMA</td>
<td>6,000</td>
<td>80.0000</td>
<td>5.00</td>
</tr>
<tr>
<td>CXBREV</td>
<td>Carex brevior</td>
<td>PLAINS OVAL SEDGE</td>
<td>29,000</td>
<td>6.0000</td>
<td>0.38</td>
</tr>
<tr>
<td>CXSCOP</td>
<td>Carex scoparia</td>
<td>LANCE-FRUITED OVAL SEDGE</td>
<td>84,000</td>
<td>2.0000</td>
<td>0.13</td>
</tr>
<tr>
<td>ELYCAN</td>
<td>Elymus canadensis</td>
<td>CANADA WILD RYE</td>
<td>5,200</td>
<td>80.0000</td>
<td>5.00</td>
</tr>
<tr>
<td>ELVIR</td>
<td>Elymus virginicus</td>
<td>VIRGINIA WILD RYE</td>
<td>4,200</td>
<td>48.0000</td>
<td>3.00</td>
</tr>
<tr>
<td>JUNDUD</td>
<td>Juncus dubius</td>
<td>DUDLEY'S RUSH</td>
<td>3,200,000</td>
<td>0.1250</td>
<td>0.01</td>
</tr>
<tr>
<td>PANVIR</td>
<td>Panicum virgatum</td>
<td>SWITCH GRASS</td>
<td>14,000</td>
<td>32.0000</td>
<td>2.00</td>
</tr>
<tr>
<td>SCHSCO</td>
<td>Schizachyrium scoparium</td>
<td>LITTLE BLUESTEM GRASS</td>
<td>15,000</td>
<td>160.0000</td>
<td>10.00</td>
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</tbody>
</table>

**SUBTOTAL**  
8.93

**TOTAL**  
34.45

### Forbs

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>SEEDS/OZ</th>
<th>OZ/ACRE</th>
<th>LB/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLCER</td>
<td>Allium cernuum</td>
<td>NODDING WILD ONION</td>
<td>7,600</td>
<td>4.0000</td>
<td>0.25</td>
</tr>
<tr>
<td>ASCSYR</td>
<td>Asclepias syriaca</td>
<td>COMMON MILKWEED</td>
<td>4,000</td>
<td>8.0000</td>
<td>0.5</td>
</tr>
<tr>
<td>BAPALB</td>
<td>Baptisia alba</td>
<td>WHITE WILD INDIGO</td>
<td>1,700</td>
<td>4.0000</td>
<td>0.25</td>
</tr>
<tr>
<td>CHAFAS</td>
<td>Chamaecrista fasciculata</td>
<td>PARTRIDGE PEA</td>
<td>2,700</td>
<td>16.0000</td>
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</tr>
<tr>
<td>CORPAL</td>
<td>Coreopsis palmata</td>
<td>PRAIRIE COREOPSIS</td>
<td>10,000</td>
<td>4.0000</td>
<td>0.25</td>
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<tr>
<td>CORTRP</td>
<td>Coreopsis tripteris</td>
<td>TALL COREOPSIS</td>
<td>14,000</td>
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</tr>
<tr>
<td>DALPUR</td>
<td>Dalea purpurea</td>
<td>PURPLE PRAIRIE CLOVER</td>
<td>15,000</td>
<td>9.0000</td>
<td>0.56</td>
</tr>
<tr>
<td>DESCAA</td>
<td>Desmodium canadense</td>
<td>SHOWY TICK TREFOIL</td>
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<td>2.5000</td>
<td>0.16</td>
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<tr>
<td>ECHPAL</td>
<td>Echinacea pallida</td>
<td>PALE PURPLE CONEFLOWER</td>
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<td>8.0000</td>
<td>0.5</td>
</tr>
<tr>
<td>ECHPUR</td>
<td>Echinacea purpurea</td>
<td>PURPLE CONEFLOWER</td>
<td>6,600</td>
<td>6.0000</td>
<td>0.38</td>
</tr>
<tr>
<td>ERYYUC</td>
<td>Eryngium yuccifolium</td>
<td>RATTLESNAKE MASTER</td>
<td>7,500</td>
<td>6.0000</td>
<td>0.38</td>
</tr>
<tr>
<td>HELHEL</td>
<td>Helianthus helianthoides</td>
<td>FALSE SUNFLOWER</td>
<td>6,300</td>
<td>16.0000</td>
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<tr>
<td>LESCAP</td>
<td>Lespedeza capitata</td>
<td>ROUND-HEADED BUSH CLOVER</td>
<td>8,000</td>
<td>4.0000</td>
<td>0.25</td>
</tr>
<tr>
<td>MONFIS</td>
<td>Monarda fistulosa</td>
<td>WILD BERGAMOT</td>
<td>70,000</td>
<td>3.0000</td>
<td>0.19</td>
</tr>
<tr>
<td>PENDIG</td>
<td>Penstemon digitalis</td>
<td>FOXGLOVE BEARD TONGUE</td>
<td>130,000</td>
<td>4.0000</td>
<td>0.25</td>
</tr>
<tr>
<td>POTARIU</td>
<td>Potentilla arguta</td>
<td>PRAIRIE CINQUEFOIL</td>
<td>230,000</td>
<td>0.5000</td>
<td>0.03</td>
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<tr>
<td>PTCVIR</td>
<td>Pycnanthemum virginianum</td>
<td>COMMON MOUNTAIN MINT</td>
<td>220,000</td>
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<td>0.03</td>
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<tr>
<td>RATPIN</td>
<td>Ratibida pinnata</td>
<td>YELLOW CONEFLOWER</td>
<td>30,000</td>
<td>8.0000</td>
<td>0.5</td>
</tr>
<tr>
<td>RUDHIR</td>
<td>Rudbeckia hirta</td>
<td>BLACK-EYED SUSAN</td>
<td>92,000</td>
<td>8.0000</td>
<td>0.5</td>
</tr>
<tr>
<td>RUDSUB</td>
<td>Rudbeckia subtomentosa</td>
<td>SWEET BLACK-EYED SUSAN</td>
<td>43,000</td>
<td>4.0000</td>
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</tr>
<tr>
<td>RUDTRI</td>
<td>Rudbeckia triloba</td>
<td>BROWN-EYED SUSAN</td>
<td>34,000</td>
<td>2.0000</td>
<td>0.13</td>
</tr>
<tr>
<td>SILLAC</td>
<td>Silphium lacinatum</td>
<td>COMPASS PLANT</td>
<td>660</td>
<td>2.0000</td>
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</tr>
<tr>
<td>SOLRIG</td>
<td>Solidago rigidla</td>
<td>STIFF GOLDENROD</td>
<td>41,000</td>
<td>4.0000</td>
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</tr>
<tr>
<td>SYMLAE</td>
<td>Symphyotrichum laeve</td>
<td>SMOOTH BLUE ASTER</td>
<td>55,000</td>
<td>1.5000</td>
<td>0.09</td>
</tr>
<tr>
<td>SYMONV</td>
<td>Symphyotrichum novae-angliae</td>
<td>NEW ENGLAND ASTER</td>
<td>65,000</td>
<td>2.5000</td>
<td>0.16</td>
</tr>
<tr>
<td>TRAHOI</td>
<td>Tradescantia ohiensis</td>
<td>COMMON SPIDERWORT</td>
<td>8,000</td>
<td>4.0000</td>
<td>0.25</td>
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<tr>
<td>VERHAS</td>
<td>Verbena hastata</td>
<td>BLUE VERVAIN</td>
<td>93,000</td>
<td>1.0000</td>
<td>0.06</td>
</tr>
<tr>
<td>ZIZAUR</td>
<td>Zizia aurea</td>
<td>GOLDEN ALEXANDERS</td>
<td>11,000</td>
<td>8.0000</td>
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</table>

**SUBTOTAL**  
1950

### Supplemental Plug Species

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>PLUGS PER ACRE</th>
<th>PLUGS PER SQ FT</th>
<th>NUMBER OF PLUGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCPUR</td>
<td>Asclepias purpurascens</td>
<td>PURPLE MILKWEED</td>
<td>435</td>
<td>0.01</td>
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</tr>
<tr>
<td>GENALB</td>
<td>Gentiana alba</td>
<td>YELLOWISH GENTIAN</td>
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<td>0.01</td>
<td>150</td>
</tr>
<tr>
<td>HEURIC</td>
<td>Heuchera richardsonii</td>
<td>PRAIRIE ALUM ROOT</td>
<td>435</td>
<td>0.01</td>
<td>150</td>
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<tr>
<td>LIAPYC</td>
<td>Liatris pycnostachya</td>
<td>PRAIRIE BLAZING STAR</td>
<td>1742</td>
<td>0.04</td>
<td>600</td>
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<td>PEDCAN</td>
<td>Pedicularis canadensis</td>
<td>WOOD BETONY</td>
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<td>0.02</td>
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<tr>
<td>VERVIR</td>
<td>Veronicastrum virginicum</td>
<td>CULVER’S ROOT</td>
<td>1742</td>
<td>0.04</td>
<td>600</td>
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</table>

**TOTAL**  
1,950

Install a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre.
## ZONE 4: TURF PLANTING ZONE

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Oz/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grasses, Sedges, Rushes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Bouteloua curtipendula</em></td>
<td>Side Oats Grama</td>
<td>80.00</td>
</tr>
<tr>
<td><em>Elymus canadensis</em></td>
<td>Canada Wild Rye</td>
<td>32.00</td>
</tr>
<tr>
<td><em>Panicum virgatum</em></td>
<td>Switchgrass</td>
<td>16.00</td>
</tr>
<tr>
<td><em>Schizachyrium scoparium</em></td>
<td>Little Bluestem</td>
<td>160.00</td>
</tr>
<tr>
<td><em>Sorghastrum nutans</em></td>
<td>Indian grass</td>
<td>48.00</td>
</tr>
<tr>
<td><em>Sporobolus heterolepis</em></td>
<td>Prairie Dropseed</td>
<td>16.00</td>
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</table>
## TREES AND SHRUBS

### ZONE 1: EMERGENT PLANTING ZONE

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEPOCC</td>
<td><em>Cephalanthus occidentalis</em></td>
<td>BUTTONBUSH</td>
<td>12</td>
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### ZONE 2: WETLAND EMERGENT PLANTING ZONE

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACLINC</td>
<td><em>Alnus incana</em></td>
<td>SPECKLED ALDER</td>
<td>2</td>
</tr>
<tr>
<td>BETPUM</td>
<td><em>Betula pumila</em></td>
<td>BOG BIRCH</td>
<td>2</td>
</tr>
<tr>
<td>CORAMO</td>
<td><em>Cornus amomum</em></td>
<td>SILKY DOGWOOD</td>
<td>2</td>
</tr>
<tr>
<td>CORSCE</td>
<td><em>Cornus sericea</em></td>
<td>RED-OSIER DOGWOOD</td>
<td>1</td>
</tr>
<tr>
<td>ROSPAL</td>
<td><em>Rosa palustris</em></td>
<td>SWAMP ROSE</td>
<td>2</td>
</tr>
<tr>
<td>SALDIS</td>
<td><em>Salix discolor</em></td>
<td>PUSSY WILLOW</td>
<td>3</td>
</tr>
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### ZONE 3: MESIC PLANTING ZONE (LOWER GRADES)

<table>
<thead>
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<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETALL</td>
<td><em>Betula alleghaniensis</em></td>
<td>YELLOW BIRCH</td>
<td>15</td>
</tr>
<tr>
<td>CELOCC</td>
<td><em>Celtis occidentalis</em></td>
<td>HACKBERRY</td>
<td>15</td>
</tr>
<tr>
<td>EUOATR</td>
<td><em>Euonymus atropurpureus</em></td>
<td>BURNING BUSH</td>
<td>10</td>
</tr>
<tr>
<td>QUEBIC</td>
<td><em>Quercus bicolor</em></td>
<td>SWAMP WHITE OAK</td>
<td>15</td>
</tr>
<tr>
<td>VIBLEN</td>
<td><em>Viburnum lentago</em></td>
<td>NANNYBERRY</td>
<td>10</td>
</tr>
</tbody>
</table>

### ZONE 3: MESIC PLANTING ZONE (UPPER GRADES)

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BETPAP</td>
<td><em>Betula papyifera</em></td>
<td>PAPER BIRCH</td>
<td>4</td>
</tr>
<tr>
<td>CERCAN</td>
<td><em>Cercis canadensis</em></td>
<td>REDBUD</td>
<td>4</td>
</tr>
<tr>
<td>CORAME</td>
<td><em>Corylus americana</em></td>
<td>HAZELNUT</td>
<td>4</td>
</tr>
<tr>
<td>HAMVIR</td>
<td><em>Hamamelis virginiana</em></td>
<td>COMMON WITCHHAZEL</td>
<td>4</td>
</tr>
<tr>
<td>SASALB</td>
<td><em>Sassafras albidum</em></td>
<td>SASSAFRAS</td>
<td>2</td>
</tr>
<tr>
<td>QUEALB</td>
<td><em>Quercus alba</em></td>
<td>WHITE OAK</td>
<td>2</td>
</tr>
<tr>
<td>QUEMAC</td>
<td><em>Quercus macrocarpa</em></td>
<td>BUR OAK</td>
<td>2</td>
</tr>
<tr>
<td>QUERUB</td>
<td><em>Quercus rubra</em></td>
<td>RED OAK</td>
<td>6</td>
</tr>
<tr>
<td>QUEVEL</td>
<td><em>Quercus velutina</em></td>
<td>BLACK OAK</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total** 121
Under no circumstances shall the site be stabilized with winter rye, perennial rye, grain rye, or winter wheat. These plants produce toxins that inhibit native seed germination.
NOTES:
1. REFER TO EXCAVATION PLANS FOR LIMITS OF EXCAVATION AND GRADE.
2. RESTORATION TO OCCUR WITHIN LIMITS OF PLANTING ZONES AS SHOWN.
3. SEE FIGURES 9C FOR GENERAL RESTORATION DETAILS AND FIGURE 9D FOR TYPICAL PLANTING DETAILS.

LEGEND
ZONE 1 - EMERGENT PLANTING ZONE
ZONE 2 - WETLAND PLANTING ZONE
ZONE 3 - MESIC PLANTING ZONE
ZONE 4 - TURF PLANTING ZONE
PROPOSED TREE
PROPOSED SHRUB

APPROXIMATE LOCATION OF CONTRACTOR DESIGNED COFFER DAM (TYP)
MIN. TOP ELEVATION = 694.0

RESTORATION SECTION (TYP)
SEE FIGURE 9C FOR CROSS-SECTION DETAILS
SEE FIGURE 9D FOR TYPICAL DETAIL
SEE FIGURE 9E FOR TYPICAL PLANTING DETAILS.

NOTES:
1. REFER TO EXCAVATION PLANS FOR LIMITS OF EXCAVATION AND GRADE.
2. RESTORATION TO OCCUR WITHIN LIMITS OF PLANTING ZONES AS SHOWN.
3. SEE FIGURES 9C FOR GENERAL RESTORATION DETAILS AND FIGURE 9D FOR TYPICAL PLANTING DETAILS.

LEGEND
ZONE 1 - EMERGENT PLANTING ZONE
ZONE 2 - WETLAND PLANTING ZONE
ZONE 3 - MESIC PLANTING ZONE
ZONE 4 - TURF PLANTING ZONE
PROPOSED TREE
PROPOSED SHRUB

APPROXIMATE LOCATION OF CONTRACTOR DESIGNED COFFER DAM (TYP)
MIN. TOP ELEVATION = 694.0

RESTORATION SECTION (TYP)
SEE FIGURE 9C FOR CROSS-SECTION DETAILS
SEE FIGURE 9D FOR TYPICAL DETAIL
SEE FIGURE 9E FOR TYPICAL PLANTING DETAILS.

NOTES:
1. REFER TO EXCAVATION PLANS FOR LIMITS OF EXCAVATION AND GRADE.
2. RESTORATION TO OCCUR WITHIN LIMITS OF PLANTING ZONES AS SHOWN.
3. SEE FIGURES 9C FOR GENERAL RESTORATION DETAILS AND FIGURE 9D FOR TYPICAL PLANTING DETAILS.

LEGEND
ZONE 1 - EMERGENT PLANTING ZONE
ZONE 2 - WETLAND PLANTING ZONE
ZONE 3 - MESIC PLANTING ZONE
ZONE 4 - TURF PLANTING ZONE
PROPOSED TREE
PROPOSED SHRUB

APPROXIMATE LOCATION OF CONTRACTOR DESIGNED COFFER DAM (TYP)
MIN. TOP ELEVATION = 694.0

RESTORATION SECTION (TYP)
SEE FIGURE 9C FOR CROSS-SECTION DETAILS
SEE FIGURE 9D FOR TYPICAL DETAIL
SEE FIGURE 9E FOR TYPICAL PLANTING DETAILS.
1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed.

2. Begin at the top of the slope by anchoring the RECPs in a 6" (15cm) deep x 6" (15cm) wide trench with approximately 12" (30cm) of RECPs extended beyond the up-slope portion of the trench. Anchor the RECPs with a row of staples/stakes approximately 12" (30cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12" (30cm) portion of RECPs back over the seed and compacted soil. Secure the remaining RECPs over compacted soil with a row of staples/stakes spaced approximately 12" (30cm) apart across the width of the RECPs.

3. Roll the RECPs (A) down or (B) horizontally across the slope. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to the soil surface by placing staples/stakes in appropriate locations as shown in the staple pattern guide.

4. The edges of parallel RECPs must be stapled with approximately 2"-5" (5-12.5cm) overlap depending on the RECPs type.

5. Consecutive RECPs spliced down the slope must be end over end (Shingle style) with an approximate 3" (7.5cm) overlap. Staple through overlapped area approximately 12" (30cm) apart across the entire RECPs width.

*NOTE: In loose soil conditions, the use of stapler or stake lengths greater than 6" (15cm) may be necessary to properly secure the RECPs.*
STREAM BANK CONCEPT

Suggested construction sequence:
1. Place erosion and sediment controls
2. Excavate contaminated soil to normal water surface elevation and to grades shown
3. Place and temporarily anchor erosion control blanket
4. Place riprap (including subgrade filter) at toe of slope to anchor erosion control blanket
5. Remove temporary erosion control blanket anchors, roll up erosion control blanket
6. Place new clean fill to grades shown; loam and seed
7. Unroll erosion control blanket and anchor upstream side as shown
8. Install live branch cuttings and live stakes and other plantings