NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. This Specification must be edited for each project's special conditions. Do not include these instructions in the Contract Documents).

The attached Seattle Parks and Recreation (SPR) Standard Specifications represent the minimum acceptable standards for Hydroseeding of Irrigated and Mowed Lawn areas, Non-mowed "Eco-Turf" areas, Erosion Control areas or Wildflower/Meadow areas. There are several options for execution of Soil Preparation and Hydroseeding operations as needed for the individual project requirements depending upon the existing conditions of the site, or as specified at the Park Engineer's direction. The Consultant shall choose the options that best suit the project conditions and edit the specifications accordingly. The following guidelines shall be followed:

Grading:
Maintaining positive drainage to a drainage structure or detention facility is required at all times. Grades shall be a minimum of 2%. Areas that are intended to be regularly mowed shall not exceed a ratio of 5 horizontal to 1 vertical (5:1). Any area that is not intended to be mowed on a regular basis (Erosion Control or Meadow Areas) shall be graded between 5:1 and 3:1 depending on site conditions. Any areas exceeding 3:1 shall be protected with erosion control fabric or other methods as specified by the Engineer. Areas over 3:1 shall be planted as shrub bed areas or as shown on the drawings. No area shall exceed a grade of 2:1 without the construction of a wall or rockery with adequate footings and drainage.

Soil Preparation Options:
Refer to Section 32 91 13 - Soil Preparation, for soil preparation and amendment options based on soil testing and/or existing conditions of native soils at the project site or as directed by the Engineer. One of the soil preparation options shall be chosen and the specifications shall be edited accordingly to fit preparation strategy.

Compaction of soils:
Condition 1 - Soils require full compaction to levels as described in Section 31 00 00 – Earthwork and Section 32 91 13 – Soil Preparation.
Condition 2 - Soils require cultivation to lessen compaction density to acceptable levels.

PART 1 - GENERAL

1.01 Description: Furnish all materials, equipment, and labor necessary for Hydroseeding of Lawns, “Eco-turf”, Erosion Control, Meadow and Wildflower areas. Provide seeded areas as shown on the contract drawings and as specified herein.

A. The work includes the following:

1. Preparation of the Sub-soil.
2. Soil Preparation; including the placing of specified topsoils and/or soil amendments.
3. Liming and Fertilizing.
4. Seed Mixes for Various Applications.
5. Maintenance and Establishment.

1.02 Related Sections:

Section 31 00 00 - Earthwork
Section 32 91 13 - Soil Preparation

1.03 References:

A. All construction shall be in accordance with the City of Seattle Standard Plans and Specifications (most recent edition).

B. The Seattle Parks & Recreation (SPR) Standard Specifications and Details.

1.03 Quality Assurance: The seed shall be furnished in containers that show the following information: seed name, lot number, net weight, percentage of purity, germination, weed seed and inert material. Seed that has become wet, moldy, or otherwise damaged will not be accepted. Seed shall conform to the requirements of the Washington State seed law and when applicable the Federal Seed Act, and shall be "certified" grade or better.

1.04 Submittals: Submit seed vendor's certification for required grass seed mixture, indicating percentage by weight and percentages of purity, germination and weed seed for each grass species.

1.05 Delivery, Storage and Handling: Deliver seed and fertilizer materials in original unopened containers showing weight, analysis, and name of manufacturer. Store the seed in such a manner that will prevent the wetting and deterioration of the seed.

1.06 Field Quality Control:

A. Grading Inspection:

1. Rough grading or sub-grades shall be inspected and approved by the Engineer prior to placing playfield soil.

2. Finish grading, soil placement and preparation shall be inspected and approved by the Engineer prior to hydroseed application.

B. Other Inspections: The Contractor shall request a provisional inspection by the Engineer upon completion of the work. Call the **SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov** to make arrangements for inspections. Upon Substantial Completion and completion of the punch list items, the Engineer will make provisional acceptance in writing.

PART 2 - PRODUCTS

2.01 Soil Preparation shall be installed per the requirements of Section 32 91 13 - Soil Preparation and shall include the following:

A. Imported Playfield Soil for all Mowed Lawn areas.

B. (Optional) Composted Organic Amendment incorporated into existing site Native Soils.

C. Dolomite Lime shall be applied to all soil preparation options for all seeded areas with mixes specified as follows.

OPTIONAL SEED MIXES: Seed must be one or more of the following mixes as noted on the plan. Edit the following:

2.02 Grass Seed Mix for Irrigated/Mowed Lawn areas:

A. The Grass Seed Mix shall be composed of the following, by weight:
50% Turf-type Perennial Ryegrasses
25% Creeping Red Fescue
25% Chewings Fescue

B. The Grass Seed Mix shall also meet or exceed the following:
Minimum pure seed percent - 98%
Minimum germination percent - 90%
Maximum weed seed percent - 0.5%

C. All Seed shall be packed in clean, sound containers of uniform weight.

2.03 Erosion Control Seed Mix for Ecology Areas.

A. The recommended Seed Mix for Erosion Control (and/or Lawn Areas not intended to be automatically irrigated) shall be composed of the following, by weight:
50% Turf-type Perennial Ryegrass
20% Creeping Red Fescue
20% Chewings Fescue
10% Hard Fescue

B. The seed shall meet or exceed the following:
Minimum pure seed percent - 98%
Minimum germination percent - 90%
Maximum weed seed percent - 0.5%

C. The seed mix shall be packed in clean, sound containers that are of uniform weight.

2.04 Seed Mixes for Ecology or Non-irrigated Turf Areas:

A. Description: Seed Mixes for Meadow Areas are meant to be used for low maintenance, low water use areas where only periodic irrigation and mowing are intended. The mix shall be composed of the following seed types by weight:

1. "ECO-TURF" Lawn Seed Mix:

Elf Perennial Rye	***80%***
Wildflower and Flower Seed Mix;	
(English Daisy, Alyssum, Yarrow,	
Baby Blue Eyes, and Strawberry Clover)	***20%***

This mix is designed as an environmental alternative for traditional lawn grasses and is a low maintenance mixture of dwarf grass and wildflowers that require less water, fertilizer and mowing. It so recommended that mowing is done at a height of 4-6" with no cutting of more than 1" per mowing from wildflowers and flowers. When this mix is well established, do not water or mow more than once or twice a month.

OR, one of the following optional mixes, depending upon the site conditions and situation or as directed by the Engineer:

2. SUNMARK SEEDS XERISCAPE ECOLAWN Seed Mix:

Stonehedge Hard Fescue	***40%***
Covar Sheep Fescue	***15%***
Purple Prairie Clover	***15%***
Dwarf Bachelor Buttons	***12%***
Sandberg Bluegrass	***6%***
Baby Blue Eyes	***5%***
White Clover	***2%***
Dwarf White Allyssum	***2%***
Scarlet Globmallow	***2%***
Dwarf White Yarrow	***1%***

3. SUNMARK SEEDS ECOLOGY Seed Mixture

Delaware Dwarf Perennial Ryegrass	***45%***
Nordic Hard Fescue	***30%***
Strawberry Clover	***8%***
Dutch White Clover	***5%***

Baby Blue Eyes	*5%*
Dwarf White Alyssum	*3%*
Dwarf English Daisy	*2%*
White Yarrow	*2%*

4. ***<u>PROTIME 705 PDX ECOLOGY</u> Seed Mixture***

PR8820 Perennial Ryegrass	*60%*
Eureka Hard Fescue	*15%*
Wildflower and Flower Seed Mix;	
Dwarf Yarrow, Dutch White Clover,	
Salina Strawberry Clover, and Sweet Alyssum	*25%*

This mix is designed to form a year round green cover, with little or no irrigation required. Starter fertilizer is recommended but additional fertilization is usually not required. Mowing is optional. Seeding rate is 1.5 to 2 lbs. per 1000square feet, depending upon slope.

5. ***<u>PROTIME 706 FRAGRANT HERBAL</u> Lawn Seed Mix***

PR8820 Perennial Ryegrass	*55%*
Eureka Hard Fescue	*25%*
Wildflower and Flower Seed Mix;	
Dwarf Yarrow, Salina Strawberry Clover,	
Sweet Alyssum, and Roman Chamomile	*20%*

This mix as designed for use in the casual lawn or transitional area. Chamomile replaces flowers in this mix. Starter fertilizer is recommended but additional fertilization is usually not required. Seeding rate is 1 lb. per 800 square feet.

6. ***<u>PROTIME 755 FLEUR de LAWN</u> Flowering Lawn Seed Mix***

PR8820 Perennial Ryegrass	*80%*
Wildflower and Flower Seed Mix;	
Dwarf Yarrow, Salina Strawberry Clover,	
Baby Blue Eyes, Sweet Alyssum, and English Daisy	*20%*

This mix is designed for use in the casual lawn or transitional area. Starter fertilizer is recommended but additional fertilization is usually not required. Seeding rate is 1 lb. per 1000 square feet.

Mixes shall be applied in accordance with manufacturer's written directions which shall be submitted for the Engineer's approval, a minimum of 2 Working Days prior to application of seed mix. Written directions shall include the rate of application and the incorporation of specific species of grass seed components when appropriate, to achieve adequate erosion control protection while maximizing flower display and regeneration.

2.05 Wildflower Seed Mix for Meadow Areas.

A. Wildflower Seed Mix for Meadow Areas shall be composed of the following seed types (or approved equal), by weight:

Turf Type Perennial Rye (3 types)	45%
Chewings Fescue	25%
Hard Fescue	15%
Wildflowers	15%

B. Mixes shall be applied in accordance with manufacturers written directions which shall be submitted for Engineers approval, a minimum of 2 Working Days prior to application. Written directions shall include rate of application and the incorporation of specific species of grass seed components when appropriate to achieve adequate erosion control protection while maximizing flower display and regeneration.

C. Wildflower seed mix shall have a minimum of 20 wildflower species and shall not contain more than 10% (by weight) of any single species. No noxious weeds will be permitted. The seed mix shall be no less than 98% pure and shall have a minimum germination rate of 90%. Recommended sources of wildflower mixes are:

2.06 Fertilizers:

A. For Initial fertilization of all Hydroseeded areas use:

1. Lawn Starter Fertilizer: (10-20-20), or, approved equal.

Total Nitrogen* (N)	***10.0%***
(10.0% Ammoniacal Nitrogen)	
Available Phosphate (P205)	***20.0%***
Soluble Potash (K20)	***20.0%***
Sulfur (S)	***7.0%***

****Shall be derived from Ammonium Sulfate, Potassium Chloride, and Monoammonium Phosphate.***

(Or)

1. Lawn Starter Fertilizer (7-7-2) 'Starter Feed', or approved equal. Fertilizer shall be 100% Organic Fertilizer, as manufactured by Walt's Organic Fertilizer Co.

B. For Follow-up fertilization of all Hydroseeded areas use:

1. Lawn Maintenance Fertilizer: (16-16-16), or approved equal.

Total Nitrogen* (N)	***16.0%***
(8.5% Ammoniacal Nitrogen)	
(7.5% Urea Nitrogen)	
Available Phosphate (P205)	***16.0%***
Soluble Potash (K20)	***16.0%***
Sulfur (S)	***7.6%***

****Shall be derived from Ammonium Sulfate, Potassium Chloride, Monoammonium Phosphate, and Urea.***

(Or)

1. <u>Lawn Maintenance Fertilizer</u> (9-3-5) '<u>Regular Feed</u>', shall be 100% Organic Fertilizer as manufactured by Walt's Organic Fertilizer Co., or approved equal.

2.07 Optional Supplemental Mycorrhizal Amendment (3-3-4) '<u>EndoROOTS</u>', shall be 100% Organic as manufactured by roots, Inc, or approved equal. Apply per the manufacturer's directions.

2.08 Hydromulch: Mulch shall be wood cellulose fiber from clean wood chips, containing no growth or germination inhibiting substances; a soil-binding agent (tackifier) is required. Hydromulch shall be dyed a suitable color to facilitate placement.

2.09 Soil Binding Agent: Soil binding agent shall consist of non-toxic, biodegradable materials that are environmentally safe such as MG 250F, Guar Gum Powder, or approved equal.

PART 3 - EXECUTION

3.01 Soil Preparation: All soil preparation operations, compaction and clean up of debris shall be done prior to seeding per Section 32 91 13 - Soil Preparation.

3.02 Cultivation: Cultivation shall be executed in conjunction with the requirements of Section 32 91 13. Cultivation may be done by farm disc, harrow or other suitable equipment approved by the Engineer. Prior to cultivation apply dolomite limestone at the rate of 50 lbs. per 1,000 square feet and cultivate to a depth of 4 inches (if required by soil test or as directed by the Engineer).

3.03 Soil Placement: Soil placement shall be executed in conjunction with the requirements of Section. 32 91 13. When specified, amendments or prepared soils shall be evenly spread in the locations and to the depths shown on the Plans. After soil has been spread, all large clods, rocks and debris greater than 1" in any dimension, shall be removed. Soil shall not be placed when the ground is frozen, wet or in a condition detrimental to the work.

3.04 Compaction:

A. Compact with sheep's foot roller, cleated crawler tractor, vibratory roller, or equipment approved by the Engineer. Equipment must produce 150-300 pounds per square inch of ground pressure.

B. Compaction shall produce a uniform rough textured surface free of tire ruts, depressions and low spots, and be ready for seeding and mulching. A minimum of four passes is required. After compaction, finish grade shall be flush with the top of curbs, catch basins and other structures.

3.05 Irrigation: If required by the Engineer, water shall be provided to condition the soil for compaction or to provide dust control. Water shall be furnished and applied by contractor from on site supply or by watering truck if necessary.

3.06 Hydroseeding:

A. Seed, Lawn Starter Fertilizer and Hydromulch shall be applied in slurry in one operation with approved hydraulic equipment. Apply materials at the following rates:

1. Seed Mix:
   a. 8lbs. per 1,000 square feet for Irrigated/Mowed Lawn areas.
   b. 5lbs. per 1000s.f. for Eco-turf, Erosion Control or Wildflower/Meadow areas.
2. Lawn Starter Fertilizer: 1lb. of N per 1,000 square feet of blended materials.
3. Hydromulch, at 50lbs. per 1,000 square feet.
4. Soil Binding Agent, at 1lb. per 1,000 square feet.

B. Seeding shall not be done during windy weather (above 25 mph) or when the ground is overly wet (saturated) or frozen. Contractor shall give the Owner 48 hours notice of seeding operations. Seeding, fertilizing, and mulching of prepared areas shall be performed during the following time frames:

1. Hydroseeding shall be done from April 1 to May 31 or from September 1 to October 31.
2. No hydroseeding shall be done before or after these dates without the Engineer's written approval. Written permission to seed from June 1 to August 31 may be granted only if automatic irrigation is available and operational at the site. Permission to seed from November 1 to March 31 will only be given when completion of the Project is imminent and the environmental conditions are conducive to acceptable growth. No seeding shall be done on weekends or legal holidays without written approval of the Engineer.
3. Application of pre-germinated seed, moisture retention agents and/or provision for supplemental watering may be required by the Engineer should the Contractor schedule this portion of the Work outside the time frames listed in item 1 immediately above.
4. All areas that are partially completed to grade, shall be prepared and seeded during the first available planting period and shall not be allowed to sit idle for long periods of time without receiving the erosion control specified in the Contract.
5. When environmental conditions are not conducive to acceptable results from seeding operations, the Engineer may order the Work suspended, and it shall be resumed only when the desired results are likely to be obtained.

C. Equipment shall use water as the carrying agent utilizing a continuous built-in agitation system. Equipment with a gear pump is not acceptable.

D. Pump a continuous, non-fluctuating supply of homogenous slurry to provide a uniform distribution of material over designated areas.

3.07 Maintenance and Establishment:

A. Maintain all Hydroseeded areas until seed mix is well established and exhibits a vigorous growing condition.

B. Maintenance shall include protection, watering, fertilizing, weeding and a minimum of two mowing cycles.

C. After the first mowing, turf shall be fertilized with specified Lawn Maintenance Fertilizer for lawns and athletic fields, at the rate of 1lb. of N per 1,000 square feet of blended materials.

D. All weeds and grass clippings shall be removed from the site if requested by the Engineer.

3.08 Substantial/Physical Completion:

A. Inspection to determine Substantial Completion of seeded areas will be made by the Engineer upon the Contractor's request. Provide notification at least five (5) working days before requested inspection date.

1. Hydroseeded areas shall be accepted provided all requirements, including maintenance, have been complied with and grass is well established and exhibits a vigorous growing condition.
2. Areas failing to show a uniform stand of grass shall be reseeded at the Contractor’s expense.

B. Upon Physical Completion, the Owner will assume lawn maintenance.

3.09 Clean Up: Perform cleaning during installation of the work and upon completion of the work. Remove from the site all excess materials, soil, debris, and equipment. Repair the damage resulting from seeding operations.

3.10 Warranty and Replacement: All seeded areas must have a relatively uniform stand of turf grass or other seed mixes as specified with no bare spots over 6" square at the time of Substantial Completion. Reseed at the original rate and fertilize at the rates as for all blended materials. All areas failing to vigorously establish within 90 days after germination or one growing season (whichever is longest), shall be redone at the Contractor’s expense.

END OF SECTION