

ITEM 659 SEEDING AND MULCHING

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659.01 Description. This work consists of placing topsoil, preparing the seed bed, and placing and incorporating seed, agricultural lime, commercial fertilizer, and placing mulching material.

Perform this work in stages according to Item 207.

Perform this work in areas shown on the plans for seeding and mulching.

Perform seeding and mulching after completing all work in the area and within 7 days of obtaining final grade. If it is anticipated that future work may disturb an area, place temporary seed (Class 7), and provide mulch according to Item 207 and perform seeding and mulching after all work is completed. If the Contractor disturbs a final area, then the Contractor shall restore this area.

Use all excavation material in the work. Alternatively legally use, recycle, or dispose of all excavated materials according to 105.16 and 105.19.

659.02 Testing of Soil or Topsoil. When a Soil Analysis Test of the soil or topsoil is required in the plans, use the following sampling frequency to determine the lime required:

A. When an area is near final grade, perform Standard Soil Analysis Test to measure the soil acidity or alkalinity (pH) if no topsoil is to be placed. This testing will determine the soil requirements for lime. If the soil requirements are different than the

standard lime mixture ratio application rates then the standard application rate shall be adjusted up or down such that the soil requirements are met. If liquid lime is used then use the following application table to achieve a pH of 6.5 or greater. Calculate the difference between the soil pH and 6.5 pH.

Difference	0.25	0.50	0.75	1.0
Application rate in gals/ac (L/ha)	2.5 (4)	5 (8)	10 (15)	20 (30)

Example: Soil Analysis Test pH=5.75 required pH=6.5 difference= .75 required application rate is 10 gals/ac (15L/ha) Only use Liquid lime on the QPL list. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates.

Make no change in the mixture ratio. The sampling frequency is one sample every 10 acres (4.0 ha) per project side or one sample per project side whichever is greater. A sample consists of 15 soil cores in a random pattern spaced at a minimum of 500 feet (153 m) apart. Sample any change in soil. Soil changes can be seen as color and/or texture changes.

B. If placing topsoil, perform the Standard Soil Analysis Test from topsoil stockpiles to measure the topsoil acidity or alkalinity (pH). This testing will determine the soil requirements for lime. If the topsoil requirements are different than the standard lime mixture ratio application rates then the standard application rate shall be adjusted up or down such that the topsoil requirements are met.

If liquid lime is used then use the following application table to achieve a pH of 6.5 or greater. Calculate the difference between the soil pH and 6.5 pH.

Difference	.25	.50	.75	1.0
Application rate in gals/ac (L/ha)	2.5 (4)	5 (8)	10 (15)	20 (30)

Example: Soil Analysis Test pH=5.75 required pH=6.5 difference= .75 required application rate is 10 gals/ac (15L/ha). Only use Liquid lime on the QPL list. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates.

Make no change in the mixture ratio. The sampling frequency is one sample every 10,000 cubic yards (7600 m³) of a topsoil stockpile, or at least two samples per stock pile whichever is greater. Test each stockpile. A sample consisting of 15 soil cores in a random pattern spaced evenly throughout the stockpile.

Mix the 15 cores from each sample and then remove 1 pint (0.5 L) for testing.

The Ohio County Extension offices can provide the Contractor with a soil sample kit and testing laboratory locations.

The City will review the sample test results and approve application rates for the standard mixture ratios provided by the Contractor.

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If a Soil Analysis Test of the soil is not required by the plans, use the standard application rates for lime and commercial fertilizer.

659.03 Lime. Obtain granular or liquid lime from an agricultural lime dealer or manufacturer whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture. The granular or liquid lime standard grade is Ag-ground 90+. Ag-ground 90+ is defined as agricultural ground limestone, having a total neutralizing power (TNP) of 90 percent or more, at least 40 percent passing a No. 100 (150 μ m) sieve and 95 percent passing a No. 8 (2.36 mm) sieve. Test granular or liquid lime according to ODOT Supplement 1007. Apply the granular or liquid lime standard grade Ag-ground 90+ at the standard application rate of 92 pounds per 1000 square feet (2 tons per acre) [0.45 kg/m² (9 metric tons/ha)].

The Contractor may provide other lime grade materials. The lime grade materials provided will meet Table 7-10 "Equivalent Amounts of Liming Materials" found in Bulletin 472, *Ohio Agronomy Guide*, published by the Cooperative Extension Service, The Ohio State University. Based on the type of lime grade material provided, determine the increase or decrease in the standard application rate from Table 7-10 "Equivalent Amounts of Liming Materials" found in Bulletin 472, "Ohio Agronomy Guide", published by the Cooperative Extension Service, The Ohio State University.

If using liquid lime apply liquid lime at a rate of 5 gals/acre (8 L/ha) unless otherwise required per the soil or topsoil Soil Analysis Test. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates. Only use Liquid lime on the QPL list.

If testing of the soil or topsoil was performed, use sufficient lime to reach a slightly acidic (pH 6.5) growing environment. Adjust the application rate of the standard grade lime Ag-ground 90+ up or down to achieve this condition and report to the City for approval. No lime is required for the soil or topsoil if the test shows a slightly acidic condition.

659.04 Commercial Fertilizer. Obtain commercial fertilizer from a dealer or manufacturer whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture.

Use dry or liquid commercial fertilizer.. Apply standard commercial fertilizer 10-20-10 evenly over the surface at a standard dry application rate of 20 pounds per 1000 square feet (0.1 kg/m²). Furnish liquid application rates for approval by the City.

The Contractor may provide other commercial fertilizer mixture ratios, however, ensure that the ratio meets or exceeds the standard commercial fertilizer ratio of 10-20-10 by providing an application rate specific for that ratio. The City will approve this application rate that is specific to that ratio provided by the Contractor.

For areas of inter-seeding apply commercial fertilizer 12-12-12 over the affected area at the above rate.

For commercial fertilizer second application the method, mixture, and rate is broadcast 12-12-12 evenly over the surface without incorporation into the soil at a rate of 10 pounds per 1000 square feet (0.05 kg/m²).

659.05 Topsoil. If placing topsoil as specified in the plan, then stockpile topsoil off site for testing and/or stockpile stripped topsoil from the project for testing. Perform the

Soil Analysis Test from these stockpiles to determine the percent of organic matter present. Ensure that the topsoil contains between 4 percent and 20 percent organic matter as determined by loss on ignition of samples oven dried to constant weight at 212 °F (100 °C) and consist of fertile, loose, friable, and loamy material that contains humus material. For topsoil to qualify as loamy, ensure that the fraction passing the No. 10 (200) sieve does not contain more than 40 percent clay. Test topsoil according to ODOT Supplement 1016.

The City will review the sample test results and approve the stockpiles for use. Do not use stockpiles outside the above limits.

Use stripped topsoil from the R/W limits from the upper most layers of the excavation areas. Remove all heavy grass, weeds, and other vegetation before stripping topsoil from the excavation areas.

The City will treat a mixture of 1 part compost and 2 parts topsoil as topsoil.

659.06 Compost. Acceptable compost includes Ohio EPA rated Class IV compost, EQS biosolids compost, or a City approved equal. Furnish compost with a nitrogen content of 1.4 percent or above. Obtain compost from an Ohio EPA approved facility. Before delivering compost, provide the Engineer with the facility name and location.

659.07 Seeds. Furnish grass seed from a grass seed dealer or grower whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture or from the approved list of grass seed dealers or growers on file with the Ohio Department of Transportation per ODOT Supplement 1022. Furnish the kind and type of grass seed required that meets current specifications on file with ODOT as to percentage purity, percentage weed seed, and percentage germination.

Refer to turf grass germination rates specifications shown below in Table 659.07-1 to obtain an understanding of the specifications on file with the City along with information to understand what the City requires.

TABLE 659.07-1 GERMINATION RATES

Species	Minimum Percent	High Quality Percent
Kentucky Bluegrass	80	85
Fine Fescue	85	90
Perennial Ryegrass	85	90
Annual Ryegrass	85	90
Tall Fescue	85	90
Creeping Red Fescue	85	90

If the plans do not show high quality, then provide the minimum germination rate.

Mark the test date on seed bags. Furnish seeds as separate species and cultivars, packaged together or bagged separately, and labeled, tagged, or marked according to ORC 907.03. Sow seeds within 9 months of the testing date. The City reserves the right to test, reject, or approve all seed after delivery.

659.08 Legumes. Inoculate or treat all leguminous seeds (crown vetch) with the proper amount of pure nitrogen-fixing bacteria and mix with sufficient water to

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thoroughly wet the seed. Select bacteria for maximum vitality no more than one-year old. Provide all culture records with the leguminous seeds.

If sown hydraulically, use 4 times the inoculant rate specified by the inoculant manufacturer. If pre-inoculated seed is used then use 3 times the inoculant rate specified by the inoculant manufacturer. Immediately before seeding, add inoculant and sticking agent directly into the slurry, and thoroughly mix the slurry. Sow seed as soon as possible after inoculation. If left standing for more than 24 hours, reinoculate seed before sowing. Mix all seed on the project. Sixty days before seeding, provide a written description for the Class 3C mixture showing the percentage by weight (mass) of each kind of seed for the Engineer's approval.

Include the following with the description:

- A. Name and location of the seed supplier.
- B. Origin and date of harvest of each kind of seed.
- C. A statement of the purity and germination of each type of seed.
- D. Testing date for each seed.
- E. How and when seeds were mixed.

659.09 Native Grasses and Wildflowers. Table 659.09-1 lists the seed quantities by weight per area. Use Classes 4, 5, and 6 in the amounts of pure live seed (PLS) for each species listed. If seed tests show that the seed has an actual pure live seed (PLS) yield less than the intended yield, adjust the specified quantity to provide the intended PLS yields.

For Class 4, 5, and 6 mixtures, provide seed specifically grown for the Ohio climate.

Use cool season turf Classes 1, 2, 3A, and 3B as listed in Table 659.09-1 composed of no less than two and no more than four cultivars of the same species. Sixty days before seeding, provide a written description for the Class 1, 2, and 3A mixtures showing the percentage by weight (mass) of each kind of seed for the Engineer's approval. Mix all seed on the project. Sixty days before seeding, provide a written description for the Classes 1, 2, 3A, 3B, 4, 5, and 6 mixtures showing the percentage by weight (mass) of each kind of seed for the Engineer's approval.

Include the following with the description:

- A. Name and location of the seed supplier.
- B. Origin and date of harvest of each kind of seed.
- C. A statement of the purity and germination of each seed.
- D. Testing date for each seed.
- E. How and when seeds were mixed.

TABLE 659.09-1 GRASS AND WILDFLOWER SEED MIXES

Class	Mix Type Seeds	Weight per Area	
		lb 1000 ft ²	kg 1000 m ²
1	Lawn Mixture Use for areas in front of residences, commercial properties, etc. between curb and sidewalk with slopes 3:1 or flatter.		
	Kentucky Bluegrass (<i>Poa pratensis</i>)	4	14.64
	Creeping Red Fescue (<i>Festuca rubra</i>)	4	14.64
	Annual Ryegrass (<i>Lolium multiflorum</i>)	3	9.76
	Perennial Ryegrass, turf type (<i>Lolium perenne</i>)	3	9.76
2	Roadside Mixture		
	Kentucky Bluegrass (<i>Poa pratensis</i>)	1.5	7.32
	Kentucky 31 Fescue (<i>Festuca arundinacea</i> var. KY 31)	2	9.76
	Perennial Ryegrass (<i>Lolium perenne</i>)	1.5	7.32
3A	Slope Mixtures Use for slopes flatter than or equal to 3:1. Use Class 2, 3B, 3C, or 4B mixtures		
3B	Low Growing Slope Mixture Use for slopes steeper than 3:1 when low growing species are required		
	Hard Fescue (<i>Festuca longifolia</i>)	1.3	6.35
	Creeping Red Fescue (<i>Festuca rubra</i>)	0.8	3.9
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.23	1.12
3C	Crown Vetch Mixture Use for slopes steeper than 3:1 and shale or rock slopes.		
	Crown Vetch (<i>Coronilla varia</i>)	0.9	4.39
	Perennial Ryegrass (<i>Lolium perenne</i>)	1.8	8.79
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.3	1.46
4A	Native Grass Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	Big Bluestem (<i>Andropogon gerardii</i>)	0.07	0.34
	Indiangrass (<i>Sorghastrum nutans</i>)	0.09	0.44
	Switchgrass (<i>Panicum virgatum</i>)	0.02	0.09
	Annual Ryegrass (<i>Lolium multiflorum</i>)	spring 0.11 fall 0.34	0.54 1.66
4B	Low Growing Native Grass Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation when low growing species are required.		

Class	Mix Type Seeds	Weight per Area	
		lb 1000 ft ²	kg 1000 m ²
	Little Bluestem (<i>Schizachyrium scoparium</i>)	0.18	0.88
	Sideoats Grama (<i>Bouteloua curtipendula</i>)	0.04	0.19
	Prairie Dropseed (<i>Sporobolus heterolepis</i>)	0.04	0.19
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.11	0.54
	spring	0.11	0.54
	fall	0.34	1.66
5A	Annual and Perennial Wildflower Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	<i>Annual Mixture</i>	0.07	0.34
	Do not exceed 25% by weight of any one of the following species:		
	Corn Poppy (<i>Papaver rhoeas</i>)		
	Cosmos (<i>Cosmos bipinnatus</i>)		
	Yellow Cosmos (<i>Cosmos sulphureus</i>)		
	Cornflower (<i>Centaurea cyanus</i>)		
	Rocket Larkspur (<i>Delphinium ajacis</i>)		
	Indian Blanket (<i>Gaillardia pulchella</i>)		
	<i>Perennial Wildflower Mixture</i>	0.28	1.37
	Do not exceed 50% by weight PLS of any one of the following species:		
	Black-eyed Susan (<i>Rudbeckia hirta</i>)		
	Purple Coneflower (<i>Echinacea purpurea</i>)		
	Lance-leaved Coreopsis (<i>Coreopsis lanceolata</i>)		
5B	Native Wildflower and Grass Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	<i>Native Wildflower Mixture</i>	0.34	1.66
	Do not exceed 10% by weight PLS of any one of the following species:		
	Butterfly-weed (<i>Asclepias tuberosa</i>)		
	New England Aster (<i>Aster novae-angliae</i>)		
	Partridge Pea (<i>Cassia fasciculata</i>)		
	Purple Coneflower (<i>Echinacea purpurea</i>)		
	Rattlesnake Master (<i>Eryngium yuccifolium</i>)		
	Ox-eye Sunflower (<i>Heliopsis helianthoides</i>)		
	Wild Bergamot (<i>Monarda fistulosa</i>)		
	Greyhead Coneflower (<i>Ratibida pinnata</i>)		
	Orange Coneflower (<i>Rudbeckia fulgida</i>)		
	Prairie Dock (<i>Silphium terebinthinaceum</i>)		
	Whorled Rosinweed (<i>Silphium trifoliatum</i>)		
	Stiff Goldenrod (<i>Solidago rigida</i>)		
	<i>Grass Mixture</i>		
	Big Bluestem (<i>Andropogon gerardii</i>)	0.046	0.22
	Little Bluestem (<i>Schizachyrium scoparium</i>)	0.069	0.34

Class	Mix Type Seeds	Weight per Area	
		lb 1000 ft ²	kg 1000 m ²
	Indiangrass (<i>Sorghastrum nutans</i>)	0.023	0.11
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.92	4.49
6	Wildlife Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	Big Bluestem (<i>Andropogon gerardii</i>)	0.13	0.63
	Little Bluestem (<i>Schizachyrium scoparium</i>)	0.18	0.88
	Indiangrass (<i>Sorghastrum nutans</i>)	0.13	0.63
	Ox-eye Sunflower (<i>Heliopsis helianthoides</i>)	0.18	0.88
	Prairie Dock (<i>Silphium terebinthinaceum</i>)	0.18	0.88
	Purple Coneflower (<i>Echinacea purpurea</i>)	0.18	0.88
	Whorled Rosinweed (<i>Silphium trifoliatum</i>)	0.11	0.54
	Downy Sunflower (<i>Helianthus mollis</i>)	0.07	0.34
	New England Aster (<i>Aster novae-angliae</i>)	0.07	0.34
	Annual Ryegrass (<i>Lolium multiflorum</i>) spring	0.11	0.54
	fall	0.34	1.66
7	Temporary Erosion Control Mixture		
	Annual Ryegrass (<i>Lolium multiflorum</i>)	2.02	9.86

659.10 Site Preparation. Before placing topsoil or seed, remove rock or other foreign material of 1 inch (25 mm) or greater in any dimension from all areas.

Finish the area in such a manner that seeding, place sod, planting, or, placing topsoil can proceed without additional soil preparation.

Apply commercial fertilizer, lime, or other soil amendments including compost to the soil or topsoil surface in separate operations. Incorporate the commercial fertilizer, granular lime, or other soil amendments, including compost either separately or together, into the soil or topsoil to a depth of 2 to 4 inches (50 to 100 mm). Do not mix Liquid lime into the soil or topsoil. Only apply liquid lime to the top of the soil or topsoil. Furnish a smooth surface for the seed or topsoil by tracking with a dozer or by other methods. If the site is inaccessible to a dozer and other methods do not provide results equivalent to hand raking, hand rake these areas. Provide a uniform surface, free of gullies, rivulets, crusting, and caking. Finely grade the surface for seed or topsoil for slopes 4:1 or flatter, and grade all other slopes. Rake or open the surface with a dozer cleats or otherwise loosen the surface of these areas to a depth of 1 inch (25 mm) immediately before covering with topsoil. Remove raked up material from the area.

659.11 Placing Topsoil. If shown on the plans, place topsoil in loose lifts that construct a 4-inch (100 mm) compacted depth. Prepare the topsoil surface to meet the final grade as shown on the cross-sections. Use the following methods or combination of any of the methods to produce the required space to place the topsoil.

A. Cut or place the 203 Items to the final grade, which will match the plan quantities for Items 203, and then remove a 4-inch (100 mm) thickness for the topsoil.

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B. Cut or place the 203 Items to a 4-inch (100 mm) depth below the final grade to match the plan quantities in the 203 Items for this method.

Track the area with a dozer to compact and provide good contact between the topsoil and the surface.

Place topsoil by using pneumatic, or hydraulic methods. If using pneumatic or hydraulic methods to place the topsoil, place the top 1-inch (25 mm) with a mix of seed, commercial fertilizer, lime, and other soils amendments. Use a mixture of 1 part compost and 2 parts topsoil. Do not apply mulch to this surface. The City will consider compost as the mulch.

659.12 Seeding Methods. Apply seed to prepared areas. If compacted before seeding, loosen areas prepared for seeding using disks, rakes, or other methods.

Thoroughly mix all seed, and evenly sow the seed over the prepared areas at the required rates. Do not sow seed during high winds. For slopes subject to windy conditions, seed using hydraulic methods only. Operate equipment in a manner to ensure complete coverage of the entire seeded area.

If broadcast seeding, seed Classes 1, 2, 3A, and 3B between August 15 to October 30. If necessary to seed Classes 1, 2, 3A, or 3B before August 15, but after March 1 increase the seeding rates by 5 percent.

Between March 1 and October 30, use hydro seeding, which applies the mulch, seed, water, and commercial fertilizer in the same operation, for Classes 1, 2, 3A, 3B, 3C, and 7.

Between October 30 and March 1, apply temporary seed according to Item 207. With the Engineer's approval, apply permanent seed between October 30 and March 1 on projects started and completed within the same calendar year.

Seed before or concurrently with all required erosion control items.

Do not apply crown vetch seed from September 1 to October 31.

Wildflower Classes 5 and 6 seed from September 1 to October 30, unless the Engineer allows seeding from March 1 to May 31.

Seed Class 4 wildflowers from March 1 to May 31.

Seed native grasses and wildflowers in Classes 4, 5, and 6 with a rangeland type, slit seeder or native seed grass drill. Seed native grasses with no less than two passes in different directions and by equally splitting the seed application rate to each pass. Use broadcast seeding, along with cultipacking or rolling, only with the Engineer's approval.

If broadcast seeding, perform the following, immediately after sowing, to provide good seed-soil contact:

A. For flat surfaces, lightly rake the area, then roll.

B. For slopes, track the area with a dozer.

659.13 Mulching Operation. Mulch materials consist of straw, compost, or wood fiber for 3:1 or flatter slopes. The Contractor may specify which mulch to use, if not shown on the plans. Use mulch reasonably free of weed seed, foreign materials, or other materials that would prohibit seed germination. Do not mulch during high winds. For

slopes subject to windy conditions mulch using hydraulic methods only. Within 24 hours after seeding an area, evenly place mulch. Immediately replace mulch that becomes displaced.

659.14 Straw Mulch. Straw mulch consists of straw. Evenly place straw mulch over all seeded areas at the following rates:

Seeding Period	Rate
From March 15 to October 30	2 tons per acre (0.5 metric ton/1000 m ²)
From October 31 to March 14	3 tons per acre (0.7 metric ton/1000 m ²)

Keep straw mulching materials in place by applying an asphalt emulsion at a minimum rate of 60 gallons per ton (250 L/metric ton) of straw mulch or by applying tackifiers according to the manufacturer's recommendations. Apply an additional application at a rate of 30 gallons per ton (125 L/metric ton) of straw mulch to shoulder areas, starting at the berm edge and extending out for a distance of 10 feet (3 m). Use an emulsion that is nontoxic to plants and prepared in a manner that will not change during transportation or storage.

659.15 Wood Fiber Mulch. Wood fiber mulch consists of pure wood fibers manufactured expressly from clean wood chips. Ensure that the chips do not contain lead paint, varnish, printing ink, and petroleum based compounds. Do not use wood fiber mulch manufactured from recycled materials of unknown origin such as sawdust, paper, cardboard, or residue from chlorine-bleached pulp and paper mills.

Ensure that the wood fiber mulch maintains uniform suspension in water under agitation and blends with grass seed, commercial fertilizer, and other additives to form a homogeneous slurry. Use manufacturer-approved tackifiers.

Using standard hydraulic mulching equipment, evenly apply the slurry over the soil surface in a one-step operation. Apply slurry from March 1 to October 30 at the following rates:

Surface	Rate
Slopes 3:1 or flatter	46 pounds per 1000 square feet (225 kg/1000 m ²)

659.16 Compost Mulch. Provide compost applied to a minimum depth of 1/4-inch (6 mm) over the prepared seed areas. Mix the grass seed with the compost and using pneumatic equipment. Place this mixture to a minimum depth of 1/4-inch (6 mm) over the prepared seed areas. If using compost, the City will not require tackifiers or asphalt emulsion.

659.17 Watering. Thoroughly water all permanent seeded areas (Classes 1 to 6) after the seed germinates. Apply a total rate of 300 gallons per 1000 square feet (12.2 m³/1000 m²) in at least 2 applications spread over 7 days. Apply the water using a hydro-seeder or a water tank under pressure with a nozzle that produces a spray does not dislodge the mulch material.

Perform a secondary water application between 7 and 10 days after the primary applications. If 1/2-inch (13 mm) or greater of rain falls within the first 7-day period, delay or omit the secondary application, depending on weather conditions.

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659.18 Maintenance. Maintain all seeded and mulched areas until final inspection. Repair damaged areas to the original condition and grade.

659.19 Mowing. The Engineer may require mowing before permanent seeding and during the growing season following permanent seeding. The Engineer will notify the Contractor of when to begin each mowing. Use suitable mowing equipment of the rotary, flail, disk, or sickle type. Do not bunch or windrow mowed vegetation. Mow to a final cutting height of no less than 6 inches (150 mm). If necessary to achieve the cutting height, make more than one pass with the mower.

659.20 Repair Seeding and Mulching. Repair all damage or erosion of the seeded and mulched areas before the completion of the project.

Rework or reshape slopes, and bring in additional material, as necessary, using whatever equipment is necessary to restore slopes to grade. Seed and mulch repaired areas according to this specification. As an alternative, apply compost to repair areas as specified in Item 659.

659.21 Inter-Seeding. Inter-seeding is defined as seeding existing thin and spotty growing turf using a slit or drill type seeder. Perform inter-seeding only from March 15 to May 15 and from September 1 to October 15. If necessary to achieve good seed-soil contact, mow before seeding according to Item 659.

For seeding steep slopes or inaccessible areas, use broadcast or hydraulic seeding methods. Broadcast commercial fertilizer over affected areas as specified in Item 659. Water affected areas at the rate specified in 659 to aid in seed-soil contact.

659.22 Fertilization: 2nd Application. After completion of all repair seeding and mulching, and inter-seeding, and no earlier than 3 months after seeding, perform a Soil Analysis Test if shown on the plans to determine the need for a second application of commercial fertilizer. Do not apply the second application of commercial fertilizer unless the grass has germinated. Broadcast commercial fertilizer of 12-12-12 evenly over the surface without incorporation at a rate of 10 pounds per 1000 square feet (0.05 kg/m²).

659.23 Performance. The City will inspect all seeded areas no earlier than 6 months and no later than 12 months after final seeding. For any area identified without a uniform density of at least 70 percent grass cover, repair seeding and mulching as specified in 659 or perform inter-seeding as specified in 659, and fertilize as specified in this subsection.

Also repair seeding and mulching or perform inter-seeding, and fertilize seeded areas damaged by traffic or erosion, due to no fault or negligence of the Contractor.

659.24 Method of Measurement. The City will measure Soil Analysis Test by the number of tests submitted to the Engineer.

The City will measure the compacted topsoil by the number of cubic yards (cubic meters).

The City will measure Commercial Fertilizer by the number of tons (kilograms) of each quantity of furnished, spread, and incorporated into the soil or topsoil. The City will convert this measure to the standard application rate for the standard mixture ratio.

The City will measure lime or liquid lime by the number of acres (ha) furnished, spread, and incorporated into the soil or topsoil. The City will convert the measure to the standard application rate for the standard mixture ratio.

The City will measure Seeding and Mulching by the number of square yards (square meters).

The City will measure Repair Seeding and Mulching by the number of square yards (square meters) of damaged or eroded areas reshaped, seeded, and mulched. If the contractor substitutes compost for mulch to repair areas, the City will include such work under Repair Seeding and Mulching.

The City will measure Water by the number of 1000 gallon units (cubic meters) applied. The City will measure water in tanks, tank wagons, or trucks of predetermined capacity, or by means of meters of a type satisfactory to the Engineer and furnished and installed by the Contractor at expense to the City, or determined by weight conversion.

The City will measure Inter-Seeding by the number of square yards (square meters) of the seeded area.

The City will measure mowing by the number of M square feet (square meters) satisfactorily mowed.

Seeded areas damaged by traffic or erosion, due to no fault or negligence of the Contractor, the City will measure for such work and mobilization by Supplemental Agreement.

The City will not measure for repairs to seeding and mulching if damage or erosion of the areas occurs as a result of fault or negligence of the Contractor.

659.25 Basis of Payment. The City will pay the plan quantity for compacted topsoil. The City will not adjust topsoil quantities when the volume between two consecutive cross-sections differs by less than 5 percent from the plan quantity. For quantity differences greater than 5 percent, submit supporting documentation to the Engineer.

The City will pay the plan quantity for Seeding and Mulching. The City will not adjust Seeding and Mulching quantities when the area between two consecutive cross-sections differs by less than 5 percent from the plan quantity. For quantity differences greater than 5 percent, submit supporting documentation to the Engineer.

The City will pay for accepted quantities at the contract prices as follows (M=1000):

Item	Unit	Description
659	Each	Soil Analysis Test
659	Cubic Yard (Cubic Meter)	Topsoil
659	Ton (Kilogram)	Commercial Fertilizer
659	Acres (ha)	Lime
659	Square Yard (Square Meter)	Seeding and Mulching
659	Square Yard (Square Meter)	Seeding and Mulching for Wildlife
659	Square Yard	Seeding and Mulching Class ____

659.25

	(Square Meter)	
659	Square Yard	Repair Seeding and Mulching
	(Square Meter)	
659	M Gallons	Water
	(Cubic Meters)	
659	Square Yard	Inter-Seeding
	(Square Meter)	
659	M Square Feet	Mowing
	(Square Meter)	