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Memo

TO: Metro District Design

FROM: Brett Troyer, P.E.
Erosion Control Engineer

DATE: April 14, 2014

SUBJECT: Turf Establishment Recommendations for Metro District

Please distribute this memorandum to personnel designing projects in your district including consultants

This letter is the turf establishment recommendations for projects in **Metro District** and will remain in effect until superseded at which time a new letter with necessary modifications will be distributed.

The metro district seed recommendations will be divided based on soil type and type of project. The seed mixture recommendations may reflect aspect (north – shaded; west – hot and dry) and soil moisture conditions. This general guideline is for typical conditions. Extraordinary conditions such as long and steep slopes, heavily shaded areas, wetland mitigation sites, steep or high flow conveyance systems and outlet stabilization may need special seed mixes and stabilization methods.

A. Soil

1. **Topsoil**
The metro area has four general base soil types (Table 1). However, each project may have all of these types, plus muck soils. Low cohesive sands and silts are very difficult to stabilize and the plan should include measures to temporarily convey water from high potential energy to low points. Examples for temporary conveyance include flumes and down pipes. It is important to retain all available topsoil on the project to the maximum extent practicable. It is ideal to place 6 inches of topsoil in areas to be seeded; however, this will have to be adjusted to the amount of available topsoil. Areas with high sand content (outwash and drift) generally have very thin topsoil with low organic matter. To supplement the thin sandy topsoil, blend compost or muck soil. Muck soil or compost can be blended back into thin topsoils at a ratio of 1 part muck or compost to 2 parts inplace topsoils. Muck soils must be free of noxious weeds.

Table 1. Soil Types by Counties

MLRA Region 10	Soil Textural Classification	AASHTO System	Metro Counties
Sandy outwash	Sandy loam, muck, clay	A-2. A-2-4, A-4	Hennepin, Ramsey, Anoka, Chisago, Dakota
Prairie till	Loams, silty loams, silty clay loams	A-4, A-6, A-7	Hennepin, Carver, Scott, Dakota
Loess and till	Loamy sediment, sand, gravels, muck	A-1, A-3, A-4, A-2-4	Ramsey, Washington, Chisago
Sandy drift	Sandy loam, loamy	A-2-4, A-4	Chisago

	sand		

2. **Topsoil Borrow (spec 3877)**
These are soils that are modifications, blends or processes that are required to solve specific slope, bioretention, biodetention and ditch stability problems. These may be specified for slopes with ROW limitations, special ditch grades, landscape function, and storm water treatment. There are new engineered topsoil blends available for solving problems:

a. Common Topsoil Borrow. General use topsoil when deficient to meet the minimum depth of 4 inches.
b. Loam Topsoil Borrow. General landscape and planting beds if soils are deficient in rooting potential.
c. Sandy Clay Loam Topsoil borrow: processed topsoil for turf reinforcement mats, cellular confinements systems, and tied or untied concrete mats.
d. Sandy Loam Topsoil Borrow: well drained sandy loam soils for temporary staging over tree roots, and restoration of tree damaged areas
e. Rooting Topsoil Borrow: general rooting soils, with excellent drainage characteristics composed of three material components of sand, compost and loam topsoil Borrow
f. Boulevard Topsoil Borrow: high performance median landscape bed media that supplies proper level of compaction, water holding capacity and nutrient retention of equal parts of loam, sand, and compost
g. Filter Topsoil Borrow: well drained water quality planting medium composed of a sand compost blend to be used for infiltration area. This is the media that 5 percent iron would be added to remove soluble phosphorus.
h. Organic Topsoil Borrow: excellent turf growing medium or supplementing existing poor topsoil, consisting of a blend of common topsoil borrow or the salvaged topsoil and compost.

Soil Preparation (spec 2574)

1. Subsoiling
Designate areas that are not to be used for staging, or driving (eg. infiltration treatments, wetland soil edges, certain utilities). Storage areas for equipment, stockpiles, and materials (i.e. Precast Median Barriers), temporary haul and access roads must be decompacted before final turf establishment. Areas with proposed turf establishment provide subsoiling, **pay item 2574.575by the acre**

2. Soil Bed Preparation
Provide this for all areas that will require turf establishment. Provide in the plans soil bed preparation, **pay item 2574.578** on slopes flatter than 1:2 and Soil tracking, **pay item 2574.580** on slopes 1:2 and steeper.

3. Lime (3879)
Lime will be necessary if the soil test indicates acid soils below a pH of 6.3. Most soils in the metro district are alkaline (above 7.0) within the existing alignments. Add 3 tons of lime per acre for projects within the Anoka Sand plain.

Fertilizer (Spec 2574&3881)

The four types are as follows; Type 1 is commercial, Type 2 is phosphorus free, Type 3 is slow release nitrogen, and Type 4 is natural base. It is the designer's responsibility to include the analysis, and any other pertinent information, in the statement of estimated quantities or tabulation sheets, see the Fertilizer attachment.

Due to changes in regulations, phosphate must be used sparingly. Although phosphate is allowed for new turf establishment, care must be noted to limit loss of fertilizer off site. Impaired waters for nutrients use Type 3.

If soil tests are not available, use general fertilizer recommendations found in Attachment 1.

Generally the **pay item will be 2574.508 Type 1, 2, 3, or 4 by the pound**.
The analysis and application rate will need to be taken care of in a note on the SEQ or in the tabulation sheet in the plans. One idea is shown below:

STATEMENT OF ESTIMATED QUANTITIES						
TAB	SHEET NO.	ITEM NO.	DESCRIPTION		UNIT	TOTAL ESTIMATED QUANTITIES
A	123	2574.508	Fertilizer type 3	(1)	Pound	500
A	123	2574.508	Fertilizer type 4	(2)	Pound	250

(1) Fertilizer analysis 22-5-10, application rate 350 lbs per acre for seed areas
Fertilizer analysis 22-5-10, application rate 175 lbs/ acre for sod areas
(2) Fertilizer analysis 18-1-8, application rate 150 lbs /acre for seed areas

If you have multiple analysis of the same type fertilizer it can further be broken down and shown in the tab sheets to break down the pound of each.

Seeding (spec 2575)
The seed mixture will depend on location, functional outcome, climate, and soil type. See Attachment 1 for a general seed mixtures based on design requirements, fertilizer and mulch recommendation based on project type. All seed mixtures are based on pure live seed.
Turf establishment lump sum is for establishing permanent soil covers for small areas. These would include turn lane construction, lighting projects, and culvert replacement.

1. Temporary Seed Mixtures (spec 3876)
All plans must provide a seed pay item for temporary seed. **Pay item 2575.502 seed mixture (21-xxx or 22-xxx)** Temporary seed will be installed by the broadcast or hydroseed method. Use temporary seed for contiguous areas larger than 2.0 acres.

Use rapid stabilization methods for areas smaller than 2.0 acres. The plan must indicate areas for rapid stabilization; quantities should include an estimate of multiple applications based on staging or phase of construction. These are for small critical areas, scattered over the project site. Use in Areas of Environmental sensitivity (AES) and may be noted on plan sheet as 'Site Management Plan Area.'

Alternatives to temporary seeding or rapid stabilization in areas adjacent to rivers, bridge abutments, and other steep slope consider using temporary poly covering. The contractor will be able to 'open and close' this cover every day while completing the work. Include a **pay item 2575.518 temporary poly covering**.

2. Permanent Seed Mixtures (spec 3876)
In general, sandy and silty soils will have all seed mixes broadcast by any method over freshly prepared topsoil and cultipacked or harrowed into the soil surface (incidental). In the metro area, due to weed control and other management issues, seed mix 25-141/25-121 will be the dominate seed mix from the inslope to the ROW limits. Exceptions will be in areas of resident and commercial properties, and the community side of noise walls (High maintenance lawn turf; 25-151). All bridge abutments, engineered walls, and slope systems will generally use 25-141. All storm water pond edges and upland buffers will be seeded with native mixes. Rivers and floodplain buffers seeding will typically use 34-261. Infiltration ponds will typically use 35-221. All wetland mitigation systems will be seeded with native plant mixes, and may require a custom blend, based on regulatory or performance issues. The DNR requires strong provisions to ensure wildlife access and crossings are restored to native plant communities.

See Current seeding manual for seed mix's and seed mix conversion tables from old MnDOT seed mixtures.

3. Seeding Method

The seeding method specified depends on the soil type and existing plant materials. On occasion there may be need to indicate the seeding method for final or temporary stabilization.

a. Drill seeding

Specify drill interseeding for native or general seed mixtures when seeding into either an established temporary vegetative cover or areas where temporary straw mulch have been placed.

b. Broadcast seeding

i. Hydraulic application

Specify in all plans for temporary seeding and seeding of difficult areas such as slopes steeper than 1:2, limited access, or saturated soils.

ii. Hand

Specify for small areas, areas under maintenance restrictions, and erosion failures. This can be for either native or general seed mixtures. If hand raking of seeding is specified, indicate as incidental.

Sod

Sod should be used in areas where it can be maintained or necessary for instant erosion control. Areas where sod may be considered are residential lawns, in urban areas, and areas of concentrated flow where erosion is a concern. It is important to specify the correct type of sod (Lawn, Mineral, or Salt tolerant) for the area to be placed. Lawn sod is appropriate for residential use; Mineral sod is appropriate for granular, sandy soils ; Salt tolerant sod is appropriate for high traffic areas at boulevards, road edges, and medians where salt use is high.

Stabilizing Covers (spec 2575)

All projects will have one of the following or combinations of the following stabilizing covers. This material will help limit erosion and aid in plant germination.

1. Mulch (specs 3882)

a. Type 1 mulch

May be used as an alternative to Type 3 with the temporary or Non-native seed mixtures.

b. *Type 3 mulch*

All areas that specify native seed mixes shall have specified Type 3, noxious weed free mulch in the plan.

c. Type 4 mulch

In areas where crimping is difficult, , use Type 4 mulch (provide a note in the tabulations either Type 1or 3 straw, depending on seed mixture).

d. Type 5 mulch

Type 5 mulch made from grounded up grubbed trees can be used for, traction on clay soils, tree root protection, slash mulch for slopes, and temporary access roads.

e. Type 6 mulch

Type 6 mulch made of wood chips and can be used in areas for landscape beds.

f. Type 9 mulch

Type 9 mulch made of 3/8" aggregate and can be used in areas where grass will not grow (landscape beds, guardrail, and bullnose areas).

Provide disc anchoring on Mulch, Type 1 or 3.

2. Erosion Control Blankets (spec 3885)

Erosion control blankets are used as a higher level cover from mulch. New blanket categories have been developed to reflect changes in performance and outcome. All ditches will require blanket. In critical areas specify maintenance on the blanket. All plans should include the standard plan sheet for blanket installation.

Standard Blankets for the Metro District construction

a. *Category00 or 0:* one sided net, All soils Bottom of ponds, median areas.
b. *Category1:* Rapid degrade, use on lawns, mow areas slopes flatter than 1:3.
c. *Category 3 (3b):* Wood fiber, natural net. All soil types, but critical for sandy, silty, and clay dominated topsoil. Provide a Note: category 3b, Natural Net in the tabulations or SEQ. Use wood fiber for all ditch bottoms.
d. Category 3 (3a) Straw blanket (natural net preferred) should be specified only for slopes with loamy topsoil, or soils with significant organic cohesive properties.
e. *Category 4* Semi permanent. For slopes between 1:2 and 1:1, and channels less than 4 percent grade. Typically specified with erosion stabilization mats for seed germination.
f. *Category5.* Semi-permanent. For channels less than 5 percent grade
g. *Category 6.* Permanent surface stabilization. Not soil filled. For channels less than 6 percent grade.
h. *Category 7*. Permanent surface stabilization, not soil filled. For channels less than 7 percent grade.

Turf Reinforcement mats (TRM)(Spec 3885)

All turf reinforcement mats are soil filled. The TRM should be designed based on bed shear, with the first 3 Categories providing a range of bed shear stabilization between 2.1 and 8 lbs/ft^2. Category 4 is for steep slope surface stabilization where high tensile strength is required. If a TRM is called for in the plan, provide the appropriate category of erosion control blanket (typically Cat 4) as a separate pay item. Provide Topsoil Borrow, Type Sandy clay loam as a separate pay item (see spec 2574) for the fill material.

Hydraulic Erosion Control Products (HECP) (specs 3884)

Hydraulic matrix can be used both for temporary conditions and permanent turf establishment**.**

a. Use Hydraulic matrix Type mulch for short term temporary cover. Use a multiplier of 3-5 times the permanent turf areas for each construction season.
b. Use Type Bonded Fiber for difficult access locations with safety concerns and without concentrated storm water flows. May prevent rapid seedling establishment.
c. Use Type Fiber Reinforced for longer term cover, for temporary over wintering conditions. This also can be used as an alternate to Blanket for permanent turf establishment in mow areas, and adjacent to traffic lanes, except in ditches.
d. Use Type Hydraulic Compost to supplement weak sandy soils and act as an erosion control mat for use on slopes less than 1:6.

Watering

For areas where it is critical to obtain good turf cover water is a must. For watering of Turf Reinforcement Mats, steep slopes, RSS walls, slopes adjacent to infiltration areas, and ponds) Provide Temporary Irrigation by special provision.

Weed Control *(Spec 2575)*

Noxious weeds as defined by Minnesota Department of Agriculture must be controlled. There are several species on the noxious weed list. Each County may have additional secondary listed weeds that must be controlled. Weed spraying and or mowing will be required prior to the seeding operation. This should be indicated in the construction & soils notes. Expect to specify in the plan areas where weed control is required and any quarantine soil zones. Noxious weed locations can be found on Georilla, a MnDOT electronic graphics information system.

1. Weed Spraying

When noxious weeds are known to be on the project the designer should provide for weed spraying and weed spray mixture. Provide in the plans and tabulations the areas of weeds, weed type, herbicide, and either spot spray or broadcast spray. Contact OES Roadside Vegetation management Unit to obtain Herbicide recommendations.
Provide the following note in the tabulations:
Weed spraying to be done throughout the project to prevent and control spread of weeds. Weed spraying will be measured by the area covered or area spot sprayed by herbicide and successfully applied as indicated by dead noxious weeds. Weed spray mixture will be measured by volume of ingredients furnished and used.

2. Mowing
Provide mowing in plans, **pay item 2575.541 by the acre**. Include mowing in the provisions or plans according to the following schedule (to the extent possible within the timeframe of the project):
Mowing to be done after the seeding and starting when the majority of vegetation is 12”-18” high
Mow non-native seeding once or twice to control weeds.
Mow native seeding approximately 3 times at 1-month intervals in the first growing season after planting, and 2 times at 1-month intervals in the second growing season.

For questions related to turf establishment, please contact Dwayne Stenlund, or Lori Belz.

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Attachments; Turf Establishment Recommendations, ADA

Attachment 1: Turf Establishment Recommendations

Grading/Reconstruction: Rural Section Design (See also Ponds)

Non-Native Typical	**Native Typical**
Seed 25-141 @ 59 lbs/ac. On sandy soils: 25-121 @ 61 lbs/ac Next to agricultural areas 25-142@ 45 lbs/ac **Fertilizer:** Type 3, 22-5-10 @350 lbs/acre **Blanket:** Category 3 for slopes 1:3 to 1:2(wood fiber, natural net), Category 4 on slopes 1:2 and steeper. Also all ditch bottoms. Provide 1 blanket width on bottoms of super elevations and mow areas: Category 3(natural net, wood fiber) **Mulch:** Rural Setting; Type 1 @ 2 tons/ac + Disc anchoring on all slopes less than 1:3 and wider than 12 feet in width. **HECP**: Urban Settings; Hydraulic Matrix Type Fiber Reinforced	**Seed:** 35-241 @ 36.5 lbs/ac On Sandy soils: 35-221 @ 36.5 lbs/ac ***Fertilizer:** Type 4, 18-1-8 or 17-10-7 @150lbs/acre **Blanket:** Category 3 for slopes 1:3 to 1:2(wood fiber, natural net) or category4 on slopes 1:2 and steeper. Also all ditch bottoms. Specify natural nets **Mulch:** Type 3 @ 2 tons/ac + Disc anchoring on all slopes less than 1:3 and greater than 12 feet in width. or **HECP**: Hydraulic Matrix Type Fiber Reinforced
Temporary Seed: Up to 1 year; 21-111, 21-112@100lbs/acre, 21-113 @110lbs/acre 1 to 5 years; 22-111 @ 30.5 lbs/ac **Temporary Fertilizer***:* Type 1, 10-10-20@200lbs/acre **Temporary Mulch/HECP:** **Routine areas:** Type 1 @ 2 tons/ac + Disc anchoring; OR Type 4@2 tons/ac; OR Hydraulic matrix type Hydraulic Mulch for slopes less than 3:1; all other slopes use Hydraulic Matrix Type Fiber Reinforced. **AES Areas:** Rapid Stabilization 200 feet all around the areas, and where water leaves the project	**Temporary Seed:** Up to 1 year; 21-113 @ 110 lbs/acre 1 to 5 years; 32-241@38 lbs/acre **Temporary Fertilizer**: Type 1, 10-10-20@200lbs/acre **Temporary Mulch/HECP:** **Routine Areas:** Type 1 @ 2 tons/ac + Disc anchoring; OR Type 4@2 tons/ac; OR Hydraulic matrix type Hydraulic Mulch for slopes less than 3:1; all other slopes use Hydraulic Matrix Type Fiber Reinforced. **AES Areas:** Rapid Stabilization 200 feet all around the areas, and where water leaves the project

Grading/Reconstruction: Urban Section Design (See also Ponds)

Seed: 25-151 @ 120 lbs/ac (adjacent to homeowners 25-131 @ 220lb/ac adjacent to commercial businesses and city medians/boulevards Elsewhere, same as Rural Design **Fertilizer:** Type 3, , 22-5-10@350 lbs/acre **Blanket/HECP:** Category 3 (wood fiber, natural net), or Hydraulic Matrix Type Fiber Reinforced Same as Rural Design
Alternative: Lawn, Salt Tolerant Sod with Fertilizer Type 3, 22-5-10@200 lbs/ac (392 kg/ha)

Temporary Bypass

Seed: 22-111 @ 30.5 lbs/ac (44.8 kg/ha) **Fertilizer:** Type 1, 10-10-20@200 lbs/acre **HECP:** Hydraulic matrix type fiber reinforced matrix longer term or hydraulic matrix type Hydraulic Mulch for short term (1 construction season) **Blanket:** Category 3 Wood Fiber

Bridge Replacement

Bridge End and Side Slopes **Seed:** 25-141 @ 59 lbs/ac **Fertilizer:** Type 3, 22-5-10@350 lbs/acre **Blanket:** Category 3 wood fiber, or 4 depending on steepness and slope length (include maintenance requirement notation in SEQ)	**Native Seed Mix Option:** See 'Wet Ponds & Upland Buffer' or 'Dry/Infiltration Ponds & Upland Buffer'
Alternative: salt tolerant sod with 22-5-10@ 200 lbs/ac (392 kg/ha)	
Temporary Seed: (depending on length of time needed for embankment settlement) Up to 1 year; 21-113 @110 lbs/acre , Up to 2 years; 22-111 @ 30.5 lbs/acre, Up to 5 years 22-112 @ 40 lbs/acre **Temporary Fertilizer:** Type 1, 10-10-20@200 lbs/acre **Temporary Blanket/HECP:** Category 3(wood fiber) or Hydraulic Matrix Type Fiber Reinforced (depending on steepness, slope length), or temporary poly covers.	**Temporary Seed:** (depending on length of time needed for embankment settlement) Up to 1 year 21-113 @ 110 lbs/acre , Up to 2 years; 32-241 @ 38 lbs/acre **Temporary Fertilizer:** Type 1, 10-10-20@200 lbs/acre **Temporary Blanket/HECP:** Category 3(wood fiber) or Hydraulic Matrix Type Fiber Reinforced (depending on steepness, slope length), or temporary poly covers.

Mill and Overlay (Minimal Disturbance)

Seed: 25-121 @ 61 lbs/ac **Fertilizer:** Type 1, 10-10-20@400 lbs/acre **Mulch/HECP:** Type 4, or Hydraulic Matrix Type Fiber Reinforced Matrix

Shoulder Widening (With Inslope Regraded)

<u>Existing Non-Native</u> **Seed:** 25-141 @ 59 lbs/ac **Fertilizer:** Type 3, 22-5-10@350 lbs/acre **Blanket/HECP:** Category 3 Wood Fiber Blanket (natural net), or Hydraulic Matrix Type Fiber Reinforced Matrix	**Existing Native** **Seed:** 35-241 @ 36.5 lbs/ac ***Fertilizer:** Type 4, 18-1-8 or 17-10-7@150lbs/acre **Blanket/HECP:** Category 3 Wood Fiber Blanket (natural net), or Hydraulic Matrix Type Fiber Reinforced Matrix

Culvert Repair/Replacement

Seed: 25-121@ 61lbs/ac **Fertilizer:** Type 1, 10-10-20@400 lbs/acre, or Type 3, 22-5-10@200 lbs/acre, next to rivers and streams **Blanket:** Category 3 (Wood Fiber) or Category 4, also include outfall area if no riprap	**Native Seed Mix Option:** See 'Wet Ponds & Upland Buffer' or 'Dry/Infiltration Ponds & Upland Buffer'
Alternative: Salt tolerant Sod with fertilizer type 3@200 lbs/acre, 22-5-10	

Wet Ponds & Upland Buffer

Do NOT seed bottom of pond
Seed 1: 33-261 @ 35 lbs/ac to be planted 10 feet on either side of the normal water level
***Fertilizer 1:** Type 4, 18-1-8 or 17-10-7@120 lbs/acre
Seed 2: 35-241 @ 36.5 lbs/ac) to be planted from the 33-261 to top of pond to transition in with seed mix specified for the rest of the project
***Fertilizer 2:** Type 4, 18-1-8 or 17-10-7@100 lbs/acre
Mulch: Type 3 @ 2 tons/ac + Disc anchoring if pond side slope width greater than 12 feet, and flatter than 4:1, or blanket entire slope around pond
Blanket: Ring pond with Category 3(natural net), one blanket width (6–8 feet) at the normal water level; emergency spillway; and areas of concentrated in-flow and overland flow

Dry/infiltration Ponds & Upland Buffer

Seed 1: 33-261 @ 35 lbs/ac to be planted in the bottom and up 3 feet from the bottom
***Fertilizer 1:** Type 4, 18-1-8 or 17-10-7@120 lbs/acre
Seed 2: 35-221 @ 36.5 lbs/ac to be planted from Seed 1 to top of pond to transition in with seed mix specified for the rest of the project
***Fertilizer 2:** Type 4, 18-1-8 or 17-10-7@180 lbs/acre
Blanket: Category 3 wood fiber (natural net) at areas of concentrated flow, such as pond corners or areas where ditches carry water into the pond. Category 00 on bottom of pond

Ditch Reconstruction

A. Normally Dry
Seed: 25-141 @ 59 lbs/ac;
Fertilizer: Type 3, 22-5-10 @350 lbs/acre, or
Mulch: Blanket, Category to be determined by velocity. Specify natural nets.
B. Normally Wet
Seed: 33-261 @ 35 lbs/ac to be planted 10 feet on either side of the normal water level
***Fertilizer:** Type 4, 18-1-8 or 17-10-7@120 lbs/acre,
Blanket: Category to be determined by velocity and sheer bed load

Signalization

Seed: 25-141@ 59 lbs/ac (78.3 kg/ha)
Fertilizer: Type 3, 22-5-10@350 lbs/acre,
Blanket: Category 3 (natural nettings) or salt tolerant sod

***18-1-8 (NPK) is to be specified in loam and clay loam. 17-10-7 (NPK) is to be specified in sandy soils with low clay and organic matter**.

Attachment 2: Americans with Disabilities Act (ADA) Projects Addendum

Permanent soil protection and turf re-establishment for ADA and related safety improvements shall consist of one of the following stabilization systems, depending on location.

1. ADA terminates in a rural section with salvaged loam soil, with future path connections
    a. Seed Mixture 25-141 at a 59 lbs/acre
    b. Fertilizer Type 3, f 200 lbs/acre, 22-5-10
    c. Category 3 Erosion control blanket, footnote in SEQ as wood fiber, natural net, no substitutions
2. ADA terminates in a rural section, with salvaged sandy loam soil, with future path connection
    a. Same fertilizer and blanket as No. 1 above,
    b. Seed mixture changed to 25-121, 61 lbs/acre
3. ADA within urban mowed section, salvaged topsoils, with expected low deicing agent applications and low to high expected maintenance
    a. Seed mixture 25-131, 220 lbs/acre
    b. Fertilizer Type 3, 350 lbs/acre, 22-5-10
    c. Category 00 Erosion control blanket. Footnote in SEQ as no substitutions allowed.
4. ADA within urban mowed section, salvaged topsoils, with expected high deicing agent applications and medium to high expected (mowing) maintenance
    a. Option 1. Salt Tolerant Sod
    b. Option 2. Seed Mixture Special (Tabulated Below) 150 lbs PLS per acre, Category 00 Erosion control blanket. Footnote in SEQ as no substitutions allowed.
    c. Fertilizer Type 3, 350 Lbs/acre, 22-5-10
    d. Add 3896 Soil and root additives: Hydrophillic Polymer, as incidental and specified as per manufactures recommendation as a foot note in the plan.

Hydromulch soil stabilization is not typically acceptable due to overspray within the walkway and electrical control systems. Improper netting from the blanket stabilization creates unsafe walking conditions, and mowing entanglement concerns. It is recognized that there are potential locations where hydromulch products are the best fit BMP. The designer may substitute the permanent erosion control stabilization to Hydraulic Matrix Type Bonded Fiber at a rate of 2500 lbs per acre, if a note is placed in the contract documents that requires the contractor to exercise extreme care on controlling the overspray and removal if accidental or willful overspray on anything other than the turf establishment area. If existing topsoil is less than 3 inches, of poor quality due to salt loading, or loss of soil structure resulting in poor drainage, the Designer should supplement or replace with 3877 Topsoil Borrow Type loam and add a note in the Statement of Estimated Quantities to the pay item: **screened and pulverized.**
Use Seed Mixture Special and add to the provisions the following mix table

Seed Mixture Special:

Common Name	Approved Varieties	% of Mix
Creeping red fescue (slender)	Seabreeze GT, Shoreline, Sealink	20
Creeping red fescue (strong)	Cardinal, Celestial, Epic, McAlpin, Navigator	20
Kentucky bluegrass	Bedazzled, Diva, Moonlight SLT, Shiraz, Bluenote	20
Hard, Sheeps and/or Chewings fescue (minimum of two species, each making up at least 10% of the total mix)	Hard Fescue: Beacon, Bighorn GT, Little Bighorn Sheeps fescue: Marco Polo Chewings fescue: Radar, SR5130	40

Temporary Erosion and sediment controls. All exposed soils that are not under the proposed concrete flatwork or other hard structures must have down gradient perimeter (includes road surfaces and gutterlines as indicated by flow arrows) and all stockpiles defended with 3897 Filter Log, Type Compost. For rough estimating, specify ½ proposed work area circumference as linear feet of Compost Filter Log. If the work is expected to take longer than 7 days due to conditions of related utility construction, signalization or paving, specify total (1x) area disturbed mulch cover as Type 1 mulch, with a footnote as 'Hand Installed' or plastic sheeting. Estimate quantity of storm drain and/culvert inlets, and define as incidental.