

TABLE OF CONTENTS

CHAPTER 2
EARTHWORK, EROSION CONTROL, AND REVEGETATION

	Page
2.00.00 EARTHWORK AND GRADING	2-1
2.10.00 EROSION CONTROL	2-1
2.10.01 <i>Limitations</i>	2-1
2.10.02 <i>Exemptions</i>	2-2
2.10.03 <i>Responsibility</i>	2-2
2.10.04 <i>Regulations</i>	2-2
2.11.00 EROSION AND SEDIMENT CONTROL PLANS	2-3
2.11.01 <i>Requirements</i>	2-3
2.11.02 <i>Modifications to Approved Erosion and Sediment Control Plans</i>	2-5
2.11.03 <i>Grading and Erosion Control Notes</i>	2-5
2.11.04 <i>Standard Erosion Control Details</i>	2-6
2.12.00 STORMWATER MANAGEMENT PLANS (SWMP)	2-6
2.20.00 REVEGETATION	2-6
2.20.01 <i>Topsoil</i>	2-6
2.20.02 <i>Soil Preparations</i>	2-6
2.20.03 <i>Seeding</i>	2-7
2.20.04 <i>Mulching</i>	2-7
2.20.05 <i>Irrigation</i>	2-7
2.20.06 <i>Weed Management</i>	2-7
2.20.07 <i>Wildflower Introduction</i>	2-7
2.30.00 CONSTRUCTION	2-7
2.30.01 <i>Topsoil</i>	2-7
2.30.02 <i>Grading Preparation</i>	2-8
2.30.03 <i>Amendments, Fertilizers & Compost</i>	2-8
2.30.04 <i>Seeding</i>	2-8
2.30.05 <i>Mulching</i>	2-9
2.30.06 <i>Temporary Irrigation</i>	2-9
2.30.07 <i>Weed Management</i>	2-10
2.30.08 <i>Wildflower Introduction</i>	2-10
2.40.00 MATERIALS	2-10
2.40.01 <i>Topsoil</i>	2-10
2.40.02 <i>Manufactured Topsoil</i>	2-10
2.40.03 <i>Amendments, Fertilizers & Compost</i>	2-10
2.40.04 <i>Seeding</i>	2-13
2.40.05 <i>Mulching</i>	2-14
2.40.06 <i>Irrigation</i>	2-14
2.40.07 <i>Weed Management</i>	2-14
2.40.08 <i>Wildflower Seeding</i>	2-14

CHAPTER 2
EARTHWORK, EROSION CONTROL, AND REVEGETATION

2.00.00 **EARTHWORK AND GRADING**

All earthwork operations shall be executed in a manner which will minimize dust, noise, excessive accumulation of debris, danger to the public, and interference with other construction. Positive drainage and adequate erosion control shall be provided at all times during the earthwork operations.

Earthwork operations shall be executed to provide compaction to a minimum 85-percent Standard Proctor density at ± 3 percent of optimum moisture in areas to be eventually turfed or planted and compaction to minimum 95 percent Standard Proctor density at ± 2 percent of optimum moisture under all walks, trails, streets, structures, and other site improvements. Testing, if required by the CITY to demonstrate compliance with this specification, shall be performed per AASHTO T-180 by a Professional Engineer registered in the State of Colorado and practicing in the field of soils mechanics. All costs for such testing shall be paid by the CONTRACTOR/DEVELOPER. Refer to the applicable section in these STANDARDS AND SPECIFICATIONS for compaction requirements within the public right-of-way.

Upon completion of earthwork operations, the CONTRACTOR shall leave the site and soil clean to allow for proper installation of irrigation, plantings, and related site improvements. Completed grades shall be smoothly and uniformly sloped, properly compacted, and shall provide drainage away from site improvements. All banks or slopes constructed shall be maintained in a stable condition by approved methods to prevent slips, washouts, or erosion. No area to be seeded or sodded shall be steeper than a 4:1 maximum slope (4 horizontal: 1 vertical), nor flatter than a 2-percent minimum slope. Final grades shall conform to the final drainage study and grading plans.

2.10.00 **EROSION CONTROL**

The primary goal of erosion control is to reduce and/or prevent movement of eroded soil sediments off-site to promote the safety, health, and general welfare of the public. Selection of the proper erosion control measures must consider the magnitude and type of erosion specific to the site, as well as the resources available for implementation. To address proper erosion control measures, a site erosion plan shall be designed and implemented for every site that requires a Land Disturbance Permit to be in regulatory compliance.

There are two major elements in developing an erosion and sedimentation control plan. The first is an investigation and analysis of the natural characteristics of a site (such as soil type, steepness of slopes, and available vegetation) that will help the developer anticipate where erosion problems might occur. Detailed information on soils, vegetation, topography, geologic, and hydrologic conditions shall be obtained for the site. The second element is use of effective control measures. Attention shall be given to identify and evaluate problems that may cause serious erosion during and after construction. Runoff from the site, as well as runoff from the watershed above, shall be controlled and discharged safely. Measures shall be taken to prevent erosion and sediment deposition on downstream properties.

2.10.01 **Limitations**

No person shall clear or grade land without implementing soil erosion and sediment controls in accordance with the requirements of these STANDARDS AND SPECIFICATIONS, and the CITY CODE. Any grading, stripping, excavating, filling or otherwise disturbing of land within the CITY limits shall comply with the CITY CODE, an IMPROVEMENTS AGREEMENT, an

approved Land Disturbance Permit and the CDPHE Water Quality Control Division's Construction Stormwater Discharge Permit Regulations.

A Land Disturbance Permit in accordance with CITY CODE Section 8-11-5 shall be obtained by the OWNER or CONTRACTOR when there is not an IMPROVEMENTS AGREEMENT in place for the work and any of the following applies:

- (A) The grading covers an area equal to or greater than one acre, or
- (B) The grading covers an area less than one acre if the site is part of a larger common plan of development, or
- (C) The grading involves earthwork affecting more than 200 cubic yards of material, or
- (D) The work occurs in environmentally sensitive areas, as determined by the CITY MANAGER, or
- (E) The grading is on any property that possesses physical characteristics or features that increase the potential for erosion, such as highly erodible soils, natural drainage channels or swales, or slopes in excess of eight percent.

2.10.02 Exemptions

- (A) Agricultural land management practices and construction of agricultural structures;
- (B) Clearing or grading activities that are subject exclusively to State approval and enforcement under State law and regulations.

2.10.03 Responsibility

Any person who undertakes or is responsible for undertaking any activity which involves any land disturbance is ultimately responsible for controlling soil erosion, sedimentation, and water flow characteristics to the extent necessary to avoid damage to property and the pollution of public waters. Nothing in the DRAINAGE CRITERIA MANUAL shall be taken or construed as lessening or modifying the ultimate responsibility of such persons nor do the requirements of the DRAINAGE CRITERIA MANUAL imply the assumption of any liability on the part of the CITY. The DRAINAGE CRITERIA MANUAL does not relieve such person's responsibility to provide effective control measures.

2.10.04 Regulations

Any grading, stripping, excavating, filling or otherwise disturbing of land within the CITY limits shall comply with the CITY CODE, these STANDARDS AND SPECIFICATIONS, and CDPHE Water Quality Control Division's Construction Stormwater Discharge Permit regulations.

2.11.00

EROSION AND SEDIMENT CONTROL PLANS

2.11.01 Requirements

- (A) A person may not clear or grade land without first preparing an erosion and sediment control plan which has been approved by the CITY and then acquiring a Land Disturbance Permit.
- (B) Developers are required to develop site plan(s) that locate (if applicable) and identify all structural and non-structural control measures for the applicable construction activities. The site plan(s) must contain installation and implementation specifications or a reference to the document with installation and implementation specifications for all structural control measures. A narrative description of non-structural control measures must be included in the site plan(s).
- (C) The erosion control plans shall be prepared electronically at a scale no smaller than 1 inch equals 100 feet and shall contain, but not be limited to the following information:
 - 1. Vicinity Map
 - 2. Site boundary based upon a legal survey
 - 3. Legal description and size of parcel being graded
 - 4. Existing topography of the property and at least 150 feet beyond the property boundaries with a maximum contour interval of 2 feet.
 - 5. Proposed topography with a maximum contour interval of 2 feet.
 - 6. Proposed grading limits.
 - 7. Identification of proposed steep slopes both temporary and permanent.
 - 8. Identification of existing and proposed swales, ditches and drainageways.
 - 9. Proposed surface improvements (i.e. roads, detention ponds, storm sewers).
 - 10. Location of the soil stockpiles with the anticipated height, width and length as well as the limits for the stockpiles.
 - 11. Location of the proposed erosion and sediment control measures.
 - 12. Details of the proposed erosion and sediment control measures.
 - 13. Other details or requirements that may be necessary to ensure compliance with the Federal Water Pollution Control Act.
 - 14. General notes as specified in Chapter 2 of these STANDARDS AND SPECIFICATIONS.
 - 15. The following note shall be included on all erosion control plans: "This erosion and sediment control plan has been submitted to the CITY of Westminster and is in general conformance with the CITY's Standards and Specifications. Additional erosion and sediment control measures may be required of the owner and his or her agents due to unforeseen erosion problems or if the proposed erosion control measures do not function as intended. The requirements of this erosion control plan and the obligation of the land owner shall run with the land until such time as the erosion control plan is properly completed, officially modified, or voided".
 - 16. All erosion control plans shall include a signature block for the property owner stating the following: "I, (property owner's name), have reviewed the CITY's Standards and Specifications and this erosion control plan. I acknowledge my responsibility to provide all necessary erosion and sediment control measures to avoid damage to property and polluting of receiving waters."
 - 17. All erosion control plans shall include a signature block for the design engineer acknowledging responsibility for the preparation of the erosion and sediment

control plan. All plans shall be prepared by or under the direction of a Professional Engineer registered in the State of Colorado.

- (D) The applicant shall submit an erosion and sediment control plan and any supporting computations to the CITY for review and approval. The erosion and sediment control plan shall contain sufficient information, drawings, and notes to describe how soil erosion and off-site sedimentation will be minimized. The CITY shall review the plan to determine compliance with these STANDARDS AND SPECIFICATIONS and the CITY CODE prior to approval. The plan shall serve as a basis for all subsequent grading and stabilization.
- (E) In approving the plan, the CITY may impose such conditions thereto as may be deemed necessary to ensure compliance with the provisions of these STANDARDS AND SPECIFICATIONS for the preservation of public health and safety.
- (F) The erosion and sediment control plan shall not be considered approved without the inclusion of the signature and date of signature of the CITY ENGINEER.
- (G) Approved plans may remain valid for one year from the date of approval unless renewed by the CITY.
- (H) Approved plans will become an exhibit to the CITY's Land Disturbance Permit. In addition, the DEVELOPER/CONTRACTOR will be required to execute an improvements agreement and provide surety in a form outlined by CITY CODE prior to beginning earthwork operations.
- (I) Control measures must be selected, designed, installed, implemented, and maintained to provide control of all potential pollutants, such as but not limited to sediment, construction site waste, trash, discarded building materials, concrete truck washout, chemicals, sanitary waste, and contaminated soils in discharges to the MS4. At a minimum, pollutant sources associated with the following activities (if part of the applicable construction activity) must be addressed:
 - Land disturbance and storage of spoils.
 - Vehicle tracking
 - Loading and unloading operations
 - Outdoor storage of construction site materials, building materials, fertilizers, and chemicals
 - Bulk storage of materials
 - Vehicle and equipment maintenance and fueling
 - Significant dust or particulate generating processes
 - Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents and oils
 - Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment
 - Dedicated asphalt and concrete batch plants
 - Other areas or operations where spills occur
 - Other non-stormwater discharges including construction dewatering not covered under the Construction Dewatering Discharges general permit and wash water that may contribute pollutants to the MS4. Ensuring proper fastening of port o lets

2.11.02 Modifications to Approved Erosion and Sediment Control Plans

When inspection of the site indicates the approved erosion and sediment control plan needs modification, the modification shall be made in compliance with the erosion and sediment control criteria contained in these STANDARDS AND SPECIFICATIONS, the DRAINAGE CRITERIA MANUAL, and the CITY CODE.

- (A) The permittee shall submit requests for major modifications to approved erosion and sediment control plans, such as the addition or deletion of a sediment basin, to the CITY to be processed appropriately. This processing includes modifications due to plan inadequacies at controlling erosion and sediment as revealed through inspection.
- (B) The CITY may approve minor modifications to approved erosion and sediment control plans in the field if conditions so merit.

2.11.03 Grading and Erosion Control Notes

The following minimum grading and erosion control notes shall be stated on, as well as incorporated into the overlot grading and erosion control plan:

GRADING AND EROSION CONTROL NOTES

- (A) All site grading (excavation, embankment, and compaction) shall conform to the recommendations of the latest soils investigation for this property and shall further be in conformance with the CITY of Westminster's "**STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS**," latest edition.
- (B) Natural vegetation shall be retained and protected wherever possible. Exposure of soil to erosion by removal or disturbance of vegetation shall be limited to the area required for immediate construction operation and for the shortest practical period of time.
- (C) Topsoil shall be stockpiled to the extent practicable on the site for use on areas to be revegetated. Any and all stockpiles shall be located and protected from erosive elements.
- (D) Temporary vegetation shall be installed on all disturbed areas where permanent surface improvements are not scheduled for installation within three months. Vegetation shall be a vigorous, drought tolerant, native species mix. (Refer to Section 2.40.04 of these STANDARDS AND SPECIFICATIONS for seeding mix.) Project scheduling should take advantage of spring or fall planting seasons for natural germination, but seeded areas shall be irrigated, if conditions so merit.
- (E) At all times, the property shall be maintained and/or watered to prevent wind-caused erosion. Earthwork operations shall be discontinued when fugitive dust significantly impacts adjacent property. If earthwork is complete or discontinued and dust from the site continues to create problems, the owner/developer shall immediately institute mitigative measures and shall correct damage to adjacent property.
- (F) Temporary cut/fill slopes shall not exceed a steepness of 2:1 (2H:1V). Permanent slopes shall not exceed 4:1 (4H:1V) in areas to be seeded or sodded.
- (G) Utility construction is not approved under this plan.

- (H) The OWNER/DEVELOPER shall provide any additional dust abatement and erosion control measures deemed necessary by the CITY, should conditions merit them.
- (I) Temporary fences shall be installed along all boundaries of the construction limits or property lines as shown on the approved erosion control plan, to prevent grading on property not owned by the developer. In addition, the CITY may require additional temporary fences if field conditions so merit them.

2.11.04 Standard Erosion Control Details

In the Appendix of these STANDARDS AND SPECIFICATIONS are the standard erosion control details which are acceptable to the CITY. The CITY may accept other proposed BMP products upon review and approval by the CITY ENGINEER.

2.12.00 STORMWATER MANAGEMENT PLANS (SWMP)

Any land disturbance that disturbs more than an acre of land or under an acre that is part of a larger development will require a State Construction Stormwater General Permit along with the preparation of a Stormwater Management Plan (SWMP).

- (A) **Land Disturbance Permits will not be issued by the CITY without acquiring a CDPHE Water Quality Division’s Construction Stormwater General Permit.**
- (B) All SWMP’s are subject to standards set by CDPHE Water Quality Division’s Stormwater Construction General Permit.
- (C) The CITY will review Stormwater Management Plans to ensure compliance with the standards set by CDPHE Water Quality Division’s Construction Stormwater General Permit.

2.20.00 REVEGETATION

For the purpose of this chapter, the term “revegetation” refers to ground cover only. “Formal” landscaping requirements are specified in a separate document titled CITY of Westminster Landscape Regulations. Final drawings, specifications, and details shall be submitted to the CITY for review and approval prior to construction.

2.20.01 Topsoil

Areas to be revegetated shall be prepared with topsoil and soil preparation amendments. The CITY has the prerogative of deleting all or a portion of the soil preparation requirements when topsoil is imported, depending on topsoil quality and quantity. Topsoil amendments shall meet the requirements of these STANDARDS AND SPECIFICATIONS.

2.20.02 Soil Preparation

Soil preparation amendments shall be provided on all areas to be seeded, sodded, or otherwise planted.

2.20.03 Seeding

Areas to be revegetated shall utilize seeding in the mixes according to these STANDARDS AND SPECIFICATIONS. The mix to be utilized will vary depending on the location (open space versus trailside/roadside) and shall be specified in the PLANS.

2.20.04 Mulching

Mulch is required on seeded areas and is utilized to conserve moisture, prevent crusting, reduce runoff and erosion and help establish a plant cover.

2.20.05 Irrigation

Irrigation, whether temporary or permanent, is required to establish the revegetation for the duration of the agreement with the CITY.

2.20.06 Weed Management

Following seeding, weed management is required for all seeded areas until final acceptance of the project by the CITY. Eradication method shall be approved by the CITY ENGINEER.

2.20.07 Wildflower Introduction

After the first year of broadleaf weed abatement is complete, wildflower over-seeding is required. Seeding must be done in the spring (March-May) prior to the second summer growing season.

2.30.00 CONSTRUCTION

2.30.01 Topsoil

Areas to receive topsoil shall be scarified to a 6-inch depth to improve the bond of topsoil to subsoil. Place topsoil to a minimum depth of 6-inches after settlement. Spread evenly and grade to elevations and slopes shown on the approved ODP or PLANS. Hand rake areas inaccessible to machine grading.

If sufficient on-site material is not available, the CONTRACTOR shall furnish and install imported topsoil in the manner described above. Topsoil shall be mixed thoroughly with the salvaged topsoil prior to placement.

Utilize manufactured topsoil as the top layer, placing over scarified subgrade to a depth of 6-inches.

Protect completed areas where topsoil has been spread from traffic to prevent compaction. Any areas that, as determined by CITY ENGINEER, become compacted due to the CONTRACTOR's construction traffic shall be reconstructed.

2.30.02 Grading Preparation

The surface shall be graded to finished elevations per approved ODP or PLANS. No ponding water will be allowed and shall be corrected.

2.30.03 Amendments, Fertilizers & Compost

The CONTRACTOR shall submit bag tags and/or truck load tickets for all products. The CONTRACTOR shall apply one or more of the following as directed by the CITY ENGINEER:

- (A) Apply Biosol organic slow-release fertilizer at a rate of 1000 lbs. per acre per manufacturer's recommendation.
- (B) Apply Earthgreen Menefee Humate All Natural Organic Soil Conditioner at a rate of 250 lbs. per acre per manufacturer's recommendation.
- (C) Apply AM-120 Standard mycorrhizal inoculum at a rate of 60 lbs. per acre per manufacturer's recommendation.
- (D) Apply Triple superphosphate at a rate of 1000 lbs. per acre.
- (E) Compost shall be evenly spread over the entire surface at the rate of 4 cubic yards per 1,000 square feet (approximately 1-1/2" depth).

Upon establishment of approved grades, the soil surface shall be loosened by rototilling to a minimum of 8 inches (for a 20% to 30% inclusion rate), and all materials over 2 inches in diameter shall be removed and the soil surface shall be reasonably free of large clods, roots, and stones greater than 2 inches, and other material which will interfere with seeding and subsequent site maintenance. Higher inclusion rates are necessary for upgrading marginal soils, as determined by the CITY ENGINEER. All amendments, fertilizers and compost shall be mixed thoroughly into the soil surface to a depth of 8 inches by means of a rototiller, soil mixer or similar equipment. Do not leave mycorrhizal inoculum exposed to sunlight for more than four hours. The surface shall then be finish-graded, compacted to the approved elevations and the soil surface shall be raked smooth prior to seeding.

Seeding shall take place within 48 hours of soil preparation, unless otherwise approved by the CITY ENGINEER.

2.30.04 Seeding

See seeding mix in Section 2.40.04 for seeding application rates. Seeding shall be hydroseeded unless otherwise approved by the CITY ENGINEER. Areas larger than 1 acre with slopes of 3:1 or flatter may be drill seeded and areas with slopes greater than 3:1 may be hand broadcast, if approved by the CITY ENGINEER. The CONTRACTOR shall submit seed bag tags for all seeding methods.

Hydroseeding shall occur as a separate process prior to hydromulching. Do not mix seed and mulch together in one slurry application process.

If approved by the CITY ENGINEER, seed may be drill seeded. Mechanical power-drawn drills shall have depth bands set to maintain a planting depth between ¼ inch and ½ inch and shall be set to space the rows not more than 2 inches apart. In addition, the drill shall be equipped with multiple seed boxes from which large smooth, small smooth, and appendaged (i.e. fluffy or trashy) seed can be metered evenly. Seed that is extremely small shall be sowed from a separate hopper adjusted to the proper rate of application. Seed shall not be drilled or sown during windy weather or when the ground is frozen or

otherwise unillable. If inspections indicate that strips wider than the specified space between the rows planted have been left or other areas skipped, the CITY may require immediate resowing of seed in such areas at the developer's expense. During all seeding operations, proper functioning of the seed drill will be demonstrated to the satisfaction of the CITY upon request.

If approved by the CITY ENGINEER, seed may be hand or mechanical broadcasted. Hand method of broadcasting seed will be permitted only on small areas not accessible to machine methods. All seed sown by broadcast-type seeders shall be "raked in" or otherwise covered with soil to a depth of at least 1/4-inch.

The minimum standard for any dryland grass is 8 seedlings of the seeded species per square foot. If requested by the CITY, this count/inspection shall be taken four (4) weeks after germination by a qualified botanist. Any area not meeting the specifications on germination will be touch up seeded in one of the following methods:

- (A) Hand Broadcast and Incorporation
- (B) Mechanical Broadcast and Incorporation
- (C) Interseeding with Seed Drilling Equipment

Water thoroughly after seeding.

2.30.05 Mulching

Mulching material shall be applied immediately after seeding.

For hydroseeding, slurry mix shall not be combined with hydroseeding. Apply hydro-mulch (wood fibers in a water slurry) at a minimum rate of 2,000 lbs/acre with a guar gum tackifier.

For drill-seeded areas: Grain straw shall be used at an application rate of 4,000 lbs/acre of air-dried material. At least 50-percent of the mulch by weight shall be 10 inches or more in length. Mulch shall be anchored immediately after distributing with a mulch crimper and tackifier.

For steep slopes hand or mechanical broadcasted:

1. Mulch netting shall be firmly held in place with pins spaced not more than ten linear feet apart. In sandy or extremely loose soil, the pins shall be located not more than 5 linear feet apart.
2. Jute netting or similar approved materials shall be installed according to the manufacturer's recommendations.
3. Excelsior mat shall be installed according to the manufacturer's recommendations.

2.30.06 Temporary Irrigation

All disturbed areas shall be irrigated temporarily by a method approved by the CITY. Water and irrigation plan shall be approved by the CITY. Temporary irrigation shall remain in place for a period of at least one growing season or until the WORK has been accepted out of WARRANTY, whichever time period is longer. All irrigation piping must be buried, including drip or bubbler tubing to trees and shrubs. Removal or discontinuation of temporary irrigation shall be approved by the CITY. Tap fees and water costs used for the establishment of seed are to be paid by the OWNER or DEVELOPER.

Any and all repairs of the temporary irrigation system are the responsibility of the OWNER or DEVELOPER through the life of the IMPROVEMENTS AGREEMENT. Such repairs are to be completed by the DEVELOPER in a timely manner.

2.30.07 Weed Management

Manual control will be undertaken where species and circumstances allow. Chemical treatment may become necessary in some areas. Eradication method must be approved by the CITY ENGINEER.

2.30.08 Wildflower Introduction

See wildflower mix in Section 2.40.08 for seeding application rates. Wildflower seeding shall be hand or mechanical broadcast. Water thoroughly after seeding.

2.40.00 MATERIALS

2.40.01 Topsoil

All imported topsoil shall be a loam or sandy loam conforming to ASTM D 5268. At least 10 days prior to topsoil delivery, notify the CITY ENGINEER of the source(s) from which topsoil is to be furnished. Topsoil shall be furnished by the CONTRACTOR and shall be a natural, friable soil representative of productive soils and shall meet the following conditions. Topsoil shall be free from weeds, sod, and material larger than 1-inch, toxic substances, litter or other deleterious material. The topsoil shall have an acidity in the range of pH 6.5 to pH 8.5, and shall be screened and meet the following mechanical analysis:

	<u>% PASSING</u>	<u>% RETAINED</u>
1 Inch Screen	100	0
1/2 Inch Screen	97-100	0-3
#100 Mesh Sieve	60-40	40-60

Soil Texture:

Sand: 30% - 50%

Silt: 30% - 50%

Clay: 5% - 30%

Soluble Salts: Electric conductivity (EC) shall be less than 2.0 mmhos/cm for turfgrass areas, dryland areas, and planting beds.

2.40.02 Manufactured Topsoil

“Amended Topsoil” as manufactured by A1 Organics, 16350 WCR 76, Eaton, CO 80615 Ph: (970) 454-3492, (800) 776-1644 Fax: (970) 454-3232 www.a1organics.com, or substitution as approved by the CITY ENGINEER.

2.40.03 Amendments, Fertilization, Compost

- A) Organic slow-release fertilizer (6-1-1, NPK): Biosol, or CITY approved equal.
- B) Natural soil conditioner: Earthgreen Menefee Humate All Natural Organic Soil Conditioner, or CITY approved equal.

- C) Mycorrhizal inoculum: AM-120 Standard, or CITY approved equal.
- D) Triple superphosphate (P_2O_5 with an N-P-K of 0-46-0)
- E) If a soil analysis indicates sufficient amounts of the above elements the CITY may, at its discretion, waive the requirement to fertilize.
- F) Compost shall be a well decomposed, stable, weed free organic matter source. It shall be derived from: agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; source-separated or mixed solid waste. The product shall contain no substances toxic to plants and shall be reasonably free (< 1% by dry weight) of man-made foreign matter. The compost will possess no objectionable odors and shall not resemble the raw material from which it was derived. The product shall be certified through the U.S. Composting Council's (USCC) Seal of Testing Assurance (STA) Program.

Product Parameters*:

Parameters^{1,6}	Reported as (units of measure)	General Range
pH	pH units	6.0 - 7.5
Soluble Salt Concentration (electrical conductivity)	dS/m (mmhos/cm)	Maximum 5
Moisture Content	%, wet weight basis	30 – 60
Organic Matter Content	%, dry weight basis	30 – 65
Particle Size	% passing a selected mesh size, dry weight basis	98% pass through 3/4” screen or smaller
Stability Carbon Dioxide Evolution Rate	mg CO ₂ -C per g OM per day	< 2
Maturity Indicator	Carbon to Nitrogen Ratio (C/N)	<12
Maturity Indicator	Ammonia N / Nitrate N Ratio	< 4
Maturity (Cucumber Bioassay) Seed Emergence and Seeding Vigor	% , relative to positive control % , relative to positive control	Minimum 80% Minimum 80%
Maturity (Red Clover-Clopyralid Sensitive Plants-Bioassay) Seed Emergence and Seed Vigor	% , relative to positive control % , relative to positive control	Minimum 80% Minimum 80%
Physical Contaminants (inerts)	%, dry weight basis	< 1
Chemical Contaminants ²	mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants ³ Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

¹ Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMECC, The US Composting Council)

² US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels = Arsenic 41ppm, Cadmium 39ppm, Copper 1,500ppm, Lead 300ppm, Mercury 17ppm, Molybdenum 75ppm, Nickel 420ppm, Selenium 100ppm, Zinc 2,800ppm.

³ US EPA Class A standard, 40 CFR § 503.32(a) levels = Salmonella <3 MPN/4grams of total solids or Fecal Coliform <1000 MPN/gram of total solids.

⁴ CITY landscape architects and project engineers may modify the allowable compost specification ranges based on soil analysis, specific field conditions and plant requirements.

*Before delivery of the compost, supplier must provide a copy of the lab analysis, performed by a STA Program certified lab, verifying that the compost meets the product parameters listed above. The lab analysis should not be more than 90 days old.

*Truck delivery tickets must match the approved compost.

Verifying current participation in the STA Program can also be achieved by logging onto the USCC website at www.compostingcouncil.org.

2.40.04 Seeding

(A) Open Space Mix

Species	Common Name	Rate-PLS lb/ac*
<i>GRASSES</i>		
<i>Bouteloua curtipendula</i>	Sideoats Grama	13.6
<i>Bouteloua gracilis</i>	Blue grama - Alma or native	24.8
<i>Buchloe dactyloides</i>	Buffalograss - Native	36.0
<i>Calamovilfa longifolia</i>	Prairie Sandreed	12.4
<i>Schizachyrium scoparium</i>	Little Bluestem	9.6
<i>Sporobolus airoides</i>	Alkali Sacaton-Native	1.6

* Rate for hydroseeding; PLS = PURE LIVE SEED (Bulk rate =PLS rate/(% purity x % germination).

Hydroseeding Rate:	98 PLS#/Acre
Drill Seeded Rate:	49 PLS#/Acre
Mechanical Broadcast Rate:	98 PLS#/Acre
Hand Broadcast Areas Rate:	98 PLS#/Acre

(B) Trailside Low Grow Mix – For use along trails and roadways.

Species	Common Name	Rate-PLS lb/ac*
<i>GRASSES</i>		
<i>Bouteloua curtipendula</i> ‘Vaughn’	Sideoats Grama	18.0
<i>Bouteloua gracilis</i> ‘Alma’	Blue grama - Alma or native	15.0
<i>Buchloe dactyloides</i> ‘Texoka’	Buffalograss - Native	48.0
<i>Koeleria macrantha</i>	Junegrass	3.6
<i>Pascopyrum smithii</i> ‘Arriba’	Western Wheatgrass, Arriba	12.0

* Rate for hydroseeding; PLS = PURE LIVE SEED (Bulk rate =PLS rate/(% purity x % germination).

Hydroseeding Rate:	96.6 PLS#/Acre
Drill Seeded Rate:	48.3 PLS#/Acre
Mechanical Broadcast Rate:	96.6 PLS#/Acre
Hand Broadcast Areas Rate:	96.6 PLS#/Acre

C) Purity: Grass seed specified will comply with all current state regulations regarding weed seed content and will meet the required pure live seed content as adjusted for batch purity and germination.

2.40.05 Mulching

A guar-based tackifier shall be included in the hydro-mulch.

2.40.06 Irrigation

A temporary irrigation plan and materials must receive approval from the CITY ENGINEER prior to installation.

2.40.07 Weed Management

Chemical management materials must receive approval from the CITY ENGINEER prior to use.

2.40.08 Wildflower Seeding

Wildflower Mix

<u>Species</u>	<u>Common Name</u>	<u>Rate-PLS lb/ac*</u>
<u><i>Aquilegia caerulea</i></u>	Blue Columbine	9.0
<u><i>Cleome serrulata</i></u>	Rocky Mountain Beeplant	9.0
<u><i>Coreopsis tinctoria</i></u>	Plains Coreopsis	9.0
<u><i>Erigeron speciosus</i></u>	Fleabane Daisy	9.0
<u><i>Erysimum capitatum</i></u>	Western Wall Flower	9.0
<u><i>Gaillardia aristata</i></u>	Perennial Gaillardia	9.0
<u><i>Linum lewisii</i></u>	Blue Flax	14.0
<u><i>Penstemon strictus</i></u>	Rocky Mountain Penstemon	9.0
<u><i>Ratibida columnifera</i></u>	Prairie Coneflower	14.0
<u><i>Rudbeckia hirta</i></u>	Blackeyed Susan	9.0

* Rate for hydroseeding; PLS = PURE LIVE SEED (Bulk rate =PLS rate/(% purity x % germination).

Hydroseeding Rate:	100 PLS#/Acre
Drill Seeded Rate:	50 PLS#/Acre
Mechanical Broadcast Rate:	100 PLS#/Acre
Hand Broadcast Areas Rate:	100 PLS#/Acre