

Design Requirements

Landscape Plan

A final landscape plan is required where landscape planting or mitigation planting will occur. The landscape plan shall be submitted for Acceptance by the CDOT Project Engineer and the CDOT Landscape Architect.

An interim and final stabilization plan shall be required for any area of the work where new construction disturbance occurs, and shall be developed in conjunction with erosion control requirements as a Best Management Practice in Section 5 - Environmental.

Landscape design and re-vegetation (stabilization) plans shall include, but not limited to, the mitigation measures as described and as listed below:

- Cut and fill slopes shall be minimized and the cut line blended into the existing terrain. Maximum soil slope steepness shall be 2H:1V.
- Permanent and temporary stabilization for each construction phase.
- Areas to be permanently stabilized after completion shall follow the requirements of the 2011 CDOT Standard Specifications for Road and Bridge Construction, Sections 101, 107, and 208, 213, and 620 Water Quality Control, 213 Mulching specifications, and other referenced material.
- Disturbed areas where work has halted shall follow the requirements of the 2011 CDOT Standard Specifications for Road and Bridge Construction, Sections 101, 107, and 208, 213, and 620 Water Quality Control.
- Removal of adjacent roadside vegetation shall be minimized where possible
- Amend embankment to prepare topsoil with compost/bionutrients. Temporary erosion control and sediment control BMP's shall be maintained until the requirements of Section 5 – Environmental are satisfied.

Construction Requirements

Temporary Seeding and Stabilization

Disturbed areas where work has halted shall follow the requirements of the 2011 CDOT Standard Specifications for Road and Bridge Construction, Sections 101, 107, and 208, 213 and 620 - Water Quality Control.

All temporary disturbed areas not within the work area will be returned to preconstruction elevation and contours and reseeded with the CDOT approved native seed mix that is certified weed free.

Control noxious weeds, if present prior to disturbance, as needed throughout construction and until SCP permit inactivation.

Clearing and Work Area Limits Identification and Protection

- The Contractor shall delineate the clearing and work limits for Acceptance by the CDOT Project Engineer (see Section 5, Migratory Birds for bird nesting survey requirements). Existing vegetation and or sensitive environments to remain shall be identified and protected. BMP's shall be used to prevent degradation of habitats adjacent to construction area. The CDOT Project Engineer will flag those trees adjacent to the boundary that are to remain in place. If trees, shrubs and willows are within the Contractor delineated clearing and work limits the following requirements will apply:
- The Contractor shall use all appropriate care to avoid damage or removal of the flagged trees. Trees that are damaged shall be replaced at the Contractor's expense. Trees that are damaged and assessed as salvageable shall be promptly repaired, pruned, wrapped, and protected from further damage at the Contractor's expense.
- Any **native** tree removed with a diameter of 2 inches or greater will be replaced in-kind at a **24:1** ratio **with a native tree as described in Section 5 - Environmental**. The diameter of a tree is the measured diameter 2-feet up the tree from the ground surface.
- Shrubs and willows removed shall be replaced with live willow cuttings collected from nearby stands. Willow cuttings will be placed on 2 foot centers.
- All planted trees and shrubs located in planting areas as shown in the Plans shall be protected with geotextile fabric and wood chip mulch. Trees will not be accepted if the ball of earth surrounding the roots is cracked or broken during delivery and planting.
- The Contractor shall repair or replace in-kind all landscape material and vegetation on private property which is disturbed by the Work. Replaced materials shall be equal or better to the existing materials in size, type and condition.

Removal of Trees and Shrubs

Tree stumps within the roadway prism or within 10 feet of the edges of roadway pavements shall be completely removed and disposed of off the Project site. All other tree stumps within the Project shall be ground 3 feet below finished grade.

All trees or shrubs removed from the Project shall become the property of the Contractor and be completely disposed of off-site by the Contractor.

Tree and Shrub Transplanting

The Contractor shall not transplant or use non-native trees or shrubs.

The Contractor shall transplant native shrubs requiring transplanting within the Right-of-Way and outside the clear zone requirements in conformance with the Contract.

Pruning

The Contractor shall have all root and branch pruning completed by a licensed and certified tree surgeon. All work shall be in accordance with American National Standard Institute – ANSI A300-1995, Section 5.3.3.2.

Root Pruning

Tree roots 2 inches or greater in diameter shall not be removed, unless they interfere with the work. Extensive root pruning may require tree replacement as directed by the Engineer.

Roots below the excavation depth for the work shall not be pruned.

Branch Pruning

The Contractor may prune branches that will interfere with the Work

Staking and Watering

New and transplanted trees shall be staked. Stakes and guying shall comply with the CDOT Standard Plans and Specifications.

The Contractor shall water new and transplanted trees on the Project as required by the Contract.

Topsoil

The Contractor shall prepare topsoil with organic amendments at a rate of 43 cubic yards/acre, as described in subsection 212.02 (b) of the 2011 CDOT Standard Specifications for Road and Bridge Construction. The prepared topsoil shall be spread over all disturbed areas with a minimum thickness of 4 inches. The prepared topsoil shall not include any minerals or elements detrimental to plant growth. All rocks and debris larger than 4 inches in diameter that are visible after the topsoil is prepared and spread shall be removed and disposed of in an appropriate manner off the project site.

Permanent Native Seeding

Placement of soil conditioning and fertilizer, seeding and mulching shall not be done in a single operation, and shall be completed within 48 hours following each construction phase or prior to any winter shutdown work. All seeding requirements in the approved project SWMP shall also be followed. Fertilizer shall not be used adjacent to wetlands and waterways. Refer to the Standard Specification Section 212 for additional requirements.

All disturbed areas within the Right-of-Way which are not surfaced shall be re-vegetated to replicate or enhance native vegetative communities. Re-vegetation species that attract wildlife to the Highway or practices that allow noxious weeds shall not be used.

Due to high failure rates the Contractor will not be allowed to use hydromulching and/or hydroseeding or straw.

Seeding shall be drilled 1/4-inch to 1/2-inch into the soil. In areas where machine seeding is impossible, hand broadcast at double the contract rate, and rake 0.25 inch to 0.5 inch into the soil.

Mulch tackifier shall be applied at a rate of 200 pounds per acre.

Mulching application shall be 1.5 tons of certified weed free hay per acre mechanically crimped into the soil in combination with organic mulch tackifier.

The soil conditioning and fertilizer requirements shall be 800 pounds per acre biological nutrient (organic material based fertilizer) (Biosol, Sustane, or Grow Power) and 600 pounds per acre humate.

All native seeding areas with slopes 3:1 or flatter shall be mulched and mechanically crimped with 1.5 tons per acre of weed free hay and applied with mulch tackifier.

All other slopes shall have soil retention blanket for slopes steeper than 3:1. Roadside ditches shall be lined with soil retention blanket or turf reinforcement blanket to contain the design flow width (wetted perimeter), designed based on the hydraulics of the ditch for both before and after the final stabilization is established. If soil retention blanket is used, mulch and tackifier are not required.

Reseeding Operations and Corrective Stabilization

Prior to final acceptance

1. Seeded areas shall be reviewed during the 14 day inspections by the Erosion Control Supervisor for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc. shall be re-graded,

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- seeded, mulched and have mulch tackifier (or blanket) applied as necessary.
- The Contractor shall maintain seeding/mulch/tackifier, mow to control weeds or apply herbicide to control weeds in the seeded areas until Final Acceptance.

The Contractor shall use the following seed mixes for locations within the Project:

INTERIM AND FINAL STABILIZATON

A. SEEDING PLAN

Soil preparation, Soil Conditioning, Topsoil, Seeding (Native), Soil Retention Blanket and Mulching will be required for an estimated xxx acres of disturbed area within the right-of-way limits which are not surfaced. The following types and rates shall be used:

<i>COMMON NAME</i>	<i>BOTANICAL NAME</i>	<i>POUNDS PLS/ACRE</i>
Blue grama	Bouteloua gracilis v. Hachita	2
Western wheatgrass	Pascopyrum smithii v arriba	6
Sideoats grama	Bouteloua curtipendula v. Vaughn	3
Little bluestem	Schizachyrium scoparium 'Pastura'	3
Green needlegrass	Stipa viridula v. Lordom	3
Switchgrass	Panicum virgatum 'Dacotah"	4
Junegrass	Koeleria macrantha	0.2
Hilaria jamesii	Galleta Grass 'Viva'	5
Sand dropseed	Sporobolus cryptandrus	0.1
Inland Saltgrass	Distichlis spicata stricta	1
Coneflower	Ratibida columnaris	0.5
Gaillardia	Gaillardia aristata	1
Oats	Avena sativa	3
TOTAL		31.8

Noxious Weed Management Plan

Identify and provide a noxious weed management plan if state noxious weeds are present.

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The Contractor shall use CDOT’s standard protocol for weed management, including the development of an Integrated Noxious Weed Management Plan (INWMP) to mitigate the potential adverse effects of earth disturbance.

Deliverables

At a minimum, the Contractor shall submit the following to CDOT for review, Approval and/or Acceptance:

Deliverable	Acceptance or Approval	Schedule
Final Landscape Plan	Acceptance	Prior to Landscaping
Seed Certification and Fertilizer Analysis	Acceptance	Prior to placing
Noxious Weed Management Plan	Acceptance	Prior to disturbance
Organic Soil Amendment Certificate of Compliance	Acceptance	At least 30 Days prior to its use on the Project
Organic Soil Amendment Compost CDPHE facility permit to produce or sell compost	Acceptance	Prior to application
Organic Soil Amendment Compost U.S. Composting Council’s Seal of Testing Assurance Program (STA) participation certificate and test data on a Compost Technical Data Sheet	Acceptance	Prior to application

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