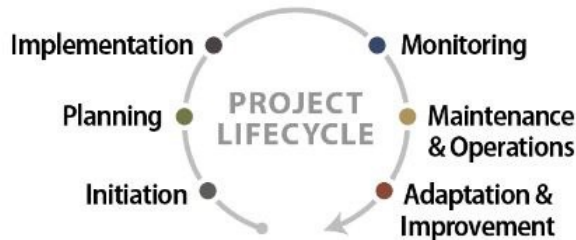


Instructions for using the 207 and 212 specifications during the development of the Stormwater Management Plan (SWMP)

Background:

After all of the grading and infrastructure improvements are completed (built capital), the process of amending topsoil and seeding is collectively known as “roadside revegetation,” or constructing the natural capital. When planned well, successful roadside revegetation programs support transportation goals for safety and efficiency, stabilize slopes, reinforce infrastructure, and create natural beauty and diversity along the roadside that supports pollinators while also improving the road user’s experience (FHWA Roadside Revegetation Manual). CDOT’s existing roadside revegetation process has been under evaluation for the last 4 years, starting with a research project that provided an assessment of past and active construction projects. To start evaluating the research recommendations, CDOT conducted a Pilot Program during the 2018 construction season that implemented substantial changes to roadside revegetation methods through design and construction. The Landscape Architecture Section is now ready to apply the latest version of the roadside revegetation best practices as standards. Proposed processes are under evaluation, and feedback would be appreciated regarding the documents.



Recommended Integrated Approach to Improve Roadside Revegetation by FHWA

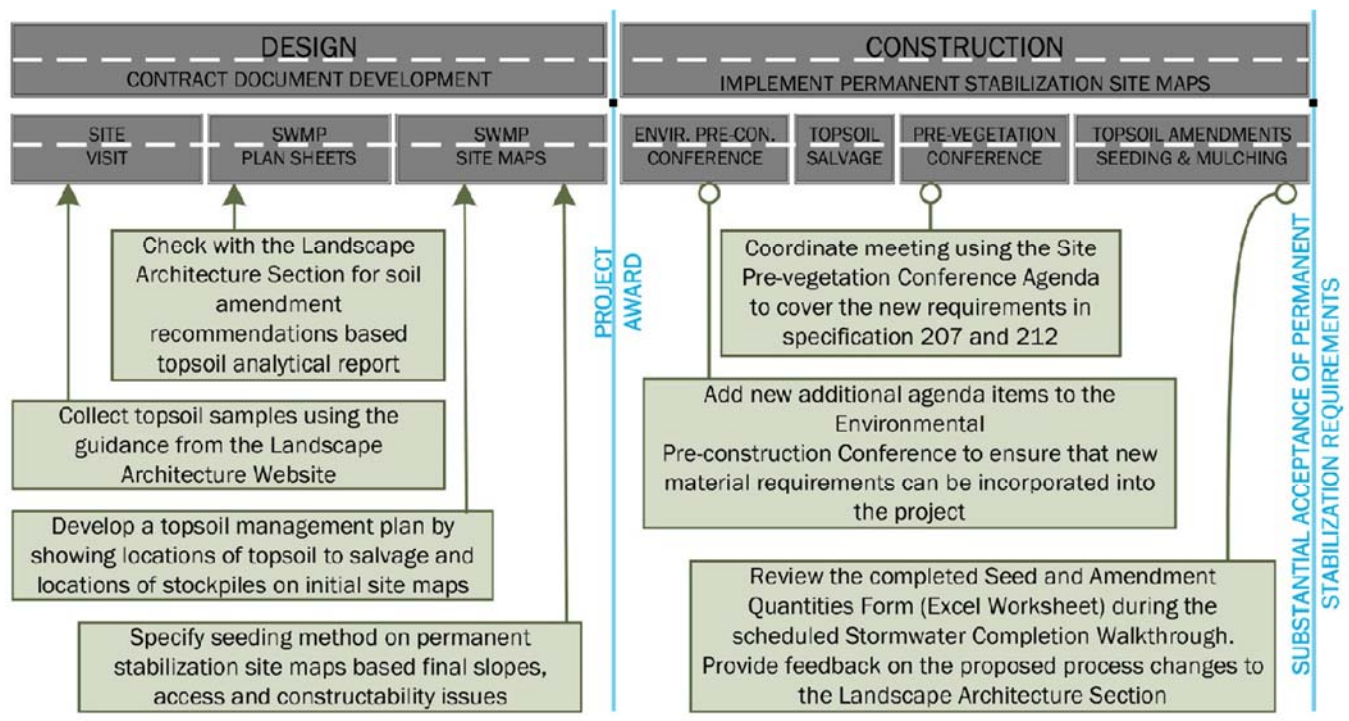
Application of this Guidance:

These instructions will provide the overall directions for using the 207 and 212 standards and SWMP development tools. These changes have been proposed to update protocol for roadside revegetation, while offering flexibility for site-specific decisions based on a required analysis of the existing conditions during design.

The Landscape Architecture Section staff would be interested in observing projects that use the standards to complete Inspector/Engineer-in-Charge training.



Project Delivery Timeline



DESIGN PHASE: Tools and Options

To achieve a higher level of success and project benefits, the process changes start in the design phase. This early coordination of the revegetation design with other aspects of transportation project planning is when the SWMP Permanent Stabilization Site Maps (revegetation plan) are completed: the site topsoil inventory and analytical testing along with topsoil management, soil amendment and seeding strategies are developed. Please download the following documents to be used during the design phase from the Landscape Architecture web page.

1. *Topsoil Testing Procedure*
2. *SWMP Templates*
3. *(Optional) Topsoil Stockpile Windrow Combined With Temp Berm Control Measure Detail (PDF and .dgn)*

Step 1 – Topsoil Collection and Analytical Test

Using the Topsoil Testing Procedure, the SWMP designer is required to do a topsoil assessment of all areas within the anticipated limits of disturbance (LDA). It is important to identify the locations, depth and quality of the site’s topsoil potential as a resource so that it is not inadvertently wasted. Topsoil samples also need to be sent into a lab for analysis. On undisturbed sites, topsoil is visually differentiated from the underlying subsoil by having darker colors, less clay, better soil structure, and higher abundance of fine roots.

The reason for pre-construction soil testing is to provide a more prescriptive SWMP based on the chemical and physical properties of the existing soil. A topsoil sample should be taken from each identified revegetation unit on the project. Revegetation units are areas with similar revegetation treatments and environment (e.g., soils, climate, and vegetation potential). Large projects with greater diversity (different soil types, microclimates, vegetation types and management needs) will have more than one revegetation unit. During the Field Inspection Review (FIR) meeting, discuss with the regional environmental staff the potential of having more than one vegetation unit on the project. When collecting topsoil samples on-site, also inventory the Limit of Construction (LOC), along with adjacent reference sites, for existing plant species, weed pressures and other site factors that might affect vegetation.

Step 2 – Topsoil Amendments

Based on the analytical topsoil report from an accredited laboratory, types and quantities of soil amendments should be specified in the SWMP Plan Sheets (template). The topsoil limiting factor(s) for revegetation might not be only a nutrient. For example, limiting factors could be high pH value, low organic matter, soil stability, nitrogen to carbon ratios and salts. The Landscape Architecture Section is available to assist with developing or reviewing the topsoil amendment strategies for the project.

Step 3 – Topsoil Management Strategy

The most important and cost effective step for successful roadside revegetation is topsoil salvage and placement on finished civil grade. Topsoil protection is also required by the updated 2019 CDPS General Permit: Stormwater Discharges Associated with Construction Activity (COR40000). Part 1 B.1.a.i.(f) states, “*Unless infeasible, topsoil shall be preserved for those areas of a site that will utilize vegetative final stabilization.*”

Information collected in Step 1 above should be used to develop the topsoil management strategy. Step 1 provides a topsoil depth inventory. Some projects might require testing both the topsoil and subsoil within the LOC, depending upon the topsoil management strategy. Other site conditions that can affect topsoil strategies include noxious weeds and the depth of litter and duff, which is the layer of fresh and decomposed needles and leaves covering the

ground surface of forest and shrub plant communities. This organic material can be a valuable source of seeds and nutrients. Based on the site assessment of desirable or problematic pre-existing plant species, direction should be given to either stockpile litter or duff with topsoil or dispose of offsite. Litter and duff management also effects the topsoil amendment strategies for a project.

Topsoil should not be collected in areas that have a high degree of weeds, rocks or previous construction debris. Some weed species and project locations might allow for treatment or physical removal prior to topsoil salvage.

To document the topsoil management strategies so they can easily be interpreted and tightly bid the SWMP designer should use the initial and permanent SWMP Site Maps. The outcome of the topsoil survey and testing will provide locations and depth for topsoil salvage. The site maps should also propose methods and locations of topsoil stockpiling along with the appropriate control measures. The windrow method for topsoil stockpiles is the preferred technique for most project to limit the height of stockpiles and reduce the haul distances. A proposed project detail has been developed to show how a windrow stockpile can be combined with a perimeter control measure temporary berm. Volume calculation of the amount of salvaged topsoil should be made to confirm there is enough room between the LDA and LOC.

Step 4 – Seeding Method(s)

Revegetation design solutions can vary widely depending on the project and specific site conditions. The standards provide the SWMP designer three pay items to specify seeding methods based on what would be the most successful options for the project. Consider equipment access by evaluating slope lengths, gradient and rocky conditions to be negotiated by drill seeders. Drill seeding with straw mulch is the preferred method of seed application when feasible. Hydraulic seeding is the alternative method for areas on sites where drill seeding is not feasible. Areas not suitable for drill or hydraulic seeding methods should be broadcast seeded.

Step 5 – 207 and 212 Standards

For revegetation specifications we moved away from an end-result specification (landscape establishment in the 214) to a more method-based specifications (prescriptive with materials and methods). End-result specifications have been challenging for smaller revegetation sub-contractors and the rolls and responsibilities can be confusing.

Step 6 – Coordinate Earthwork Tabulations.

The final SWMP topsoil strategies must be coordinated with the overall Earthwork Quantities Worksheet.

A few notable potential changes that might affect quantities from current standard practice are:

- Increase depth from 4 to 6 inches for topsoil salvage and redistribution.
- Added an option to import approved topsoil to the site for areas receiving vegetation practices.
- Added an option to remove existing topsoil from the project site.
- Savaging of existing topsoil is now paid for using the new 207 pay items is not paid for as clearing and grubbing.

References:

For assistance with any of these documents, please contact:

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