Water Quality Permit Requirements

Natural Resource Office
Environmental Permits Section

Design Overview
Permit Process Overview

Water Quality Permits
- ARAP, Corps, TVA, TWRA
- Tasks Associated with Obtaining Permits
  - Review Environmental Boundaries
  - Permit Assessment
  - Permit Application
  - Distribute Permits

Stormwater Coverage
- Attend Field Reviews
- Supply Erosion Control Comments
- SWPPP Preparation and Submittal (Final Plans Required)
Regulatory Agencies

- Tennessee Department of Environment and Conservation
  - Aquatic Resource Alteration Permit
  - NPDES Construction General Permit Coverage
  - Class V Injection Well Permit (Sinkholes)

- United States Army Corps of Engineers
  - Nationwide Section 404
  - Individual 404

- Tennessee Valley Authority
  - Section 26a Permits

- Reelfoot Watershed Management Permit
  - Joint application with TDEC permits
# Environmental Boundaries (EB)

<table>
<thead>
<tr>
<th>Elements of the Report</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COVER LETTER</strong></td>
</tr>
<tr>
<td><strong>TOPO MAP</strong></td>
</tr>
<tr>
<td><strong>FORM G</strong></td>
</tr>
<tr>
<td>• <strong>Labels</strong></td>
</tr>
<tr>
<td>• <strong>Stream</strong></td>
</tr>
<tr>
<td>• <strong>Wetland</strong></td>
</tr>
<tr>
<td><strong>PICTURES OF FEATURES</strong></td>
</tr>
<tr>
<td><strong>MARKED UP PLAN SHEETS</strong></td>
</tr>
<tr>
<td><strong>FORM J</strong></td>
</tr>
<tr>
<td>• <strong>Sketch Information</strong></td>
</tr>
<tr>
<td>• <strong>Channel Relocation</strong></td>
</tr>
<tr>
<td>• <strong>Streams</strong></td>
</tr>
<tr>
<td>• <strong>Wetlands</strong></td>
</tr>
<tr>
<td><strong>SPECIAL NOTES &amp; PLANS NOTES</strong></td>
</tr>
<tr>
<td><strong>SPECIES</strong></td>
</tr>
</tbody>
</table>
MEMORANDUM

To:       Lee Jones
          Design Division

From:    Dennis Crumby
          Environmental Division

Date:     January 19, 2011

Subject: ENVIRONMENTAL BOUNDARIES AND MITIGATION DESIGN FOR:
          Sumner County: SR-6, Intersections at SR-25 and N. Locust Ave./Locust St. N.
          PIN 110421.00      P.E. # 83950-0257-54

An ecological evaluation of the subject project has been conducted with the following results:

X  No wetlands identified

X  No streams are present

X  No protected species identified in project impact area: The project is covered by the Memorandum of Agreement between TDOT and the U.S. Fish and Wildlife Service; therefore, no endangered species coordination is required.

No aquatic resource alteration permits or mitigation will be required for this project.

Your assistance is appreciated. If you have any questions or comments please contact me at 615-253-2465 or dennis.crumby@tn.gov.

copy:       John Hewitt
            Jerry Melson
            Environmental Division Project File/Reading File
# Form G: Feature Labels

## Complete list of color coded feature labels

<table>
<thead>
<tr>
<th>MAP LABEL</th>
<th>FEATURE DESCRIPTION</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>STR</td>
<td>Perennial or intermittent stream</td>
<td>BLUE</td>
</tr>
<tr>
<td>SPG</td>
<td>Spring</td>
<td>BLUE</td>
</tr>
<tr>
<td>SEP</td>
<td>Seep</td>
<td>BLUE</td>
</tr>
<tr>
<td>PND</td>
<td>Pond, quarry</td>
<td>BLUE</td>
</tr>
<tr>
<td>LAK</td>
<td>Lake</td>
<td>BLUE</td>
</tr>
<tr>
<td>WFL</td>
<td>Waterfall/cascade</td>
<td>BLUE</td>
</tr>
<tr>
<td>WWC</td>
<td>Wet weather conveyance</td>
<td>YELLOW</td>
</tr>
<tr>
<td>WTL</td>
<td>Wetland</td>
<td>GREEN</td>
</tr>
<tr>
<td>WMS</td>
<td>Potential wetland mitigation site</td>
<td>GREEN</td>
</tr>
<tr>
<td>CAV</td>
<td>Cave</td>
<td>BROWN</td>
</tr>
<tr>
<td>RKS</td>
<td>Rock shelter</td>
<td>BROWN</td>
</tr>
<tr>
<td>SNK</td>
<td>Sinkhole</td>
<td>RED</td>
</tr>
<tr>
<td>SPH</td>
<td>Specialized habitat, management area</td>
<td>PURPLE</td>
</tr>
<tr>
<td>PSP</td>
<td>Protected Species</td>
<td>PURPLE</td>
</tr>
<tr>
<td>Others</td>
<td>Contact TDOT Region Biologist</td>
<td></td>
</tr>
</tbody>
</table>
Form G - Streams

Lists:

- Feature
- Approximate Station
- Feature Name & Number
- General Information Concerning Feature
- ETW (Exceptional TN Waters)
- 303(d) Status

---

<table>
<thead>
<tr>
<th>Column</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Station</td>
<td>98-00R to 168-00R</td>
</tr>
<tr>
<td>2. Map label and name</td>
<td>STR-1, Gap Creek</td>
</tr>
<tr>
<td>3. Latitude/Longitude</td>
<td>36.20683, -82.72528</td>
</tr>
<tr>
<td>4. Potential impact</td>
<td>Crossing/encroachment, runoff?</td>
</tr>
<tr>
<td>5. Feature description: what is it</td>
<td>Intermittent Stream</td>
</tr>
<tr>
<td>5. Feature description: blue line on topo? (y/n)</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Feature description: defined channel (y/n)</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Feature description: straight or meandering</td>
<td>Straight</td>
</tr>
<tr>
<td>5. Feature description: channel bottom width</td>
<td>NA</td>
</tr>
<tr>
<td>5. Feature description: top of bank width</td>
<td>4’</td>
</tr>
<tr>
<td>5. Bank height and slope ratio</td>
<td>3:1</td>
</tr>
<tr>
<td>5. Bank gradient of stream (%)</td>
<td>10%</td>
</tr>
<tr>
<td>5. Substratum</td>
<td>Cobble, gravel</td>
</tr>
<tr>
<td>6. Riffle/runpool</td>
<td>N/A</td>
</tr>
<tr>
<td>6. Width of buffer zone</td>
<td>LB: 5’; RB: 10’</td>
</tr>
<tr>
<td>6. Water flow</td>
<td>No flow at origin of stream. Flow observed further downstream</td>
</tr>
<tr>
<td>6. Water depth</td>
<td>N/A</td>
</tr>
<tr>
<td>6. Water width</td>
<td>N/A</td>
</tr>
<tr>
<td>6. General water quality</td>
<td>N/A</td>
</tr>
<tr>
<td>6. OFFW indicator</td>
<td>Vegetation line approximately one foot up the bank</td>
</tr>
<tr>
<td>6. Groundwater connection</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Dominant species: LB, RB</td>
<td>LB, RB – green ash, jewel weed, privet, tulip poplar, dogwood, southern red oak, white pine, and hemlock</td>
</tr>
<tr>
<td>6. Overhead canopy (%)</td>
<td>80%</td>
</tr>
<tr>
<td>6. Benthos</td>
<td>N/A, downstream approximately 50 feet, crayfish and amphibian egg sacks</td>
</tr>
<tr>
<td>6. Fish</td>
<td>N/A</td>
</tr>
<tr>
<td>6. Aquatic plant life</td>
<td>N/A, downstream approximately 50 feet, filamentous algae</td>
</tr>
<tr>
<td>6. Habitat assessment score</td>
<td>No flow at location</td>
</tr>
<tr>
<td>6. Water elevation (ft)</td>
<td>12’; 7’; 8’</td>
</tr>
<tr>
<td>6. Rainfall information</td>
<td>Rainfall during site visit</td>
</tr>
<tr>
<td>6. HUC code &amp; name</td>
<td>06010103 (Watanga River); 060101030501 (Watanga River)</td>
</tr>
<tr>
<td>7. Determined by</td>
<td>CEC, Inc</td>
</tr>
<tr>
<td>8. Confirmed by</td>
<td>CEC, Inc</td>
</tr>
<tr>
<td>9. Mitigation: yes/no (if yes, include on Form J)</td>
<td>Yes</td>
</tr>
<tr>
<td>10. Notes</td>
<td>Water appears at driveway located at STA 106+50R</td>
</tr>
</tbody>
</table>
Form G - Wetlands

Lists:
- Feature
- Approximate Station
- Feature Name
- Feature Number
- General Information Concerning Feature

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Approximate Station</th>
<th>Feature Number</th>
<th>General Information Concerning Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetland Type</th>
<th>Feature description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Indicator</th>
<th>Stratum</th>
<th>Dominant Plant Species</th>
<th>Indicator</th>
<th>Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraxinus pennsylvanica</td>
<td>FACW</td>
<td>T</td>
<td>Elymus virginicus</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Salix lasiolepis</td>
<td>NI</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation</th>
<th>% of Dominance OR</th>
<th>FAC</th>
<th>FAC = 66</th>
<th>Hydrophytic Vegetation Present</th>
<th>X</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Profile Description</th>
<th>Subgroup: thermic Upland Soils</th>
<th>Confirmed Map Unit Type</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydrologic Sensitivity</th>
<th>X</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project: Williamson County</th>
<th>1-65, from N. of SR-840 to N. of SR-96, includes the SR-248 (Goose Creek Interchange), P.E. 00002.1-178-34, Permit 106289</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Area:</td>
<td>STA 243-900, to 248-750.</td>
</tr>
<tr>
<td>Wetland Type:</td>
<td>WTLS</td>
</tr>
<tr>
<td>Feature Name:</td>
<td>Wetlands</td>
</tr>
<tr>
<td>General Information:</td>
<td>Concerning Feature</td>
</tr>
<tr>
<td>Watershed:</td>
<td>Harpeth</td>
</tr>
<tr>
<td>Hydrophytic Vegetation:</td>
<td>Wetland Hydrology Present: X Yes No</td>
</tr>
<tr>
<td>Mitigation:</td>
<td>Not Mitigated</td>
</tr>
<tr>
<td>Notes:</td>
<td>Narrow wetland along toe of road slope. Likely was a concrete channel that has silted in.</td>
</tr>
</tbody>
</table>
Photo 1. Downstream view of STR-1 (Five Mile Creek) taken from beneath bridge.

Photo 2. Upstream view of STR-1 (Five Mile Creek) taken from beneath bridge.

Photo Summary: 4 October 2011
Project Description: Williamson County; SR-248 bridge over Five Mile Creek at LM 3.46
P.E.: 9400-4211-04 P.E.: 113441.00
## Form J: Mitigation Sketch/Information

### Natural Resources Mitigation Sketches/Information

**County:** Carter County  
**Route:** N/A  
**LM:** N/A  
**PE No.:** 10016-1212-04  
**PIN No.:** 101216.00  
**Project Description:** S.R. 362, From +/- 0.2 Miles South of Dry Creek Rd., to S.R. 67 (U.S. 321)  
**Date of survey:** August 25-27, 2008  
**Biologist:** Catron/Garcia/Nelhus/Williams  
**Affiliation:** CEC, Inc.

<table>
<thead>
<tr>
<th>Station</th>
<th>Map label</th>
<th>Attachments: Marked-up plans sheet (A); notes (B); mitigation plan (C) attached</th>
<th>Calculate permanent &amp; temporary wetland impacts &amp; provide to Keven Brown and John Hewitt (&quot;X&quot;)</th>
<th>Apply &quot;standard&quot; stream relocation configuration &amp; instructions (&quot;X&quot;)</th>
<th>Survey boundaries as flagged in field (&quot;X&quot;)</th>
<th>General notes and/or specific changes requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>98+00R to 115+00R</td>
<td>STR-1</td>
<td>A, B, C</td>
<td>X</td>
<td></td>
<td>Proposed 6T channel should be replaced with relocation of STR-1 mimicking natural pattern and profile. Tie channel back into existing Gap Creek at ~ 115+00R. SPG1/STR-3 should be surveyed and placed on plans so that an attempt can be made to incorporate them into the new STR-1 channel (If possible).</td>
<td></td>
</tr>
<tr>
<td>109+70L</td>
<td>STR-2</td>
<td>A, B</td>
<td></td>
<td></td>
<td>No culvert shown on plans – mitigation requirements cannot be determined. If &lt; 200 LF of channel is encapsulated, no compensatory mitigation will be required.</td>
<td></td>
</tr>
<tr>
<td>113+60R</td>
<td>SPG-1</td>
<td>A, B</td>
<td></td>
<td></td>
<td>Survey resource and place on plans to determine if resource can be avoided by proposed STR-1 relocation channel channel.</td>
<td></td>
</tr>
<tr>
<td>113+60R to 116+00R</td>
<td>STR-3</td>
<td>A, B</td>
<td></td>
<td></td>
<td>Survey resource and place on plans to determine if resource can be avoided by proposed STR-1 relocation channel channel. Additional ROW or in-lieu fee mitigation may be required.</td>
<td></td>
</tr>
</tbody>
</table>

This is just a best guess impact assessment by the Ecology staff. Once all features have been surveyed this information will change.
Scope J:

These notes should be added to plans.

Channel Relocation Notes

Plans Notes

Please add the following information verbatim to the Final Plans:

CHANNEL RELOCATION SEQUENCE AND IMPLEMENTATION NOTES FOR RELOCATED STREAM CHANNELS (IGNORE REFERENCES TO ITEMS NOT SPECIFIED)

1. The new channel shall be excavated and stabilized during a low-water period. Rip-rap (only as shown on plans), seeding, and sod shall be installed immediately following channel completion. Trees shall be installed in the first planting season following channel excavation. Water shall be diverted into the new channel only after it is completely stabilized, and only during a low-water period. Stabilized means that all specified rock and erosion control blanket or flexible channel liner is in place, and seeding and sod are in place and established.

2. CHANNEL RELOCATION SEQUENCE
   a. Flag edge of the new channel top bank prior to clearing. Do not clear large trees in position to shade the new channel. Leave as many trees and shrubs as possible between toe of the new highway slope and the stream.
   b. Excavate the new channel “in the dry” by leaving areas of undisturbed earth (diversion berms) in place at both ends.
   c. Shape channel to specifications shown. Remove loose soils and debris.
   d. Place topsoil, erosion control blanket or flexible channel liner, seed, and sod as specified.
   e. Remove diversion berms, beginning with the most downstream, banks and bottom elevation of the old channel should transition smoothly into the new channel. The elevations of the new channel bottom at each end of the relocation sequence should match the elevations of the existing channel, and a steady percent slope should be maintained throughout the relocated channel centerline or as specified.
   f. Install trees according to standard specifications section 802.
3. Only rip-rap shown on plans should be used in the relocated channel reach. Any other proposed rip-rap should be coordinated with the Environmental Division through the TDOT Headquarters Construction Office.
4. Requests by any agency that would require the modification of channels, ditches, elevations, rip-rap or any other stream mitigation items associated with the channel relocations shall be referred to the TDOT Environmental Division via the Headquarters Construction Office for coordination with all involved agencies and TDOT divisions.

TREES

No substitutions of tree species or sizes shall be allowed without the written approval of TDOT Environmental Division. Concerning stream mitigation, trees shall be of the variety requested and first quality. Concerning temporary wetland mitigation, trees shall be of the variety requested, well branched, bare root (roots must be kept moist at all times), and first quality. No clones or cultivars will be accepted. Any found to be incorrect species, or improperly planted, at any time prior to termination of the contract shall be removed and replaced at the contractor’s expense. Stakes and wires shall be
Scope J: Stream Mitigation

Standard Stream Mitigation (STR-1)

Apply these measures to all applicable streams listed in Form J. Duplicate the length, bottom channel width, elevations, side slopes, meander wavelength, and curvature of the existing channels to the extent possible. Each channel should transition smoothly from its beginning elevation to its tie-in elevation in the receiving stream, without profile drops or jumps. Locate the new channels in as flat an area as possible to avoid unusually high side slopes; this may require some additional right-of-way. Channel length placed in spring-boxes or culverts counts as part of the new channel length (but may require off-site compensatory mitigation that would not be required for an open channel). Channel side slopes should mimic existing channel side slopes, if possible, and be stabilized using appropriate BMPs – the use of rip-rap should be avoided if possible. If rip-rap is required, the rip-rap should be imbedded into the soil so that the top of the rip-rap is flush with the bottom and sides of the channel.

Plant two alternating rows of tree or shrub species on both sides of the new channels, the first row shall be bare root seedlings that are planted on the channel slope, centered on the midpoint of the slope. Along the top of bank, 3-gallon container-grown trees are to be planted within one foot of the top of bank.

Rip-rap, if required, should be limited to ends of culverts. All relocated channels and their accompanying mitigation features, including trees, are to be placed in right-of-way rather than easements; this may require acquisition of additional right-of-way. Use the following specifications for planted species (leave item number blank):

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(</td>
<td>Red maple (<em>Acer rubrum</em>)</td>
<td>Each</td>
</tr>
<tr>
<td>(</td>
<td>Black walnut (<em>Juglans nigra</em>)</td>
<td>Each</td>
</tr>
<tr>
<td>(</td>
<td>Sycamore (<em>Platanus occidentalis</em>)</td>
<td>Each</td>
</tr>
<tr>
<td>(</td>
<td>Tulip poplar (<em>Liriodendron tulipifera</em>)</td>
<td>Each</td>
</tr>
<tr>
<td>(</td>
<td>Southern red oak (<em>Quercus falcata</em>)</td>
<td>Each</td>
</tr>
</tbody>
</table>

Figure 1. Spacing for planting along relocated stream.
Scope J: Wetland Mitigation

**STANDARD ON-SITE MITIGATION FOR TEMPORARY WETLAND IMPACT AREAS**

Apply these measures to all applicable temporary wetland impact areas listed in Form J. For temporary wetland impact areas, remove the top six to 12 inches of topsoil and stockpile it until construction is complete. Once construction activities are completed, restore all temporary wetland impact areas to pre-construction conditions. This includes removing haul roads (if applicable), restoring the site to the original (pre-construction) elevation and spreading stockpiled topsoil back over the wetland site. The area of temporary impacts will then be seeded, covered with straw and planted with tree seedlings to stabilize the site. Seedlings will be planted on 10-foot centers. Place a note on the present and proposed layout sheets to protect wetland areas located beyond the limits of the fill slope and proposed right-of-way. Use the following tree specifications (leave item number blank):

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seedling (scientific name &amp; common name here 18&quot;-24&quot; SEEDLING B. R)</td>
<td>Each</td>
</tr>
<tr>
<td></td>
<td>Seedling (scientific name &amp; common name here 18&quot;-24&quot; SEEDLING B. R)</td>
<td>Each</td>
</tr>
<tr>
<td></td>
<td>Seedling (scientific name &amp; common name here 18&quot;-24&quot; SEEDLING B. R)</td>
<td>Each</td>
</tr>
<tr>
<td></td>
<td>Seedling (scientific name &amp; common name here 18&quot;-24&quot; SEEDLING B. R)</td>
<td>Each</td>
</tr>
<tr>
<td></td>
<td>Seedling (scientific name &amp; common name here 18&quot;-24&quot; SEEDLING B. R)</td>
<td>Each</td>
</tr>
</tbody>
</table>

**TREE PLANTING SCHEME FOR TEMPORARY WETLAND IMPACT AREAS**

- Roadway
- Area of permanent wetland impacts
- Toe of
- Fill Slope
- Area of temporary wetland impacts
- Proposed Right-of-way
- Plan View
Please place the following notes in the Special Notes section of the plans:

Topsoil is to be removed from all areas of temporary wetland impacts and stockpiled prior to construction.

Upon completion of construction activities, temporary haul roads are to be removed. Excavated material from the haul roads is to be disposed of as directed by the engineer.

Upon completion of construction activities, all temporary wetland impact areas are to be restored to pre-construction contours and the stockpiled wetland topsoil spread to restore these areas to pre-construction elevation.
# Species

## Species Review Form

**Project:** Van Buren County: SR 111, from south of Manus Road to south of Double Bridge Road; PE No. 88027-1229-04; PIN 100257.01

**Date of field study:** 06 December 2010
**Date TDEC database checked:** 21 July 2011
**Biologists:** J. Garcia, C. Herwig (CEC); D. Kathman (this form)

**Species reported within 1 mile radius of project:**

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Species is potentially present in ROW because:</th>
<th>Species is considered likely NOT present in ROW because:</th>
<th>Habitat (e.g., breeding area, site visit)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Typlops subterraneus</em> (common miner) (A)</td>
<td>D</td>
<td>(A) Present habitat unsuitable</td>
<td>(B) Not observed during site visit</td>
<td>Inhabits caves</td>
<td></td>
</tr>
<tr>
<td><em>Mentorina magaer</em> (Allegheny woodrat) (A)</td>
<td>D</td>
<td>(A) Present habitat unsuitable</td>
<td>(B) Not observed during site visit</td>
<td>Last observed in 2021 in Swamp River Cave</td>
<td></td>
</tr>
</tbody>
</table>

*TWRA requires no disturbance to habitat immediately around study sites.*
EB Plan Requirements

What to include in plans:

• All Environmental features such as streams, springs, seeps, wetlands, ponds, caves, and sinkholes (verified by Geotechnical)

What not to include in plans:

• NWA - Non wetland areas
• Sinkholes and caves that cannot be verified by the Geotechnical Report
• Features picked up by survey but not verified by ecology
EB Plan Requirements

• Environmental feature locations must be surveyed and shown on plans, not located based on the marked up EB plan sheets.

• If ecology provides .shp files to Design showing boundaries of wetlands/features, they do not need to be resurveyed in
  • Ask biologists for this information if it is not provided
  • Not always available

• Submit a revised set of plans showing EB features to Permits for use in the permit assessment as soon as possible.
PERMIT ASSESSMENT

Format Types
• Memo
• Plans

MEMORANDUM

TO:      Designer
        Region X Design Office
FROM:    Name, Natural Resource Office
        Environmental Permits Section
DATE:    Month, Date, Year

SUBJECT: PERMIT ASSESSMENT / DISTRIBUTE PERMIT REQUIREMENTS

P.E. #
FED. #
PIN
SR.
To:
From: County

Thank you for sending the plans for review on the above referenced project. Please refer to the Environmental Boundaries and Mitigation Design Memoranda dated (Date) from (Biologist) when making the following adjustments:

Please submit a copy of this permit assessment with the "Revision Status" section completed when submitting revisions to the plans/permit sketches.

Please make the following revisions to the roadway plans in addition to the detailed revisions listed below:

- Locate, show and label all streams, wetlands and Wet Weather Conveyances (Present and Proposed layout). See Environmental Boundaries and Mitigation Design Memoranda for locations.

<table>
<thead>
<tr>
<th>Revision Status</th>
<th>Complete</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Plans Sheet Format

- On this sheet, show for stream str. 1:
  - The plan view schematic of the spacing for planting along the relocated stream channel, from the environmental boundaries and mitigation design memorandum.
  - The cross section of the relocated stream channel, from the environmental boundaries and mitigation design memorandum, and provide channel dimensions (it has been recommended that the proposed channel width should be 3 ft. and the channel depth should be 15 ft. to 20 ft.).
  - The mitigation planting quantities for both the container-grown plants and the bare root seedlings, from the environmental boundaries and mitigation design memorandum.

- Call out length of proposed channel change, and show mitigation plantings per the environmental boundaries and mitigation design memorandum from Matt Richards.

- Provide and label rip-rap, if needed.

- Add the following label (if applicable to this structure): “Provide a low flow channel for this structure per standard drawing STD-13-10A.”

- Proposed layout (Sheet 4B) calls this structure a ROBC. The profile (Sheet 4C) and the culvert cross section (Sheet 60) call it a box bridge. Verify and fix this so all sheets match one another.

- Provide and label rip-rap, if needed.

- Add label “STR-1” to the stream.
General Assessment Comments

• Locate, show and label all springs, streams, wetlands, wet weather conveyances and any other feature listed in the Environmental Boundary report (Present and Proposed layout). See Environmental Boundaries and Mitigation Design Memorandum for locations.

• Revised plans and permit sketches, with all water quality comments addressed, should be submitted to the Permit Section within two weeks for small projects and one month for large alignments, unless otherwise specified.
General Wetland Comments

- If the permanent wetland impact is greater than 0.1 acre cumulative, permits sketches are required.
- High visibility fence should be shown around non-impacted wetland areas on EPSC sheets.
- Reduce roadway slopes where possible to minimize impacts to wetland areas.

**Plan Notes:**
- "The contractor shall use any measure necessary to ensure that the remaining wetland will not be disturbed and is protected from sediment and other pollutants.”
- "Temporary wetland impacts must be limited to 10 -15 feet beyond the toe of slope.”
Present Layout

Wetland Requirements

- Show entire Wetland Boundaries including areas outside ROW
- Hatching (Temporary vs. Permanent)
- Wetland Impact Box
Proposed Layout
Wetland Requirements

- Only show remaining wetland area

- Mitigation
  - Tree plantings per Env. Boundaries Report
  - Notes per Environmental Boundaries Report

- Ensure wetland is not being drained (clay plugs, berms, other methods)
General Stream Comments

• **Excavation in the dry note:**
  - Any work within the wetland/stream channel area (e.g., for Pier Footing, Rip-Rap Placement, Multi-Barrel Culvert/ Bridge Construction etc.) shall be separated from flowing water or expected flow path and performed during low flow conditions. All items used within the wetland/stream channel area for diversion of flow (or expected flow), unless specified in the plans, shall not be paid for directly but shall be included in the cost of the other items. The note excludes any items specified in the plans for use with EC-STR-31 (ECM-STR-31) and EC-STR-32 (ECM-STR-32).

• **Velocity Check**
  - Ensure outlet protection is adequate
    (Only a general rule of thumb provided by hydraulics)
    • 6 – 10 ft/s: Class “B” Rip-rap
    • 10 – 14 ft/s: Class “C” rip-rap
    • Greater than 14 ft/s: Dissipater
Information Required for Stream Crossings

The length and type of each must be provided:

<table>
<thead>
<tr>
<th>Show Length and Type</th>
<th>Shown on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Structure</td>
<td>Present Layout and/or Culvert Cross Section</td>
</tr>
<tr>
<td>Proposed structure</td>
<td>Proposed Layout and Culvert Cross Section</td>
</tr>
<tr>
<td>Extensions</td>
<td>Proposed Layout and Culvert Cross Section</td>
</tr>
<tr>
<td>Proposed rip-rap</td>
<td>Proposed Layout and Culvert Cross Section</td>
</tr>
<tr>
<td>Stream transitions</td>
<td>Proposed Layout and/or Culvert Cross Section</td>
</tr>
<tr>
<td>Energy dissipaters, aprons, and U-Endwalls</td>
<td>Proposed Layout and Culvert Cross Section</td>
</tr>
</tbody>
</table>
Stream Crossing Notes

Plan Notes:

- **Box structure, with a bottom, is proposed (not applicable in Reg. 4)**
  
  “If adequate bedrock is encountered, change to bottomless structure.”

- **Rip-rap proposed in bottom of stream channel**
  
  Rip-rap shall be placed as to mimic the existing contours of the stream channel. The top of the proposed rip-rap shall be at grade with the bottom of the existing stream channel. Voids within the rip-rap shall be filled with creek gravel to prevent loss of stream within rip-rap areas. Creek gravel can be removed from culvert excavation area.

- **Stream Comments:**
  
  - Please minimize the use of rip-rap (2 time the barrel width)
  - The proposed channel must mimic the existing stream characteristics (size, shape, etc.). Refer to the EB for existing channel characteristics.
Stream Crossing Notes

Low Flow

• Required if proposed structure is wider than original stream width
• Stream widening is not permitted by TDEC & other agencies
• Should not be used in culverts less than 6 ft in height
• Should only be used on box culverts and not single circular or oval culverts
• Show the two following notes on each sheet fitting this situation

NOTES: REFER TO STD. DWG. EC-STR-30A FOR CONSTRUCTION PHASING AND CHANNEL DIVERSION OF PROPOSED BOX BRIDGE.

REFER TO STD-15-16A FOR LOW FLOW CHANNEL DIVERSION DETAILS FOR BOX BRIDGE INLET AND OUTLET.
GENERAL NOTES:

1. **ALTERNATE IS TO FORM ENTIRE CROSS-SECTION WITH CARTON OR RICE-PAPER** APPROPRIATELY SIZED AND PLACED WITH REDUCED-RESISTANCE COVERING TO ALLOW MAXIMUM WATER TO DRIP OFF INTO MAINS WITHOUT SIGNIFICANTLY REDUCE BROADCAST OPENING.

2. **GENERATE OF STEEL LINERS IN BUNKER WILL BE USED** AS AN ALTERNATIVE TO THE LOW FLOW CONSTRUCTION, WITH APPROVAL BY ENGINEERING DISTRICT IN YOUR STATE.

3. **DETERMINE NON-SPECIFIED ITEMS TO BE RECOMMENDED TO LOW FLOW CHANNEL CONSTRUCTION IS TO BE DETERMINED BY THE ENVIRONMENTAL DISTRICT.**

4. **WHERE BUNKER IS PLACED IN BUNKER DRAINAGE, A DRAINING SYSTEM** IS TO BE PROVIDED TO PREVENT EXCESSIVE WATER ACCUMULATION.

5. **TOP AND BOTTOM PLATES** IN THE BUNKER SHALL BE PLACED AND FIXED WITH THE EXISTING STREAM SUBSTRATE WITH EXPANSION JOINTS AND SHALL MAKE THE ENTIRE CHANNEL DIAMETRICAL, TO MINIMIZE THE FLOW CHANNEL CONSTRUCTION SHALL NOT BE DONE UNTIL CULVERTS ARE COMPLETELY EXCAVATED AND FIXED.

RIPARIAN ZONE/FLOODPLAIN SEED MIX

FOR STABILIZATION OF CHANNEL EXCAVATION AREAS FOLLOWING CONSTRUCTION

SCIENTIFIC NAME COMMON NAME SOWING RATE (O/U) QUANTITY (SOWING RATE x UNIT AREA)
COARSE SEDIMENT 0.5 LBS. 500 SQ. YDS. 0.0001 0.40
TOTAL SEEDS 0.60 0.0001 0.40
GRAND TOTALS 0.60 0.0001 0.40

NOTE: **SOWING RATE TO BE USED WHEN CULVERT IS LESS THAN 0.100 IN WIDE**.

DEPARTMENT OF TRANSPORTATION

LOW FLOW CHANNEL CONSTRUCTION

DETAILED REAR FOR CULVERT INLET AND OUTLET

CONTRACTOR

ROUGH GRADING

05/07

STC-15-10A

NOTE: STRUCTURE SHOWN, STRUCTURE MAY VARY
# Requirements for Stream Relocations

## Additional information required for stream relocations

<table>
<thead>
<tr>
<th>Show Length and Type of each</th>
<th>Shown on</th>
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</thead>
<tbody>
<tr>
<td>Beginning &amp; End Stream Impact</td>
<td>Present &amp; Proposed Layout</td>
</tr>
<tr>
<td>Detailed Mitigation Information</td>
<td>Proposed Layout or Mitigation Sheet</td>
</tr>
<tr>
<td>Existing &amp; Proposed Stream Cross Section</td>
<td>Present &amp; Proposed Layout or Mitigation Sheet</td>
</tr>
<tr>
<td>Top and bottom of bank</td>
<td>Present and Proposed Layout</td>
</tr>
</tbody>
</table>

## Standard information required for both stream relocations and crossings.

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</tr>
<tr>
<td>Energy dissipaters, aprons, and U-Endwalls</td>
<td>Proposed Layout and Culvert Cross Section</td>
</tr>
</tbody>
</table>
Determining Begin and End Impact

**Begin Impact**
Point where proposed stream deviates from the existing stream channel

- Label for Begin Impact should include “Begin Stream Impact, Station xx+xx”

**End Impact**
Point where the proposed stream intersects the existing stream channel

- Label for Ending Impact should include “End Stream Impact, Station xx+xx”
Mitigation Requirements

- Mitigation details are shown in Scope J of the EB Report such as tree and shrub species and spacing

- Mitigation Sheets may be added if adequate space is not available on the proposed layout sheets

- Stream relocations greater than 200 ft. may require a Natural Stream Design, provided by the Environmental Division
  - Natural Stream Design sheets will be inserted in the same manner as utility sheets

- Stream Impacts to 303d listed streams for habitat alteration or Exceptional Tennessee Waters require in-system mitigation (Shown in EB Report)
Common Stream Issues

- Ensure source of existing stream is still connected to proposed stream channel
- Tie stream relocation into existing stream

- Sod must not be used in the bottom of the stream channel. Contact Biologist if not addressed in EB
Springs

- Show treatment method
  - French Drain
  - Spring Box
  - Graded solid rock

- Show any associated rock pads in the area

- Ensure spring flow is directed into channel

- Place following note:
  - “Before installation of the spring box, the spring head should be field verified. If SPR-x moves from the current location, flow from the spring area should be conveyed/directed into the proposed stream relocation”
Sinkholes

Treatment Plan
Per Geotechnical Report
Additional Information Required

**Alternative Analysis** required by TDEC for all impacts to environmental features.

- How did roadway design minimize environmental (wetland & stream) impacts?
  - Structures considered and why they were selected or not selected
  - Cost
  - Constructability
  - ROW needs
  - Roadway slopes reduced
  - Maintenance

The above info should be emailed to the permits contact person that submitted assessment or included as an assessment response.
ADDITIONAL COSTS TO CONSIDER

PERMIT SKETCHES
Compensatory Mitigation for Individual Permits
In-Lieu Fee Program

ALTERATION TYPE I ($100 per foot)

$ Loss of riparian canopy (trees) on proposed stream relocations
$ Stream channel modifications
$ Synthetic channel liners along banks
Compensatory Mitigation for Individual Permits
In-Lieu Fee Program

<table>
<thead>
<tr>
<th>ALTERATION TYPE II ($150 per foot)</th>
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<tbody>
<tr>
<td>$ Rip-rap lined channels (bottom and sides)</td>
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<tr>
<td>$ Rip-rap or concrete lined stream banks (both banks)</td>
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<tr>
<td>$ Impoundments</td>
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</table>
Compensatory Mitigation for Individual Permits
In-Lieu Fee Program

ALTERATION TYPE III ($200 per foot)

$ Encapsulations (culverts) longer than 200 feet
$ Loss of stream length
$ Concrete lined channels (bottom and sides)
Compensatory Mitigation Example

230 ft. Culvert
Cost = $46,000

Stream Length Loss = 75 ft.
Cost = $15,000
Compensatory Mitigation Example

- Remove 100 ft of Canopy
  Cost = $10,000

- Place 100’ Rip Rap
  Cost = $15,000

TOTAL IN-LIEU FEE COST = $86,000
Permit Sketches

- Purpose – Public Notice

- Sketches required if:
  - Stream relocation
  - Stream impact greater than 200 ft
  - Scenic river or contaminated sediments
  - Permanent wetland impact(s) greater than 0.1 acre cumulative
  - Species with a “May Affect”

- Permit Assessment will advise when required
Elements of Permit Sketches

- Location Map
  - County Map
    Pinpointing each Environmental Feature
- Impacted Env. Site
- Culvert Cross Section
- Stream Cross Section (if relocation)
- Mitigation Information
Encapsulation/Extension

- Plan view from proposed layout
- Impact Table

**STREAM IMPACT TABLE**

**EXISTING**

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<td>STRUCTURE</td>
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<td>INCLUDES:</td>
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<tr>
<td>CONCRETE APRON AT INLET</td>
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<td>U-TYPE ENDWALL AT INLET</td>
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<td>CONCRETE APRON AT OUTLET</td>
<td>000 FT.</td>
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<td>U-TYPE ENDWALL AT OUTLET</td>
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<tr>
<td>ENERGY DISSIPATOR AT OUTLET</td>
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<tr>
<td>TOTAL EXISTING STRUCTURE</td>
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<td>TOTAL EXISTING LENGTH</td>
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**PROPOSED**

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<td>TOTAL PROPOSED LENGTH</td>
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</tbody>
</table>
Encapsulation with Stream Relocation

Show

- Stream labels
- Existing & proposed stream relocation
- Impact box
- Begin & End Impact Labels
- Mitigation & details

(All info except impact box should already be shown on plans)
Stream Relocations

• Show
  • Stream labels
  • Existing & proposed stream relocation
  • Impact box
  • Begin & End Impact Labels
  • Mitigation & details

• Measure existing impacted stream surface area

• If stream impact spans multiple pages, impact box should be shown on first page of impact & summed across site
Culvert Cross Sections

- Structure length (existing to remain & proposed)
- Hydraulic data
- Rip-rap at inlet & outlet
- U shaped end walls & paved outlets
- Energy dissipaters
Mitigation Details

Stream Cross-section
• Existing & Proposed stream channel
• Dimensions of each channel

Plantings
• Type
• Spacing
• Quantities

Method of stabilizing bank slopes. (seeding, sod, blankets, rip-rap...)

Permit Sketch
Mitigation

Notes:

All notes related to mitigation and species must be shown

Permit Sketch
Measuring Existing

Existing Open Channel Length

- Do not include structure lengths, only the actual open channel length
- Include rip-rap

Existing Structure Length

- Structure length plus u-shaped headwalls, dissipaters, concrete aprons, etc.

Total Existing Impact Length

- Existing open channel length plus existing structure length

Permit Sketch
Measuring Proposed

Proposed Open Channel Length
- Do not include structure lengths, only the actual open channel length
- Include rip-rap

Proposed Structure Length
- Structure length plus u-shaped headwalls, dissipaters, concrete aprons, etc.

Total Proposed Impact Length
- Proposed open channel length plus proposed structure length

Permit Sketch
Wetlands

- Impact Boundaries & Hatching
- Impact Table
  - Temporary & Permanent Impact Areas
  - Temporary & Permanent Fill Volume
- Mitigation & Notes Listed in EB
<table>
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<th>R.O.M., TRACT NO.</th>
<th>PLANS PROPERTY OWNER</th>
<th>OWNER ADDRESS</th>
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<td>RONALD D. MOUGER</td>
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<td>IVAN K. BORDEN</td>
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<td>ROBBY AND MARIE</td>
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<td></td>
<td>M. BROWN</td>
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<td></td>
<td></td>
<td>A.T. AND VIRGINIA B.</td>
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<td></td>
<td>KETTS</td>
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**Application by:**
TENNESSEE DEPARTMENT OF TRANSPORTATION
QUAD: EAGLE ISLAND - 146SW
QUAD: BIG RIDGE PARK - 146NW
PE: 9019-00219-18
PIN: 101230.00
S.R. 33 FROM NORTH OF S.R. 71 TO THE UNION COUNTY LINE

**Date:** 02/22/11

List property owners that are impacted and adjacent to all wetlands impacts.
PERMIT TIMETABLE

- GARAP/Nationwide 404: 30 days
- IARAP/Nationwide 404: 90-120 days (3-4 months)
- I-404/401 Certification: 4 to 5 months
- TVA: Approximately 30-60 days AFTER TDEC issues permit

PERMITS MUST BE ISSUED BEFORE TURN IN
QUESTIONS!!!
TDOT DESIGN DIVISION

MODULE 2:

2011 TN NPDES GENERAL PERMIT FOR DISCHARGE OF STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES
Overview

- **CGP**
  - Issue date: May 23, 2011
  - Effective date: May 24, 2011
  - Expiration date: May 23, 2016

- CGP authorizes *point source* discharges of stormwater from construction activities (outfalls)

- Required for land disturbances of 1 acre or more

- Includes support activities (borrow and waste areas, concrete and asphalt plants, staging yards, material storage areas, etc.)
Overview

Tennessee is Granted Primacy by EPA to Oversee the State NPDES Program

- Managed by the Tennessee Department of Environment & Conservation (TDEC) - Division of Water Pollution Control (WPC)
- Entitled – “General NPDES Permit for Discharges of Stormwater Associated with Construction Activities” or “Construction General Permit” (CGP)
1.2.3. Non-stormwater discharges

- Dewatering of work areas of stormwater and ground water may require (added):
  - filtering
  - chemical treatment

1.5.1 Notice of Coverage (NOC)

- Issuance of a NOC for any site requiring other permits (i.e. ARAPs) may be:
  - delayed or
  - not issued until the other permits have been issued or resolved
3.1. The General Purpose of the SWPPP

- A site-specific SWPPP must be developed for each construction project
- The design, inspection and maintenance of Best Management Practices (BMPs) must be:
  - described in the SWPPP
  - prepared in accordance with good engineering practices
- Permit allows use of innovative or alternative BMPs
  - performance has been documented to be equivalent or superior to conventional BMPs
  - certified by the SWPPP/EPSC designer
TDEC CGP

Section 3: SWPPP Requirements

3.1.1. Registered engineer or landscape architect requirement

- SWPPP narrative (SWPPP Consultant or TDOT ED) may be prepared by:
  - CPESC or
  - TDEC Level II (new)

- Plans and specifications requiring structural, hydraulic, hydrologic or other engineering calculations be **stamped and certified** by PE or LA
3.5 Components of the SWPPP

- Site description
- Description of stormwater runoff controls
- Erosion prevention and sediment controls (EPSC Plans)
- Stabilization practices
- Structural practices
- Stormwater management
- Other items needing control
- Maintenance
- Inspections
- Pollution prevention measures for non-stormwater discharges
- Documentation of permit eligibility related to TMDLs (303d siltation or habitat alteration)
3.5.1. **Site description**

- c) estimates of the total area:
  - of the site (project area)
  - disturbed area
- f) estimate of the percentage of impervious area:
  - before and
  - after construction
- n) limits of disturbance shall be:
  - clearly marked in the SWPPP (**EPSC plans**) and
  - areas to be undisturbed clearly marked in the field before construction activities begin
Section 2: Notice of Intent (NOI) Requirements
3.5.2. Description of stormwater runoff controls

EPSC plans that reflect construction phases (i.e. initial, interim grading, final, etc.) should be depicted on multiple plan sheets

EPSC staging

- One sheet depicting all EPSC that will be used during the life of the project will not be considered complete
- Sites disturbance
  - <5 acres – minimum of 2 stages of EPSC (initial/clearing and final)
  - >5 acres - minimum of 3 stages of EPSC (initial/clearing, interim and final)
3.5.3 Erosion prevention and sediment controls

- a) Erosion prevention controls designed to eliminate the dislodging and suspension of soil in water
- b) Proposed physical and/or chemical treatment must be:
  - researched
  - applied according to the manufacturer’s guidelines
  - fully described in the SWPPP
3.5.3 Erosion prevention and sediment controls

- h) Pre-construction vegetative ground cover shall not be destroyed, removed or disturbed more than 15 days (previously 10 days) prior to grading or earth moving unless the area is seeded and/or mulched or other temporary cover is installed.

- k) Construction project phasing
  - Required for all sites regardless of size
  - Off-site borrow or waste areas are to be included in the 50 acres of disturbance if associated with construction support activities.
3.5.3.1. EPSC General criteria and requirements (cont.)

- k) 50 acre limitation does not apply to linear construction projects if the following conditions are met:
  - where *no one area* of active soil disturbance is greater than 50 acres and the various areas of disturbance have *distinct receiving waters*; or
  - where *contiguous disturbances* amount to greater than 50 acres, but no one *distinct water* is receiving run off from more than 50 disturbed acres; or
  - with the department’s written concurrence, where more than 50 acres of disturbance is to occur and where one receiving water will receive run-off from more than 50 acres; or
  - where *no one area* of active soil disturbance is greater than 50 acres and the various areas of disturbance are more than *5 miles apart*
3.5.3.1. EPSC General criteria and requirements (cont.)

- n)
  - offsite vehicle tracking of sediments and the generation of dust shall be minimized
  - construction entrances shall be described and implemented
3.5.3.2 **Stabilization practices**

- Steep slopes shall be temporarily stabilized not later than 7 days after construction activity on the slope has temporarily or permanently ceased.

**Steep Slopes**

- A natural or created slope of 35% grade (>3:1 slope)
- No height restrictions
- Designers must pay special attention to stormwater management to convey runoff non-erosively around or over a steep slope
3.5.3.3 Structural practices

- 2-year and 5-year design storm depths and intensities derived:
  - from total rainfall in the designated period or
  - the equivalent intensity

- A drainage area (onsite + offsite) of 10 or more acres includes:
  - both disturbed and undisturbed portions of the site or
  - areas adjacent to the site
  - all draining through the common outfall
3.5.9. Pollution prevention measures for non-stormwater discharges

- Estimated volume of the non-stormwater component(s) of the discharge must be included in the design of all impacted control measures
  - dewatering of work areas (sediment filter bags)
  - water for dust control
  - waterline flushings
  - groundwater
  - wash areas
Non-Stormwater Discharges

Sediment filter bags

Dust control
New section that includes non-numeric effluent limitations for the following:

- EPSC
- Buffer zones
- Pre-approved sites
- Soil stabilization
- Dewatering
- Pollution prevention measures
- Prohibited discharges
- Surface outlets
4.1.1. Erosion Prevention and Sediment Controls

EPSC must be designed, installed and maintained to:

- Control stormwater *volume and velocity* within the site to minimize soil erosion
- Control stormwater discharges, including both *peak flows and total stormwater volume*, to minimize erosion at outlets, stream channels and streams banks
- Minimize the amount of soil exposed
- Minimize the disturbance of steep slopes
4.1.1. Erosion Prevention and Sediment Controls (cont.)

- Eliminate sediment discharges from the site
- *Design*, installation and maintenance of EPSC controls must address:
  - design storm (2 yr or 5 yr – 24 hour)
  - soil characteristics
  - include range of soil particle sizes expected to be present
- Provide and maintain natural buffers around surface waters
- Minimize soil compaction – preserve topsoil
4.1.2. Buffer zone requirements

- Applicable to all streams
  - 60 feet (on each side of stream) for impaired and exceptional TN waters (average width with a min. of 30 feet)
  - 30 feet (on each side of stream) for all other streams (average width with a min. of 15 feet)

- Identified using methodology from TDEC “Standard Operating Procedures for Hydrologic Determinations” (Qualified Hydrologic Professionals) – Ecology Section
- Ecology forms will be including this information in the future
4.1.2. Buffer zone requirements (cont.)

- Are not primary sediment control structures
- Requirement does not apply to any valid ARAP or equivalent permit by federal agencies
- Buffer zone exemptions defined based on existing land uses
4.1.2.2. Pre-Approved Sites

- TDOT projects are exempt from buffer zone requirements if final TDOT right-of-way plans were finalized before **February 1, 2010**
4.1.4. **Dewatering**
- Discharges from dewatering activities are prohibited unless managed by controls providing equivalent level of treatment (filters – i.e. sediment filter bags)

4.1.7 **Surface Outlets**
- Discharges from basins and impoundments, utilize outlet structures that only withdraw water from near the surface of the basin or impoundment (i.e. Faircloth skimmer)
4.1.7 Surface Outlets

- “Sediment Basin” definition updated to reflect new design components including:
  - forebay cell
  - permanent pool
  - primary spillway with secondary or emergency spillway
  - surface dewatering

- Size
  - includes shape
  - incoming runoff volume and peak flow
  - particle size
  - receiving stream classification (impaired or exceptional waters)

- TDOT in process of redesigning STD DWG.
4.1.5. Pollution prevention measures

Measures must be *designed*, installed and maintained to minimize the:

- Discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters
- Exposure of building materials and products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater
- Discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures
5.4.1. Additional SWPPP/BMP Requirements for discharges into impaired or exceptional TN Waters

- Includes discharges from sites upstream or within “close proximity” of the exceptional segment
  - TDOT/TDEC agreement defines close proximity as: the project is within a one mile flow length upstream of the KETW
- b) Requires SWPPP (EPSC plans part of) to be prepared by a person who has completed TDEC Level II
  - effective within 24 months (May 24, 2013)
  - copy of certification or training record for inspector included in the SWPPP
Questions?
TDOT DESIGN DIVISION

MODULE 3:

TDOT SWPPP Process

ENvironmental Division
Natural Resource Office

Storm Water Pollution Prevention Plan Manual

Prepared By:
PalmEr Engineering
TDOT ED
Natural Resources Section

TDOT SWPPP’s are produced by:

- In-house TDOT Staff and/or
- Consultants assigned by TDOT ED
Communication with TDOT Design Manager

SWPPP writers are to contact the TDOT Design Manager once they are assigned to a project.

Questions that may be asked by the SWPPP writer:

- What design stage is the project in? (Preliminary ROW, ROW or Construction)
- When is the next field review?
- Have there been any major design changes?
- Request to be placed on the distribution list for the next field review
SWPPP writers are to review the project site including:

- Verify natural resources – streams, wetlands, springs, sinkholes etc. within and adjacent to the project site utilizing:
  - ecology report
  - design plans
  - USGS topographic map
- Verify TDEC’s assessment for 303d impaired streams for siltation and/or habitat alteration:
  - fully-supporting
  - partially-supporting
  - not supporting or not assessed
- Known Exceptional Tennessee Waters (KETW) (high quality or Tier II waters)
Review Project Site

Watershed & Stream Designation Review

- Determine the watershed and sub watersheds in which the project discharges:
  - 8-digit Hydrologic Unit Code (HUC) and
  - 12-digit HUC
- Determine if the project directly discharges to:
  - a 303(d) listed stream
  or
  - if the project is located within a 1-mile flow length upstream of a designated KETW (close proximity)
- Review the TDEC Stream Impairment Assessment web-based mapping utility:
  http://tnmap.tn.gov/wpc/
Review Project Site

TMDL Review


- Project located within a TMDL watershed?
- If yes, is site located in a sub-watershed with a Waste Load Allocation (WLA)?
- If yes, does the project discharge directly into an impaired stream?

Answer Yes to all 3 questions - TDOT required to request consultation with TDEC to confirm adherence to the requirements of the General NPDES Permit for Discharges of Stormwater Associated with Construction Activities (CGP) for an approved TMDL for siltation
Review Project Site

- Perform a site visit to review:
  - on-site and adjacent topographic conditions and land uses
  - existing and proposed drainage patterns
  - existing erosion problems
  - additional jurisdictional features found
  - enough ROW or easements for EPSC installation and maintenance
- Knowing where things are makes it easier to discuss in field reviews
Review Project Site

Additional jurisdictional feature (spring/stream) found

TDOT Design Manager was notified
Review Project Site

Offsite drainage

Temporary stream crossing

Sediment filter bag locations
Review
Project
Site

Existing erosion

Curb inlets not identified or protected
Review Project Site

Bridge construction, haul roads, jetties, barge access, etc.
Review
Project
Site

Site Condition
Restraints

ROCK CLIFF – PROPOSED SEDIMENT TRAP LOCATION
Preparing for Field Reviews

EPSC Plan Review

- Review the present, proposed and EPSC plans
- Are the EPSC plans phased?
  - The number of EPSC phases required provided
  - Existing contours depicted (combine with Phase I EPSC)
  - Proposed contours depicted (combine with Phase 2, 3 or later EPSC phases)
- Are utilities included in contract or by others?
  - If yes, are EPSC measures depicted for utility construction?
Preparing for Field Reviews

EPSC Plan Review

- All existing and proposed inlets (pipes, culverts, storm sewer) have appropriate inlet protection
- Existing drainage ditches are being protected (i.e. rock check dams, sediment tube ditch checks, etc.)
- Off-site water being diverted by diversion berms, sediment tubes or other methods
- Slope drains being utilized in low points of the diversion berms
- Each outfall has an appropriate EPSC BMP installed. (i.e. enhanced rock check dam, sediment tube ditch check, etc.)
- No EPSC measures are installed across streams
- Silt fence is not installed in concentrated flow areas (ditches, swales, etc.)
- Silt fence installed along the contour
Preparing for Field Reviews

EPSC Plan Review

- J-hooks should be added to silt fence not on contour to prevent undercutting
- Silt fence with backing (or other adequate BMPs) being utilized at the toe of large fill slopes
- Environmentally sensitive areas are protected with adequate BMPs.
- Silt fence with backing installed along stream banks (each side) and wetlands in existing and proposed conditions
- All streams must have a designated buffer zone (delineate with high visibility fencing)
- Temporary diversion channel or temporary diversion culvert is shown for all stream relocations
- Temporary stream crossings designated
- Suspended pipe diversions
Preparing for Field Reviews

EPSC Plan Review

• Graded solid rock being utilized to fill wetland areas as designated by Geotech
• Sediment filter bags provided during construction of:
  ▶ box and pipe culverts on streams
  ▶ stream diversions
  ▶ Bridges over streams/wetlands
• Sediment filter bags – enough ROW or easements
• Construction exit(s) depicted on the plans – multiple locations needed
• Haul roads, jetties, etc. necessary for bridge construction provided
• Special ecology notes added to the plans
Preparing for Field Reviews

EPSC Plan Review

- Ensure all measures are designed and applied in accordance with:
  - TDOT standard drawings
  - Chapter 10 of “TDOT Design Division Drainage Manual”
  - Latest instructional bulletins (IB)

- Review the soil types your project is located in.
  - Hydrologic Soil Group (A-D soil)
  - Erodibility of the soil (k value)
  - High or low runoff potential
Preparing for Field Reviews

EPSC Plan Review

USDA WEB SOIL SURVEY (WSS)

http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm
### EPSC Plan Review

> **K Value** = The More Erodible The Soil Is

#### Summary by Map Unit — Morgan County Area, Tennessee

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>GnD</td>
<td>Gilpin silt loam, 12 to 20 percent slopes</td>
<td>15.9</td>
<td>15.1%</td>
</tr>
<tr>
<td>GpE</td>
<td>Gilpin-Petros complex, 20 to 35 percent slopes</td>
<td>26.9</td>
<td>25.5%</td>
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<tr>
<td>GpF</td>
<td>Gilpin-Petros complex, 35 to 80 percent slopes</td>
<td>3.1</td>
<td>3.0%</td>
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<tr>
<td>LbC</td>
<td>Lily loam, 5 to 12 percent slopes</td>
<td>2.3</td>
<td>2.2%</td>
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<tr>
<td>LgC</td>
<td>Lily-Gilpin complex, 5 to 12 percent slopes</td>
<td>2.3</td>
<td>2.2%</td>
</tr>
<tr>
<td>W</td>
<td>Water</td>
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<td>0.8%</td>
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<tr>
<td>WrB</td>
<td>Wernock silt loam, 2 to 5 percent slopes</td>
<td>17.0</td>
<td>16.1%</td>
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<td>WrC</td>
<td>Wernock silt loam, 5 to 12 percent slopes</td>
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<td>Totals for Area of Interest</td>
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</table>

**43.7% of the soils (C) will have a high rate of runoff during construction**

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>GnD</td>
<td>GILPIN SILT LOAM, 12 TO 20 PERCENT SLOPES</td>
<td>.32</td>
<td>15.1%</td>
</tr>
<tr>
<td>GpE</td>
<td>GILPIN-PETROS COMPLEX, 20 TO 35 PERCENT SLOPES</td>
<td>.32</td>
<td>25.5%</td>
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<tr>
<td>GpF</td>
<td>GILPIN-PETROS COMPLEX, 35 TO 80 PERCENT SLOPES</td>
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<tr>
<td>LbC</td>
<td>LILY LOAM, 5 TO 12 PERCENT SLOPES</td>
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<td>LILY-GILPIN COMPLEX, 5 TO 12 PERCENT SLOPES</td>
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<td>W</td>
<td>WATER</td>
<td>.8</td>
<td>0.8%</td>
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<td>WrB</td>
<td>WERNOCK SILT LOAM, 2 TO 5 PERCENT SLOPES</td>
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<td>100.0%</td>
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<tr>
<td>Totals for Area of Interest</td>
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<td>105.3</td>
<td>100.0%</td>
</tr>
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</table>

**54.1% of the soils (0.37) will have a high rate of sediment loss during construction**
Soils Summary

Hydrologic Soil Groups (HSG) 4 Types (A, B, C, D)

Higher CN or “C” Factor = More Runoff Potential

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<tr>
<th>Cover Description</th>
<th>Curve Numbers for Hydrologic Soil Group</th>
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<tr>
<td></td>
<td>A</td>
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<tr>
<td>Impervious areas:</td>
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</tr>
<tr>
<td>Paved parking lots, roofs, driveways, etc. (excluding ROW)</td>
<td>98</td>
</tr>
<tr>
<td>Streets and roads:</td>
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</tr>
<tr>
<td>Paved: curbs and storm sewers (excluding ROW)</td>
<td>98</td>
</tr>
<tr>
<td>Paved: open ditches (including ROW)</td>
<td>83</td>
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<tr>
<td>Gravel (including ROW)</td>
<td>76</td>
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<tr>
<td>Dirt (including ROW)</td>
<td>72</td>
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<tr>
<td>Newly graded areas (pervious areas only, no vegetation)</td>
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<tr>
<td>Meadow - continuous grass</td>
<td>30</td>
</tr>
<tr>
<td>Woods - good condition</td>
<td>30</td>
</tr>
</tbody>
</table>
Attending Field Reviews

- Provide watershed information: 303d status (siltation or habitat alteration) or KETW
- SWPPP writers are to explain their recommendations – why it is needed not because they think it needs to be that way
- Their recommendations should be consistent with IB’s, Drainage Manual, Std. Drawings, etc.
Attending Field Reviews

Common sheets that comments may be made

- Index and Standard Drawings
  - SWPPP sheets to be added to index: S series (S-1, S-2, etc.)

- Estimated Roadway Quantities
  - Request following note to be added below the quantities table
    - “All quantities are to be used as directed by the engineer.”

- Typical Sections and Details
  - Stabilization of slopes and ditches

- Special Ditch Sections
  - Stabilization, lining, dimensions, etc.
Attending Field Reviews

Common sheets that comments may be made

- General and Special Notes
  - Latest edition
  - All applicable notes shown
  - Special ecology notes added
- Present/Proposed Plan Sheets
  - Drainage concerns
- Culvert X-Sections
  - Outlet protection depicted, type, length, depth, etc.
- Drainage Maps provided
- EPSC Notes
  - Latest edition
  - Utility EPSC notes needed
- EPSC Plan Sheets
Attending Field Reviews

- Construction Division representative – get their input. They are building the project.

- Never let the statement “Construction will take care of it in the field” go unaddressed in regard to stormwater and EPSC

- Not every single phase of EPSC can be reflected in the plans. (There are an infinite number of phases)

- Add notes on EPSC plan and other sheets for additional guidance if needed
Issuing Comments

- Plans versus type written comments are to be provided to the TDOT Design Manager and design consultant (if applicable)

- To be provided within 2 weeks after the field review
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<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
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<td>Roadway Cut</td>
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<td>1453.70</td>
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<tr>
<td>1.11</td>
<td>Roadway Cut</td>
<td>yd³</td>
<td>1453.70</td>
</tr>
</tbody>
</table>

**Additions:**
- 209-08.08 - Enhanced Rock Check Dam
- 209-04.12 - Polyurethane Powder
- 209-04.21 - Polymarine Gelcoat
- 209-01.24 - Jute Mesh Fabric
- 209-04.33 - Catch Basin Protection (Type X)
- 209-05.06 - Machined Riffle (Class A-3)
GENERAL COMMENTS:
1. INCLUDE AN ADDITIONAL PHASE FOR CLEARING & GRUBBING
2. DEPICT SILT FENCE WITH BAKING AROUND STREAMS & WETLANDS WHERE ACTING CONSTRUCTION OCCURS
3. ADD TCG (TEMPORARY CONSTRUCTION ENTRANCE) AT POINTS OF EXIT/ENTRANCE TO ACTIVE WORK AREAS
4. CONSIDER INCREASING THE SCALE TO 1:50 TO PROVIDE CLARITY
Outfall Locations

- Per IB 09-11, “the designer is responsible for identifying and labeling stormwater outfalls on all phase of the EPSC plans…..”

- SWPPP writer may prefer to locate the outfalls for you to save time and editing

- Outfall drainage areas – to be provided by the designer
Coordination with Roadway Designer

- Designer to provide a copy of the revised EPSC plans for final review and approval
- SWPPP writer to:
  - contact designer minimum of 2 weeks prior to the design turn-in date
  - Review plans to determine if recommendations have been taken into consideration
  - Verify outfall labels have been placed in each phase and are labeled correctly
- For recommendations not accepted, the designer will be asked to provide their reason in writing
- Provide final comments (if needed)
What’s in a TDOT SWPPP?

SWPPP Template:

- Site description (including soils, runoff, etc.)
- Order of construction activities
- Stream, outfall, wetland, and TMDL information
- Ecology information
- EPSC measures to be utilized
- Offsite material storage
- Maintenance and inspection
- Stormwater management
- Non-stormwater discharges
- Spill prevention management and notification
- Record keeping
- Certifications
- Environmental permits
- Figure – topographic map
SWPPP Template Sections

Section 1: SWPPP Requirements

Section 2: Site Description

Section 3: Order of Construction Activities

Section 4: Stream, Outfall, Wetland, TMDL & Ecology Information

Section 5: Erosion Prevention and Sediment Control (EPSC) Measures

Section 6: Construction support Activities – Borrow and Waste Areas

Section 7: Maintenance and Inspection
Section 8: Site Assessments

Section 9: Stormwater Management

Section 10: Non-Stormwater Discharges

Section 11: Spill Prevention, Management and Notification

Section 12: Record Keeping

Section 13 and 14: Certifications (TDOT and Contractor)

Section 15: Environmental Permits
## 2.1. Soil Properties Table (2.1.4.1)

| Primary Soil Name | HEC% | # of Site | Eradicability (
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkosic Montmorillonite Complex</td>
<td>20.9</td>
<td>2.37</td>
<td></td>
</tr>
<tr>
<td>Devonian Clay Complex</td>
<td>4.8</td>
<td>2.32</td>
<td></td>
</tr>
<tr>
<td>Emsian Clay Complex</td>
<td>15.4</td>
<td>2.32</td>
<td></td>
</tr>
<tr>
<td>Eocene Marl Complex</td>
<td>19.8</td>
<td>2.32</td>
<td></td>
</tr>
<tr>
<td>Lyndon-Nashville-Rock Outcrop Complex</td>
<td>18.1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>St. Louis Clay Complex</td>
<td>17.0</td>
<td>2.37</td>
<td></td>
</tr>
</tbody>
</table>

## 3.0. Install Inlet and Culvert Protection (3.0.1.4.1.01)

1. Install inlet and culvert protection once structures are in place and downstream of interfering flow.
2. Pour final fill grading and install base of tile.
3. Complete final paving and sealing of concrete.
4. Install traffic control and protective devices.
5. Complete final stabilization of embankment, bedding, and support, etc.
6. Remove temporary erosion control and accumulated sediment from areas that have established at least 20 percent permanent vegetation cover.
7. Restore areas disturbed by removal activities.

## 4.1. Stream Information (4.1.1.1)

1. Natural Resource Label: None
2. Natural Resource Impact: None
3. Natural Resource Impact: None
4. Natural Resource Impact: None

## 5.0. Site and Environment Information (5.0.1.1.01)

1. Site Address: None
2. Site Description: None
3. Site Size: None
4. Site Condition: None
5. Site Impact: None

## 6.0. Stormwater Pollution Prevention Plan (6.0.1.1.01)

1. Stormwater Pollution Prevention Plan: None
2. Stormwater Pollution Prevention Plan: None
3. Stormwater Pollution Prevention Plan: None
4. Stormwater Pollution Prevention Plan: None
4.3.2. If any acres or more for an outfall that discharges to an impaired stream (or a designated trout stream) prior to 1983, the project will be subject to Chapter 10, Part 1, N.Y. 00:00:00.

4.3.2.1. OUTFALL TABLE (Table 3.1.4, 4.1.2.1)

<table>
<thead>
<tr>
<th>OUTFALL LABEL</th>
<th>STATION LT OR CT</th>
<th>DRAINAGE AREA (AC)</th>
<th>DEGREE OF MEASURABLE EROSION (Y/N)</th>
<th>DEGREE OF INDICATED EROSION (Y/N)</th>
<th>SUB-OUTFALL INFORMATION</th>
<th>RECEIVING WATER NAME OR LABEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>300-40, LT</td>
<td>34</td>
<td>4.2</td>
<td>N/A</td>
<td>WIT-1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>310-40, LT</td>
<td>15</td>
<td>20.1</td>
<td>Y/N</td>
<td>STR-1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>310-40, LT</td>
<td>33</td>
<td>12.2</td>
<td>Y/N</td>
<td>STR-1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>310-40, LT</td>
<td>18</td>
<td>7.5</td>
<td>Y/N</td>
<td>WAG-1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>230-40, LT</td>
<td>9</td>
<td>2.3</td>
<td>Y/N</td>
<td>WAG-2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>180-40, LT</td>
<td>10</td>
<td>3.8</td>
<td>Y/N</td>
<td>STR-2</td>
<td></td>
</tr>
</tbody>
</table>

5. EROSION PREVENTION AND SEDIMENT CONTROL (Table 3.2.3)

5.1. The project shall be designed, installed, and maintained to control sediment and erosion and to control stormwater volume and velocity within the site to minimize erosion (Table 3.2.3).

5.2. EPIC measures must be designed, installed, and maintained to control sediment and erosion at all outlets of all tributaries, stormwater drainage, and stormwater runoff areas. These measures shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

5.3. All disturbed areas of the site that have been permanently stabilized, shall be inspected and maintained for a minimum period of 2 years from the date of the project.

5.4. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

5.5. All disturbed areas of the site that have been permanently stabilized, shall be inspected and maintained for a minimum period of 2 years from the date of the project.

6. CONSTRUCTION SUPPORT ACTIVITY - EROSION AND SEDIMENT CONTROL (Table 3.2.3.1.4)

6.1. The project shall be designed, installed, and maintained to control stormwater volume and velocity within the site to minimize erosion (Table 3.2.3.1.4).

6.2. A pipe, larger than 3 inches, shall be installed within the site to minimize erosion (Table 3.2.3.1.4).

7. MAINTENANCE AND INSPECTION (Table 3.2.3.1.4)

7.1. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.2. All disturbed areas of the site that have been permanently stabilized, shall be inspected and maintained for a minimum period of 2 years from the date of the project.

7.3. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.4. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.5. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.6. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.7. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.8. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.9. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.

7.10. The project shall be designed, installed, and maintained to control storm runoff generated by a 5-year, 24-hour storm event. The project shall be designed to control storm runoff generated by a 5-year, 24-hour storm event.
42 Developed by TDOT Environmental Div. – Jan. 2012
Section 1: SWPPP Requirements

Construction General Permit (CGP) references are in parentheses

TDEC Level II requirement effective May 24, 2013

1. **SWPPP REQUIREMENTS (3.0)**

1.1. HAS THE SWPPP TEMPLATE BEEN PREPARED BY AN INDIVIDUAL THAT HAS THE FOLLOWING CERTIFICATIONS (3.1.1) YES ☑ NO ☐ (CHECK ALL THAT APPLY BELOW)

1.1.1. ☑ CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC); OR

1.1.2. ☑ TDEC LEVEL II

1.2. DOES THE EPSC PLANS INVOLVE STRUCTURAL DESIGN, HYDRAULIC, HYDROLOGIC OR OTHER ENGINEERING CALCULATIONS FOR EPSC STRUCTURAL MEASURES (SEDIMENT BASINS, ETC.)? YES ☐ NO ☑ (3.1.1)

IF YES, HAVE THE EPSC PLANS BEEN PREPARED, STAMPED AND CERTIFIED BY A LICENSED PROFESSIONAL ENGINEER OR LANDSCAPE ARCHITECT?

☐ YES ☐ NO

1.3. DOES THE PROJECT STORMWATER OUTFALLS DISCHARGE INTO THE FOLLOWING? (5.4.1) YES ☑ NO ☐ (CHECK ALL THAT APPLY BELOW)

1.3.1. ☑ IMPAIRED WATERS (303d FOR SILTMATION OR HABITAT ALTERATION)

1.3.2. ☐ TENNESSEE KNOWN EXCEPTIONAL WATERS

IF YES, HAVE THE EPSC PLANS BEEN PREPARED BY AN INDIVIDUAL WHO HAS COMPLETED TDEC LEVEL II? ☑ YES ☐ NO (5.4.1.b); AND

IF YES, HAS THE SWPPP TEMPLATE BEEN PREPARED BY AN INDIVIDUAL WHO HAS COMPLETED TDEC LEVEL II? ☑ YES ☐ NO (5.4.1.b)
Section 1:
SWPPP Requirements
TDEC Level II Check
TNEPSC website
http://www.tnepsc.org/
Section 2: Site Description

Pre-approved site exemption (buffer zone requirements)

2. SITE DESCRIPTION (3.5.1)

2.1. PROJECT LIMITS REFER TO TITLE SHEET (3.5.1.g):

2.2. PROJECT DESCRIPTION: (3.5.1.a)
   TITLE: SR-33 FROM NORTH OF SR-71 TO THE UNION COUNTY LINE
   COUNTY: KNOX
   PIN: 101230.00

2.3. SITE MAP(S): REFER TO TITLE SHEET (3.5.1.g)

2.4. DESCRIPTION OF EXISTING SITE TOPOGRAPHY (3.5.1.d): REFER TO EXISTING
   CONTOURS SHEET(S) 22-35, DRAINAGE MAP SHEET(S) 14-18, USGS QUAD MAP,
   AND THE OUTFALL TABLE IN SECTION 4.2.3 BELOW.

2.5. MAJOR SOIL DISTURBING ACTIVITIES (3.5.1.b) (CHECK ALL THAT APPLY)
   2.5.1. ☒ CLEARING AND GRUBBING
   2.5.2. ☒ EXCAVATION
   2.5.3. ☒ CUTTING AND FILLING
   2.5.4. ☒ FINAL GRADING AND SHAPING
   2.5.5. ☒ UTILITIES
   2.5.6. ☐ OTHER (DESCRIBE): _________________

2.6. TOTAL PROJECT AREA (3.5.1.c): 224.3 ACRES

2.7. TOTAL AREA TO BE DISTURBED (3.5.1.c): 154.1 ACRES
   IF GREATER THAN 50 ACRES, HAS CONSTRUCTION PHASING BEEN
   SPECIFIED IN SECTION 3 BELOW AND IN THE PLANS (3.5.3.1.k)?
   YES ☒ NO ☐ N/A ☐

2.8. ARE THERE ANY SEASONAL LIMITATIONS ON WORK? YES ☐ NO ☒
   IF YES, DESCRIBE AND LIST THE CORRESPONDING PLAN SHEET: _________________

2.9. WAS ROW FINALIZED PRIOR TO FEBRUARY 1, 2010?
   YES ☐ ___________________________ (DATE) NO ☒ (4.1.2.2).
   IF ROW WAS FINALIZED PRIOR TO FEBRUARY 1, 2010, THIS PROJECT IS
   CONSIDERED A PRE-APPROVED SITE (4.1.2.2)

2.10. ARE UTILITIES INCLUDED IN THE CONTRACT? YES ☒ NO ☐
Section 2: Soils Summary

HSG – Hydrologic Soil Group

k – Erodibility (higher the “k” value the more erodible the soil)

% of Site Total = 100%

### 2.11. SOIL PROPERTIES (3.5.1.e)(4.1.1)

<table>
<thead>
<tr>
<th>PRIMARY SOIL NAME</th>
<th>HSG</th>
<th>% OF SITE</th>
<th>ERODIBILITY (k value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APISON-MONTEVALLO COMPLEX</td>
<td>C</td>
<td>25.3</td>
<td>0.37</td>
</tr>
<tr>
<td>DEWEY SILT LOAM</td>
<td>B</td>
<td>4.6</td>
<td>0.32</td>
</tr>
<tr>
<td>EMORY SILT LOAM</td>
<td>B</td>
<td>15.4</td>
<td>0.37</td>
</tr>
<tr>
<td>ETOWAH-MINVALE COMPLEX</td>
<td>B</td>
<td>19.6</td>
<td>0.32</td>
</tr>
<tr>
<td>LOYSTON-NONABURG-ROCK OUTCROP COMPLEX</td>
<td>D</td>
<td>18.1</td>
<td>N/A</td>
</tr>
<tr>
<td>STEADMAN SILT LOAM</td>
<td>C</td>
<td>17.0</td>
<td>0.37</td>
</tr>
</tbody>
</table>

60.4% of the soils (C & D) will have a high rate of runoff during construction

57.7% of the soils (0.37) will have a high potential for sediment loss

Are your EPSC measures designed to handle the higher runoff and sediment loads?
### Section 2: Runoff

Area Type – Keep Simple - 3 Categories (if possible)

% of Total Area = 100%
Section 4: Stream, Outfall, Wetland, TMDL, and Ecology Information

Scope G forms have been updated to indicate 303d or KETW for streams

4. STREAM, OUTFALL, WETLAND, TMDL AND ECOLOGY INFORMATION

4.1. STREAM INFORMATION

4.1.1. THE STRUCTURAL EPSC MEASURES HAVE BEEN INCLUDED IN THE TOTAL PROJECT IMPACTS AND HAVE BEEN INCLUDED IN THE AQUATIC RESOURCE ALTERATION (ARAP) PERMIT OR SECTION 401 CERTIFICATION (3.5.1.i). REFER TO THE LIST OF APPLICABLE ENVIRONMENTAL PERMITS LOCATED ON SWPPP SHEET 5. ALL PERMITS WILL BE MAINTAINED ON SITE IN THE ‘DOCUMENTATION AND PERMITS’ BINDER.

4.1.1.2. RECEIVING STREAMS (3.5.1.j)

<table>
<thead>
<tr>
<th>NATURAL RESOURCE LABEL</th>
<th>NAME OF RECEIVING NATURAL RESOURCE</th>
<th>IMPAIRED FOR SITATION OR HABITAT ALTERATION (YES OR NO)</th>
<th>KNOWN EXCEPTIONAL QUALITY WATERS (YES OR NO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWC-1</td>
<td>WET WEATHER CONVEYANCE</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>STR-1</td>
<td>MILL BRANCH</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>WWC-2</td>
<td>WET WEATHER CONVEYANCE</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>WWC-3</td>
<td>WET WEATHER CONVEYANCE</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>SPG-1/STR-2</td>
<td>UNNAMED TRIBUTARY TO MILL BRANCH</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>WWC-4</td>
<td>WET WEATHER CONVEYANCE</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>WWC-5</td>
<td>WET WEATHER CONVEYANCE</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
Section 4: Stream, Outfall, Wetland, TMDL, and Ecology Information

Buffer zones

4.1.2. ARE BUFFER ZONES REQUIRED? YES ☑ NO ☐ (4.1.2, 5.4.2)
If YES, THEY HAVE BEEN INCLUDED ON PLAN SHEET(S) 22-35
If YES, CHECK THE APPROPRIATE BOX BELOW FOR SIZE OF BUFFER
☑ 60-FEET FOR IMPAIRED AND EXCEPTIONAL WATERS (AVERAGE WIDTH PER SIDE WITH A MINIMUM OF 30-FEET)
☐ 30-FEET FOR ALL OTHER STREAMS (AVERAGE WIDTH PER SIDE WITH A MINIMUM OF 15-FEET)

BUFFER ZONE REQUIREMENTS ARE NOT REQUIRED FOR PRE-APPROVED SITES (4.1.2.2)

4.1.3. ARE THERE BUFFER ZONE EXEMPTIONS? YES ☐ NO ☑ (4.1.2.1)
### Section 3: Stream, Outfall, Wetland, TMDL, and Ecology Information

#### Outfall information

<table>
<thead>
<tr>
<th>OUTFALL LABEL</th>
<th>STATION LT OR RT</th>
<th>SLOPE WITHIN ROW (%)</th>
<th>DRAINAGE AREA (AC)</th>
<th>SEDIMENT BASIN OR EQUIVALENT MEASURE(S) (YES, NO OR N/A)</th>
<th>SUB-OUTFALL (e.g. A, B, C)</th>
<th>RECEIVING NATURAL RESOURCE NAME OR LABEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>206+80, RT</td>
<td>23</td>
<td>4.3</td>
<td>N/A</td>
<td></td>
<td>WTL-1</td>
</tr>
<tr>
<td>2</td>
<td>210+10, RT</td>
<td>15</td>
<td>20.1</td>
<td>YES</td>
<td></td>
<td>STR-1</td>
</tr>
<tr>
<td>3</td>
<td>210+40, LT</td>
<td>33</td>
<td>1.2</td>
<td>N/A</td>
<td></td>
<td>STR-1</td>
</tr>
<tr>
<td>4</td>
<td>210+80, LT</td>
<td>18</td>
<td>7.5</td>
<td>YES</td>
<td></td>
<td>WWC-1</td>
</tr>
<tr>
<td>5</td>
<td>233+60, LT</td>
<td>5</td>
<td>2.3</td>
<td>N/A</td>
<td></td>
<td>WWC-2</td>
</tr>
<tr>
<td>6</td>
<td>261+70, LT</td>
<td>10</td>
<td>3.6</td>
<td>N/A</td>
<td></td>
<td>STR-2</td>
</tr>
</tbody>
</table>

**Note:** Sub-outfalls are defined as outfalls that discharge within the project and do not directly discharge off row or into waters of the state.

4.2.4. Where possible, has non-project run-on been diverted through the project so that the off-site run-on will not flow over disturbed areas within the ROW, thus separating non-project run-off from project run-off thereby reducing the drainage area to any one outfall? **YES ☑ NO ☐**

4.2.5. Are equivalent measures being substituted for a sediment basins? **YES ☑ NO ☐**

4.2.6. Have all outfalls been labeled on the EPSC plan sheets (3.5.1.g, 5.4.1.f)? **YES ☑ NO ☐**

4.2.7. Have all outfalls been labeled on a usgs topographic map included in the "Documentation and Permits" binder (2.6.2)? **YES ☑ NO ☐**
Section 4: Stream, Outfall, Wetland, TMDL, and Ecology Information

Wetland information

### 4.3. WETLAND INFORMATION

Will construction and/or erosion and sediment controls impact any wetlands? Yes ☒ No ☐

If yes, the structural EPSC measures have been included in the total project wetland impacts and have been included in the ARAP permit, 401 or 404 permits.

<table>
<thead>
<tr>
<th>WETLAND LABEL</th>
<th>FROM STATION LT OR RT</th>
<th>TO STATION LT OR RT</th>
<th>TEMPORARY IMPACTS (AC)</th>
<th>PERMANENT IMPACTS (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTL-1</td>
<td>206+25, RT</td>
<td>207+25, RT</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>WTL-2</td>
<td>338+60, LT</td>
<td>339+60, LT</td>
<td>0.00</td>
<td>0.39</td>
</tr>
<tr>
<td>WTL-3</td>
<td>368+60, RT</td>
<td>369+25, RT</td>
<td>0.08</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Section 4: Stream, Outfall, Wetland, TMDL, and Ecology Information

TMDL and Ecology information

4.4. TOTAL MAXIMUM DAILY LOADS (TMDL) INFORMATION (3.5.10)

4.4.1. IS THIS PROJECT LOCATED IN A WATERSHED THAT MAINTAINS AN EPA APPROVED TMDL FOR SILTATION? YES ☒ NO ☐

4.4.2. IF YES, IS THIS PROJECT LOCATED WITHIN A SUBWATERSHED WITH A WASTE LOAD ALLOCATION (WLA)? YES ☒ NO ☐

4.4.3. IF YES, DOES THE PROJECT HAVE A DIRECT DISCHARGE TO A 303(d) LISTED STREAM FOR SIL TATION OR HABITAT ALTERATION?
YES ☒ NO ☐

4.4.4. IF YES, HAS A SUMMARY OF THE CONSULTATION (LETTER) BEEN INCLUDED WITH THE SWPPP DOCUMENTATION? YES ☒ NO ☐

4.5. ECOLOGY INFORMATION (3.5.5.e)

IF SPECIAL NOTES ARE PRESENT IN THE TDOT ECOLOGY REPORT, HAVE THEY BEEN ADDED TO THE APPROPRIATE PLAN SHEETS?
YES ☐ NO ☐ NO NOTES REQUIRED ☒

IF YES, LIST ALL PLAN SHEETS WHERE SPECIAL NOTES HAVE BEEN ADDED.
Section 5: EPSC Measures

Stormwater volumes and peak flows

Limits of disturbance

Phased EPSC plans

Steep slopes

Chemical treatment

### 5. EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) MEASURES (3.5.3)

5.1. EPSC MEASURES MUST BE DESIGNED, INSTALLED AND MAINTAINED TO CONTROL STORMWATER VOLUME AND VELOCITY WITHIN THE SITE TO MINIMIZE EROSION. (4.1.1)

5.2. EPSC MEASURES MUST CONTROL STORMWATER DISCHARGES, INCLUDING BOTH PEAK FLOWS AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS, STREAM CHANNELS AND STREAM BANKS. (4.1.1)

5.3. HAVE THE CONTROL MEASURES BEEN DESIGNED ACCORDING TO THE SIZE AND SLOPE OF THE DISTURBED DRAINAGE AREA (3.5.3.3)? YES ☑ NO ☐

5.4. THE CONTROL MEASURES HAVE, AT A MINIMUM, BEEN DESIGNED FOR THE 5-YEAR, 24 HOUR STORM EVENT (3.5.3.3, 5.4.1.a). FOR SITES THAT DISCHARGE INTO AN IMPAIRED OR KNOWN EXCEPTIONAL QUALITY WATER, EPSC MEASURES WILL BE DESIGNED TO CONTROL STORM RUNOFF GENERATED BY A 5-YEAR, 24-HOUR STORM EVENT.

5.5. ARE THE LIMITS OF DISTURBANCE CLEARLY MARKED ON THE EPSC PLANS? (3.5.1.n) YES ☑ NO ☐

5.6. HAVE PHASED EPSC PLANS BEEN PREPARED FOR THE PROJECT? (3.5.2)

YES ☑ NO ☐ (IF YES, CHECK ONE BELOW)

5.6.1. ☐ PROJECT DISTURBED AREA IS THAN LESS THAN 5 ACRES (MINIMUM OF TWO PHASES OF EPSC PLANS)

5.6.2. ☑ PROJECT DISTURBED AREA IS GREATER THAN 5 ACRES (MINIMUM OF THREE PHASES OF EPSC PLANS)

5.7. IS ADDITIONAL PHYSICAL OR CHEMICAL TREATMENT OF STORMWATER RUNOFF NECESSARY (5.4.1.a)? YES ☑ NO ☐

5.8. HAVE STEEP SLOPES (GREATER THAN 35%) BEEN MINIMALLY DISTURBED AND/OR PROTECTED BY CONVEYING RUNOFF NON-EROSIVELY AROUND OR OVER THE SLOPE? (3.5.3.2) (10 “STEEP SLOPES”)

YES ☑ NO ☐

5.9. ALL PHYSICAL AND/OR CHEMICAL TREATMENT WILL BE RESEARCHED, APPLIED IN ACCORDANCE WITH MANUFACTURE’S GUIDELINES AND FULLY DESCRIBED ON THE EPSC PLANS (3.5.3.1.b).
5.10. ALL EPSC CONTROL MEASURES WILL BE INSTALLED ACCORDING TO TDOT STANDARDS (E.G. STANDARD DRAWINGS).

5.11. EPSC MEASURES WILL NOT BE INSTALLED IN A STREAM WITHOUT FIRST OBTAINING US COE SECTION 404, TDEC ARAP, AND TVA PERMITS.

5.12. DISCHARGES FROM DEWATERING ACTIVITIES ARE PROHIBITED UNLESS MANAGED BY CONTROLS PROVIDING EQUIVALENT LEVEL OF TREATMENT (FILTRATION) (4.14).

5.13. DISCHARGES FROM SEDIMENT BASINS AND IMPOUNDMENTS MUST USE OUTLET STRUCTURES THAT ONLY WITHDRAW WATER FROM NEAR THE SURFACE OF THE BASIN OR IMPOUNDMENT, UNLESS INFEASIBLE. (4.1.7)

5.14. THE CONTROL MEASURES LISTED IN THE QUANTITIES TABLE ON SHEET 2A-2B HAVE BEEN SELECTED IN ACCORDANCE WITH TDOT STANDARD DRAWINGS AND GOOD ENGINEERING PRACTICES (3.5.3.1.b).

5.15. THE QUANTITIES REQUIRED FOR STABILIZED CONSTRUCTION EXITS PER TDOT STANDARDS HAVE BEEN SPECIFIED ON SHEET 2A (3.5.3.1.n).

5.16. STABILIZATION PRACTICES

PRE-CONSTRUCTION VEGETATIVE COVER WILL NOT BE DESTROYED, REMOVED OR DISTURBED MORE THAN 15 DAYS PRIOR TO GRADING OR EARTH MOVING UNLESS THE AREA WILL BE SEEDED AND/OR MULCHED OR OTHER TEMPORARY COVER IS INSTALLED. (3.5.3.1.h)

5.17. STABILIZATION MEASURES WILL BE INITIATED AS SOON AS POSSIBLE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED. TEMPORARY OR PERMANENT STABILIZATION WILL BE COMPLETED WITHIN 14 DAYS AFTER ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IN THAT AREA. PERMANENT STABILIZATION WILL REPLACE TEMPORARY MEASURES AS SOON AS PRACTICABLE. (3.5.3.2)

5.18. STEEP SLOPES (3.5.3.2)

STEEP SLOPES ARE DEFINED AS A NATURAL OR CREATED SLOPE OF 35% GRADE OR STEEPER REGARDLESS OF HEIGHT. STEEP SLOPES SHALL BE TEMPORARILY STABILIZED NOT LATER THAN 7 DAYS AFTER CONSTRUCTION ACTIVITY ON THE SLOPE HAS TEMPORARILY OR PERMANENTLY CEASED.
Section 10: Non-Stormwater Discharges

Filtering

Chemical treatment

Volume of non-stormwater discharge

10. **NON-STORMWATER DISCHARGES** (3.5.9)

10.1. THE FOLLOWING NON-STORMWATER DISCHARGES ARE ANTICIPATED DURING THE COURSE OF THIS PROJECT (CHECK ALL THAT APPLY):

- 10.1.1. ☒ DEWATERING OF WORK AREAS OF COLLECTED STORMWATER AND GROUNDWATER
- 10.1.2. ☐ WATERS USED TO WASH VEHICLES (OF DUST AND SOIL) WHERE DETERGENTS ARE NOT USED AND DETENTION AND/OR FILTERING IS PROVIDED BEFORE THE WATER LEAVES SITE
- 10.1.3. ☒ WATER USED TO CONTROL DUST (3.5.3.1.n)
- 10.1.4. ☒ POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS FROM WHICH CHLORINE HAS BEEN REMOVED TO THE MAXIMUM EXTENT PRACTICABLE
- 10.1.5. ☒ UNCONTAMINATED GROUNDWATER OR SPRING WATER
- 10.1.6. ☒ FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH POLLUTANTS
- 10.1.7. ☐ OTHER:

10.2. ALL ALLOWABLE NON-STORMWATER DISCHARGES WILL BE DIRECTED TO STABLE DISCHARGE STRUCTURES PRIOR TO LEAVING THE SITE. FILTERING OR CHEMICAL TREATMENT MAY BE NECESSARY PRIOR TO DISCHARGE.

10.3. THE DESIGN OF ALL IMPACTED EPSC MEASURES RECEIVING FLOW FROM ALLOWABLE NON-STORMWATER DISCHARGES MUST BE DESIGNED TO HANDLE THE VOLUME OF THE NON-STORMWATER COMPONENT.

10.4. WASH DOWN OR WASTE DISCHARGE OF CONCRETE TRUCKS WILL NOT BE PERMITTED ON-SITE UNLESS PROPER SETTLEMENT AREAS HAVE BEEN PROVIDED IN ACCORDANCE WITH BOTH STATE AND FEDERAL REGULATIONS.

10.5. ARE ANY DISCHARGES ASSOCIATED WITH INDUSTRIAL (NON-CONSTRUCTION STORMWATER) ACTIVITY EXPECTED (3.5.1.h)?

**YES ☐ NO ☒** IF YES, SPECIFY THE LOCATION OF THE ACTIVITY AND ITS PERMIT NUMBER.
Documentation and Permits Binder

A book that contains permits and forms for record keeping and compliance tracking
DOCUMENTS AND PERMITS BINDER

CHECKLIST

PROJECT NAME:
PIN:
PROJECT NO.:
COUNTY:

1. INDEX OF REVISIONS
2. RAINFALL RECORD SHEETS
3. EPSC INSPECTION REPORTS
4. NOI AND NOC
5. BLANK NOT
6. CONSTRUCTION GENERAL PERMIT (CGP)

7. ENVIRONMENTAL PERMITS
   7.1 PERMIT APPLICATION LETTER
   7.2 PERMITS
      a. TDEC ARAP
      b. CORPS OF ENGINEERS (COE)
      c. TVA 26A
      d. OTHER

8. ECOLOGY REPORT

9. TRAINING CERTIFICATIONS
   TDEC LEVEL I
      a. EPSC INSPECTOR
      b. TDOT PROJECT SUPERVISOR
      c. TDOT PROJECT SUPERVISOR MANAGER
      d. CONTRACTOR PROJECT SUPERVISOR
   TDEC LEVEL II
      e. TDOT PROJECT SUPERVISOR MANAGER

10. TMDL INFORMATION REQUIRED
    a. Yes
    b. No
TDOT DESIGN DIVISION

MODULE 4:

STORMWATER OUTFALLS
Outfalls Are Defined As:

- Stormwater runoff, snow melt runoff, and surface runoff and drainage
- Stormwater must be in a discernable/discrete/confined conveyance
  - pipes and culverts
  - ditches and channels
  - curb and gutter
  - catch basins or curb inlets (sub-outfalls)
- May include the discharge of:
  - sediment filter bags
  - dewatering structures
Outfalls

Definition

Location:

- leaves the project:
  - ROW
  - project limits
  - easement (i.e. temporary construction or permanent drainage)

or

- directly enters jurisdictional features (streams, springs, wetlands and sinkholes)
Existing conditions
Phase 1: clearing and grubbing

Natural drainage features need to be protected
Rip rap channel to stream. Outfall enters a jurisdictional feature within ROW

Multiple culverts discharging into a wet weather conveyance
Multiple outfalls in one location

Natural drainage swales or toe ditches that discharge to streams
Relocated stream channel discharging to another stream

Pipe/culvert/ditch discharging at ROW or easement before entering offsite stream

THIS IS NOT AN OUTFALL IN THE FINAL PHASE
Discharge from a sediment filter bag

May be designated as a temporary outfall on the EPSC plans
Sub-ouffalls are defined as:

- Outfalls that have been subdivided:
  - to reduce the drainage area (eliminates sediment basins and/or traps)
  - to account for drainage in a closed storm system from upslope areas that is collected in area drains or curb inlets
Phases of curb inlets
Curb inlets with no protection
Area drain/catch basin protection

Stormwater manholes
Area drain during construction

Area drain after construction
Outfalls

EPSC Phases

- Outfall locations may change in the EPSC phases
  - Existing
  - Intermediate
  - Final

- Size of drainage area to each respective outfall may change in each phase

- Outfall drainage area(s) to be provided by the roadway designer
TDOT SWPPP
Section 4.2.3: Outfall Table

Outfall drainage areas will be requested by the SWPPP writer (consultant or TDOT)

Required by the CGP
Outfall Location - Present (existing) Conditions

Outfall Location - Proposed Conditions

PROPOSED SPECIAL & TOE DITCHES

NATURAL DRAINAGE FEATURE FILLED IN

STR-3

STR-4
Outfall Locations

Present (existing) Conditions
Outfall Locations

Proposed Conditions
Outfall Locations

Proposed Conditions
Outfall Location – Phase 1 EPSC
Clearing & Grubbing

DRAINAGE AREA = 2 ACRES
OUT-#4

DRAINAGE AREA = 3 ACRES
OUT-#5

WWC-2

DRAINAGE AREA = 3.5 ACRES
OUT-#2

STR-1
303d

WTL-1

TDOT

ARCADIS

Outfall Location – Phase 2 EPSC Intermediate
MODULE 5:

PROJECT VS. DISTURBED AREAS
Areas

Definition

Project Area:

- Includes all areas within the project limits:
  - Proposed project ROW
  - Easements (slope, construction, permanent drainage, etc.)
- Will be requested by the SWPPP writer
- Required by the CGP
- It’s an estimate – round to the nearest acre
Disturbed Area:

- Determines the CGP Permit Fee
- Area to be cleared, graded or excavated during the life of the project
- Includes utility locations
- CGP requires limits of disturbance to be clearly marked on the plans and in the field
  - cut and fill lines
  - slope easements
  - construction easements
  - drainage easements
- Will determine how many EPSC phases are required
Disturbed Area:

- Divert off-site water around the disturbed area not the total project area
- Determines sediment storage needed
- It’s an estimate – round to the nearest acre
2. SITE DESCRIPTION (3.5.1)

2.1. PROJECT LIMITS REFER TO TITLE SHEET (3.5.1.g).

2.2. PROJECT DESCRIPTION: (3.5.1.a)

TITLE: SR-33 FROM NORTH OF SR-71 TO THE UNION COUNTY LINE
COUNTY: KNOX
PIN: 101230.00

2.3. SITE MAP(S): REFER TO TITLE SHEET (3.5.1.g)

2.4. DESCRIPTION OF EXISTING SITE TOPOGRAPHY (3.5.1.d): REFER TO EXISTING CONTOURS SHEET(S) 22-35, DRAINAGE MAP SHEET(S) 14-18, USGS QUAD MAP, AND THE OUTFALL TABLE IN SECTION 4.2.3 BELOW.

2.5. MAJOR SOIL DISTURBING ACTIVITIES (3.5.1.b) (CHECK ALL THAT APPLY)

2.5.1. ☒ CLEARING AND GRUBBING
2.5.2. ☒ EXCAVATION
2.5.3. ☒ CUTTING AND FILLING
2.5.4. ☒ FINAL GRADING AND SHAPING
2.5.5. ☒ UTILITIES
2.5.6. ☐ OTHER (DESCRIBE): ___

2.6. TOTAL PROJECT AREA (3.5.1.c): 224.3 ACRES

2.7. TOTAL AREA TO BE DISTURBED (3.5.1.c): 154.1 ACRES

IF GREATER THAN 50 ACRES, HAS CONSTRUCTION PROJECT PHASING BEEN SPECIFIED IN SECTION 3 BELOW AND IN THE PLANS (3.5.3.1.k)?

YES ☒ NO ☐ N/A ☐

2.8. ARE THERE ANY SEASONAL LIMITATIONS ON WORK? YES ☐ NO ☒

IF YES, DESCRIBE AND LIST THE CORRESPONDING PLAN SHEET: ___

2.9. WAS ROW FINALIZED PRIOR TO FEBRUARY 1, 2010?

YES ☐ _________________ (DATE) NO ☒ (4.1.2.2).

IF ROW WAS FINALIZED PRIOR TO FEBRUARY 1, 2010, THIS PROJECT IS CONSIDERED A PRE-APPROVED SITE (4.1.2.2)

2.10. ARE UTILITIES INCLUDED IN THE CONTRACT? YES ☒ NO ☐
TOTAL PROJECT AREA

RIGHT-OF-WAY
PROJECT AREA
ROW + slope easements + construction easements
DISTURBED AREA
ROW + slope easements + construction easements – undisturbed area
Aerial View

Total Project Area

versus

Total Disturbed Area
Aerial View

Total Disturbed Area

Have you thought about how large is your disturbed area?

What if it were all open (disturbed) at one time?
Clearing Limits

Prevents unnecessary clearing

Less disturbed areas = reduced EPSC measures needed

reduced construction costs

reduced risk of sediment releases and potential NOVs
TDOT DESIGN DIVISION

MODULE 6:

BUFFER ZONE REQUIREMENTS
Additional protection is required for any waters of the State or U.S. that are located on or immediately adjacent to the project site.

Buffer Zones Are Defined As:

- A strip of dense undisturbed perennial native vegetation, either original or re-established, that borders:
  - streams and rivers
  - ponds and lakes
  - wetlands and seeps
- “Every attempt should be made for construction activities not to take place within the buffer zone.” – TDEC CGP
Buffer Zones

30 OR 60 FEET

Area of Earth Disturbance

Water of the U.S.

Buffer

30 OR 60 FEET

Area of Earth Disturbance

Water of the U.S.

Buffer

30 OR 60 FEET
Buffer Zones

Purpose

- Buffer zones are established for the purposes of:
  - slowing water runoff
  - enhancing water infiltration
  - minimizing the risk of any potential nutrients or pollutants from leaving the upland area and reaching surface waters

- Buffer zones are:
  - not primary sediment control structures
  - are most effective when stormwater runoff is flowing into and through the buffer zone as shallow sheet flow, rather than in concentrated form such as in channels, gullies, or wet weather conveyances
Stream buffer requirements

- Clearly identified and outlined on the plans
  - 707-08.11 HIGH-VISIBILITY CONSTRUCTION FENCE

- Applicable to **ALL** streams
  - 60 feet (on each side of stream) for impaired and Exceptional TN Waters (average width with a min. of 30 feet)

  - 30 feet (on each side of stream) for all other streams (average width with a min. of 15 feet)
Section 4: Stream, Outfall, Wetland, TMDL, and Ecology Information

4.1.2. Are buffer zones required? Yes □ No ☒ This project consists of bridge repair work. No excavation/soil disturbance and clearing within the buffer zone is allowed except for the installation and removal of EPSC measures and the construction access road (4.1.2, 5.4.2)

If yes, they have been included on plan sheet(s) _______

If yes, check the appropriate box below for size of buffer

□ 60-feet for impaired and exceptional waters (average width per side with a minimum of 30-feet)

□ 30-feet for all other streams (average width per side with a minimum of 15-feet)

4.1.3. Are there buffer zone exemptions? Yes □ No ☒ (4.1.2.1)
High visibility fence identifying clearing limits around known exceptional TN waters (KETW) prior to bridge construction.

Buffer zone during bridge construction.
Vegetated buffer and equivalent measures along a temporary stream crossing

Vegetative buffer left in place during bridge construction
Vegetated buffer and equivalent measures adjacent to a spring

High visibility fencing identifying clearing limits and buffer zone adjacent to a wetland
Buffer Zones – Phase 1 EPSC Clearing and Grubbing

Wet weather conveyance that is adjacent to a KETW

Buffer Zones – Phase 1 EPSC Clearing & Grubbing

WET WEATHER CONVEYANCE THAT DRAINS IMMEDIATELY DOWN STREAM TO A KETW MAY REQUIRE A BUFFER.

HIGH VISIBILITY FENCING FOR BUFFER PROTECTION

Buffer Zones

Exemptions

Buffer zone exemptions

- Requirement does not apply to any valid ARAP or equivalent permit by federal agencies
- Buffer zone exemptions defined based on existing land uses if in place prior to issuance of NOI
  - buildings
  - parking lots
  - roadways
  - utilities
- Only the portion of the buffer zone that contains the footprint of the existing land use is exempt
Buffer Zones

Exemptions

Buffer zone exemptions

- If an area with an existing land use is proposed to be converted to another use or the imperious surfaces located within the buffer area are being removed, buffer zone requirements shall apply.

- For TDOT: sites pre-approved if ROW finalized before February 1, 2010.
If a water of the State or U.S. is on or immediately adjacent to your site, you must comply with one of the following:

- Provide the proper amount of buffer of undisturbed natural vegetation between construction activities and top of bank/edge of water
- Provide a narrower buffer that is supplemented by additional sediment and erosion controls, which will achieve an *equivalent* sediment load reduction as the designated buffer
- If infeasible to provide a buffer of any size, implement sediment and erosion controls that achieve an *equivalent* sediment load reduction as the designated buffer
Buffer Zones

Example of Buffer Alternative Equivalent Measure

- Step 1: Estimate sediment reduction from designated buffer
- Step 2: design EPSC measures that matches sediment removal efficiency of designated buffer
- Step 3: document how site-specific EPSC controls will achieve sediment removal efficiency of the designated buffer
Buffer Zones

Example of Buffer Alternative Equivalent Measure

Silt fence with backing

Dual temporary sediment tube with clean wood mulch interior (mulch filter berm)
Buffer Zones

Example of Buffer Alternative Equivalent Measure

Silt fence with backing triple stacked sediment tubes with jute mesh
Buffer Zones

Example of Buffer Alternative Equivalent Measure

Sediment tube in front and behind silt fence with backing
Buffer Zones

Example of Buffer Alternative
Equivalent Measure not acceptable
Buffer Zones

Buffer Alternative Equivalent Measure Project Example: EPSC Phase I

- VEGETATED BUFFER UNDISTURBED AREA
- WOOD MULCH FOR TEMPORARY STABILIZATION
- SFB
- DUAL TEMP. SEDIMENT TUBES WITH WOOD MULCH
- KETW STREAM
- WOOD MULCH
Buffer Zones

Buffer Alternative Equivalent Measure

Project Example: Silt fence with backing

Sediment tubes with filter berm

Rock berm overlain with geotextile fabric
Not depicted in any EPSC phases (including clearing and grubbing)
- Outlet protection not provided
- Not used on super elevated road sections
- Not used to divert offsite drainage around or through a construction area
- Not discharged at toe of slope
- A BMP that could be used to meet the new steep slope requirement
Slope drain without outlet protection

Discharge slope drains to toe of slope or into channels
Check dams used as slope drain outlet protection and runoff control within ditch.

Super elevated road sections diverted into slope drains.
Project Example: Bridge replacement project on a KETW

EPSC Phase 1

- SFB IN MIDDLE OF SLOPE
- TURBIDITY CURTAIN

EPSC Phase 2

- SFB AT TOP OF SLOPE
Project Example: Bridge replacement project on a KETW
Finish grade work for roadway

Permanent seeding and ECBs placed on finished slopes

NO BERM AND COMPACTED SUBGRADE
No slope drains depicted in EPSC plans. Several slope failures occurred due to surface runoff from compacted roadway surface.

BMP failure at toe of slope. Sediment discharged into KETW.
Multiple slope drains added to convey surface runoff to toe of slope until roadway is completed (change order to construction)

Slope drain discharges at toe of slope onto rock fill for outlet protection
Construction Entrances

Typical comments on EPSC plans

- Not depicted in any EPSC phases (including clearing and grubbing)
  - item numbers not included
  - construction change order
- Required by the CGP
- Not depicted at side road crossings
- Temporary drainage pipes not provided under entrance
Construction entrance not provided
No temporary pipe culvert included for existing drainage swale

Properly installed construction entrance
Sediment Filter Bags

Typical comments on EPSC plans

- Should be included with all culverts (pipe, box, etc) associated with stream crossings, relocations, etc.
- Not depicted for bridge construction with piers outside of streams (groundwater, surface runoff, etc.)
- Not depicted far enough away from buffer zone
- Not located on flat topography
- Not enough ROW or temporary construction easements provided for installation and maintenance
Don’t depict in streams

They can be undersized
No construction easement or enough stream buffer provided for sediment filter bag.

Sediment filter bag had to be dug into toe of fill slope to stay within ROW.

ONLY ONE SEDIMENT FILTER BAG LOCATION DEPICTED FOR BOTH ENDS OF CULVERT EXTENSION ON A 4 LANE DIVIDED HWY.
Great flat area for installation….

but no construction easement provided for installation on opposite side

ONLY ONE SEDIMENT FILTER BAG LOCATION DEPICTED FOR BOTH ENDS OF CULVERT EXTENSION ON A 4 LANE DIVIDED HWY.
Sediment filter bags located too close to receiving water bodies
Sediment filter bags are not designed to remove fine sediments or control turbid water.

Discharge of sediment filter bag above into a KETW.
Silt Fence

Typical comments on EPSC plans

- Overly used – not the cure all
- ROW and/or clearing limits lined with silt fence
- Not placed on contour
- Placed across natural drainage swales, ditches, concentrated flow, etc. with no outlet
- J-hooks not provided
- Depicted at toe of slope = no storage area
- Not enough ROW or construction easements provided for sediment storage and maintenance
Silt fence placed at top of slope – not needed

Silt fence placed properly along the contour
Silt fence placed at toe of slope = no sediment storage and hard to perform maintenance and removal

Silt fence with wire backing should be used on large fill slopes
Silt Fence

Placement of silt fence or other BMPs at toe of slopes allows for maximum sediment storage, ease of maintenance and removal.
Never place silt fence across concentrated flow paths

Never depict silt fence across streams
Never place silt fence across concentrated flow paths

Silt fence should not be used for culvert outlet protection.
Never place silt fence across concentrated flow paths

Silt fence should not used for culvert outlet protection
Place enhanced or rock dams in low lying areas to prevent...

silt fence from collapsing and releasing sediment offsite
Silt fence using erosion eels for J-hooks on silt fence not placed on contour

J-hooks constructed out of silt fence
Silt fence shouldn’t be depicted perpendicular to contours. No outlet provided at low point in silt fence at toe of slope resulting in silt fence being overtopped during storm event.

SILT FENCE PLACED PERPENDICULAR TO CONTOURS CHANNELIZES SURFACE RUNOFF.
HOOKS SHOULD BE PROVIDED OR AN ALTERNATE BMP USED.

OUTLETS NOT PROVIDED AT LOW POINTS IN SILT FENCE FOR WATER TO BE RELEASED AT OUTFALLS.
OUTLETS NOT PROVIDED AT LOW POINTS IN SILT FENCE FOR WATER TO BE RELEASED AT OUTFALLS

SILT FENCE PLACED PERPENDICULAR TO CONTOURS CHANNELIZES SURFACE RUNOFF.
HOOKS SHOULD BE PROVIDED OR AN ALTERNATE BMP USED.
Outlet s (i.e. rock check dams) are needed in silt fence runs where low spots in the topography occur to prevent water from building up and overtopping silt fencing.
Roadway shoulders

Typical comments on EPSC plans

- Gravel shoulders not stabilized on super elevated roadway cross sections
Super elevated roadway on a down gradient slope

RIP RAP CHANNEL
HYDRAULIC CAPACITY REDUCED – FILLED WITH SHOULDER STONE

Stabilize shoulders with prime or tack coat
Temporary Stream Crossings & Diversions

Typical comments on EPSC plans

- A temporary stream crossing will be required almost every time for culvert and or bridge construction
- Not enough ROW or construction easements provided for installation and maintenance
- Diversions not phased with culvert and or bridge construction
- Diversions not depicted
- Number of pipes, sizes, cross sections dimensions, etc. for temporary stream crossings and stream diversions not provided on EPSC plans
Suspended pipe diversion on box culvert extension on inlet – not properly diverted into inlet for high flows
Stream diversion using bypass pumping - undersized?
Stream diversion for new box bridge

Size of diversion and lining provided on EPSC plans
Suspended pipe stream diversion – pipe size provided on EPSC plans

Diversion may be needed for wet weather conveyances
TEMPORARY DIVERSION 42" PIPE WITH SAND BAG PLUGS

4'-T TEMPORARY DIVERSION CHANNEL (GEOTEXTILE AND RIP-RAP)
Stream diversion for channel relocation – plastic pipe and gravel berm

Diversions may be needed for existing bridge removal
Temporary stream crossing – installed correctly?

Size and number of pipes needed for temporary stream crossing were not provided to contractor.
After the water receded. The contractor had to remove stone from creek channel by hand.

Contractor reinstall temporary stream diversion and uses same number and size of pipes and adds steel plates.
Next rain event took out the temporary stream crossing again.
Your site may require special temporary stream diversion pipe with baffles for trout.
Temporary stream diversion using jersey barrier and plastic sheeting.

Temporary stream diversion and crossing to construct a box culvert.
Temporary stream diversion lined with plastic and rip-rap.

Same temporary stream diversion in use after a storm event.
Rip-rap berm used to protect an intermittent stream.

Temporary stream diversion gone bad.
Verify that the channel lining specified in the stream diversion can handle the velocities during the design storm event.
Curb Inlet / Catch Basin Protection

Typical comments on EPSC plans

- Inlet protection not provided on different phases of construction
Inlet protection is considered a perimeter control because the discharge from area drains and curb inlets is usually at the project boundaries.

Catch basin filter assembly placed over a median drain.
Catch basin filter assemblies placed over curb inlets during different phases of construction.
Curb inlet protection Type 1-4 needed to protect inlets from sediment

Type 1 curb inlet protection
Type 3 curb inlet protection

Type 4 inlet protection
Type A catch basin protection with a silt saver top

Type B catch basin protection
Type D catch basin protection

Type E catch basin protection
Phases of inlet protection for a median drain
Toe Ditches

Common mistakes on EPSC plans

- A toe ditch is created where fill meets existing contours creating a “V” channel
- Not protected for discharge from roadway or special ditches
- Inadequately sized rip rap
Project example: EPSC plan view (Final Phase)

TOE DITCH WITH SMALL DRAINAGE AREA UPSLOPE DOES NOT NEED TO BE STABILIZED PERMANENTLY

TOE DITCH WITH LARGE DRAINAGE AREA UPSLOPE BUT NOT DEPICTED TO BE STABILIZED PERMANENTLY
Large drainage area upslope from roadside ditch leads to a toe ditch...

Can the toe ditch handle the flow from above?
Typically toe ditches are on a very steep gradient and need stabilization.

Small drainage area upslope therefore no need for additional stabilization in the toe ditch.
Low point in roadway required both toe ditches to be stabilized with rip rap.

Only one toe ditch required additional stabilization.
Steep Slopes

Future comments on EPSC plans

- New requirements per the CGP for steep slopes
- Steep Slopes are defined as:
  - natural or created slope of 35% grade or greater
  - no height restrictions
- Steep slopes shall be temporarily stabilized not later than 7 days after construction activity on the slope has temporarily or permanently ceased
- Designers must pay special attention to stormwater management to convey runoff non-erosively around or over a steep slope
Bridge abutment slopes protected with sediment tubes and matting (intermediate EPSC phase)
Diversion ditches and matting used to protect steep slope areas during construction (intermediate EPSC phase)

Diversion ditch used to divert stormwater runoff away from steep slopes and to EPSC measures down slope (intermediate EPSC phase)
TOE DITCHES PROTECTED FROM CONCENTRATED RUNOFF

SEDIMENT TUBES ON SLOPE FOR STEEP SLOPE PROTECTION

DIVERSION BERMS AND SLOPE DRAINS TO CONVEY CONCENTRATED RUNOFF TO TOE OF FILL
Sediment tubes placed on slopes to break up surface runoff into relocated stream channel (final EPSC phase)

Diversion berm with slope drains down slope to divert runoff from steep slope areas
Combination of sediment tubes, diversion berms and slope drains to protect steep slope areas

Sediment tubes used to protect a roadside ditch slopes until the sod is rooted.
Stormwater Discharges from Construction Sites in Tennessee

- Permit compliance is based on visible and color discharge
- Don’t change the color of the receiving water body (“objectional color contrast”)
- No measureable standards (NTUs)
- Very subjective
- Difficult to enforce
- Left room for error
Current NPDES Compliance

Objectionable color contrast
Current NPDES Compliance

Objectionable color contrast
Current NPDES Compliance

Objectionable color contrast
Sediment Releases

Fine sediments deposited in streams

TDOT EPSC measures not designed for fine sediments or turbidity
Sediment Releases

Turbidity measurements >1000 NTUs
EPA Effluent Guidelines for stormwater Discharges from Construction Sites


- December 1, 2009 – EPA publishes “Final Rule: Effluent Guidelines for Discharges from the Construction and Development Industry”

- February 1, 2010 – Effluent guidelines were to become effective nationwide
Future NPDES Compliance

Previously: EPA Effluent Guidelines Final Rule Phase In

- August 1, 2011 - 20 acre or greater sites will have to meet a discharge effluent limit
- February 1, 2014 - 10 acre or greater sites will have to meet a discharge effluent limit
Future NPDES Compliance

EPA’s *Original* Discharge Effluent Limits

- Must sample stormwater discharges at outfalls during the rain event
- 280 Nephelometric Turbidity Unit (NTU) limit (average)
- Not applicable for storm events over the 2 year-24 hour storm
- Does not include weekends or holidays
- Sampling protocols not clearly defined
Future NPDES Compliance

EPA original discharge effluent limit – 280 NTUs
In August 2010 EPA ELG rule challenged by:

- Wisconsin Homebuilders Association
- National Association of Homebuilders
- Utility Water Act Group

Previously in April 2010, the Small Business Administration Office of Advocacy filed a complaint/petition
All 3 groups filed separate petitions with the Court. Court consolidates the 3 petitions on several common factors

- An argument that there are deficiencies in the EPA Dataset to adopt the 280 NTU effluent guideline in their rule – flawed analysis
- Failure to consider site specific characteristics (in particular, cold weather sites and small drainage areas within a site)
- Specific issues relevant to linear gas and electric projects
- Cost to achieve the limits would cost more than the $953 million estimated by the EPA – SBA estimates up to $10 billion annually
<table>
<thead>
<tr>
<th>EPA</th>
<th>ELGs Challenged</th>
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<tr>
<td>- EPA asked court to vacate the numeric standard while EPA re-evaluates the calculation of the turbidity limitation</td>
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<tr>
<td>- The Justice Department asked EPA to defend the numeric limit – remanded the rule back to the EPA, but did not vacate the numeric limitation</td>
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<td>- EPA itself admits the ELG would control less than one quarter of one percent of all total sediment runoff</td>
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<td>- EPA was forced to admit several flaws in the final rule and that it had improperly interpreted the data.</td>
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Construction Techniques

Polyacrylamide (PAM) active treatment trains

Removal of fine sediments

Turbidity reduction
Construction Techniques

Polyacrylamide (PAM)
active treatment trains

Dry Powders
Liquids
Emulsions
Gel/Floc logs
Construction Techniques

Polyacrylamide (PAM) active treatment trains

- Powdered PAM
- Plastic check dams
- Jute mesh
- Slope drain
Construction Techniques

Polyacrylamide (PAM) active treatment trains

Powdered PAM
Jute mesh
Rock check dams
Plastic check dams
Wood mulch
Construction Techniques

Polyacrylamide (PAM) active treatment trains

Treatment/diversion ditch with PAM and jute mesh

Wood mulch and rock check dams

Slope drain pipe with PAM floc logs
Construction Techniques

Polyacrylamide (PAM) active treatment trains

Slope drain with floc logs to sediment basin

Powdered PAM and jute mesh in median ditch
Construction Techniques

Polyacrylamide (PAM) active treatment trains

SR-840 case study KETW located at discharge point

POWDER PAM SPREAD OVER DISTURBED AREAS

DISCHARGE POINT SUB-OUTFALL

TURBID WATER COLLECTED IN VARIOUS SEDIMENT TRAPS OR LOW LYING AREAS – ALLOWED TO SETTLE OUT
Construction Techniques

Polyacrylamide (PAM) active treatment trains

Powdered PAM
Erosion Eels
Rock silt screens
Jute mesh
Erosion control blankets
Sediment tubes
Wood mulch
Construction Techniques

Polyacrylamide (PAM) active treatment trains

WOOD MULCH USED TO TRAP FINE SEDIMENTS

DISCHARGE POINT – SUB-OUTFALL
Questions?
Staged EPSC Plans

Definition

EPSC plans that reflect construction phases (i.e. initial, interim grading, final, etc.) should be depicted on multiple plan sheets.

EPSC staging

- One sheet depicting *all* EPSC that will be used during the life of the project *will not* be considered complete.
- Sites disturbance
  - <5 acres – minimum of 2 stages of EPSC (initial/clearing and final)
  - >5 acres - minimum of 3 stages of EPSC (initial/clearing, interim and final)
EPSC Stage 1: Initial Stage - Buffer Protection, Culvert Installations, Clearing and Grubbing
EPSC
Stage 1

Clearing and grubbing

Project Example
EPSC Stage 2: Intermediate Stage – Mass Grading Operations

- Cut Berm with Rock
- Sediment Dams
- Diversion Berms with Rock
- Sediment Dams

EPSC
Stage 2

Example of EPSC details

Diversion and embankment berms
**EPSC**

**Stage 2**

Example of EPSC details

Cut berms
Example of EPSC details

Grading of cut and fill sections
EPSC
Stage 2

Project Example

EPSC plans dictated grade to be tilted away (part of an EPSC staged approach)
EPSC
Stage 2

Project Example

Grade tilted to drain to sediment basin
EPSC Stage 3: Final Stage - Finished Grade, Runoff Control and Final Stabilization

- **DIVERSION BERMS WITH SLOPE DRAINS ON FILL SECTION**
- **ROCK AND ENHANCED ROCK CHECK DAMS FOR RUNOFF CONTROL AND TOE DITCH PROTECTION**
- **STEEP SLOPE PROTECTION**
- **KETW STREAM**

EPSC OUTFALL

Project Example

Discharge location into KETW
EPSC Stage 1: Initial Stage - Buffer Protection and Culvert Installation

- **TEMPORARY DIVERSION CHANNEL SPECIFIED**
- **VEGETATED BUFFER**
- **HIGH VISIBILITY FENCING TO DESIGNATE BUFFER ZONE**
- **SFB**
- **KETW STREAM**
EPSC Stage 2: Intermediate Stage – Clearing & Grubbing
Mass Grading Operations

- SEDIMENT TUBES FOR STEEP SLOPE PROTECTION
- ROCK SEDIMENT DAMS, ROCK CHECK DAMS AND ENHANCED ROCK CHECK DAMS IN NATURAL DRAINAGE WAYS FOR OUTFALLS
- SFB
- CUT BERM (SEDIMENT STORAGE SPECIFIED) WITH ROCK SEDIMENT DAMS
- DIVERSION BERM (HEIGHT SPECIFIED) WITH ROCK SEDIMENT DAMS
- UNDISTURBED AREA

EPSC Stage 3: Intermediate Stage - Finished Grade and Runoff Control

- Sediment Tubes for Steep Slope Protection
- Rock Check Dams Within Roadside Ditches
- Sediment Traps with Specified Storage and Dimensions
- Diversion Berms with Slope Drains on Fill Section
- Rock Check Dams for Toe Ditch Protection
- Undisturbed Area
EPSC Stage 4: Final Stage - Final Stabilization

TYPE 3 EROSION CONTROL BLANKET SPECIFIED FOR THIS SLOPE SECTION

SOD SPECIFIED FOR ROAD SIDE AND SPECIAL DITCHES

SOD SPECIFIED FOR THIS SLOPE SECTION