New Consultant EC Title Sheet

• Consultant Title Sheet Projects
  – Design Build Projects
  – REU On-call Contract Projects
  – Division Design Raleigh Let (DDRL) Projects

• No DocuSign Requirement

• Soil & Water will not DocuSign
Revise this box to Reviewer Address as needed

Primary NCDOT Erosion Control Reviewer’s Name
Revisions to Basin Details

• Revised Exterior Basin Slopes from 3:1 to 2:1

• Added Rigid Coupling Requirement

• Decreasing Weir Length to Q/0.8 (from Q/0.4)

• Tiered Skimmer Basin
  – Deleted Slope Drain Pipes between Basins
  – Revised Upper Basin Depth(s) from 3 ft. to 2 ft.
DETERMINE PRIMARY SPILLWAY WEIR LENGTH (FT.) USING $Q/0.8$ WHERE $Q$ IS FLOW RATE (CFS) INTO BASIN.

1. SEED AND PLACE MATTING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES.

2. PLACE SEALANT AROUND BARREL PIPE WITH MINIMUM WIDTH OF 6 IN.

CLASS B STONE PAD (4' x 4' x 1' MIN.)

3. RIGID COUPLING

4. COIR FIBER MAT

5. SOIL STABILIZATION GEOTEXTILE FOR PRIMARY SPILLWAY SHALL BE ONE CONTINUOUS PIECE OF MATERIAL OR OVERLAPPED 18 IN. (MIN.).

NOT TO SCALE
TIERED SKIMMER BASIN DETAIL

SOIL STABILIZATION GEOTEXTILE

STEEL POSTS (QUANTITY VAR.)

1' MIN.

4' (MAX.)

3' (MIN.)

1/3L

1/2L

1/2L

3'

2'

STEEL POST

TEMPORARY OR PERMANENT DITCH

PLASTIC SLOPE

1.5' (MIN.)

24" DIAMETER

EARTH DIKE

SKIMMER (SIZE VAR.)

SOIL STABILIZATION GEOTEXTILE

UNCLASSIFIED EARTH MATERIAL

COIR FIBER BAFFLE
(SEE ROADWAY STD. DWG. NO. 1640.01)

MODIFIED SILT BASIN TYPE 'B'

2' (MIN.)

2'

3' (MAX.)

4' (MIN.)

6' (MIN.)

9' (MIN.)

ROPE

WOOD STAKES, METAL POST OR STAIR

PLACING MODELS AROUND BARREL PIPE WITH MINIMUM WIDTH 6 IN.

CLASS B STONE PAD (4'x4'x1' MIN.)

NOT TO SCALE

NOTES:
1. SEED AND PLACE MATING FOR EROSION CONTROL ON INTERIOR AND EXTERIOR SIDESLOPES OF BASINS.
2. LIMIT HEIGHT OF EARTH DIKES TO 5 FT.
3. ADDITIONAL MODIFIED SILT BASINS TYPE 'B' MAY BE NEEDED DEPENDING ON SLOPE.
4. FOR BASIN DEPTHS OF 3 FT, THE MINIMUM BASIN WIDTHS SHALL BE 9 FT.
5. DETERMINE PRIMARY SPILLWAY WEIR LENGTHS (FT.) USING Q/0.8, WHERE Q IS FLOW RATE (CFS) INTO UPPER BASIN.
6. SOIL STABILIZATION GEOTEXTILE FOR PRIMARY SPILLWAYS SHALL BE ONE CONTINUOUS PIECE OF MATERIAL OR OVERLAPPED 18 IN. (MIN.)
Sediment Basin Guidance

• Place Sediment Basin at all Feasible Drainage Outlets!

• Design Surface Dewatering Basin @ Jurisdictional Outlets
  – Device with Skimmer
  – Basin with Skimmer plus Riser
  – Infiltration

• If Sediment Basin not Feasible:
  – Place Stone Device at Outlet utilizing Sediment Control Stone
  – Use Flocculant Measures Up Gradient
Flocculant Device Guidance

• Place Flocculant Device at Sediment Basin Inlet

• Place Flocculant Devices in Ditches that:
  – Flow to Jurisdictional Resources
  – Flow to Areas where Surface Area and/or Sediment Storage not achieved

• Design Flocculant Measures with Appropriate Spacing in:
  – Temporary Ditches Carrying Disturbed Area Runoff
  – Proposed Ditches Carrying Disturbed Area Runoff
Don’t Place Flocculant Devices at:

• Drainage Outlets

• Clean Water Diversions

• Live Streams

• Wetlands
Water Quality Evaluation

- Division of Water Resources Surface Water Classifications

- Check for Critical Area (CA) Waters

- Use the Final 2014 303(d) list for Turbidity Impairment
ROADSIDE ENVIRONMENTAL UNIT
SURFACE WATERS PRESENT WORKSHEET

Bucombe County

13 Div.

42324.11 WBS #

B-5167 TIP

Broad River Basin(s)

Flat Creek

9-12

Cf Tr

Name(s) of stream(s) or lake(s) with DWQ index number and classification:

□ No High Quality Water (HQW) and/or Trout Water
□ 303(d) Stream listed for Construction Related Impacts (Sediment and/or Turbidity)
□ Trout Water and/or □ Inland County HQW and/or □ CA water(s) exist
□ Falls Lake Watershed

Location of zone within 1 mile and draining to TrW:
From Sta. Begin to Sta. End
To HQW/CA water:
From Sta. to Sta.
To 303(d):
From Sta. to Sta.

□ Coastal County High Quality Water Exists

Location of zone within 600' to HQW:
From Sta. to Sta.

* Coastal Counties: Beaufort, Bertie, Brunswick, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Perquimans, Tyrrell, and Washington

For projects in the following river basins, Riparian Buffer Zones need to be identified:

□ Neuse River Basin □ Tar-Pamlico River Basin □ Jordan Lake Watershed
□ Catawba River (Main Stem) □ Randleman Lake Watershed

Mark project limits on USGS topographic map(s).

Topo map name(s) Black Mountain

Mark project limits on USDA County Soil Survey map(s), if available.

Soil map sheet number(s) N/A

Filed by: MEH Date: 5-22-12
EC Plan Submittal Items

• Water Quality Sheet
• Checklist
• Matting Spreadsheet
• Basin Design Spreadsheet(s)
• Quantity Spreadsheet (Complete all Tabs!)
• Plans (Hard Copies & PDF)
• Microstation Files
• Special Provisions (If Design Build)
EC Design Procedure

1. Determine Stream Classifications for Water Quality
2. Place Environmentally Sensitive Area (If applicable)
3. Choose Design Storm for Basins (10-yr or 25-yr)
4. Preliminary Sediment Basin Design
5. Culvert Phasing Design (If applicable)
6. Coordinate Stilling Basins with Sediment Basins
7. Design Runoff Conveyances to Sediment Basins
8. Place Perimeter Sediment Control Measures
9. Design Upland Erosion Control
10. Place Plan Sheet Notes
Culvert Phasing Tips

• Avoid Pumping Effluent across Temporary Channels

• Arrange Pipes and Channels for Complete Construction
  – Wing Walls
  – Channel Improvements

• Don’t Show Erosion Control Measures in Phasing

• Coordinate with Traffic Control Plans (Temp. Shoring)

• Culvert Phasing Presentation
Pump and Dike

- Short Duration Process (Max. 5 days!)
- Use for Pipe Installation
- Include Pump-Around Detail in the Plans
- Reference BMP Manual with Note
EXAMPLE OF PUMP-AROUND OPERATION

NOTES:
1) All excavation shall be performed in only dry or isolated areas of the work zone.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) Maintenance of stream flow operations shall be incidental to the work. This includes temporary sheeting, diversion pipes, and basins.
4) Pumps and hoses shall be of sufficient size to drain the work area.

SUGGESTS OF CONSTRUCTION FOR WET WORK AREA
1. Install special sheeting basins.
2. Install upstream pump and temporary flexible hose.
3. Place upstream impervious dikes and bottom plumbing for stream diversion.
4. Place downstream impervious dikes and pumping apparatus. Divert water into impervious area to be drained shall be equal to one day's work.
5. Install impervious dikes in accordance with the plans.
6. Erect and secure accumulated test and detained debris basins, upstream impervious dikes, pump, and temporary flexible hose. Downstream impervious dikes (skirt).
7. Remove special sheeting basins and dikes with stabilized area using seeds and mulch.
Phasing Per BMP Manual Note
Stilling Basin Design

- Volume \((\text{ft}^3)\) = Width of Stream Channel (ft.) \(\times\) (Length of Culvert (ft.) + 20 ft. (10 ft. on Each Side)) \(\times\) (Depth of Water in Stream (ft.) + Undercut for Bottom of Culvert (ft.))

- Typically used for Volumes > 100 CY (2700 ft\(^3\))

- Freeboard = 6 inches (Minimum)

- Design Permeable Stone Drain to Dewater at a Slow Rate

- Add Volume to Required Volume of Sediment Basins
Stilling Basin Volume Design

• Formula for Stilling Basin Volume:

\[
\text{Volume} = \frac{d}{3} \left[ W_{\text{top}} L_{\text{top}} + W_{\text{base}} L_{\text{base}} + \left( \frac{W_{\text{top}} L_{\text{base}} + W_{\text{base}} L_{\text{top}}}{2} \right) \right] + W_{\text{base}} L_{\text{base}} \times 1 \text{ ft.}
\]

• \( d = 2 - 5 \text{ ft.} \)
• Side Slope = 1.5:1
Stilling Basin Storage

Volume = \( W_{\text{base}} L_{\text{base}} \times 1 \text{ ft.} \)

\[
\text{Volume} = \frac{d}{3} \left[ W_{\text{top}} L_{\text{top}} + W_{\text{base}} L_{\text{base}} + \left( \frac{W_{\text{top}} L_{\text{base}} + W_{\text{base}} L_{\text{top}}}{2} \right) \right]
\]
Silt Bag Design & Placement

• Maximum Pumping Rate of 80 gal/min/sf

• Typically, Volumes less than 100 CY (2700 ft$^3$)

• Place Inside Perimeter EC Devices

• Place on Level Ground

• Locate to Avoid Pumping Across Stream
Stilling & Sediment Basin Design

• Example of Stilling Basin as Sediment Basin:

  • Required Volume for Sediment Basin = 1800 ft$^3$
  • Required Volume for Stilling Basin = 1500 ft$^3$
  • Provided Volume of Sediment Basin = 2820 ft$^3$

• Additional Volume Needed for Sediment Basin =

  
  \[ 1800 + 1500 - 2820 = 480 \text{ ft}^3 \]
Temporary Pipe Design & Construction

• Design to 5 times Average Daily Flow (ADF)

• Common Sizes: 15”, 18” and 24”

• Anchor Ends with Impervious Dikes

• Used Primarily for Culvert Extensions
Temporary Channel Design

• Design to 5 times Average Daily Flow (ADF)

• Use Maximum of 2:1 Side Slopes

• Design as Base Ditch

• Don’t Design in Areas of Existing Fill Slopes!
Common CADD Issues

- Devices not Rotated Properly
- Gaps between Perimeter Measures
- Environmentally Sensitive Area (ESA) Hatching
- Placement and Clipping of Notes
Erosion Control Tool Box

• Line Style Shift

• Auto Text Inlet Protection Labeler

• Design & Computation Manager
Keys to D&C Manager

• Set Project Scale

• Place ✓ in Box beside “Place Influence”

• Place ✓ in Box beside “New Element Only”
EC Quantity Procedure

1. Compute Quantities in D&C Manager

2. Export Quantities to CSV File

3. Copy/Paste Quantities from CSV file to EC Mapper

4. Copy/Paste* from Mapper to Quantities Spreadsheet

* - Highlight Matching Cell Areas with Dashed Borders
Design Build Projects

- Erosion Control in Color

- Provide Responses to REU Comments

- Incorporate Previous Comments to Future Submittals

- Stagger New Submittals (At least after 2nd REU Review)

- Clip or Move Notes & Labels for Clear Background
EC Design & Construction Manual

- January 2015 Release Date
- “Flocculant” Replaces “PAM”
- Available Electronically (PDF) at: http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/design_construction_manual/
Questions?