STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243-0348

DESIGN DIVISION DRAINAGE MANUAL
REVISION 10-01

TO: TDOT Design Division Drainage Manual Users

FROM: Ali R. Hangul, C.E. Manager 1
Standards and Quality Assurance Section

DATE: June 8, 2010

SUBJECT: Revision to Chapters 4, 5, 6, 7,9,10 of the Design Division Drainage Manual

Effective immediately, the Chapters 4, 5, 6, 7,9,10, are revised as follows:

Chapter 4

Section 4.04.2.1: Revised section - removed TDOT Regression Equations and revised the USGS regression equations (p. 4-15).

Section 4.04.2.2: Revised section (p. 4-20).

Section 4.04.2.2.1: Added section (p. 4-20).

Section 4.04.2.2.2: Added section (p. 4-20).

Section 4.04.5.3: Revised section – modified TR-20 to TR-55 (p. 4-23).

Section 4.05: Revised Section - Reference to HYDRAIN removed, added approved software TDOTV203 or Stream stat USGS WRIR03-4176, and modified TR-20 to TR-55, Table 4-8 (p. 4-27).

Chapter 4 - Appendix

Section 4.06.2.1.1: Revised Section – Modified table numbers (p. 4A-36, 39).

Section 4.06.2.1.2: Revised Section – Modified table numbers (p. 4A-42, 45).

Section 4.06.2.1.3: Revised Section - Reference to HYDRAIN removed (p. 4A-47).

Section 4.06.2.2.1: Revised Section – Modified table numbers and reference in the text to those table numbers (p. 4A-48, 49, 50, 51, 52, 53, 54, 55)

Section 4.06.4: Revised Section - Reference to HYDRAIN removed from Table 4-11 (p. 4A-59).

Chapter 5

Section 5.07: Reference to HYDRAIN removed from Table 5-2 (p. 5-54).

Section 5.07.2: deleted section (p.5-55)

Section 5.07.3: renamed to 5.07.2 (p.5-55).

Chapter 6

Section 6.04.2: Revised Section - Added PVC pipe to the list of materials for round culverts (p. 6-17).

Section 6.04.2.4.3: Revised Section - Added PVC pipe to the list of pipes with an n-value of 0.013 (p. 6-21).

Section 6.04.3.1.3: Revised Section - Added PVC pipe to HDPE as the types of pipes to use with a Type "6D" endwall (through 36 inches in diameter) for private drives adjoining facilities with speed limits both greater than and less than 50 mph (p. 6-24).

Section 6.04.3.3: Revised Section - Changed the reference to HEC-14 Section XI to HEC-14 Section 10 (p. 6-28).

Section 6.06: Revised Section - Table 6-4, reference to HYDRAIN adjacent to HY-8 removed, and entry for HYCULV removed (p. 6-47).

Section 6.06.3: Revised Section - Last paragraph of was edited to remove reference to HYDRAIN (p. 6-49).

Section 6.06.4: Revised Section - deleted section (p. 6-49).

Section 6.06.5: Revised Section - renamed to 6.06.4. The description of HY-8 was updated to reflect version 7.1 (p. 6-49).

Chapter 6 - Appendix

Section 6.07.1: Revised Section - revised Tables 6A-3, 6A-4, 6A-5, and 6A-6 to reference PVC (p. 6A-15, 16, 17, & 18)

Section 6.07.2.2: Revised Section - revised Example Problem #2 for the Windows HY-8 new release. (p. 6A-30)

Section 6.07.2.4: Revised Section - revised Example Problem #4 for the Windows HY-8 new release. (p. 6A-43)

Section 6.07.2.5: Deleted section - example Problem #5

Chapter 7

Section 7.03: Revised Section - Foot note added to the storm sewer entry on Table 7-1 to require an HGL check for the 50-year storm for all pipes designed for the 10-year event. Also modified "storm system" to "storm sewer system" (p. 7-4).

Section 7.03.4.1: Revised Section - Re-worded the first two sentences to read (p. 7-21):

> *Storm sewer pipes for all classifications of roadway, except local roads, should be reinforced concrete pipe. As shown on Table 6A-1, the use of alternate pipe types is permitted for local roads only.*

Section 7.03.4.2: Revised Section - The pipe sizing criteria in this section were re-worded to read. (p. 7-22):

The minimum round pipe size at any point in a storm sewer system should be 18 inches or equivalent. This includes corrugated metal pipe used for slotted drains when allowed by the Design Manager responsible for the project. Pipe-arches or horizontal elliptical pipes should be no smaller than an equivalent 18-inch round pipe.

The size selection for each pipe in the storm sewer system will normally be based on its hydraulic capacity. The capacity of a pipe is governed by its size, shape, slope, and flow resistance. The most widely used formula to compute hydraulic capacity is Manning's Equation. Manning's Equation assumes a steady uniform flow rate in the storm sewer pipe.

Two different criteria will be applied in order to determine whether a given pipe size will be adequate for the design flow rate. The first is that each pipe in the storm sewer system should have sufficient capacity to pass the design discharge as open channel or gravity flow. To maintain open channel or gravity flow, the depth of flow is usually less than the height of the pipe. In other words, the full-flow capacity of the pipe must be greater than the design flow rate. Detailed procedures for these computations are provided in Section 7.04.5.3.

The second pipe sizing criteria involves the evaluation of hydraulic grade line for the 50-year flow rate. The hydraulic grade line (HGL) is a line coinciding with the level of flowing water at any point along the storm sewer system. When water is flowing through the pipe and there is a space of air between the top of the water and the inside of the pipe, the flow is considered as open channel flow and the HGL is at the water surface. When the pipe is flowing full under pressure flow, the HGL will be above the crown of the pipe. In this situation, the hydraulic grade line is the level to which water would rise in a vertical tube at any point along the pipe.

Where storm sewer pipes have been sized for the 10-year storm frequency, the proposed storm sewer system should be checked to ensure that the HGL computed for the 50-year storm frequency will be below each of the castings in the storm sewer system. However, where the entire system has been designed for the 50-year storm frequency, the HGL check will not be needed. Criteria for selecting the design storm frequency are provided in Section 7.03.

A more detailed discussion of hydraulic grade line computations is provided in Section 7.04.6.

Section 7.03.6: Revised Section - Added PVC to the possible pipe types for bridge end drains (p. 7-31).

Section 7.04.5.1: Revised Section - Removed the reference to Table 6A-1 since it does not specifically discuss pipe types for storm drains, except for local roads (p. 7-54).

Also, added PVC to Table 7-9 (p. 7-55).

Section 7.04.6: Added section - Hydraulic Grade Line Computations (p. 7-58).

Section 7.04.6.1: Added Section (p. 7-60).

Section 7.04.6.1.1: Added Section (p. 7-62).

Section 7.04.6.2: Added Section (p. 7-62).

Section 7.04.6.2.1: Added Section (p. 7-62).

Section 7.04.6.2.2: Added Section (p. 7-63).

Section 7.04.6.2.3: Added Section (p. 7-64).

Section 7.04.6.3: Added Section (p. 7-69).

Section 7.04.6.3.1: Added Section (p. 7-70).

Section 7.04.6.3.2: Added Section (p. 7-71).

Section 7.04.6.3.2.1: Added Section (p. 7-71).

Section 7.04.6.3.2.2: Added Section (p. 7-73).

Section 7.04.6.3.2.3: Added Section (p. 7-74).

Section 7.04.6.3.3: Added Section (p. 7-76).

Section 7.04.6: Renumbered Section to 7.04.7 (p. 7-77).

Section 7.04.6.1: Renumbered Section to 7.04.7.1 (p. 7-77).

Section 7.04.6.2: Renumbered Section to 7.04.7.2 (p. 7-78).

Section 7.04.6.3: Renumbered Section to 7.04.7.3 (p. 7-79).

Section 7.04.6.4: Renumbered Section to 7.04.7.4 (p. 7-82).

Section 7.04.6.5: Renumbered Section to 7.04.7.5 (p. 7-83).

Section 7.04.7: Renumbered Section to 7.04.8 (p. 7-83).

Section 7.05: Removed the section on HYDRA and re-numbered the following sections (p. 7-86).

Section 7.05.2: Deleted the following text: *Visual Urban can be run only under the Windows 95/98 and NT4 operating systems.* (p. 7-86).

Chapter 9

Section 9.03.3.2: Revised Section - The following text (p. 9-6):

> *These energy dissipators consist of a pool at the culvert outfall, followed by an apron that rises to the channel flow line, and a transition to the natural channel cross section (see the Erosion Control section of the TDOT standard drawings). Concentrated flow at the culvert outfall will plunge into one end of the pool and then form a hydraulic jump at the other end, against the apron. Usually, the basin at the culvert outfall will be lined with Machined Riprap (Class C); however, the apron and transition to the natural valley configuration may be constructed of a smaller class of riprap.*
>
> *Riprap basins will be effective when the Froude Number of the culvert outflow is less than 3. It will not be affected by heavy debris loads and does not require a tailwater for efficient operation.*
>
> *This method may be used where allowing a natural scour hole to form will not be acceptable. Typically, the standard cut-off wall depth for the culvert end treatment will be sufficient when this method is employed.*

Was replaced with:

> *These energy dissipators consist of a pool at the culvert outfall, followed by an apron that rises to the channel flow line, and a transition to the natural channel*

cross section (see TDOT standard drawing EC-STR-21 and section 10.08.3 of this manual). Concentrated flow at the culvert outfall will plunge into one end of the pool and then form a hydraulic jump at the other end, against the apron. As a result, the flow will generally be well dispersed as it leaves the basin. In some situations, the design method provided in HEC-14 will require that the basin at the culvert outfall will be lined with a heavier class of Machined Riprap (Class B or C). Where this occurs, the apron and transition to the natural valley configuration may be constructed of a smaller class of riprap.

Riprap basins may be used where allowing a natural scour hole to form will not be acceptable. They will be effective when the Froude Number of the culvert outflow is less than 3. Although a riprap basin may be used where the tailwater depth is high, it is recommended that they be used only where the tailwater depth is less than 75% of the depth of flow at the culvert outfall. They are not affected by heavy debris loads.

For any site where a riprap basin is feasible, the designer should also check the design for a riprap apron (see Section 6.04.3) and select the structure type based on cost. Where the tailwater depth is sufficiently low, a riprap stilling basin can be shorter than a riprap apron. Thus, a basin can help to reduce the costs associated with obtaining a permanent drainage easement and environmental permits. In addition, a basin designed in accordance with HEC-14 can often be constructed using Machined Riprap (Class A1) instead of the heavier classes which would be required for an apron in the same setting. On the other hand, riprap aprons are more easily constructed and can be applied in a wider variety of situations. Section 9.04.2 provides additional information on the applicability of riprap stilling basins.

Typically, the standard cut-off wall depth for the culvert end treatment will be sufficient where a riprap stilling basin is employed.

Section 9.04.2.2.1: Revised Section - The following text (p.9-20):

The TDOT Erosion Control Standard Drawings provide design details for a permanent riprap basin energy dissipator. The procedure provided in HEC-14 may be used to design a riprap basin. The designer should carefully note the differences between the Standard Drawings and HEC-14 in regard to the variable names assigned to the various dimensions of the basin.

The depth of the pool below the culvert outfall (H1 in the Standard Drawings or hs in HEC-14) may be determined from Figure 9A-8, which has been reproduced from HEC-14. To use this figure, the culvert outlet conditions should be computed as described in Section 9.04.1.2. Specifically, the parameters of interest are:

outlet Froude Number, Fr
outlet depth, do
equivalent depth at the outlet, de. It should be noted that this parameter is called ye in Figure 9A-8. Thus, the two variable names may be used interchangeably in the following discussion.

Once the Froude Number of the culvert outflow has been computed, a value for the ratio H1 / de may be determined from Figure 9A-8, where de (called ye in the figure) is the equivalent depth of flow in a round pipe. The chart presents a family of curves in which each curve represents a given ratio between the median diameter of the riprap and the equivalent depth of flow (d50 / de). Although the use of this chart may result in estimates of H1 that are somewhat low, it should be considered adequate for most design problems. When a more

conservative estimate of H1 is desired, the following procedure may be employed:

Step 1: Once the Froude Number and equivalent depth have been computed for the culvert outflow, the ratio d50 / de may be computed for the class of riprap selected for the basin. Values of d50 for machined riprap (Class A1, B, and C) are provided in Section 5.04.7.1.2.

Step 2: Compute a value for H1 / de from Equation 9-9. Values for A1 and A2 may be interpolated from Table 9-4.

$$\frac{H1}{d_e} = A_1 \times Fr + A_2$$

(9-9)

Where: H1 = basin depth below the culvert outfall, (ft)
de (or ye) = equivalent flow depth at the culvert outfall, (ft)
Fr = Froude Number of the flow at the culvert outfall

d_{50} / d_e	A_1	A_2
0.2	3.046	-1.969
0.3	1.857	-1.537
0.4	1.553	-1.430
0.5	1.367	-1.442
0.6	1.306	-1.552
0.7	1.198	-1.580

Table 9-4
Parameters for Estimation of d_{50} / y_e for Riprap Basins
Reference: Adapted from HEC-14

The ratio d50 / de should fall between 0.2 and 0.7 for the class of riprap specified. If not, another class should be selected.

Was replaced with:

The TDOT Standard Drawing EC-STR-21 and section 10.08.3 of this manual provide design details for a permanent riprap basin energy dissipator. The procedure provided in HEC-14 should be used to design a riprap basin. The designer should carefully note the differences between the Standard Drawings and HEC-14 in regard to the variable names assigned to the various dimensions of the basin.

Equation 10.1 in HEC-14 may be used to compute the required depth of a riprap basin (H1 in the Standard Drawings or hs in HEC-14) in a ratio with the equivalent depth (de) at the culvert outfall. This equation contains a correction factor, Co, which varies with the tailwater depth. This correction factor is computed by one of two sets of equations (10.2 or 10.3) depending on whether a more conservative design is desired. In general Equation 10.2 will result in basin depths 1 to 2 feet greater than will Equation 10.3; however, it will also allow a basin to be used in a greater number of situations and is therefore recommended for use.

The application of Equation 10.1 is based on assuming a value for the D50 of the riprap and then back-checking to ensure that the resulting value for H1 meets the following criteria:

$$\frac{H1}{D_{50}} \geq 2 \qquad (9\text{-}9)$$

Theoretically, the most efficient design would be to find select a rock gradation such that the value of this ratio is as close to 2 as possible. In practice, the design should be based on a one of the standard TDOT classes of machined riprap. D50 values for TDOT machined riprap may be found in Section 5.04.7. For the great majority of situations where a riprap stilling basin will be feasible, the value of H1 determined by Equation 10.1 will be between 1.5 and 2.5 feet, even with using Equation 10.2 to determine Co. Thus, Machined Riprap (Class B or C) will be used to construct the basin only for comparatively large culvert installations. For many smaller culverts, the value of H1 determined by Equation 10.1 will be zero or negative, especially where the tailwater depth is more than approximately 85% of the equivalent depth at the culvert outfall. It is recommended that a riprap apron be considered for these situations.

Section 9.04.2.2.5: Revised Section - Reference to Figure 9A-9 was changed to 9A-8 (p.9-36).

Section 9.05: Revised Section - Removed the program HY-8 Energy as it is no longer available and has been incorporated into the Windows version of HY-8. The remaining discussion of HY-8 was revised to remove any reference to HYDRAIN and to list the energy dissipator design capabilities of HY-8 for Windows (p. 9-40).

Chapter 9 - Appendix

Section 9.06.1: Figure 9A-8 (old figure from HEC-14, 1983) was deleted since it is no longer used for riprap stilling basin design. Figure 9A-9 was renamed 9A-8 (p. 9A-13).

Section 9.06.2.2: Revised Section - Example Problem 2, Re-wrote the example problem to reflect the new procedures in HEC-14. (p. 9A-22)

Chapter 10

Section 10.04.3.1: Last paragraph (p. 10-20)

Delete: "Examples of temporary BMPs include check dams, enhanced check dams, silt fence, silt fence with wire backing, temporary seeding with mulch and erosion control blankets."

Insert: "Examples of temporary BMPs include check dams, enhanced check dams, silt fence, silt fence with wire backing, and temporary seeding with mulch."

Section 10.04.3.2: Last paragraph (p. 10-21)

Delete: "Thus, this measure may be considered permanent. More information on permanent turf reinforcement mats is available in Chapter 5 of this Manual."

Insert: "Thus, this measure may be considered permanent. More information on permanent turf reinforcement mats is available in section 10.08.1.12 and Chapter 5 of this Manual."

Section 10.04.4.1: Last paragraph (p. 10-21)

Delete: "Section 10.08.1 provides guidance for the selection of erosion control blankets and Section 5.04 provides guidance on selecting linings for ditches and other waterways."

Insert: "Section 10.08.1 provides guidance for the selection of erosion control blankets and turf reinforcement mats and Section 5.04 provides guidance on selecting linings for ditches and other waterways."

Section 10.04.6.2: Added Section (p. 10-26)

10.04.6.2 Sediment Removal

Sediment material is removed from silt fences, sediment traps, check dams, natural areas, sediment basins, and other locations on a project. Sediment removal is calculated based on the total area inside right-of-way for a project. Additional quantity is added for sediment removal for sediment basins and sediment traps. Sediment removal is calculated as follows:

Sediment Removal (C.Y.) = Area inside ROW (acre) x 34 (CY/acre)

For widening projects the volume of sediment removal is calculated as follows:

Sediment Removal (C.Y.) = Area inside ROW (acre) x 17 (CY/acre)

Additional Sediment Removal for sediment basins and sediment traps is calculated as follows:

Sediment Removal (C.Y.) = $1.25V_w$

V_w = Total volume of wet storage in all sediment basins and sediment traps

Section 10.05.1: Last paragraph (p. 10-28)

Delete: "The EPSC Plan consists of the Erosion Prevention and Sediment Control Sheets as well as the Special Erosion Prevention and Sediment Control Notes which provide additional specifications for the application of the measures shown in the plan."

Insert: "The EPSC Plan consists of the Special Erosion Prevention and Sediment Control Notes, Erosion Prevention and Sediment Control Legend, Erosion Prevention and Sediment Control Quantity Tabulations, and the Erosion Prevention and Sediment Control Sheets. The Special EPSC notes provide additional specifications for the application of the measures shown in the plan."

Section 10.05.1.2: First paragraph (p. 10-28)

Delete: "The Erosion Prevention and Sediment Control Plan should be complete to the extent possible; however, quantity tabulations will not be required until the plans are printed for construction field review."

Insert: "The Erosion Prevention and Sediment Control Plan should be complete to the extent possible. The EPSC Plan should include the Special EPSC Notes, EPSC Legend, and EPSC Site Plan Sheets when the plans are printed for the right-of-way field review; however, EPSC Quantity Tabulations and General EPSC Notes will not be required until the plans are printed for construction field review."

Section 10.05.1.2: Last paragraph (p. 10-29)

Delete: "The Design Manager should contact the Environmental Division when EPSC Plans are revised to determine whether revised plan sheets or other information will be needed."

Insert: "The Design Manager should contact the Environmental Division when EPSC Plans are revised to determine whether revised plan sheets or other information should be submitted to them."

Section 10.05.1.3: First paragraph (p. 10-29)

Delete: "A number of the control measures which may be utilized in an EPSC plan required detailed design based on the expected peak discharges at a site."

Insert: "A number of the control measures which may be utilized in an EPSC plan require detailed design based on the expected peak discharges at a site."

Section 10.05.2: Item 3 (p. 10-30)

Delete: "All other areas should have a good cover of temporary or permanent vegetation, erosion control blankets, or mulch."

Insert: "All other areas should have a good cover of temporary or permanent vegetation, mulch, or erosion control blankets."

Section 10.05.2: Item 4 (p. 10-30)

Delete: "Temporary vegetation, erosion control blankets, and mulches may be used in areas where establishing permanent vegetation is not practical."

Insert: "Temporary vegetation and mulches may be used in areas where establishing permanent vegetation is not practical."

Section 10.05.2: Item 5 (p. 10-30)

Delete: "Exposed soils which are to be left idle for more than 15 days can be covered with temporary or permanent vegetation, erosion control blankets, or mulch materials."

Insert: "Exposed soils which are to be left idle for more than 15 days can be covered with temporary or permanent vegetation, mulch, or erosion control blankets."

Section 10.05.3: First paragraph (p. 10-31)

Delete: "The erosion prevention and sediment control plan sheets are organized into two general sections. The first section contains the Tabulated Erosion Prevention and Sediment Control Quantities and the Special Erosion Prevention and Sediment Control Notes. The Special EPSC Notes describe the project specific operational practices and standards which are to be applied in implementing the proposed EPSC measures. The second section consists of site plan sheets showing the locations the proposed measures, along with any additional performance notes which may be required. An EPSC plan will usually require a complete set of site plan sheets for each phase of the plan, as described in Section 10.05.3.2. The quantity tabulation tables, footnotes, and symbols for specific measures should be shown in the erosion prevention and sediment control plans."

Insert: "The erosion prevention and sediment control plan sheets are organized into two general sections. The first section contains the Special EPSC Notes, EPSC Legend, and Tabulated EPSC Quantities. The Special EPSC Notes describe the project specific operational practices and standards which are to be applied in implementing the proposed EPSC measures. The General EPSC Notes should be located in the project plans with the other project related General Notes. The second section consists of site plan sheets showing the locations of the proposed EPSC measures, along with any additional performance notes which may be required. An EPSC plan will usually require a complete set of site plan sheets for each phase of the plan, as described in Section 10.05.3.2."

Section 10.05.3: Figure 10-9 (p. 10-32)

REPLACE

EROSION PREVENTION AND SEDIMENT CONTROL QUANTITIES

	ITEM NO.	DESCRIPTION	UNIT	QUANTITY
	209-02.07	18" TEMPORARY SLOPE DRAIN	L.F.	400
	209-05	SEDIMENT REMOVAL	C.Y.	370
(1)	209-08.02	TEMPORARY SILT FENCE (WITH BACKING)	L.F.	3400
	209-08.03	TEMPORARY SILT FENCE (WITHOUT BACKING)	L.F.	5200
ALT.	209-09.03	SEDIMENT FILTER BAG (15' X 15')	EACH	1
	209-10.01	TEMPORARY DEWATERING STRUCTURE	C.Y.	592
(2)	303-10.01	MINERAL AGGREGATE (SIZE 57)	TON	67
	709-05.07	MACHINE RIPRAP (CLASS A-1)	TON	60
(3)	740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL)	S.Y.	680

FOOTNOTES
(1) INCLUDES 400 L.F. FOR SEDIMENT FILTER BAG
(2) INCLUDES 47 TONS FOR SEDIMENT FILTER BAG
(3) INCLUDES 340 S.Y. FOR SEDIMENT FILTER BAG

Section 10.05.3.1: First Paragraph (p. 10-32)

Delete: "These notes consist of lists of instructions to the contractor and should be developed as described in Section 4-135.00 of the Roadway Design Guidelines. Usually, the first sheet of the EPSC plan will include the Tabulated Erosion Prevention and Sediment Control Quantities, the Special Erosion Prevention and Sediment Control Notes, and the Erosion Prevention and Sediment Control Legend."

Insert: "These notes consist of lists of instructions to the contractor and should be developed as described in Sections 4-135.00 and 4-135.05 of the Roadway Design Guidelines. The first sheet of the EPSC plan should include the Special Erosion Prevention and Sediment Control Notes, the Erosion Prevention and Sediment Control Legend, and the Tabulated Erosion Prevention and Sediment Control Quantities."

Section 10.05.3.1: Second Paragraph (p. 10-34)

Move This Paragraph after the EPSC Legend Paragraph

Insert as first sentence of paragraph: "The Tabulated EPSC Quantities should be added to the first sheet of the EPSC Plans."

Section 10.05.3.1: Third Paragraph (p. 10-33)

Delete: "**Erosion Prevention and Sediment Control Notes:** The General Erosion Prevention and Sediment Control Notes shown on the second sheets of the project plans are general in nature and describe practices which are to be maintained on all projects. Some of the issues discussed in these notes include frequency of inspection; the limiting of exposed areas; and proper protection of waters of the State. The Roadway Design Guidelines should be consulted to determine the up-to-date list of these notes."

Insert: "**General Erosion Prevention and Sediment Control Notes:** The General Erosion Prevention and Sediment Control Notes should be located in the project plans with the other project related General Notes. They are general in nature and describe practices which are to be maintained on all projects. Some of the issues discussed in these notes include frequency of inspection; the limiting of exposed areas; and proper protection of waters of the State. Sections 4-135.00 and 6-190.00 of the Roadway Design Guidelines should be used

when developing the General EPSC Notes for the project and for an up-to-date list of these notes."

Section 10.05.3.1: Fourth Paragraph (p. 10-33)

Delete: "The Erosion Prevention and Sediment Control Legend provides a list in tabular form of BMPs to be used on a project."

Insert: "The Erosion Prevention and Sediment Control Legend should be added to the first sheet of the EPSC Plans. The EPSC Legend provides a list in tabular form of BMPs to be used on a project."

Section 10.05.3.1: Fifth Paragraph (p. 10-33)

Move This Paragraph after the General EPSC Notes Paragraph

Delete: "**Special Erosion Prevention and Sediment Control Notes:** The Special Erosion Prevention and Sediment Control Notes provide project specific information on requirements for the proposed erosion prevention and sediment control measures, as well as specific steps the contractor is to take in the execution of the EPSC plan. The designer should develop these notes based on his or her specific knowledge of the project conditions. The Special EPSC Notes should also reflect any notes pertaining to the EPSC Plans provided by the Environmental Division."

Insert: "**Special Erosion Prevention and Sediment Control Notes:** The Special Erosion Prevention and Sediment Control Notes found in Section 6-290.00 of the Roadway Design Guidelines shall be added to the first sheet of the EPSC Plans, unless indicated otherwise. They provide project specific information on requirements for the proposed erosion prevention and sediment control measures, as well as specific steps the contractor is to take in the execution of the EPSC plan. Placement of these notes shall follow the guidance indicated in Section 6-290.00 of the Roadway Design Guidelines to determine if a particular note is required.

As needed the designer should add any additional Special EPSC Notes which provide project specific information on requirements for the proposed EPSC measures, as well as specific steps they contractor is to take in the execution of the EPSC plan. These notes should also be added to the first sheet of the EPSC Plans.

Any additional Special EPSC Notes provided by the Environmental Division shall be shown on the first sheet of the EPSC Plans."

Section 10.05.3.1: Sixth Paragraph (p. 10-33)

Move This Paragraph after the Special EPSC Notes Paragraph

Section 10.05.3.1: NEW Paragraph (p. 10-33)

Insert after Special EPSC Notes for Utility Relocations Paragraph: "**Special Erosion Prevention and Sediment Control Notes for NPDES Permitted Projects:** When a project requires a NPDES permit, the Special Erosion Prevention and Sediment Control Notes for NPDES should be included with the Special EPSC Notes in the EPSC Plans. The current version of the Roadway Design Guidelines should be consulted for an up-to-date list of these notes."

Section 10.05.3.1: Figure 10-10 (p. 10-34)

REPLACE

EROSION PREVENTION AND SEDIMENT CONTROL LEGEND		
SYMBOL	ITEM	STD. DWG.
	DEWATERING STRUCTURE	EC-STR-1
	SEDIMENT FILTER BAG	EC-STR-2
SF SF SF	SILT FENCE	EC-STR-3B
SFB SFB SFB	SILT FENCE WITH WIRE BACKING	EC-STR-3C
	ROCK CHECK DAM (TRAPEZOIDAL DITCH)	EC-STR-6
	ROCK CHECK DAM (V-DITCH)	EC-STR-6
	ENHANCED ROCK CHECK DAM (TRAPEZOIDAL DITCH)	EC-STR-6A
	TEMPORARY BERM	EC-STR-27
	TEMPORARY SLOPE DRAIN	EC-STR-27

Section 10.05.3.2: First Paragraph (p. 10-34)

Delete: "Following the erosion prevention and sediment control notes sheets, the EPSC plan consists of roadway plan sheets showing the proposed construction with symbols denoting the intended locations of all BMPs, as well as any needed performance notes."

Insert: "Following the erosion prevention and sediment control notes sheets, the EPSC site plan sheets consists of roadway plan sheets showing the proposed construction with symbols denoting the intended locations of all BMPs, as well as any needed performance notes."

Section 10.05.3.2: Second Paragraph (p. 10-35)

Delete: "At a minimum, the following features should be included on the erosion prevention and sediment control plan sheets:"

Insert: "At a minimum, the following features should be included on the erosion prevention and sediment control site plan sheets:"

Section 10.05.3.2: Second Paragraph (p. 10-35)

Insert to list of minimum features: "Storm water outfall locations"

Section 10.05.3.2: Fourth Paragraph (p. 10-35)

Delete: "A complete depiction of the existing (pre-construction) contours for a project should be shown either on the Drainage Map or on separate Existing Contour sheets. When they are used, Existing Contour Sheets should be developed at the same scale as the EPSC plans. Existing contours may be included as needed on the Phase 1 EPSC Plan sheets. Proposed (post-construction) contours should be shown either on the Phase 2 EPSC Plan sheets or on separate Proposed Contour sheets. Again, when separate Proposed Contour Sheets are used, they should be at the same scale at the EPSC plan sheets. When the existing and proposed contours are shown on separate sheets, these sheets should be included in the

plans following the EPSC Plan sheets. Refer to the Roadway Design Guidelines and current Instructional Bulletins for additional information."

Insert: "A complete depiction of the existing (pre-construction) contours for a project should be shown either on Phase 1 EPSC site plans sheets or on separate Existing Contour sheets. When they are used, Existing Contour Sheets should be developed at the same scale as the EPSC site plan sheets. Proposed (post-construction) contours should be shown either on the Phase 2 EPSC Plan sheets or on separate Proposed Contour sheets. Again, when separate Proposed Contour Sheets are used, they should be at the same scale as the EPSC site plan sheets. When the existing and proposed contours are shown on separate sheets, these sheets should be included in the plans following the EPSC Plan sheets. Refer to the Roadway Design Guidelines and current Instructional Bulletins for additional information."

Section 10.05.3.3: First Paragraph (p. 10-36)

Delete: "The EPSC plan sheets should show the TDOT approved standard EPSC symbols at the intended location of the BMP on the proposed plan."

Insert: "The EPSC plan sheets should show the TDOT approved standard EPSC symbols at the intended location of the BMP on the EPSC site plan sheets."

Section 10.05.3.4: NEW SECTION (p. 10-36)

"10.05.3.4 Storm Water Outfalls"

Section 10.06.2.1: First Paragraph (p. 10-40)

Delete: "temporary construction road entrances and/or exits"

Insert: "temporary construction exits"

Section 10.06.2.1: Second Paragraph (p. 10-40)

Delete: "First, any permanent erosion or sediment measures should not be included in this phase of the plan."

Insert: "First, any permanent EPSC measures should not be included in this phase of the plan."

Chapter 10 Erosion BMPs

Section 10.08.1.1: (p. 10EP-2)

Delete: "10.08.1.1 ENHANCED SILT FENCE CHECK (EC-STR-4 and 4A)"

Insert: "10.08.1.1 ENHANCED SILT FENCE CHECK (EC-STR-4, 4A, and 4B)"

Section 10.08.1.1.4: Figure 10EP-1 (p. 10EP-4)

REPLACED

Station (LT or RT)	L (ft)	X1 (ft)	X2 (ft)	Overflow Weir Length (ft)	Total Length of ESF (ft)	Widened Zone				
						Bottom Width (ft)	Side Slope (H:1)	Length (ft)	Transition	
									Ratio	Length (ft)

Section 10.08.1.4.5: Step 3 (p. 10EP-26)

Delete: "Since it is to be extended 10 feet on either side of the channel banks, it is first necessary to compute the top width of the channel."

Insert: "Since it is to be extended 50 feet on either side of the channel banks, it is first necessary to compute the top width of the channel."

Section 10.08.1.4.5: Step 3 Item 303-10.01 (p. 10EP-26)

Delete: "Adding the 10-feet of additional length on either side of the channel yields a total length of approximately 39 feet. Thus, the volume of aggregate required may be computed as:

$$Volume = (39)(2)(0.5) = 234 CF / 27 = 8.7 \text{ CY}$$

Multiplying this by 1.75 Tons/CY yields a final quantity of 15.2 tons."

Insert: "Adding the 50-feet of additional length on either side of the channel yields a total length of approximately 119 feet. Thus, the volume of aggregate required may be computed as:

$$Volume = (119)(2)(0.5) = 714 CF / 27 = 26.4 \text{ CY}$$

Multiplying this by 1.75 Tons/CY yields a final quantity of 46.2 tons."

Section 10.08.1.4.5: Step 3 Item 740-10.03(p. 10EP-28)

Delete: "First, the plan area of the mineral aggregate (size 57) was determined above to be 39 feet by 12 feet, or 468 SF, which corresponds to an area of 52.0 SY."

Insert: "First, the plan area of the mineral aggregate (size 57) was determined above to be 119 feet by 12 feet, or 1428 SF, which corresponds to an area of 159 SY."

Section 10.08.1.4.5: Step 3 Item 740-10.03 (p. 10EP-29)

Delete: "Thus, the total quantity of geotextile required is:

$$Area = 52.0 + 59.2 = 111.2 \text{ SY}$$"

Insert: "Thus, the total quantity of geotextile required is:

$$Area = 159.0 + 59.2 = 218.2 \text{ SY}$$"

Section 10.08.1.8: Added new section called TEMPORARY INSTREAM DIVERSION (p. 10EP-41)

Section 10.08.1.12.4: (p. 10EP-70)

Delete: "When erosion control blankets are used with seeded with crown vetch mixture, it will not be necessary to use mulch."

Insert: "When erosion control blankets are used with crown vetch mixture, it will not be necessary to use mulch."

Section 10.08.1.17: Added new section called SOIL STABILIZATION (p. 10EP-95)

Section 10.08.1.18: Added new section called POLYACRYLAMIDE (p. 10EP-99)

Chapter 10 Sediment BMPs

Section 10.08.2.2.4: Revised Section – Replace Figure 10SC-1a & Figure 10SC-1b (p. 10SC-7)

Attachement