Sheet Flow to Vegetated Filter Strips & Conserved Open Space

Q1: The flow to this vegetated filter strip is 4 cubic feet/second (cfs). What is the minimum length for the lip of the engineered level spreader? What are the minimum and maximum level spreader lengths in general?

Q1: The flow to this vegetated filter strip is 4 cubic feet/second (cfs). What is the minimum length for the lip of the engineered level spreader? What are the minimum and maximum level spreader lengths in general?

A: Minimum for this one = 52 linear feet. In general, min. = 13 feet; max = 130 feet. TABLE 2.2, SECTION 6.3.

Q2: A gravel diaphragm is required to spread flow to both Vegetated Filter Strips & Conserved Open Space. What width and depth should the diaphragm be built to? How far should the “drop” be from the pavement onto the diaphragm?

Q2: A gravel diaphragm is required to spread flow to both Vegetated Filter Strips & Conserved Open Space. What width and depth should the diaphragm be built to? How far should the “drop” be from the pavement onto the diaphragm?

A: 2 foot wide & 1 foot deep. Drop of at least 3 inches. SECTION 6.3, FIGURE 2.5 (SHOW 2-4” DROP).

What happens without a drop!

Q3: This Open Space area is 50 feet wide; what is the maximum slope for the Open Space? What is the maximum flow length for sheet flow from turf onto the Open Space area?

Q3: This Open Space area is 50 feet wide; what is the maximum slope for the Open Space? What is the maximum flow length for sheet flow from turf onto the Open Space area?

A: Maximum slope of Open Space area = 6%. Maximum flow length = 150 feet from pervious areas. TABLE 2.2.

Q4: What materials can be used to construct the Engineered Level Spreader? Would you say that this level spreader appears to be working?

Photo: R. Winston; BAE Stormwater Engineering Group, NCSU

Q4: What materials can be used to construct the Engineered Level Spreader? Would you say that this level spreader appears to be working?

A: Concrete, metal, timber, or other rigid, non-erodable material (TABLE 2.3, SECTION 6.3). This level spreader may not be level and is holding water.

Q5: During construction, what should be used to protect the perimeter of the Conserved Open Space area? Is this example adequate?

Q5: During construction, what should be used to protect the perimeter of the Conserved Open Space area? Is this example adequate?

A: Super silt fence, chain link fence, orange safety fence; measure to prevent sediment discharge. SECTION 8.1. This example may be adequate, but super silt fence is specified.

Permeable Pavement Exercise

Q6: If this permeable pavement area is 1,500 square feet, what is the maximum "external" asphalt area that can drain onto it? Would this be a Level 1 or Level 2 design?

Q6: If this permeable pavement area is 1,500 square feet, what is the maximum "external" asphalt area that can drain onto it? Would this be a Level 1 or Level 2 design?

A: Max asphalt area draining to permeable would be 3,000 square feet (2:1 ratio). Any permeable pavement with an external drainage area is Level 1. TABLE 7.3 & SECTION 5, EXTERNAL DRAINAGE AREA

Q7: You show up for an inspection and observe the following. The plan calls for a Level 2 permeable pavement. How can you confirm this? What is the key difference in the underdrain between Level 1 and 2? BONUS: Is the right underdrain material being used here?

Q7: You show up for an inspection and observe the following. The plan calls for a Level 2 permeable pavement. How can you confirm this? What is the key difference in the underdrain between Level 1 and 2? BONUS: Is the right underdrain material being used here?

A: Confirm 12 inch stone sump BELOW underdrain pipe OR contractor data on 48-hour drain time. Level 2 can also be an infiltration design with NO underdrain. Level 1 does NOT require the stone sump. TABLE 7.3. Underdrain pipe should be PVC; HDPE can be used for small applications. TABLE 7.5.

Q8: As an inspector, would you say this permeable pavement is ready for installation? If not, what measures would you recommend?

Q8: As an inspector, would you say this permeable pavement is ready for installation? If not, what measures would you recommend?

A: PP area protected from sediment. Drainage area stabilized. Install temporary E&S controls (silt fence). SECTIONS 8.1 & 8.2 – STEPS 1 AND 2.

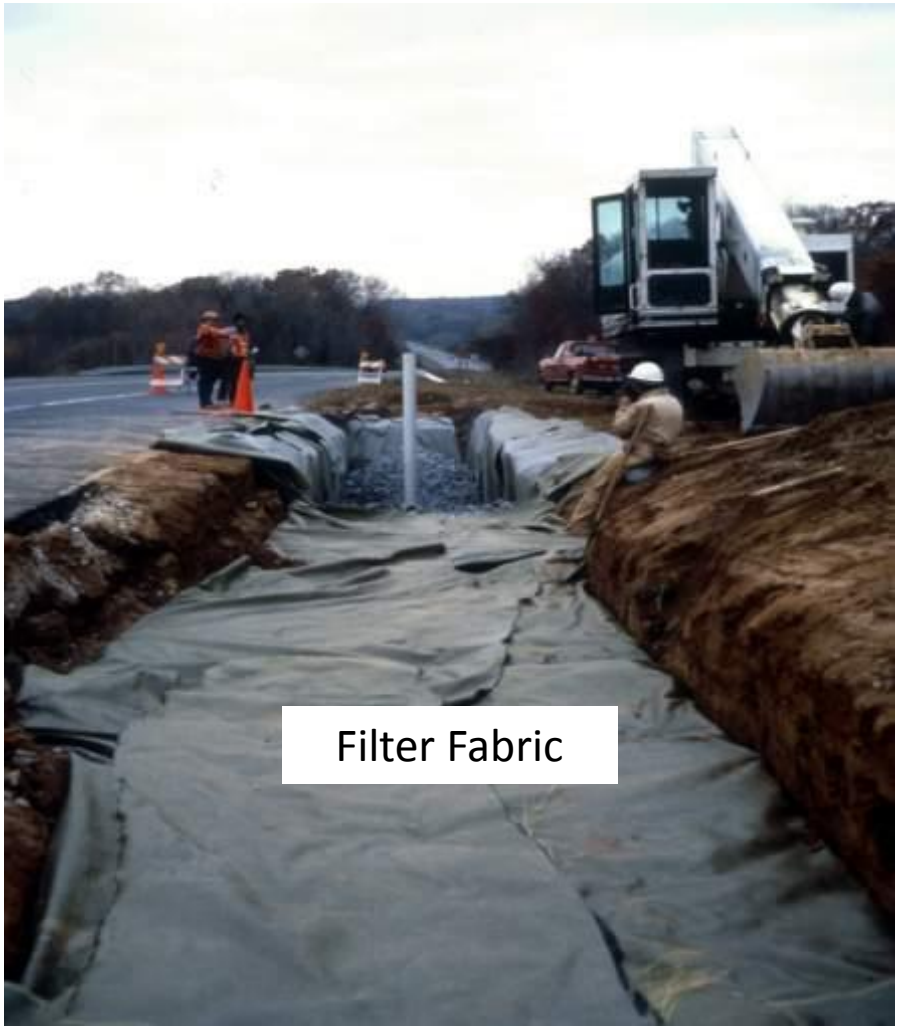
Bioretention Exercise

Q9: You show up for an inspection of this bioretention facility under construction. What steps should be taken prior to installation of the bioretention filter (soil) media?

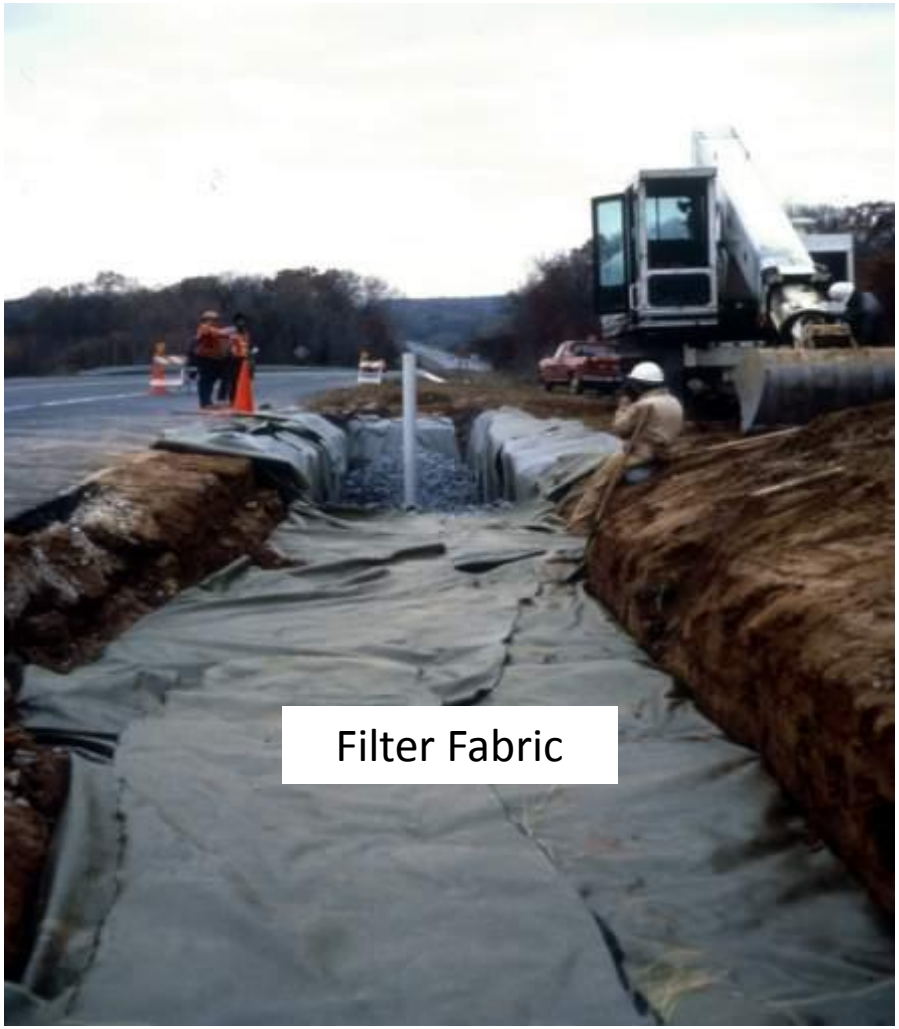
Q9: You show up for an inspection of this bioretention facility under construction. What steps should be taken prior to installation of the bioretention filter (soil) media?

A: Stabilize drainage area. Install temporary E&S controls. SECTION 8.2, STEPS 1 & 3

Q10: Which of the following shows the proper materials for separating the underdrain layer from the soil media to be installed above the underdrain stone?



Q10: Which of the following shows the proper materials for separating the underdrain layer from the soil media to be installed above the underdrain stone?



A: RIGHT: Pea gravel on top of #57 stone. Do NOT use filter fabric to cover underdrain

Proper use of filter fabric/geotextile: strip over underdrain pipe ONLY

AND/OR sides

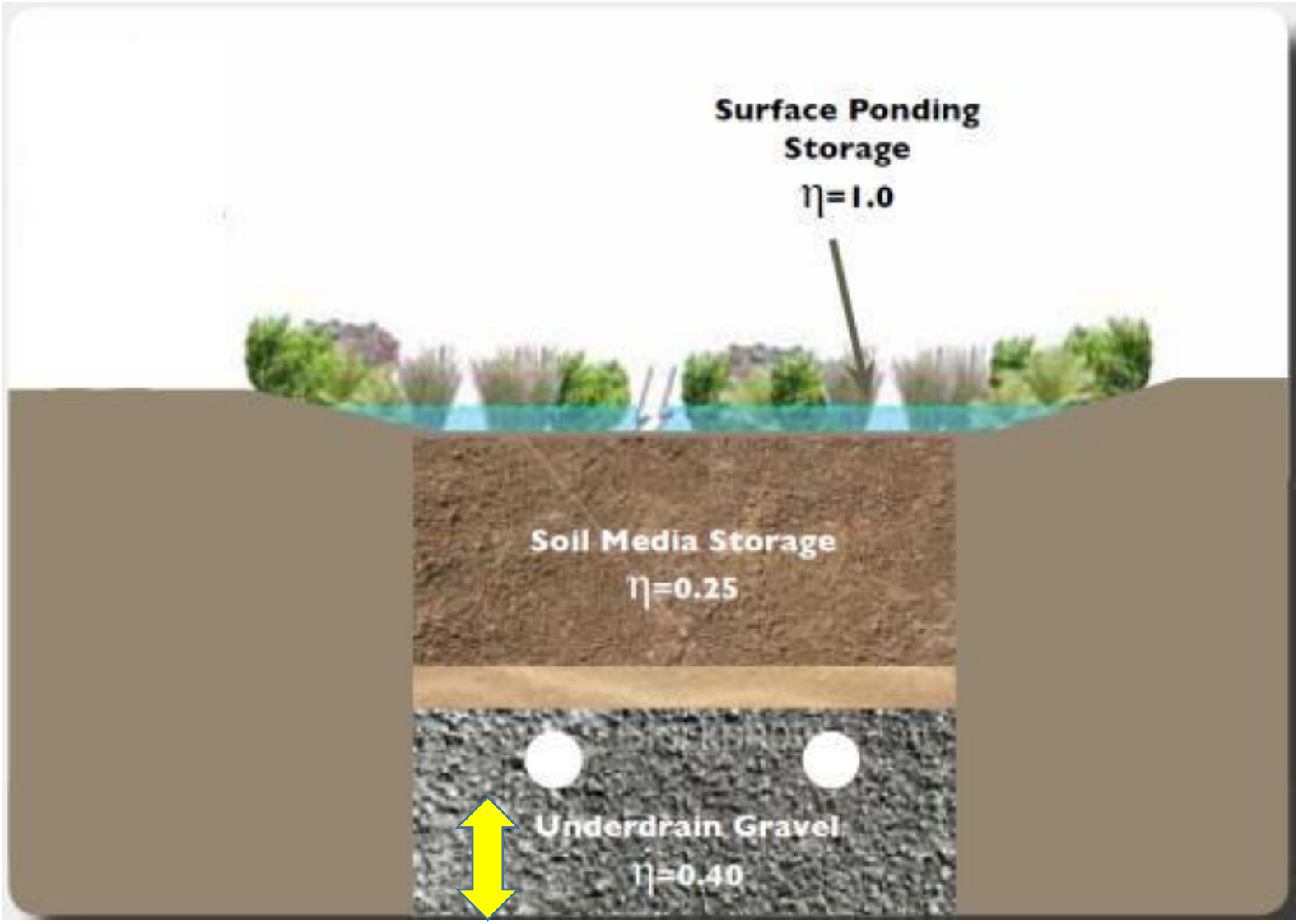
EXCEPTION: KARST (Section 7.1)

Q11: The plan calls for a Level 2 Bioretention. What will you measure to make sure it is following the specifications? How is this different than Level 1?

Q11: The plan calls for a Level 2 Bioretention. What will you measure to make sure it is following the specifications? How is this different than Level 1?

A: Filter media depth = min. of 36 inches for Level 2; 24 inches for Level 1 (Table 9.3).
BONUS: Check for underdrain sump (Table 9.3, Figure 9.4b, Section 6.7)

Level 2: 12 inch underdrain sump below underdrain pipes OR No underdrain if infiltration test conducted



Q12: The soil media should be installed in what incremental thickness until the desired depth is achieved?

Q12: The soil media should be installed in what incremental thickness until the desired depth is achieved?

A: 12 inch lifts. SECTION 8.2, STEP 8

Q13: What is right AND wrong about this installation of the filter media?

Q13: What is right AND wrong about this installation of the filter media?

A: Equipment working from sides (right) AND in the middle (wrong). SECTION 8.2, STEP 5

Q14: As a certified SWM Inspector acting on behalf of the VSMP Authority, at what construction/installation milestones would you want to perform an inspection? How many inspections would you plan to conduct?

Q14: As a certified SWM Inspector acting on behalf of the VSMP Authority, at what construction/installation milestones would you want to perform an inspection? How many inspections would you plan to conduct?

A: 3 to 4: 1 to ensure site is stabilized, 1 or 2 during installation, and a final inspection. Would also want to inspect installation sequence photos from contractor.

Extended Detention Exercise

Q15: This pond is supposed to be in its post-construction configuration. What actions should take place? BONUS: What design feature is missing?

Q15: This pond is supposed to be in its post-construction configuration. What actions should take place? BONUS: What design feature is missing?

A: Dredge and regrade to design dimensions. SECTION 8.1, STEP 2. BONUS: Missing pre-treatment forebay & outlet micro-pool. TABLE 15.2, FIGURES 15.1 & 15.2, SECTIONS 6.4 (FOREBAY) & 6.5 (MICROPOOL).

Q16: For construction inspections, what stages are recommended for inspections?

Q16: For construction inspections, what stages are recommended for inspections?

A: (1) pre-construction meetings, (2) initial site preparation, (3) excavation/grading, (4) installation of embankment, riser, outlet structure, (5) pondscaping & vegetation, and (6) final inspection. SECTION 8.2.