Appendix H

Example Construction-Phase Checklists for Inspector and Contractor Training

Introduction and Purpose

DOT representatives have identified construction phase issues as a common causes of infiltration BMP failure. This appendix contains simple construction-phase checklists that DOTs can use to support training of construction inspectors and contractors related to construction of infiltration BMPs. These checklists address key issues that can occur during the construction phase. They are intended to serve as a quick reference for a site inspector or contractor in identifying and avoiding these issues.

The checklists contained in this Appendix address the following key construction objectives:

1. Prevent and Remediate Compaction of Underlying Soil
2. Prevent Compaction of Engineered Filtration Soil (Bioretention Soil, Amended Soil)
3. Prevent and Remediate Siltation During Construction
4. Prevent and Remediate Erosion and Siltation During Establishment Period

The general construction checklist provides general recommended practices for addressing these issues. These recommendations apply to the site regardless of BMP type.

The BMP-specific construction checklist provides more specific recommendations for that apply to one or more BMPs. The checklist indicates the BMP(s) to which these recommendations apply.

Objective 1: Prevent and Remediate Compaction of Underlying Soil

Key issues	• Construction equipment • Material stockpiling • Highway traffic detours

Recommended Practices	
1. Stake off infiltration areas with construction fence or other barriers	Yes ☐ No ☐ N/A ☐
2. Mark infiltration areas on all construction sheets, such as haul routes, stockpiling areas, traffic detours	Yes ☐ No ☐ N/A ☐
3. Do not allow equipment, vehicle traffic or stock piling in these areas	Yes ☐ No ☐ N/A ☐
4. Make equipment operators aware of infiltration areas as part of construction meetings	Yes ☐ No ☐ N/A ☐
5. Excavate to finish grade of infiltration areas after most other construction is complete	Yes ☐ No ☐ N/A ☐
6. Remediate infiltration areas via tilling and/or scarification to at least 12 inches depth after excavation to finish grade and after equipment will no longer access the BMP	Yes ☐ No ☐ N/A ☐
7. Use construction-phase infiltration tests to confirm that infiltration rates have been restored	Yes ☐ No ☐ N/A ☐

Objective 2: Prevent Compaction of Engineered Filtration Soil (Bioretention Soil, Amended Soil)

Key issues	• Placement methods • Material moisture when placed

Recommended Practices	
1. Place media from the side of BMP whenever possible	Yes ☐ No ☐ N/A ☐
2. If equipment access to BMP is needed to place media, use low ground pressure equipment	Yes ☐ No ☐ N/A ☐
3. Do not place media if wet or if underlying soils are wet	Yes ☐ No ☐ N/A ☐
4. Lightly compact to approximately 75 to 80 percent relative compaction (or hydro-consolidate via flooding with water)	Yes ☐ No ☐ N/A ☐
5. Use construction-phase infiltration tests on a pilot plot to confirm that placement methods yielding adequate media infiltration rates	Yes ☐ No ☐ N/A ☐
6. Repeat testing of media infiltration rate at appropriate intervals through placement of media	Yes ☐ No ☐ N/A ☐

Objective 3: Prevent and Remediate Siltation During Construction	
Key issues	• Sediment in construction runoff to BMP • Erosion from graded BMP slopes or upper BMP cells
Recommended Practices	
1. Do not use infiltration BMPs for construction-phase sediment control	Yes ☐ No ☐ N/A ☐
2. If BMPs must be used, then partially excavate during construction (stop 2 feet short of final grade) and then continue excavation to finish grade after construction	Yes ☐ No ☐ N/A ☐
3. When BMPs are commissioned for completed phases, carefully control sediment track-out from phases of ongoing construction	Yes ☐ No ☐ N/A ☐
4. If siltation occurs, over excavate to at least 1 feet and backfill with selective fill materials	Yes ☐ No ☐ N/A ☐
5. Use infiltration testing to ensure infiltration rates have been restored after rehabilitation	Yes ☐ No ☐ N/A ☐
6. If BMP must be excavated to finish grade to serve as temporary sediment pond, consider lining pond with a sacrificial liner, such as an impermeable plastic membrane, that can be removed and disposed after construction.	Yes ☐ No ☐ N/A ☐

Objective 4: Prevent and Remediate Erosion and Siltation During Establishment Period	
Key issues	• Erosion from partially established tributary areas • Erosion from bed of BMP (upper cells resulting in sediment of lower cells)
Recommended Practices	
1. Do not allow water to flow to BMPs until the site is fully stabilized	Yes ☐ No ☐ N/A ☐
2. Initiate vegetation establishment well in advance of project completion to allow stabilization prior to BMP commissioning	
3. For vegetated BMPs, install soil amendment and vegetation well in advance of project completion to allow vegetation and root structure to establish before stormwater loading – including side slopes	Yes ☐ No ☐ N/A ☐
4. Provide irrigation, if needed, to promote more rapid vegetation establishment	Yes ☐ No ☐ N/A ☐
5. Keep environmental and construction permits open until site has full established to allow for access to perform remediation	Yes ☐ No ☐ N/A ☐

BMP-Specific Construction Checklist

Project Name_____

BMP Types_____

Location_____

Contractor Name_____

Reviewer Name_____

Inspection Date and Time _____

		Bioretention with underdrain	Bioretention no underdrain	Infiltration Trench	Infiltration Basin	Vegetated Conveyance	Permeable Shoulders	Media Filter Drain	Dispersion	Underground Infiltration
A. EXCAVATION										
1. Facility excavated to the dimensions and at the location shown on the approved plan. Excavation must be free of any standing water.	Yes ☐ No ☐ N/A ☐	x	x	x	x	x	x	x		x
2. Facility excavated from the sides to avoid compacting the existing soil.	Yes ☐ No ☐ N/A ☐	x	x	x	x	x	x	x		x
3. Bottom was scarified prior to placement of rock and sand or media (and sides if bioretention, infiltration trenches)	Yes ☐ No ☐ N/A ☐	x	x	x	x		x			
4. Bottom of excavation within design slope range per the approved plan	Yes ☐ No ☐ N/A ☐		x	x	x		x	x		x
5. Excavation sidewalls are consistent with the approved plan	Yes ☐ No ☐ N/A ☐	x	x	x				x		x
B. PIPING AND DRAINAGE	Yes ☐ No ☐ N/A ☐									
1. Inlet protection was installed at the inflow, if applicable, per the approved plan.	Yes ☐ No ☐ N/A ☐	x	x	x	x		x	x		x
2. Overflow pipe or catch basin was installed at the elevation/depth that is specified on the approved plan	Yes ☐ No ☐ N/A ☐	x	x							
3. Underdrain pipe material and size are as shown on the approved plan, if applicable.	Yes ☐ No ☐ N/A ☐	x			x		x	x		x
4. Underdrain was constructed at the depth/elevation specified in the approved plan.	Yes ☐ No ☐ N/A ☐	x			x		x	x		
5. Underdrain piping was laid flat or on a positive slope toward the outlet as shown on the approved plans.	Yes ☐ No ☐ N/A ☐	x			x		x	x		
6. Underdrain pipe perforations as shown in the approved plan.	Yes ☐ No ☐ N/A ☐	x			x		x	x		
7. Clean-out access and/or observation ports are installed to view subsurface water level	Yes ☐ No ☐ N/A ☐	x	x	x			x			x
8. Double-washed crushed aggregate or clean stone was installed around the underdrain pipe.	Yes ☐ No ☐ N/A ☐	x	x		x			x		
9. Manhole/maintenance catch basin installed at elevations as specified on the approved plan.	Yes ☐ No ☐ N/A ☐									x
10. Chambers were installed as shown on the approved plan.	Yes ☐ No ☐ N/A ☐									x
C. GRADING										
1. Channel protection and/or level spreader was provided at infiltration (or bio) inlets as specified on the approved plan	Yes ☐ No ☐ N/A ☐	x	x	x	x					
2. Spillway or top of berm was constructed to design elevation and dimensions per the approved plan	Yes ☐ No ☐ N/A ☐	x	x	x	x					
3. Side slopes of infiltration basin or bioretention buffer area (above design top of bioretention soils media) is no steeper than 3:1 (unless approved by geotechnical engineer)	Yes ☐ No ☐ N/A ☐	x	x		x					

BMP-Specific Construction Checklist

Project Name BMP Types Location Contractor Name Reviewer Name Inspection Date and Time		Bioretention with underdrain	Bioretention no underdrain	Infiltration Trench	Infiltration Basin	Vegetated Conveyance	Permeable Shoulders	Media Filter Drain	Dispersion	Underground Infiltration
4. Side slopes installed as noted on the approved plan.	Yes ☐ No ☐ N/A ☐					x				
5. Bottom of channel or basin graded as noted on the approved plan.	Yes ☐ No ☐ N/A ☐	x	x		x	x				
6. Installation of check dams (as needed) as shown on the approved plan (swales and linear bioretention)	Yes ☐ No ☐ N/A ☐	x	x			x	x			
7. Grading of level spreader and filter strip or media filter drain promotes sheet flow	Yes ☐ No ☐ N/A ☐							x	x	
D. SOIL MEDIA										
1. Bioretention soil media was installed in accordance with the approved plan.	Yes ☐ No ☐ N/A ☐	x	x							
2. Bioretention soil media was spread out using an excavator from the side of the excavation area to minimize compaction.	Yes ☐ No ☐ N/A ☐	x	x							
3. Bioretention soil media was installed when it was optimally moist (not wet or dry) and there was no precipitation.	Yes ☐ No ☐ N/A ☐	x	x							
4. Bioretention soil media was placed within bioretention facilities during the same day that the area was excavated to prevent contamination if a runoff event occurred prior to placement of soil media.	Yes ☐ No ☐ N/A ☐	x	x							
5. Media permeability was tested to verify placement methods did not compromise permeability	Yes ☐ No ☐ N/A ☐	x	x							
E. VEGETATION										
1. Vegetation planted per the numbers and species specified on the approved planting plan.	Yes ☐ No ☐ N/A ☐	x	x		x	x				
2. Plants occupy about 50% of the total surface area of the bioretention soil media.	Yes ☐ No ☐ N/A ☐	x	x							
3. Individual plant spacing follows the recommendations on the approved plan.	Yes ☐ No ☐ N/A ☐	x	x							
4. Trees were planted only around the perimeter of the facility in the native soil, and not in the bioretention soil media.	Yes ☐ No ☐ N/A ☐	x	x							
5. Phase construction to allow vegetation establishment prior to commissioning BMP	Yes ☐ No ☐ N/A ☐	x	x		x	x		x	x	
6. Stabilize side slopes of BMP prior to placing media or excavating to finish grade	Yes ☐ No ☐ N/A ☐	x	x		x					
7. Topsoil and/or compost amendments are applied evenly over the pervious area, and in quantities and depths specified in the approved plan.	Yes ☐ No ☐ N/A ☐								x	
8. Vegetation applied at a rate to achieve 90% germination and as shown on the approved plan.	Yes ☐ No ☐ N/A ☐					x			x	

BMP-Specific Construction Checklist

Project Name_____ BMP Types_____ Location_____ Contractor Name_____ Reviewer Name_____ Inspection Date and Time _____		Bioretention with underdrain	Bioretention no underdrain	Infiltration Trench	Infiltration Basin	Vegetated Conveyance	Permeable Shoulders	Media Filter Drain	Dispersion	Underground Infiltration
9. Seed mix specified on the approved plan has been applied.	Yes ☐ No ☐ N/A ☐					x			x	
10. Biodegradable erosion control blanket was installed over the previous area for protection while seed germination occurs.	Yes ☐ No ☐ N/A ☐					x			x	
F. EROSION AND SEDIMENT CONTROL										
1. Run-on protections are in place around this facility if there are areas that slope toward this facility or that could potentially discharge sediment to this facility.	Yes ☐ No ☐ N/A ☐	x	x	x	x	x	x	x	x	x
2. BMP does not receive construction site runoff.	Yes ☐ No ☐ N/A ☐	x	x	x	x	x	x	x	x	x
3. Silt fence or fiber rolls were was placed around the BMP perimeter to prevent sediment contamination prior to full stabilization of the tributary drainage area.	Yes ☐ No ☐ N/A ☐	x	x	x	x					
4. Sacrificial protective liner is included in BMP during construction and removed after site is stabilized	Yes ☐ No ☐ N/A ☐	x	x	x	x		x	x		x
5. Sediment is remediated by over-excavating to 1 foot below infiltrating surface and backfilling with select permeable material	Yes ☐ No ☐ N/A ☐	x	x	x	x		x	x		x
6. Construction stormwater must not enter BMPs with subsurface infiltration surface after they are placed (remediation not possible)	Yes ☐ No ☐ N/A ☐			x			x			x

G. General Comments and Notes:

Bibliography

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8. Virginia Department of Conservation and Recreation. Virginia DCR Stormwater Design Specification. 2011. Fact sheet on infiltration practices including design guidance, construction and feasibility. Excellent figures and schematics. Available online at http://chesapeakestormwater.net/category/publications/design-specifications/