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.
# General Construction Checklist

## Objective 1: Prevent and RemEDIATE Compaction of Underlying Soil

### Key issues
- Construction equipment
- Material stockpiling
- Highway traffic detours

### Recommended Practices

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stake off infiltration areas with construction fence or other barriers</td>
</tr>
<tr>
<td>2.</td>
<td>Mark infiltration areas on all construction sheets, such as haul routes, stockpiling areas, traffic detours</td>
</tr>
<tr>
<td>3.</td>
<td>Do not allow equipment, vehicle traffic or stockpiling in these areas</td>
</tr>
<tr>
<td>4.</td>
<td>Make equipment operators aware of infiltration areas as part of construction meetings</td>
</tr>
<tr>
<td>5.</td>
<td>Excavate to finish grade of infiltration areas after most other construction is complete</td>
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<tr>
<td>6.</td>
<td>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</td>
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<tr>
<td>7.</td>
<td>Use construction-phase infiltration tests to confirm that infiltration rates have been restored</td>
</tr>
</tbody>
</table>

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

### Key issues
- Placement methods
- Material moisture when placed

### Recommended Practices

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Place media from the side of BMP whenever possible</td>
</tr>
<tr>
<td>2.</td>
<td>If equipment access to BMP is needed to place media, use low ground pressure equipment</td>
</tr>
<tr>
<td>3.</td>
<td>Do not place media if wet or if underlying soils are wet</td>
</tr>
<tr>
<td>4.</td>
<td>Lightly compact to approximately 75 to 80 percent relative compaction (or hydro-consolidate via flooding with water)</td>
</tr>
<tr>
<td>5.</td>
<td>Use construction-phase infiltration tests on a pilot plot to confirm that placement methods yielding adequate media infiltration rates</td>
</tr>
<tr>
<td>6.</td>
<td>Repeat testing of media infiltration rate at appropriate intervals through placement of media</td>
</tr>
</tbody>
</table>
**Objective 3: Prevent and RemEDIATE Siltation During Construction**

| Key issues | Sediment in construction runoff to BMP  
<table>
<thead>
<tr>
<th></th>
<th>Erosion from graded BMP slopes or upper BMP cells</th>
</tr>
</thead>
</table>

**Recommended Practices**

<table>
<thead>
<tr>
<th>Number</th>
<th>Practice</th>
<th>Yes ☐</th>
<th>No ☐</th>
<th>N/A ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do not use infiltration BMPs for construction-phase sediment control</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2.</td>
<td>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</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>3.</td>
<td>When BMPs are commissioned for completed phases, carefully control sediment track-out from phases of ongoing construction</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>4.</td>
<td>If siltation occurs, over excavate to at least 1 feet and backfill with selective fill materials</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>5.</td>
<td>Use infiltration testing to ensure infiltration rates have been restored after rehabilitation</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>6.</td>
<td>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.</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
</tbody>
</table>

**Objective 4: Prevent and RemEDIATE Erosion and Siltation During Establishment Period**

| Key issues | Erosion from partially established tributary areas  
<table>
<thead>
<tr>
<th></th>
<th>Erosion from bed of BMP (upper cells resulting in sediment of lower cells)</th>
</tr>
</thead>
</table>

**Recommended Practices**

<table>
<thead>
<tr>
<th>Number</th>
<th>Practice</th>
<th>Yes ☐</th>
<th>No ☐</th>
<th>N/A ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do not allow water to flow to BMPs until the site is fully stabilized</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2.</td>
<td>Initiate vegetation establishment well in advance of project completion to allow stabilization prior to BMP commissioning</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3.</td>
<td>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</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>4.</td>
<td>Provide irrigation, if needed, to promote more rapid vegetation establishment</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
<tr>
<td>5.</td>
<td>Keep environmental and construction permits open until site has full established to allow for access to perform remediation</td>
<td>Yes ☐</td>
<td>No ☐</td>
<td>N/A ☐</td>
</tr>
</tbody>
</table>
### BMP-Specific Construction Checklist

<table>
<thead>
<tr>
<th>Project Name</th>
<th>BMP Types</th>
<th>Location</th>
<th>Contractor Name</th>
<th>Reviewer Name</th>
<th>Inspection Date and Time</th>
</tr>
</thead>
</table>

#### 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

2. Facility excavated from the sides to avoid compacting the existing soil.  
   - Yes [ ] No [ ] N/A [ ]  
   - 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

5. Excavation sidewalls are consistent with the approved plan.  
   - Yes [ ] No [ ] N/A [ ]  
   - x x x

#### B. PIPING AND DRAINAGE

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

8. Double-washed crushed aggregate or clean stone was installed around the underdrain pipe.  
   - Yes [ ] No [ ] N/A [ ]  
   - 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

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BMP-Specific Construction Checklist

<table>
<thead>
<tr>
<th>Project Name</th>
<th>BMP Types</th>
<th>Location</th>
<th>Contractor Name</th>
<th>Reviewer Name</th>
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</thead>
</table>

| 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 | |
| 6. Installation of check dams (as needed) as shown on the approved plan (swales and linear bioretention) | Yes ☐ No ☐ N/A ☐ | x | x | x | |
| 7. Grading of level spreader and filter strip or media filter drain promotes sheet flow | Yes ☐ No ☐ N/A ☐ | x | 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 | |
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 | | | 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

<table>
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</tr>
</thead>
</table>

| 9. Seed mix specified on the approved plan has been applied. | Yes ☐ No ☐ N/A ☐ | Bioretention with underdrain | x | x |
| 10. Biodegradable erosion control blanket was installed over the previous area for protection while seed germination occurs. | Yes ☐ No ☐ N/A ☐ | Bioretention no underdrain | 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 ☐ | Infiltration Trench | x | x |
2. BMP does not receive construction site runoff. | Yes ☐ No ☐ N/A ☐ | Infiltration Basin | x | x |
3. Silt fence or fiber rolls were placed around the BMP perimeter to prevent sediment contamination prior to full stabilization of the tributary drainage area. | Yes ☐ No ☐ N/A ☐ | Vegetated Conveyance | x | x |
4. Sacrificial protective liner is included in BMP during construction and removed after site is stabilized | Yes ☐ No ☐ N/A ☐ | Permeable Shoulders | 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 ☐ | Media Filter Drain | x | x |
6. Construction stormwater must not enter BMPs with subsurface infiltration surface after they are placed (remediation not possible) | Yes ☐ No ☐ N/A ☐ | Dispersion | x | x |

**G. General Comments and Notes:**
Bibliography


4. Low Impact Development Center, Inc. Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies. 2010. Resource that can be used to guide communities in the development of design, construction, and maintenance standards and specifications, as well as codes and ordinances, which can support their water quality management and regulatory compliance programs. Available online at https://www.casqa.org/resources/lid/socal-lid-manual


7. Prince George’s County Bioretention Manual. 2007. Environmental Services Division, Department of Environment Resources. The Prince George’s County, Maryland. This manual builds on previous manuals and further identifies methodologies, practices, and examples of bioretention. Changes that were made focus primarily on four parameters: (1) functionality and application; (2) pollutant removal efficiency; (3) aesthetics and site integration; and (4) design simplification for cost containment. Mostly applicable to local applications of bioretention. Available online at http://www.ct.gov/deep/lib/deep/p2/raingardens/bioretention_manual_2009_version.pdf