**Construction Inspection Checklist for Permeable Pavement**

# Introduction

Proper construction of permanent stormwater best management practices (BMPs) is essential to ensure BMPs achieve their treatment objectives; namely reducing the amount of stormwater runoff and pollution discharged to local lakes, rivers and streams.

This construction inspection checklist is intended to reduce construction errors for **permeable pavement** (one type of BMP). These errors can result in inadequate BMP performance and/or expensive maintenance and rehabilitation costs for the BMP owner. This checklist should be filled out by an inspector, construction supervisor and/or design engineer throughout the duration of BMP construction to assure that the BMP is installed correctly.

The items herein assume that designs follow those recommended in Volume 3 of the Urban Drainage and Flood Control District Design Criteria Manual. In some locations, design criteria may be different and certain items may not apply.

# Pre-Construction

## 1.1 - Pre-Construction Meeting

A pre-construction meeting should be held between design engineers, project managers, contractor foreman and other relevant personnel to discuss important aspects of BMP installation, including (but not limited to) verifying the items outlined in this document.

## 1.2 – Stake BMP Perimeter

Prior to excavation, stake the perimeter of excavation and verify the dimensions match the design drawings.

# Excavation

## 2.1 – Heavy Equipment

To ensure even distribution and infiltration of stormwater throughout the storage layer, avoid compaction of subgrade during construction. If possible, use a backhoe/excavator to avoid driving in the area of the BMP. Alternatively, use low ground pressure equipment in the excavated area. Use construction fencing where applicable to deter unnecessary construction traffic in the area of the BMP. *If using an impermeable liner, ignore this requirement.*

## 2.2 – Bottom “Ripping”

If equipment must travel over the excavated area, the bottom of the cell should be “ripped” to a depth of 8 to 12 inches after excavating to the appropriate depth. *If using an impermeable liner, ignore this requirement.*

## 2.3 – Bottom is Flat and Level

The bottom of the cell should be flat and level to allow for even distribution of water throughout the storage layer.  *If design calls for a sloped bottom to drain storage layer towards an underdrain, this requirement is not applicable.*

## 2.4 – Protection after Excavation

Immediately following excavation, place construction sediment control BMPs around the basin to prevent runoff from entering the cell. Only remove sediment control BMPs after the upstream catchment is stable.

## 2.5 – Infiltration Testing

If the facility uses a “full-infiltration” design, verify the infiltration rate at the surface of the subgrade is 1.0 inches/hour or greater. Conduct infiltration tests using ASTM D3385 or other method approved by the inspector/reviewer. If infiltration rates are less than 1.0 in/hr, notify the engineer of record immediately for design review.

# Impermeable Liner

The impermeable liner will prevent runoff from infiltrating into adjacent soils. This component is not present for all installations. “No infiltration” sections use impermeable liners.

## 3.1 - Liner Material

Verify liner material meets the design specifications, is at least 30 mil thick, is thermally welded, and all seams are tested. Verify liner has no tears prior to and after placement.

## 3.2 – Liner Attachment

Prior to backfilling, ensure slack in liner to prevent the liner from tearing during placement of material. After backfilling, verify liner is attached to a concrete perimeter wall according to design specifications. Perimeter attachment can take place prior to or after placement of backfill. Attaching the liner to the perimeter wall following backfill reduces potential tears but requires the means to secure the liner during backfill.

# Underdrain System

## 4.1 – Underdrain Pipe

Verify the underdrain pipe meets design specifications, particularly with regard to the size and number of slots.

## 4.2 – Underdrain Wrapping

Verify the underdrain is NOT wrapped (directly) in geotextile fabric (or a sock) to avoid clogging of this fabric immediately adjacent to the underdrain openings.

## 4.3 – Underdrain Filter

Verify that filter material placed around the underdrain meets the gradation specifications in the design specifications. Provide a copy of the gradation lab results to reviewing engineer.

## 4.4 – Cleanout Locations

Verify placement of at least one cleanout for each underdrain lateral.

## 4.5 – Cleanout Pipe

Verify cleanout pipes are solid pipe to avoid short-circuiting of runoff through the cleanout pipes.

## 4.6 – Cleanout Covers

Verify that cleanout covers are installed and watertight.

## 4.7 – Orifice Plate

Verify installation of the orifice plate at the outlet point of the underdrain system and placement of gasket material between the structure and orifice plate, per design specifications.

# Aggregate

## 5.1 – Base Course

Verify that base course meets the specified gradation, is relatively clean (very little fines), and has at least 90% fractured faces

## 5.2 – Bedding Course/Joint Fill

Verify that bedding course (typically No. 8, No. 9 or No. 89 aggregate) has been dry screened, retains no more than 1 percent on the #200 (0.075mm) screen, and has at least 90% fractured faces. Ensure that this aggregate extends to the top of the joints between pavers. *This applies only to permeable interlocking concrete pavement (PICP) installations*

## 5.3 – Compaction

Verify that base materials are compacted according to manufacturer and/or design recommendations.

# Cover/Protection

## 6.1 – Cover/Protection

After installation is completed and while other site construction is occurring, verify that pavement is covered and/or otherwise protected with construction BMPs so that construction runoff does not enter the pavement.

# Close Out

## 7.1 – Upstream Catchment Stabilization

Verify that construction in the upstream catchment (run-on areas) is complete and landscaped areas have been properly vegetated or otherwise stabilized prior to removing pavement cover or temporary sediment control BMPs. If the pavement is contaminated, contact the engineer of record for recommendations. Sweep with a regenerative air sweeper or perform other maintenance as recommended.

## 7.2 – Snow and Ice Control Signage

Verify placement of signage to notify snow removal personnel to use only granular salts for ice control and direct personnel where to store snow. If possible, snow should be stored outside of the permeable pavement area so that concentrated sediment does not deposit on to the permeable pavement surface. If design specifications do not call for signage, consult with review engineer to determine if signage is required.

**Construction Inspection Checklist for Permeable Pavement**

**Project: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Site: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Inspector: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Company: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item/Activity** | **Pass** | **Fail** | **N/A** | **Date** | **Notes** |
| **Pre-Construction** |
| 1.1 | Pre-construction meeting held to discuss BMP installation, inspection and checklist |  |  |  |  |  |
| 1.2 | BMP perimeter verified and staked |  |  |  |  |  |
| **Excavation** |
| 2.1 | Heavy equipment did not travel over excavated area  |  |  |  |  |  |
| 2.2 | Bottom of cell was “ripped” after excavation |  |  |  |  |  |
| 2.3 | Surface of cell is flat and level |  |  |  |  |  |
| 2.4 | Excavated area is surrounded by sediment/runoff control BMPs or is otherwise protected from contaminated run-on during construction. |  |  |  |  |  |
| 2.5 | Infiltration rate verified (“full-infiltration” design only) |  |  |  |  |  |
| **Impermeable Liner** |
| 3.1 | Liner meets design specifications, is at least 30 mil thick, is thermally welded, and tested with no tears.  |  |  |  |  |  |
| 3.2 | Liner is attached to concrete perimeter wall according to design specification. |  |  |  |  |  |
| **Underdrain System** |
| 4.1 | Verify underdrain pipe is per design specifications |  |  |  |  |  |
| 4.2 | Verify underdrain is NOT wrapped in geotextile fabric |  |  |  |  |  |
| 4.3 | Verify underdrain filter material gradation meets design specifications |  |  |  |  |  |
| 4.4 | Verify at least one cleanout is provided per underdrain lateral |  |  |  |  |  |
| 4.5 | Verify cleanout pipe is solid |  |  |  |  |  |
| 4.6 | Verify cleanout covers are installed and watertight |  |  |  |  |  |
| 4.7 | Verify orifice plate is installed at underdrain discharge point, per design specifications. |  |  |  |  |  |
| **Aggregate** |
| 5.1 | Base coarse is relatively absent of fines, meets gradation, and has 90% fractured faces |  |  |  |  |  |
| 5.2 | Bedding coarse has been dry screened (and is relatively clean), meets gradation and has 90% fractured faces |  |  |  |  |  |
| 5.3 | Subbase materials are installed and compacted according to manufacturer specifications |  |  |  |  |  |
| **Cover/Protection** |
| 6.1 | Verify that pavement is covered and protected from runoff from other site construction activities. |  |  |  |  |  |
| **Close Out** |
| 7.1 | Verify that upstream catchment (run-on areas) are stabile prior to removing any construction sediment BMPs. |  |  |  |  |  |
| 7.2 | Verify placement of signage for snow and ice control. |  |  |  |  |  |