

# **Maintenance Checklists for Low Impact Development Facilities**

# 1. Bioretention/Planter Box Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect                        | Conditions When Maintenance is Needed  | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|-------------------------------|--|---------------------------------|----------------------------|--|
| Appearance                    | Untidy   |                                 |                            |  |
| Trash and Debris Accumulation | Trash, plant litter and dead leaves accumulated on surface.                                    |                                 |                            |  |
| Vegetation                    | Unhealthy plants and appearance.   |                                 |                            |  |
| Irrigation                    | Functioning incorrectly (if applicable).   |                                 |                            |  |
| Inlet                         | Inlet pipe blocked or impeded.   |                                 |                            |  |
| Splash Blocks                 | Blocks or pads correctly positioned to prevent erosion.  |                                 |                            |  |
| Overflow                      | Overflow pipe blocked or broken.   |                                 |                            |  |
| Filter media                  | Infiltration design rate is met (e.g., drains 36-48 hours after moderate - large storm event). |                                 |                            |  |

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\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

## 2. Vegetated Swale Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:    post-storm    annual    routine    post-wet season    pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect                        | Conditions When Maintenance is Needed   | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|-------------------------------|---|---------------------------------|----------------------------|--|
| Appearance                    | Untidy  |                                 |                            |  |
| Trash and Debris Accumulation | Trash and debris accumulated in the swale.  |                                 |                            |  |
| Vegetation                    | When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation start to take over.                                      |                                 |                            |  |
| Excessive Shading             | Vegetation growth is poor because sunlight does not reach swale. Evaluate vegetation suitability.   |                                 |                            |  |
| Poor Vegetation Coverage      | When vegetation is sparse or bare or eroded patches occur in more than 10% of the swale bottom. Evaluate vegetation suitability.                                    |                                 |                            |  |
| Sediment Accumulation         | Sediment depth exceeds 2 inches or covers more than 10% of design area.   |                                 |                            |  |
| Standing Water                | When water stands in the swale between storms and does not drain freely.  |                                 |                            |  |
| Flow spreader or Check Dams   | Flow spreader or check dams uneven or clogged so that flows are not uniformly distributed through entire swale width.   |                                 |                            |  |
| Constant Baseflow             | When small quantities of water continually flow through the swale, even when it has been dry for weeks and an eroded, muddy channel has formed in the swale bottom. |                                 |                            |  |
| Inlet/Outlet                  | Inlet/outlet areas clogged with sediment and/or debris.   |                                 |                            |  |
| Erosion/ Scouring             | Eroded or scoured swale bottom due to flow channelization, or higher flows. Eroded or rilled side slopes.   |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

| <b>Defect</b> | <b>Conditions When Maintenance is Needed</b> | <b>Inspection Result (0, 1, or 2)*</b> | <b>Date Maintenance Performed</b> | <b>Comments of Action(s) Taken to Resolve Issue</b> |
|---------------|--|--|-----------------------------------|---|
|               | Eroded or undercut inlet/outlet structures   |  |                                   |   |

### 3. Vegetated Filter Strip Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect                         | Conditions When Maintenance is Needed   | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|--------------------------------|---|---------------------------------|----------------------------|--|
| Appearance                     | Untidy  |                                 |                            |  |
| Trash and Debris Accumulation  | Trash and debris accumulated on the filter strip.   |                                 |                            |  |
| Vegetation                     | When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over. |                                 |                            |  |
| Excessive Shading              | Grass growth is poor because sunlight does not reach swale. Evaluate grass species suitability.                                 |                                 |                            |  |
| Poor Vegetation Coverage       | When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom. Evaluate grass species suitability.  |                                 |                            |  |
| Erosion/Scouring               | Eroded or scoured areas due to flow channelization, or higher flows.  |                                 |                            |  |
| Sediment Accumulation on Grass | Sediment depth exceeds 2 inches.  |                                 |                            |  |
| Flow spreader                  | Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.                        |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

## 4. Sand Filter Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect  | Conditions When Maintenance is Needed  | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|---|--|---------------------------------|----------------------------|--|
| Trash & Debris  | Any trash and debris which exceed 5 cubic feet per 1,000 square feet of filter bed area (one standard garbage can). In general, there shall be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance. |                                 |                            |  |
| Inlet erosion   | Visible evident of erosion occurring near flow spreader outlets.   |                                 |                            |  |
| Slow drain time   | Standing water long after storm has passed (after 24 to 48 hours) and/or flow through the overflow pipes occurs frequently.  |                                 |                            |  |
| Concentrated Flow                                       | Flow spreader uneven or clogged so that flows are not uniformly distributed across the sand filter.  |                                 |                            |  |
| Appearance of poisonous, noxious or nuisance vegetation | Excessive grass and weed growth. Noxious weeds, woody vegetation establishing, Turf growing over rock filter   |                                 |                            |  |
| Standing Water  | Standing water long after storm has passed (after 24 to 48 hours), and/or flow through the overflow pipes occurs frequently.   |                                 |                            |  |
| Tear in Filter Fabric                                   | When there is a visible tear or rip in the filter fabric allowing water to bypass the fabric.  |                                 |                            |  |
| Pipe Settlement   | If piping has visibly settled more than 1 inch.  |                                 |                            |  |
| Filter Media  | Drawdown of water through the media takes longer than 1 hour and/or overflow occurs frequently.  |                                 |                            |  |
| Short Circuiting  | Flows do not properly enter filter cartridges.   |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

## 5. Infiltration BMP Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect                        | Conditions When Maintenance is Needed   | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|-------------------------------|---|---------------------------------|----------------------------|--|
| Appearance, vegetative health | Mowing and trimming vegetation is needed to prevent establishment of woody vegetation, and for aesthetic and vector reasons.  |                                 |                            |  |
| Vegetation                    | Poisonous or nuisance vegetation or noxious weeds.  |                                 |                            |  |
|                               | Excessive loss of turf or ground cover (if applicable).   |                                 |                            |  |
| Trash & Debris                | Trash and debris > 5 cf/1,000 sf (one standard size garbage can).   |                                 |                            |  |
| Contaminants and Pollution    | Any evidence of oil, gasoline, contaminants or other pollutants.  |                                 |                            |  |
| Erosion                       | Undercut or eroded areas at inlet or outlet structures.   |                                 |                            |  |
| Sediment and Debris           | Accumulation of sediment, debris, and oil/grease on surface, inflow, outlet or overflow structures.   |                                 |                            |  |
|                               | Accumulation of sediment and debris, in sediment forebay and pretreatment devices.  |                                 |                            |  |
| Water drainage rate           | Standing water, or by visual inspection of wells (if available), indicates design drain times are not being achieved (i.e., within 72 hours).                                     |                                 |                            |  |
| Media clogging surface layer  | Lift surface layer (and filter fabric if installed) and check for media clogging with sediment (function may be able to be restored by replacing surface aggregate/filter cloth). |                                 |                            |  |
| Media clogging                | Lift surface layer (and filter fabric if installed) and check for media clogging with sediment (partial or complete clogging which may require full replacement).                 |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

## 6. Permeable Pavement Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect   | Conditions When Maintenance is Needed  | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|--|--|---------------------------------|----------------------------|--|
| Sediment Accumulation                            | Sediment is visible  |                                 |                            |  |
| Missing gravel/sand fill                         | There are noticeable gaps in between pavers  |                                 |                            |  |
| Weeds/mosses filling voids                       | Vegetation is growing in/on permeable pavement   |                                 |                            |  |
| Trash and Debris Accumulation                    | Trash and debris accumulated on the permeable pavement.  |                                 |                            |  |
| Dead or dying vegetation in adjacent landscaping | Vegetation is dead or dying leaving bare soil prone to erosion   |                                 |                            |  |
| Surface clog                                     | Clogging is evidenced by ponding on the surface  |                                 |                            |  |
| Overflow clog                                    | Excessive buildup of water accompanied by observation of low flow in observation well (connected to underdrain system)<br>If a surface overflow system is used, observation of an obvious clog |                                 |                            |  |
| Visual contaminants and pollution                | Any visual evidence of oil, gasoline, contaminants or other pollutants.  |                                 |                            |  |
| Erosion  | Tributary area exhibits signs of erosion or is noticeably not completely stabilized.   |                                 |                            |  |
| Deterioration/ Roughening                        | Integrity of pavement is compromised (i.e., cracks, depressions, crumbling, etc.)  |                                 |                            |  |
| Subsurface Clog                                  | Clogging is evidenced by ponding on the surface and is not remedied by addressing surface clogging.  |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

## 7. Constructed Treatment Wetland Inspection and Maintenance Checklist

Date: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Type of Inspection:     post-storm     annual     routine     post-wet season     pre-wet season

Facility: \_\_\_\_\_

Inspector(s): \_\_\_\_\_

| Defect                | Conditions When Maintenance is Needed  | Inspection Result (0, 1, or 2)* | Date Maintenance Performed | Comments of Action(s) Taken to Resolve Issue |
|-----------------------|--|---------------------------------|----------------------------|--|
| Trash & Debris        | Any trash and debris which exceed 5 cubic feet per 1,000 sf of basin area (one standard garbage can). In general, there shall be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance. If trash and debris is observed blocking or partially blocking an outlet structure or inhibiting flows between cells, it shall be removed quickly |                                 |                            |  |
| Sediment Accumulation | Sediment accumulation in basin bottom that exceeds the depth of sediment zone plus 6 inches in the sediment forebay. If sediment is blocking an inlet or outlet, it shall be removed.  |                                 |                            |  |
| Erosion               | Erosion of basin's side slopes and/or scouring of basin bottom.  |                                 |                            |  |
| Oil Sheen on Water    | Prevalent and visible oil sheen.   |                                 |                            |  |
| Noxious Pests         | Visual observations or receipt of complaints of numbers of pests that would not be naturally occurring and could pose a threat to human or aquatic health.   |                                 |                            |  |
| Water Level           | First cell empty, doesn't hold water.  |                                 |                            |  |
| Aesthetics            | Minor vegetation removal and thinning. Mowing berms and surroundings   |                                 |                            |  |
| Noxious Weeds         | Any evidence of noxious weeds.   |                                 |                            |  |

\* Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed (include WO#). Enter 2 if maintenance was performed same day.

| <b>Defect</b>  | <b>Conditions When Maintenance is Needed</b>   | <b>Inspection Result (0, 1, or 2)*</b> | <b>Date Maintenance Performed</b> | <b>Comments of Action(s) Taken to Resolve Issue</b> |
|--|--|--|-----------------------------------|---|
| Tree Growth  | Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering, do not remove. Dead, diseased, or dying trees shall be removed. |  |                                   |   |
| Settling of Berm   | If settlement is apparent. Settling can be an indication of more severe problems with the berm or outlet works. A geotechnical engineer shall be consulted to determine the source of the settlement if the dike/berm is serving as a dam.                 |  |                                   |   |
| Piping through Berm  | Discernible water flow through basin berm. Ongoing erosion with potential for erosion to continue. A licensed geotechnical engineer shall be called in to inspect and evaluate condition and recommend repair of condition.                                |  |                                   |   |
| Tree and Large Shrub Growth on Downstream Slope of Embankments | Tree and large shrub growth on downstream slopes of embankments may prevent inspection and provide habitat for burrowing rodents.  |  |                                   |   |
| Erosion on Spillway  | Rock is missing and soil is exposed at top of spillway or outside slope.   |  |                                   |   |
| Gate/Fence Damage  | Damage to gate/fence, including missing locks and hinges   |  |                                   |   |