INDIANA DEPARTMENT OF TRANSPORTATION

Stormwater Post-Construction Best Management Practice Operations and Maintenance Manual

For

Wet Retention Ponds

Wet Retention Pond Overview

Wet Retention Ponds can be utilized as a stormwater Post-Construction Best Management Practice (PCBMP) to treat stormwater collected from INDOT project sites after construction is completed. Wet retention ponds are engineered basins designed with a permanent pool and an elevated outlet structure to store stormwater run-off. Turf grasses will typically be planted if a wet retention pond is located within 30 feet of the edge of pavement, but native grasses should be planted if it is more than 30 feet from the edge of pavement.

Inspections

All wet retention ponds that are used as a PCBMP shall be inspected at a minimum one time per 5-year INDOT Stormwater permit cycle. Values below are typical indicators for the need of maintenance for the structure. Inspections will use the form attached in Appendix A as an inspection checklist to note the following:

- Vegetation – cover should be approximately 90% on embankments where there is not a permanent pool
    - barren areas
    - dead plants which are preventing vegetative growth
    - presence of invasive plants or weeds
    - presence of woody vegetation
- Erosion and scour
    - erosion in areas of pond and embankment
    - scour at inflow or outflow points
- Trash and debris – pond should be free of trash
    - presence of trash or debris in retention pond
    - inspector should remove trash if possible
        - refer to material disposal section
- Emergency overflow or embankment
    - presence of trees or large vegetation
    - damage to embankment
- Inflow – should be able to convey flow
    - pipe is clogged
    - pipe is collapsed
- outflow – should be able to convey flow
    - pipe is clogged
    - pipe is collapsed
- Sediment buildup
    - sediment buildup has reduced the storage capacity of the wet retention pond or is blocking inflow/outflow structure
        - refer to material disposal section
- Algal growth – wet retention pond should be free of algal growth

Initial inspections should place a particular focus on ensuring the vegetation has established as designed. Issues identified during inspections shall require maintenance as soon as possible, per noted rating condition.

Maintenance

All wet retention ponds shall be mowed once yearly during the typical INDOT mowing and vegetation management cycle for their associated road. Mowing shall preserve any existing vegetative buffer area found along the water line. Additionally, maintenance shall be performed on an as needed or directed basis from inspection observations. Typical corrective actions consist of:

- Vegetation
    - reseed barren areas to bring vegetative coverage to 90% (seed mixtures provided in Appendix B)
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - clear dead vegetation that is preventing plant growth, if necessary, reseed cleared areas until cover has again reached 90%
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - remove invasive plants identified during inspection
    - remove woody vegetation identified during inspection
        - if spraying of woody vegetation is required, all applications of herbicide spray shall meet all local, state, and federal regulations
        - all herbicide sprayers shall be licensed by the Office of the Indiana State Chemist
- Erosion and scour
    - fill in erosion or rills found on embankments surrounding permanent pond and reseed until cover has again reached 90%
        - use a snake and turtle safe erosion protection blanket as seed cover and protection
    - fill in scour hole and replace/install protection around inlet or outlet
- Trash and debris
    - remove any trash or debris remaining in retention pond after inspection
        - dispose of all materials per material disposal section
- Emergency overflow or embankment
    - remove large vegetation or trees from emergency overflow
    - repair damage to emergency overflow structure
- Inflow
    - unclog pipe by removing debris
    - repair or replace collapsed pipe
- Outflow
    - unclog pipe by removing debris
    - repair or replace collapsed pipe
    - remove all debris and vegetation from overflow area
- Sediment buildup
    - remove excess sediment from permanent pond
        - dispose of all materials per material disposal section

- Algal growth – check with the INDOT Stormwater Team prior to any chemical application to retention pond
    - apply aquatic herbicide to treat excessive algal growth or cyanobacteria (must be Category 5 certified)
        - all herbicide applications shall meet all local, state, and federal regulations
        - all herbicide sprayers shall be licensed by the Office of the Indiana State Chemist

As well as issues related to the inspection criteria, maintenance will be required to address any problem which does not fall into these categories that threatens the functionality of the wet retention pond as a stormwater treatment device.

Material Disposal

All materials removed from maintenance and/or operation activities shall be disposed of according to all local, state, and federal requirements. If material observed in PCBMPs exhibits odor (petroleum, gas, oil, etc.), color, or other physical features that may indicate non-stormwater origins, do not remove this material, and contact the INDOT Stormwater Team for further investigation, identification, and proper disposal.

APPENDIX A – INSPECTION FORM

INDIANA DEPARTMENT OF TRANSPORTATION

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Wet Retention Pond	Asset ID	
Design Criteria		Location	Coordinates, Driving Directions
This wet retention pond was designed to remove Total Suspended Solids (TSS) from stormwater runoff but also serves as a peak flow mitigation measure. This pond should have a permanent pool of water.			

Information

Is this inspection being conducted within 72 hours of a rainfall event?	☐ Yes	☐ No
Is the wet retention pond holding water?	☐ Yes	☐ No
Is an overflow catch basin or embankment present?	☐ Yes	☐ No
Is there land use upstream with high probability of pollutants?	☐ Yes	☐ No
Can the unit be accessed directly from INDOT right-of-way?	☐ Yes	☐ No
Will traffic control be required for maintenance?	☐ Yes	☐ No
Is forebay present?	☐ Yes	☐ No

Inspection Criteria

Maintenance Issues:			Description:
Is vegetative cover approximately 90%?	☐ Yes	☐ No	_____.
Is there evidence of erosion/scouring present?	☐ Yes	☐ No	_____.
Is the pond free of any invasive/unwanted species?	☐ Yes	☐ No	_____.
Are in/outflow points blocked by debris or vegetation?	☐ Yes	☐ No	_____.
Is woody vegetation present in pond or on embankments?	☐ Yes	☐ No	_____.
Is there excessive algal or cyanobacteria growth?	☐ Yes	☐ No	_____.
Is there a sheen or odor present?	☐ Yes	☐ No	_____.
Are any animal burrows or nests present?	☐ Yes	☐ No	_____.
Is evidence of litter, dumping, or illicit discharge present?	☐ Yes	☐ No	_____.
Is excessive sediment present within the pond or forebay?	☐ Yes	☐ No	Depth: _____ inches

Structural Issues:		
Is there structural damage to the inflow/outflow structures?	☐ Yes	☐ No
Is there adequate scour protection at the outlet?	☐ Yes	☐ No
Is there structural damage to the emergency overflow/embankments?	☐ Yes	☐ No

Comments:

_____.
_____.
_____.
_____.
_____.
_____.
_____.
_____.

Last Inspected		Current Inspection	

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Wet Retention Pond	Asset ID	

Typical Corrective Actions

- **Vegetation – re-establish as needed so that cover is approximately 90%**
- **Erosion and scour – re-grade as needed, install erosion protection if required**
- **Trash and debris buildup – remove trash and debris as needed**
- **Emergency overflow structure or embankment - repair structures and remove large vegetation or trees from embankments as needed**
- **Inflow and outflow points and/or structures – repair structures and remove debris or blockage as needed**
- **Sediment buildup – should be ≤ 25% of original design volume – remove sediment as needed**
- **Algal Growth - apply aquatic herbicide to treat excessive algal growth or cyanobacteria - must be Category 5 certified**

Maintenance Recommendations

INDIANA DEPARTMENT OF TRANSPORTATION

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Wet Retention Pond	Asset ID	

Plans and Plan Cross Section(s)

INDIANA DEPARTMENT OF TRANSPORTATION

INSPECTION & MAINTENANCE
POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Wet Retention Pond	Asset ID	

Photographs & Maps

INSPECTED BY	APPROVED BY
Printed Name/Title	Printed Name/Title

APPENDIX B – SEED MIXES

NATIVE GRASS SEED MIX

Common Name	Botanical Name	Pure Live Seeds (Oz/Acre)
Common Milkweed	*Asclepias syriaca*	2
Frank's Sedge	*Carex frankii*	6
Spreading Oval Sedge	*Carex normalis*	6
Bottlebrush Sedge	*Carex lurida*	6
Awl-fruited Sedge	*Carex stipata*	6
Fox Sedge	*Carex vulpinoidea*	8
Common Rush	*Juncus effusus*	2
Canada Wild Rye	*Elymus canadensis*	36
Virginia Wild Rye	*Elymus virginicus*	36
Stiff Goldenrod	*Oligoneuron rigidum*	1
Switch Grass	*Panicunm virgatum*	4
Little Bluestem	*Schizachyrium scoparium*	96
Woolgrass	*Scirpus cyperinus*	2
Reddish Bulrush	*Scirpus pendulus*	4
Prairie Cord Grass	*Spartina pectinata*	2
Common Spiderwort	*Tradescantia ohiensis*	6
	Total	223

TURF GRASS SEED MIXES

(a) Seed Mixture R

This seed mixture shall be applied at the rate of 202.5 lb/ac consisting of 100 lb/ac of low endophyte Tall Fescue, 50 lb/ac of turf type Perennial Ryegrass, 50 lb/ac of Creeping Red Fescue, and 2.5 lb/ac of White Dutch Clover. Seed used in this mixture shall be drought tolerant. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.

(b) Seed Mixture U

This seed mixture shall be applied at the rate of 196.5 lb/ac consisting of 100 lb/ac of a 4-way blend of turf type Tall Fescue, 50 lb/ac Creeping Red Fescue, 45 lb/ac Perennial Ryegrass, and 1.5 lb/ac White Dutch Clover. Fertilizer and mulching material, where specified or directed, shall be applied in accordance with 621.05.