

Regulatory Requirements

Overview

- 🕒 **Why Post-Construction BMPs?**
- 🕒 **Overview of Post-Construction BMPs**
- 🕒 **Overview of Regulations**
 - 🕒 Construction General Permit
 - 🕒 ODOT's Location and Design (L&D) Manual Volume 2
- 🕒 **Alternative BMPs**
- 🕒 **Off-Site Mitigation**

Overview

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What are BMPs Supposed to Do?

- 🕒 **Post-Construction BMPs have Two Main Jobs:**
 1. **Remove Pollutants – (Quality)**
 2. **Reduce or Temporarily Hold Back Runoff from Stream – (Quantity)**
- 🕒 **Quality: By Removing Sediment, Systems Remove Other Pollutants**
- 🕒 **Quantity: Stream Stability – Limit Stream Erosion and Hydromodification from Higher Flow Rates and Higher Runoff Volumes**

Designing / Reviewing BMPs

- 🕒 Is the BMP going to do a good job removing pollutants?
- 🕒 Is the BMP going to help limit stream problems from increased flow rate and volume?



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- 🕒 **Off-Site Mitigation**

BMPs: Many Different Names

Source	BMP Name
ODOT Quality Only	Manufactured System
	Vegetated Biofilter
	Vegetated Filter Strip
ODOT Quality and Quantity	Detention Basin
	Retention Basin
	Bioretention Cell
	Infiltration Trench
	Infiltration Basin
ODOT Quantity Only	Constructed Wetland
	Underground Detention
	Stream Grade Control

Source	BMP Name
EPA CGP Table 4a	Wet Extended Detention Basin
	Constructed Extended Detention Wetland
	Dry Extended Detention Basin
	Permeable Pavement – Extended Detention
	Underground Storage – Extended Detention
EPA CGP Table 4b	Sand & Other Media Filtration – Extended Detention
	Bioretention Area/Cell
	Infiltration Basin
	Infiltration Trench
	Permeable Pavement – Infiltration
EPA CGP Alt. BMPs	Underground Storage - Infiltration
	Grass Swales
	Grass Filter Strips
	Rain Barrels
	Green Roofs
	Catch Basin Inserts
	Hydrodynamic Separators

BMPs: Only a Few Categories

DETENTION



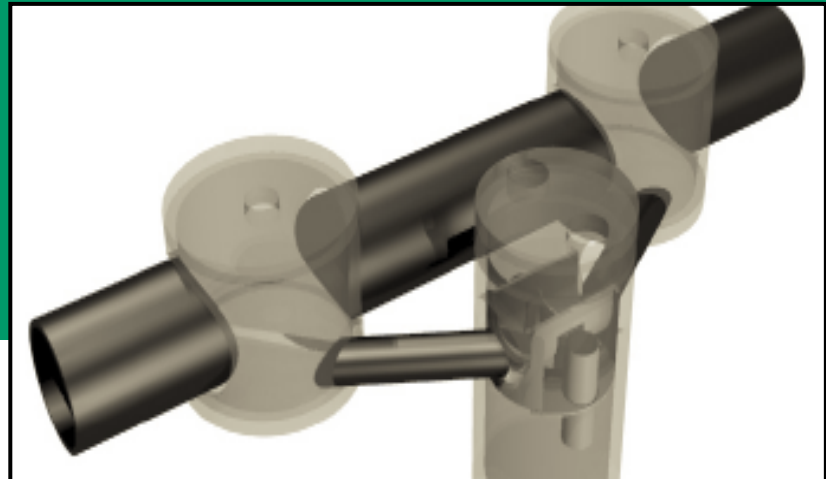
INFILTRATION



BIORETENTION



FLOW THROUGH BMPs



BMPs: Main Treatment Mechanism

☉ Detention

- ☉ Rely on hydraulic residence time to allow sediment to settle out (sedimentation)

☉ Infiltration

- ☉ Rely on soil infiltration capacity

☉ Bioretention

- ☉ Rely on physical filtering through planting media
- ☉ Filtering occurs slowly

☉ Flow Through BMPs

- ☉ Rely on physical filtering or hydrodynamic separation
- ☉ Filtering occurs quickly

Looking at BMPs Simply

☉ Four Categories

- ☉ Detention
- ☉ Infiltration
- ☉ Bioretention
- ☉ Flow Through BMPs

☉ Two Jobs

- ☉ Pollutant Removal (Quality)
- ☉ Stream Protection from Erosion (Quantity)

BMPs: Quality vs. Quantity

Source	BMP Name	Category	Quality	Quantity
ODOT Quality Only	Manufactured System	Flow Through	X	
	Vegetated Biofilter	Flow Through	X	
	Vegetated Filter Strip	Flow Through	X	
ODOT Quality and Quantity	Detention Basin	Detention	X	X
	Retention Basin	Detention	X	X
	Bioretention Cell	Bioretention	X	X
	Infiltration Trench	Infiltration	X	X
	Infiltration Basin	Infiltration	X	X
	Constructed Wetland	Detention	X	X
ODOT Quantity Only	Underground Detention	Detention		X
	Stream Grade Control	(Other)		X

Audience Participation!

Audience Participation (1 of 9)

Detention Basin



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (1 of 9)

Detention Basin



Category	
Detention	X
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	X
Quantity	X



Audience Participation (2 of 9)

Infiltration Trench



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (2 of 9)

Infiltration Trench



Category	
Detention	
Infiltration	X
Bioretention	
Flow Through	

Performance	
Quality	X
Quantity	X

Audience Participation (3 of 9)

Bioretention



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (3 of 9)

Bioretention



Category

Detention

Infiltration

Bioretention

Flow Through

X

Performance

Quality

Quantity

X

X

Audience Participation (4 of 9)

Hydrodynamic Separator

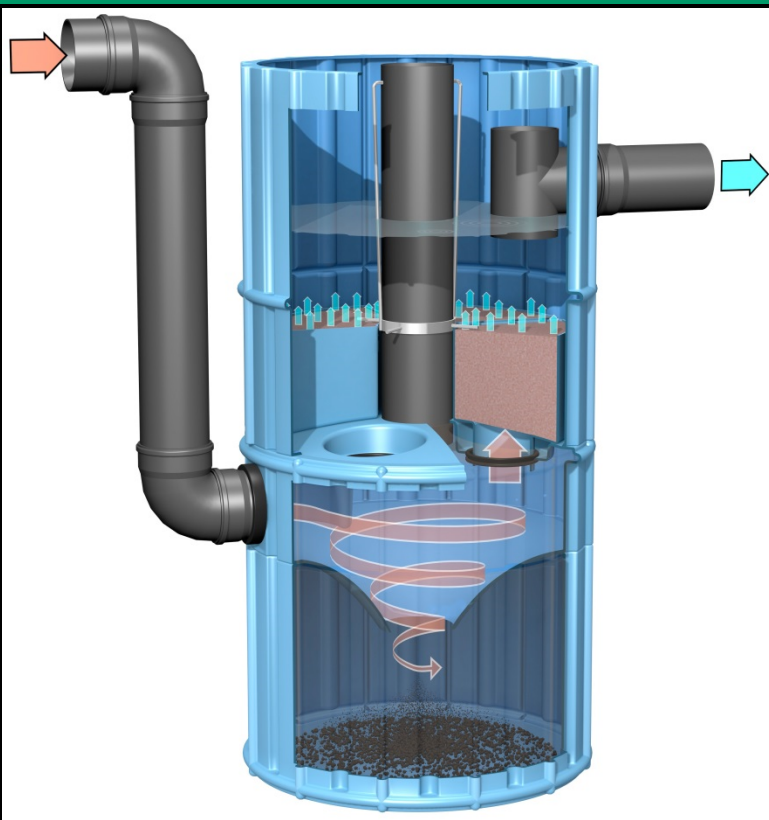


Image: 3P Technik UK

Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (4 of 9)

Hydrodynamic Separator

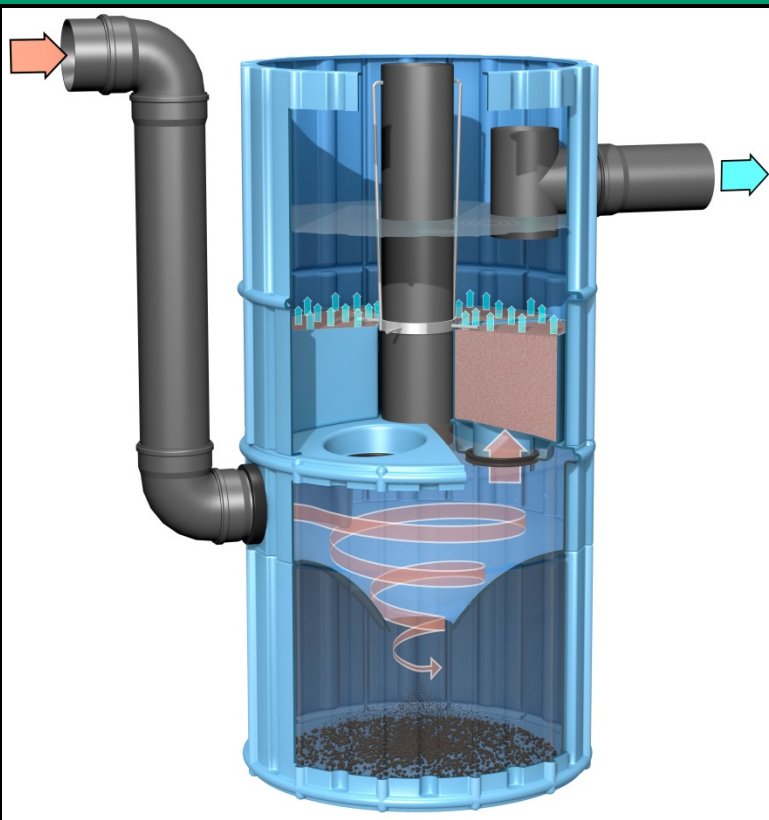


Image: 3P Technik UK

Category

Detention

Infiltration

Bioretention

Flow Through

X

Performance

Quality

X

Quantity



Audience Participation (5 of 9)

Filter Strip



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (5 of 9)

Filter Strip



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	X

Performance	
Quality	X
Quantity	



Audience Participation (6 of 9)

Vegetated Biofilter



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (6 of 9)

Vegetated Biofilter



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	X

Performance	
Quality	X
Quantity	

Audience Participation (6 of 9)

Retention Basin



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (6 of 9)

Retention Basin



Category	
Detention	X
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	X
Quantity	X



Audience Participation (7 of 9)

Pervious Pavement



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (7 of 9)

Pervious Pavement



Category	
Detention	?
Infiltration	?
Bioretention	
Flow Through	

Performance	
Quality	X
Quantity	X



Audience Participation (8 of 9)

Underground Detention



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (8 of 9)

Underground Detention



Category	
Detention	X
Infiltration	
Bioretention	
Flow Through	?

Performance	
Quality	?
Quantity	X

Audience Participation (9 of 9)

Detention Basin with Lined Channel



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	



Audience Participation (9 of 9)

Detention Basin with
Lined Channel



Category	
Detention	
Infiltration	
Bioretention	
Flow Through	

Performance	
Quality	
Quantity	

NONE



Overview

- 🕒 Why Post-Construction BMPs?
- 🕒 Overview of Post-Construction BMPs
- 🕒 **Overview of Regulations**
 - 🕒 Construction General Permit
 - 🕒 ODOT's Location and Design (L&D) Manual Volume 2
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- 🕒 **Off-Site Mitigation**

Overview of Regulations

Construction General Permit vs. ODOT's L&D Vol. 2

- 🕒 **Ohio EPA Construction General Permit: Any land disturbance over 1 ac. must meet requirements in NPDES permit**
- 🕒 **CGP: Roadway projects by public entities can use ODOT's L&D, Vol. 2 as an alternate to post-construction BMP requirements**
- 🕒 **L&D post-construction BMP guidance reviewed by Ohio EPA**

CGP vs. L&D Vol. 2

- 🕒 **Ohio EPA Construction General Permit:**
 - 🕒 1 – 2 ac.: Small construction, may use alternative BMP if meet certain conditions
 - 🕒 ≥ 2 ac.: Construction, prescriptive requirements (Table 4a and 4b BMPs)
- 🕒 **ODOT L&D. Volume 2**
 - 🕒 Different requirements...

“Small Construction Activities”

NOT TRANSPORTATION

- ① 1 – <2 acres of land disturbance
- ② Must provide justification why the use of Table 4a and 4b practices are not feasible.
- ③ Alternative practices require approval from the regulated MS4.
- ④ No list of BMPs provided for small construction
- ⑤ Implementation will depend on the local entity

Construction Activities NOT TRANSPORTATION

- **>= 2 acres of land disturbance**
- **Treat the Water Quality Volume (WQ_v)**
- **Incorporate a Table 4a or Table 4b BMP**
- **Drain time requirements**

Source	BMP Name	Category	Quality	Quantity
EPA CGP Table 4a	Wet Extended Detention Basin	Detention	X	X
	Constructed Extended Detention Wetland	Detention	X	X
	Dry Extended Detention Basin	Detention	X	X
	Permeable Pavement – Extended Detention	Detention	X	X
	Underground Storage – Extended Detention	Detention	X	X
	Sand & Other Media Filtration – Extended Detention	Detention	X	X
EPA CGP Table 4b	Bioretention Area/Cell	Bioretention	X	X
	Infiltration Basin	Infiltration	X	X
	Infiltration Trench	Infiltration	X	X
	Permeable Pavement – Infiltration	Infiltration	X	X
	Underground Storage - Infiltration	Infiltration	X	X

ODOT L&D BMP Requirements

- ☉ **Project EDA \geq 1 ac: BMP needed**
- ☉ **Four options**
 - ☉ Routine maintenance (No BMP)
 - ☉ Utility, fence, guardrail, or noise wall (No BMP)
 - ☉ Quality treatment
 - ☉ Quality and quantity treatment

Routine Maintenance Projects

- ⌚ **NOT** the same as an ODOT Maintenance Project
- ⌚ **Must** have less than 5 acres of **Total EDA**
- ⌚ **No** change to the purpose, line and grade, or hydraulic capacity of the facility
- ⌚ **ALL** of the activities must be routine operations
 - ⌚ If some disturbance is routine and some is not, then none of the project can be considered a routine maintenance project.
- ⌚ **Section 1112.2 of L&D Vol.2 lists routine maintenance activities**
- ⌚ **Do not** require an NOI and therefore do not require post-construction BMPs

Routine Maintenance Projects

- 🕒 **Pothole filling**
- 🕒 **Tree / brush removal**
- 🕒 **Repair of existing guardrail, fence, noise wall, signs, lighting, curb, sidewalk, utilities**
- 🕒 **Culvert replacement / repair**
 - 🕒 Same line, grade, and hydraulic capacity
- 🕒 **Linear grading, berm repair, ditch cleanout**
 - 🕒 To maintain drainage or address safety issues

Routine Maintenance Projects

- 🕒 **Bridge repair and replacement**
 - 🕒 Abutments, approach, deck, and associated grading
- 🕒 **Land slide repairs**
 - 🕒 Includes grading and repairing roadway features affected by the slide
- 🕒 **Unpaved / Gravel roadway or shoulder maintenance**
 - 🕒 Dragging, blading, grading, adding aggregate, etc. to existing unpaved / gravel roadway. Includes paving of existing gravel road or shoulder to stabilize.



Routine Maintenance Projects

- ④ **Full depth pavement repair / replace**
 - ④ No change to the horizontal alignment
 - ④ No change to the hydraulic capacity of roadway
 - ④ Adding curb and gutter
 - ④ Adding new storm sewer
 - ④ Increasing the size of a culvert
 - ④ Increasing the size of a ditch
 - ④ No additional impervious area added outside of the existing edge of the paved roadway
 - ④ Total EDA less than 5 acres

Routine Maintenance Projects

- ⌚ Even if project is all routine maintenance activity, the total EDA must be < 5 ac
- ⌚ **Example Culvert Replacement:**
 - ⌚ No change to line, grade, or hydraulic capacity
- ⌚ **Scenario #1:**
 - ⌚ Project EDA = 2 ac
 - ⌚ Contractor EDA = 1 ac
 - ⌚ Total EDA = 3 ac... No NOI or post-construction BMP
- ⌚ **Scenario #2**
 - ⌚ Project EDA = 2 ac
 - ⌚ Contractor EDA = 3.1 ac
 - ⌚ Total EDA = 5.1 ac... NOI and post-construction BMP required

Routine Maintenance Projects

- ⌚ For larger slide project or linear grading, if the Total EDA is over 5 acres
- ⌚ Office of Hydraulic Engineering may be able to determine that a post-construction BMP is not required
- ⌚ Need approval from Office of Hydraulic Engineering
- ⌚ Still need an NOI and SS832 since the Total EDA is over 5 acres

Utility, Fence, Guardrail, or Noise Wall

- ☉ All project EDA is associated with utility line, fence, guardrail, or noise wall
- ☉ No post-construction BMPs required
- ☉ If Total EDA \Rightarrow 1 acre, still need an NOI

ODOT L&D – Quality Only

- ☉ **≥ 1 acre Project Earth Disturbed Area (EDA)**
- ☉ **< 1 acre of new impervious area in new permanent right-of-way (Ain)**

OR

- ☉ **Discharge to 4th order stream or stream with over 100 square miles drainage area**

Source	BMP Name	Quality	Quantity
ODOT Quality Only	Manufactured System	X	
	Vegetated Biofilter	X	
	Vegetated Filter Strip	X	

ODOT L&D– Quality + Quantity

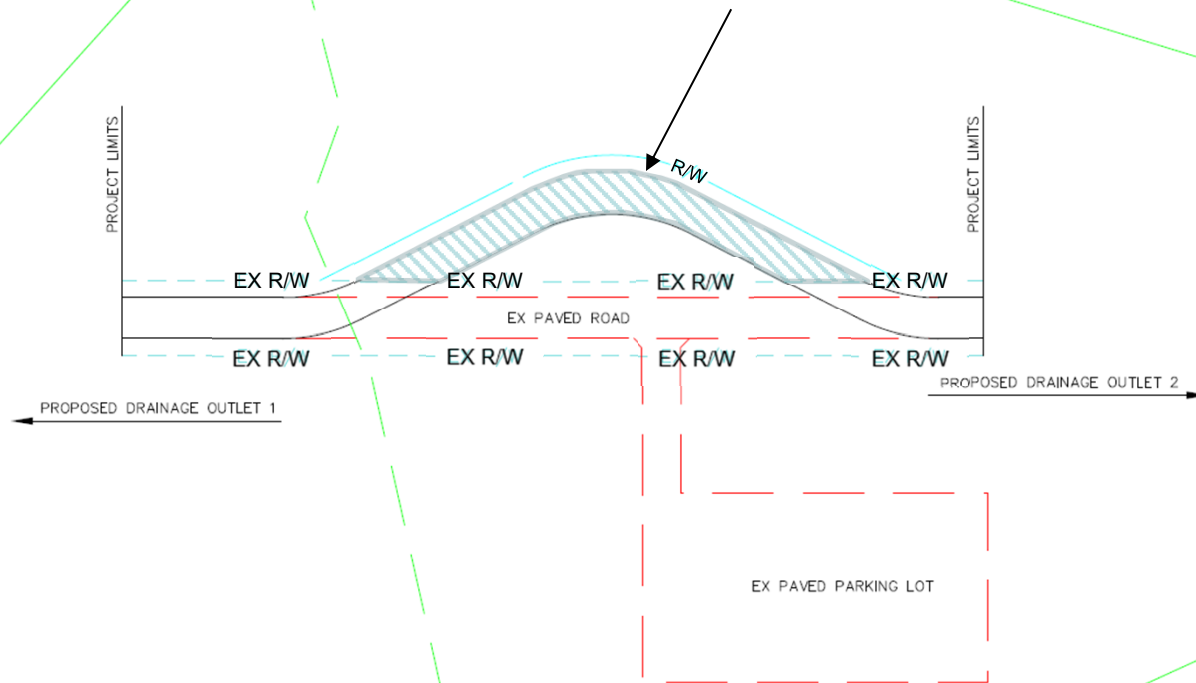
- ☉ **≥ 1 acre Project Earth Disturbed Area (EDA)**
- ☉ **≥ 1 acre of new impervious area in new permanent right-of-way**

Source	BMP Name	Quality	Quantity
ODOT Quality and Quantity	Detention Basin	X	X
	Retention Basin	X	X
	Bioretention Cell	X	X
	Infiltration Trench	X	X
	Infiltration Basin	X	X
	Constructed Wetland	X	X

- ☉ **Or a treatment train of quality only and quantity only**

Water Quality and Quantity Treatment

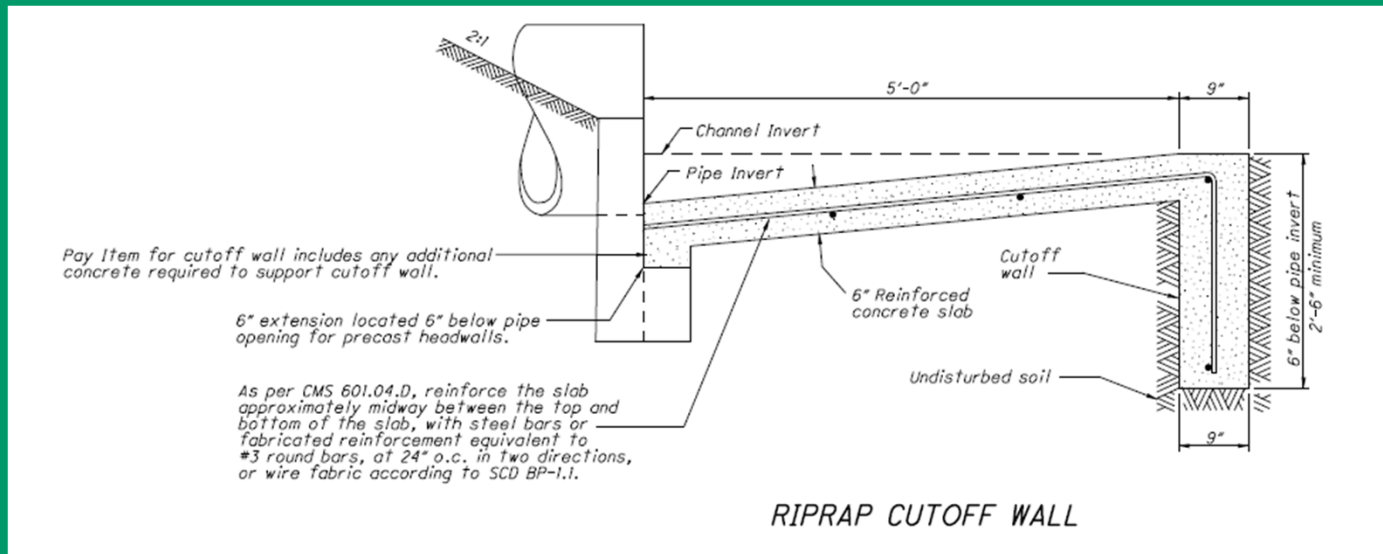
If this new impervious area is one acre or less then water quantity treatment is not required.



ODOT L&D– Quality + Quantity

- ④ When quality and quantity are required, consider a treatment train
- ④ Manufactured system (quality) followed by underground storage (quantity)
- ④ Vegetated filter strip (quality) followed by stream grade control (quantity)

Credit for Stream Grade Control



- Only applicable to “Waters of the U.S.” as defined in L&D Vol.2.
- Credit for project areas that drain to the grade control ONLY.
- Paired with quality BMP

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Other BMP Options

When the Standard BMPs Don't Fit

Other BMP Options

Alternative BMPs

-  Has to be approved by Ohio EPA

Off-Site Mitigation

-  Not near the project

Alternative BMPs

- ④ **Could be anything**
 - ④ Approved BMPs that are tweaked to fit a tight site
 - ④ New technology
 - ④ Land conservation / enhancement
 - ④ Reduced treatment requirements
- ④ **Project-specific approval from Ohio EPA and ODOT OHE**

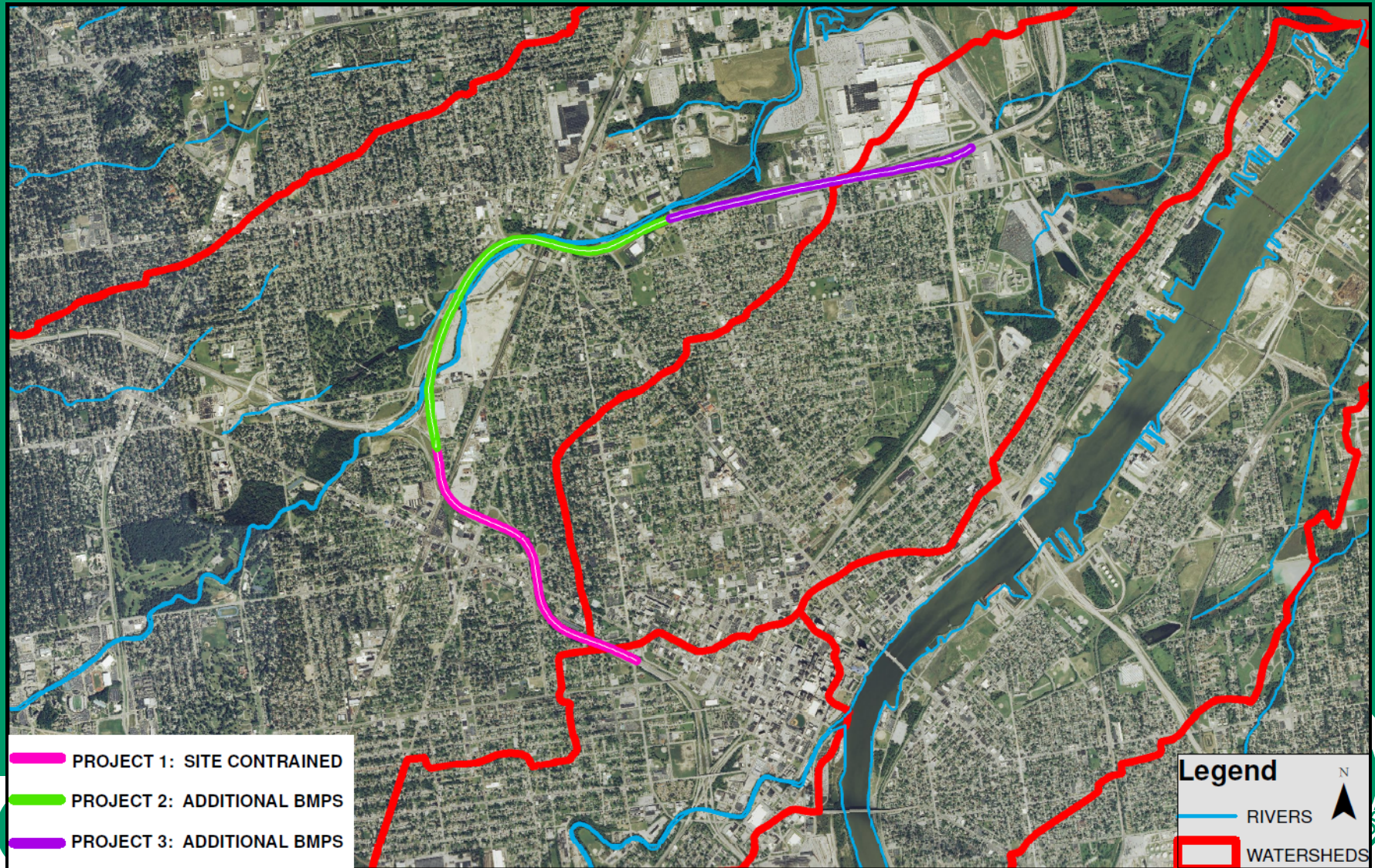
Off-Site Mitigation

- ① Demonstrate Available BMPs are not Feasible
- ① Same HUC-12 Watershed
- ① Mitigation Ratio of 1.5 Times the WQ_v or the WQ_v at the Point of Retrofit
- ① Maintenance Agreement to Ensure O&M
- ① Case-By-Case Approval from OEPA

Off-Site Mitigation

- ① **Not a Cost / Benefit Assessment**
 - ① On-Site Treatment is Generally Preferable
- ① **Late BMP Planning can Limit Options**
 - ① Consider Post-Construction BMP Space Requirements Early
 - ① The Need for Off-Site Mitigation Should be Identified Early in Project Planning

Off-Site Mitigation - Toledo



In-Lieu Fee

- ⌚ This is Generally NOT an Option
- ⌚ OEPA has MOU with ODOT and ODNR to handle Removal of Exfiltration Trench BMP from ODOT's L&D Vol. 2.
- ⌚ Approx. 36 Transportation Projects Identified
 - ⌚ Design/Funding Complete with ExTs in Oct. 2013
- ⌚ Wetland Banks: Yes
- ⌚ Stream Mitigation Banks: Yes
- ⌚ Stormwater Treatment Banks: No

Audience Participation!

Audience Participation (1 of 8)

Development	Major Highway Rehab
Project EDA	130 acres
Redevelopment Area	130 acres
Treatment %	20%
Required Treatment	26 acres
Notes:	
Rehab several miles of highway, multiple bridges, and interchanges. Some pavement is added, but all is within existing ODOT R/W.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (1 of 8)

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Treatment %	20%
Required Treatment	26 acres
Notes:	
Rehab several miles of highway, multiple bridges, and interchanges. Some pavement is added, but all is within existing ODOT R/W.	

Possible BMPs	OK?
Vegetated Filter Strip	Yes
Vegetated Biofilter (grass ditch)	Yes
Manufactured System	Yes
Detention Basin	Yes
Retention Basin	Yes
Bioretention Cell	Yes
Infiltration Trench	Yes
Infiltration Basin	Yes
Constructed Wetland	Yes
Underground Detention	No
Stream Grade Control	No

Audience Participation (2 of 8)

Development	New Road
Project EDA	15 acres
Redevelopment Area	2 acres
Treatment %	89%
Required Treatment	13.4 acres
Notes:	
New connector highway over existing farm land. Majority of EDA is outside of existing R/W.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (2 of 8)

Development	New Road
Project EDA	15 acres
Redevelopment Area	2 acres
Treatment %	89%
Required Treatment	13.4 acres
Notes:	
New connector highway over existing farm land. Majority of EDA is outside of existing R/W.	

Possible BMPs	OK?
Vegetated Filter Strip	Maybe
Vegetated Biofilter (grass ditch)	Maybe
Manufactured System	Maybe
Detention Basin	Yes
Retention Basin	Yes
Bioretention Cell	Yes
Infiltration Trench	Yes
Infiltration Basin	Yes
Constructed Wetland	Yes
Underground Detention	Maybe
Stream Grade Control	Maybe

Audience Participation (3 of 8)

Development	New Road
Project EDA	15 acres
Redevelopment Area	2 acres
Treatment %	89%
Required Treatment	13.4 acres
Notes:	
New connector highway over existing farm land. Majority of EDA is outside of existing R/W. Roadway drainage will flow along roadside ditch and discharge to 4 th order stream.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (3 of 8)

Development	New Road
Project EDA	15 acres
Redevelopment Area	2 acres
Treatment %	89%
Required Treatment	13.4 acres
Notes:	
New connector highway over existing farm land. Majority of EDA is outside of existing R/W. Roadway drainage will flow along roadside ditch and discharge to 4 th order stream.	

Possible BMPs	OK?
Vegetated Filter Strip	Yes
Vegetated Biofilter (grass ditch)	Yes
Manufactured System	Yes
Detention Basin	Yes
Retention Basin	Yes
Bioretention Cell	Yes
Infiltration Trench	Yes
Infiltration Basin	Yes
Constructed Wetland	Yes
Underground Detention	No
Stream Grade Control	No

Audience Participation (4 of 8)

Development	Intersection Improvement: Roundabout
Project EDA	4.5 acres
Redevelopment Area	3 acres
Treatment %	47%
Required Treatment	2.1 acres
Notes:	
Add a roundabout to an intersection. The project includes acquiring additional right-of-way. The project will pave 1.5 acres of area in newly acquired right-of-way that was previously undeveloped.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (4 of 8)

Development	Intersection Improvement: Roundabout
Project EDA	4.5 acres
Redevelopment Area	3 acres
Treatment %	47%
Required Treatment	2.1 acres
Notes:	
Add a roundabout to an intersection. The project includes acquiring additional right-of-way. The project will pave 1.5 acres of area in newly acquired right-of-way that was previously undeveloped.	

Possible BMPs	OK?
Vegetated Filter Strip	Maybe
Vegetated Biofilter (grass ditch)	Maybe
Manufactured System	Maybe
Detention Basin	Yes
Retention Basin	Yes
Bioretention Cell	Yes
Infiltration Trench	Yes
Infiltration Basin	Yes
Constructed Wetland	Yes
Underground Detention	Maybe
Stream Grade Control	Maybe

Audience Participation (5 of 8)

Development	Intersection Improvement: New Sidewalks
Project EDA	0.7 acres
Redevelopment Area	0.7 acres
Treatment %	?
Required Treatment	?
Notes:	
Less than 1 acre of Project EDA.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (5 of 8)

Development	Intersection Improvement: New Sidewalks
Project EDA	0.7 acres
Redevelopment Area	0.7 acres
Treatment %	NA
Required Treatment	NA
Notes:	
Less than 1 acre of Project EDA.	
No post-construction BMPs required. SS832 still required.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (6 of 8)

Development	Culvert Replacement
Project EDA	1.2 acres
Redevelopment Area	1.2 acres
Treatment %	?
Required Treatment	?
Notes:	
Replace culvert with same line, grade, and hydraulic capacity.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (6 of 8)

Development	Culvert Replacement
Project EDA	1.2 acres
Redevelopment Area	1.2 acres
Treatment %	NA
Required Treatment	NA
Notes:	
Replace culvert with same line, grade, and hydraulic capacity. No post-construction BMPs required. SS832 still required.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (7 of 8)

Development	Culvert Replacement
Project EDA	1.2 acres
Redevelopment Area	1.2 acres
Treatment %	?
Required Treatment	?
Notes:	
Replace culvert with same line, different grade, same diameter.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (7 of 8)

Development	Culvert Replacement
Project EDA	1.2 acres
Redevelopment Area	1.2 acres
Treatment %	20%
Required Treatment	0.24 acres
Notes:	
Replace culvert with same line, different grade, same diameter. Different grade and hydraulic capacity; not Routine Maintenance.	

Possible BMPs	OK?
Vegetated Filter Strip	Yes
Vegetated Biofilter (grass ditch)	Yes
Manufactured System	Yes
Detention Basin	Yes
Retention Basin	Yes
Bioretention Cell	Yes
Infiltration Trench	Yes
Infiltration Basin	Yes
Constructed Wetland	Yes
Underground Detention	No
Stream Grade Control	No

Audience Participation (8 of 8)

Development	Add Turn Lane in Ultra-Urban Area
Project EDA	7.2 acres
Redevelopment Area	5 acres
Treatment %	44%
Required Treatment	3.2 acres
Notes:	
Adding more than 1 acre of new impervious area in new R/W. Curb and gutter. Discharge to City sewer system. Highly developed area. No ability to acquire more R/W. Many underground utility conflicts. HSG D Soils.	

Possible BMPs	OK?
Vegetated Filter Strip	
Vegetated Biofilter (grass ditch)	
Manufactured System	
Detention Basin	
Retention Basin	
Bioretention Cell	
Infiltration Trench	
Infiltration Basin	
Constructed Wetland	
Underground Detention	
Stream Grade Control	

Audience Participation (8 of 8)

Development	Add Turn Lane in Ultra-Urban Area
Project EDA	7.2 acres
Redevelopment Area	5 acres
Treatment %	44%
Required Treatment	3.2 acres
Notes:	
Adding more than 1 acre of new impervious area in new R/W. Curb and gutter. Discharge to City sewer system. Highly developed area. No ability to acquire more R/W. Many underground utility conflicts. HSG D Soils.	

Possible BMPs	OK?
Vegetated Filter Strip	No
Vegetated Biofilter (grass ditch)	No
Manufactured System	Maybe
Detention Basin	No
Retention Basin	No
Bioretention Cell	No
Infiltration Trench	No
Infiltration Basin	No
Constructed Wetland	No
Underground Detention	Maybe
Stream Grade Control	No

Questions ?

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