

Stormwater Protection and Inspection

For Public Outreach and Education

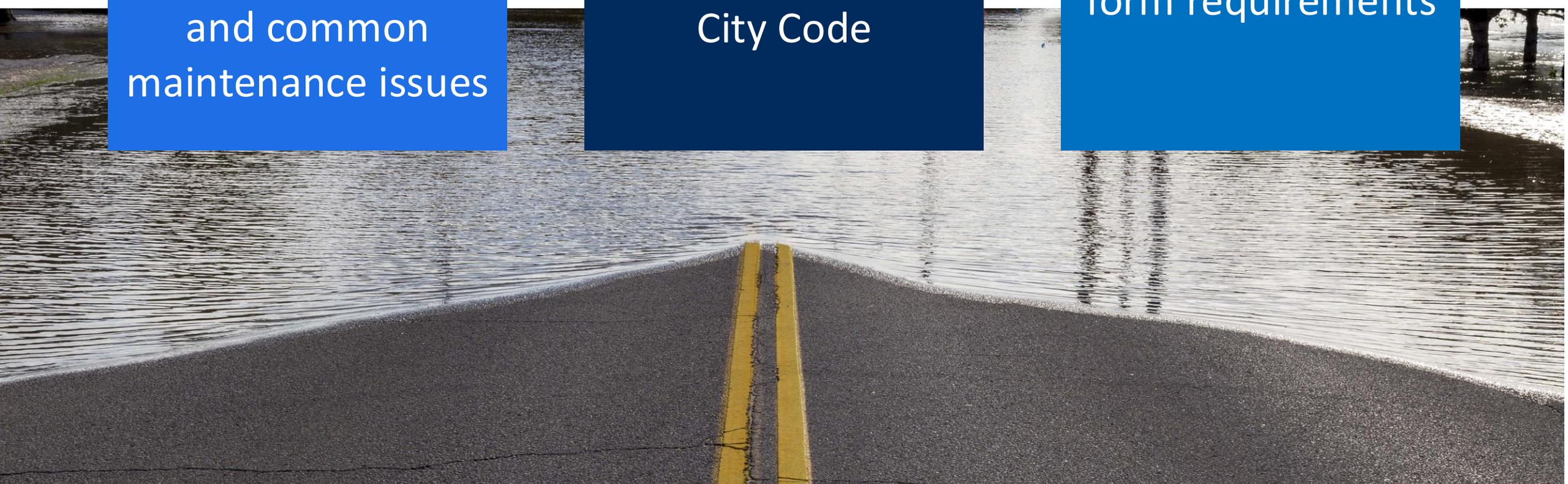
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What is the Purpose of this Course?

Provide an overview of post construction BMPs and common maintenance issues

Review permitting requirements and City Code

Review inspection form requirements



The City's MS4 Permit Program

“MS4” = Municipal Separate Storm Sewer System

- MS4 is defined “as a conveyance or system”:
 - designed or used for collecting or conveying stormwater.
 - owned or operated by a city, county or other governmental entity.
 - audited by the MoDNR

Post-Construction BMPs – Types and Common Maintenance Issues

Detention Ponds – Common Issues

- Beaver Dams
- Floatables
- Sedimentation
- Inlet/Outlet Scour
- Riprap failure
- Tree and Brush Removal
 - Invasive Species



John Richter, Senior Biologist, verifies data on site in a wetland location in Mississippi.

Photo credit: B&V

Detention Ponds – Common Issues

- Tree and Brush Removal
 - Invasive Species
 - Bush / Amur honeysuckle
 - Eastern Red Cedars
 - Johnson Grass
 - Reed Canary Grass



Photo credit: Amy Dietz

[Curse of the Bush Honeysuckle](https://mdc.mo.gov/sites/default/files/2020-04/CurseBushHoneysuckle.pdf)<https://mdc.mo.gov/sites/default/files/2020-04/CurseBushHoneysuckle.pdf>

<https://moinvasives.org/2021/02/18/2021-top-invasive-plants-expanding-in-missouri/>

Detention Ponds – Common Issues

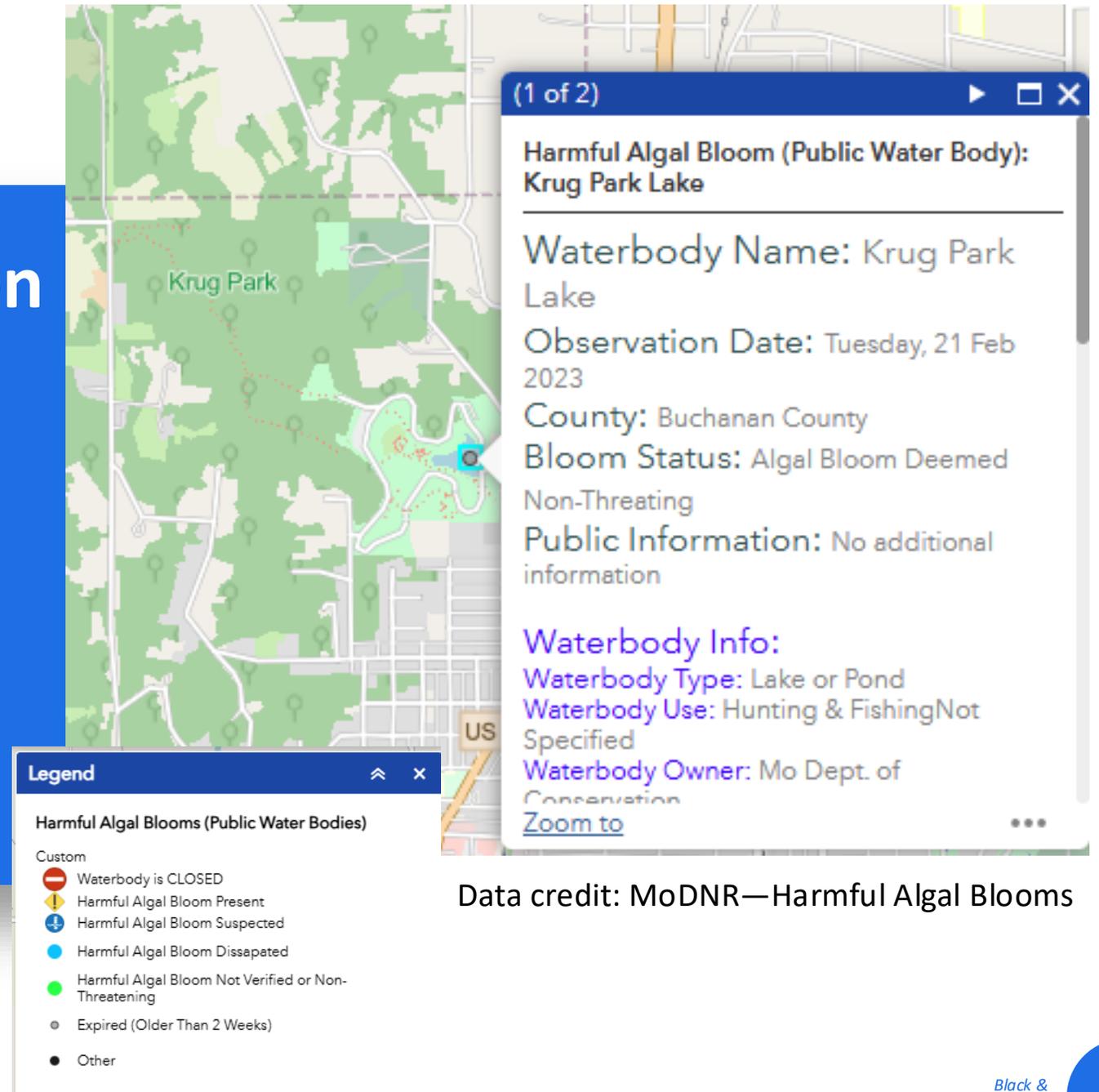
- Eutrophication
 - Excess nutrients cause algal blooms
 - Lowers dissolved oxygen (kills fish)



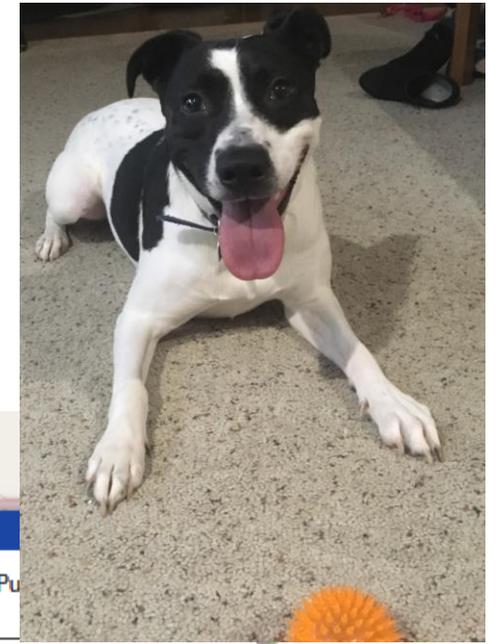
Photo credit: B&V

Detention Ponds – Common Issues

- Algal blooms. Approx. 400 dead fish.
 - Odor
 - Limits Recreational Benefits.
 - Cyanobacteria can harm humans, pets, and wildlife.

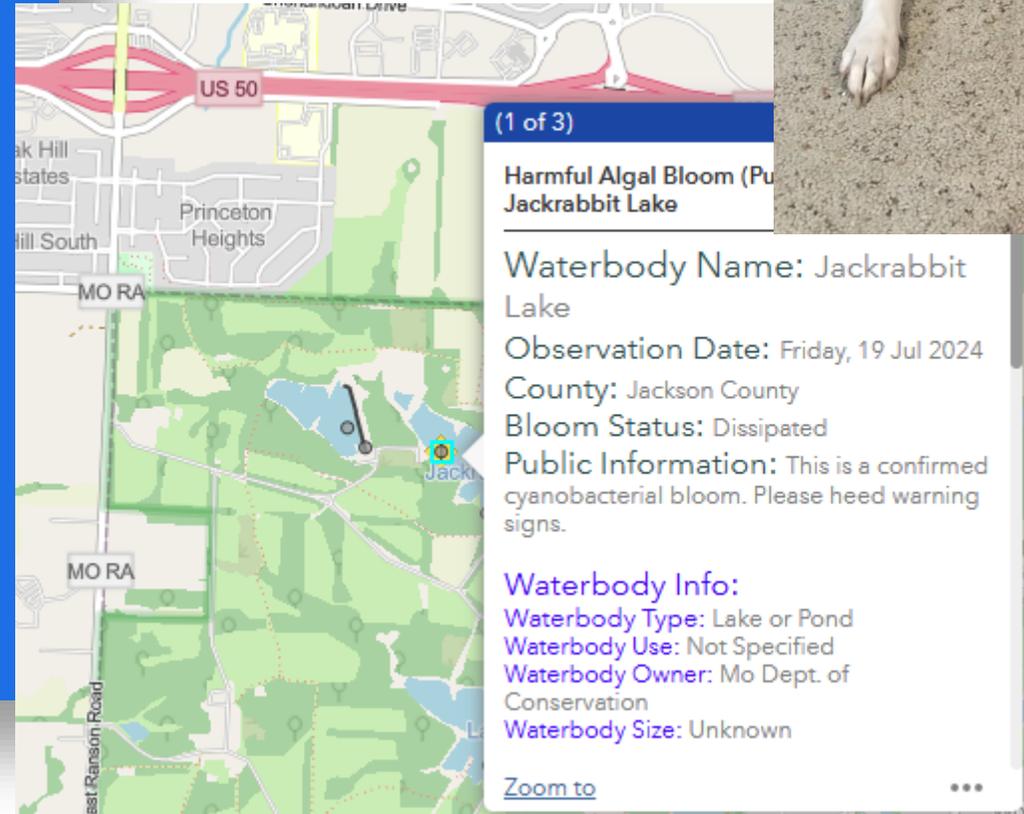


Data credit: MoDNR—Harmful Algal Blooms



Detention Ponds – Common Issues

- Dogs are especially susceptible. They like to play and drink at the water's edge.
- Neurological or liver damage



Data credit: MoDNR—Harmful Algal Blooms

Detention Ponds – Common Issues

- Inlet Scour. Loss of riprap protection.



Photo credit: City of St. Joseph

Detention Ponds – Common Issues

- Erosion / Scour: What's the big deal?
 - Structural failure in under 2 years.
 - Will continue upstream.



Detention Ponds – Common Issues

- Outlet Scour. HDPE pipe exposed to sunlight/UV. Failure of riprap blanket.



Photo credit: City of St. Joseph

Detention Ponds – Common Issues

- Beaver and muskrat damage.
- Just one winter!



Photo credits: Amy Dietz

Detention Ponds – Action items

- Removal of wildlife
- Mudpacking of burrows and/or tree stumps >4 inches. 90% soil, 10% concrete
- Removal of inlet debris.
- Replace outlet riprap.

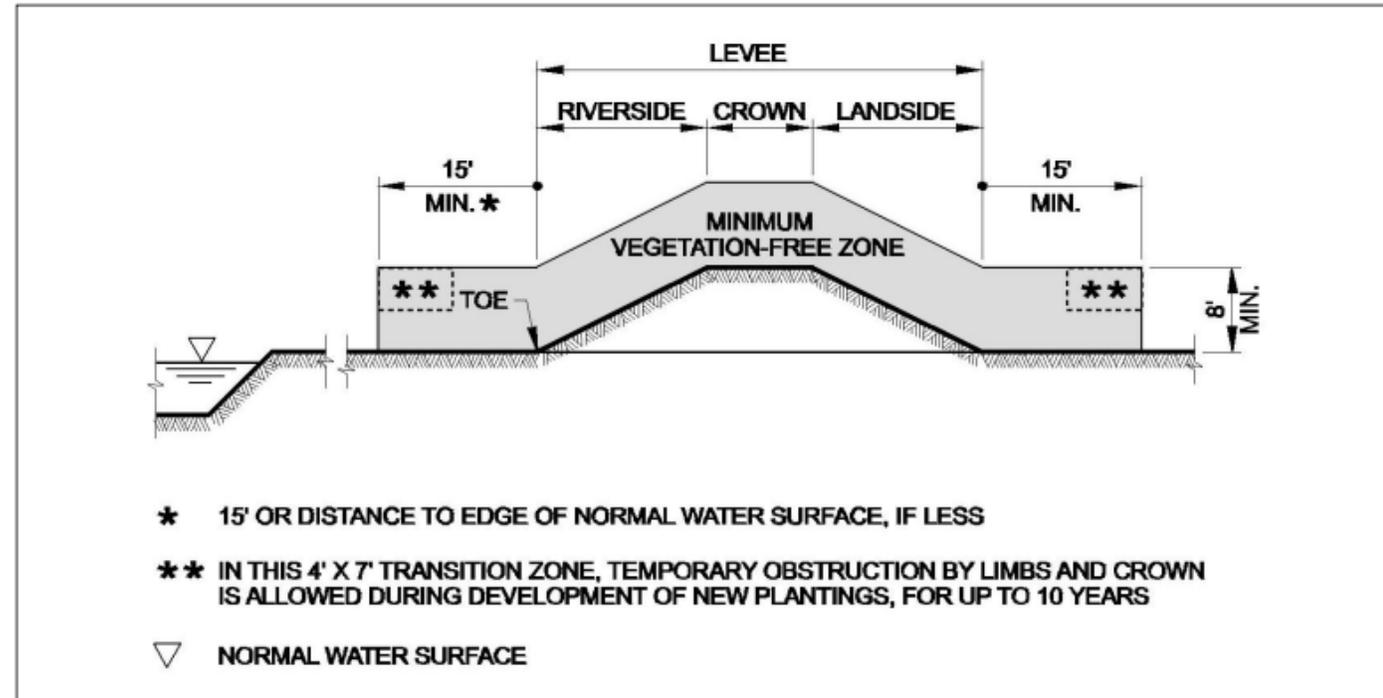


Figure A-1. Levee Section – Basic.

Bioretention – Common Issues

- Colonizing species
- Sediment removal and replanting
- Trash and floatables



Photo credit: Amy Dietz

Bioswale– Common Issues

- Colonizing Species
- Sediment/floatable removal



Photo credit: Amy Dietz



Photo credit: City of St. Joseph

Underground Detention – Common Issues

- Inspection
- Sediment/Debris removal

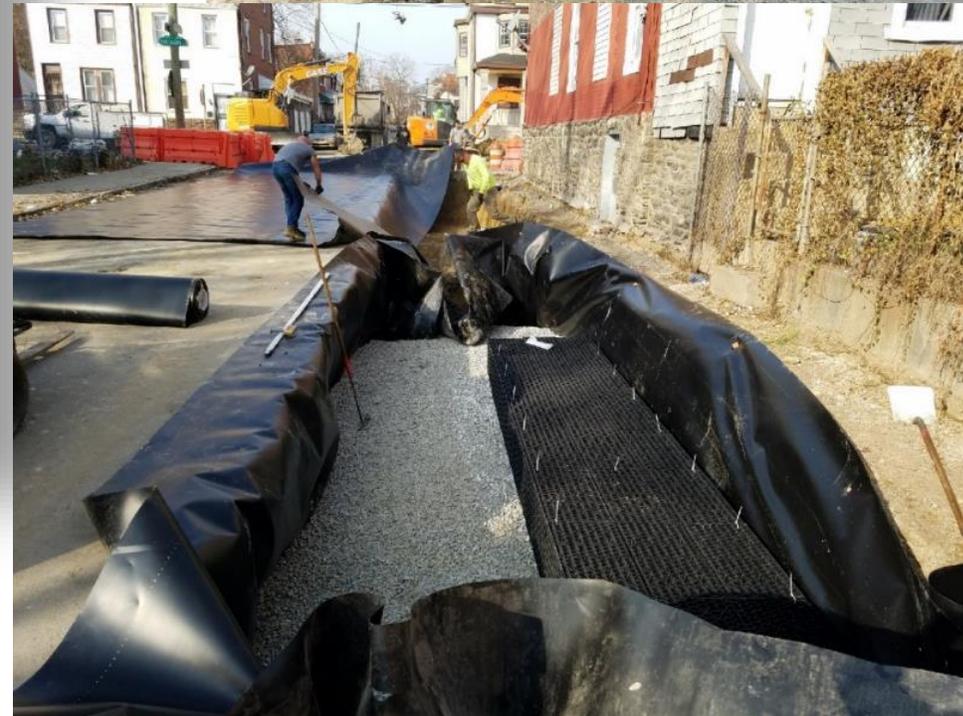


Photo credit:
Ferguson

Permitting Requirements

City Code

Annual Permitting

- Annual inspection and reporting is required by the City's General Permit for private and public stormwater facilities
- General Permit Section Division 4. Section 25-97
 - Authorizes inspection, maintenance, right-of-entry, and annual reporting



MS4 Permitting

- New MS4 Permit in 2026
- City is required to report how they are meeting the requirements of their MS4 permit
- Inspections are a part of this!



Photo Credit: Amy Dietz

The Why:

Why are inspections and maintenance records important?

- Reporting and maintenance are directly linked
- Reporting helps transfer knowledge when property changes hands or when there is staff turnover

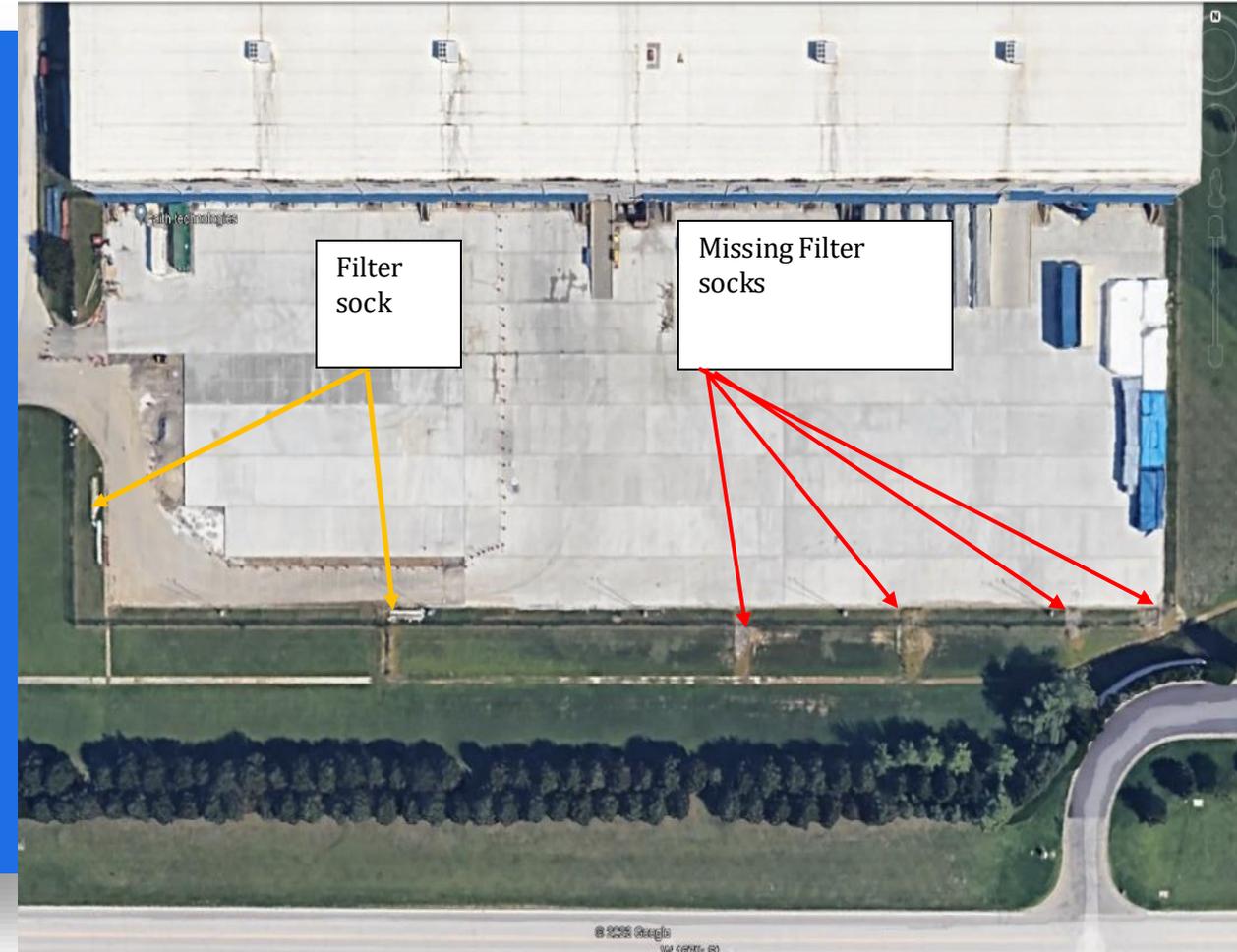


Photo Credit: Google Earth

Inspection

- Tracking inspection and maintenance items
- Forms
- Pictures for inspections and documenting maintenance



Photo Credit: City of Saint Joseph

When is maintenance required?

What Triggers Maintenance?

- New development
 - When the BMP is installed and during the establishment period
- Rainfall events
 - After 2-3 inches of rain (> 1-year, 24-hr rain event)
- Time
 - At least annually, if not more often
 - Due December 1 annually (for MS4 reporting)



Photo Credit: City of Saint Joseph

Maintenance/Inspection Forms

- General information
 - Project Name
 - SPDES Number
 - Location
 - Date and Time
 - Inspector information



Photo Credit: City of Saint Joseph

- BMP & Weather Information
 - Owner information
 - BMP type
 - Weather information
 - Current conditions
 - Date since last precipitation



Photo Credit: City of Saint Joseph

Bioretention vs Underground Detention

- There are two inspection forms:
 - Bioretention/Bioswale/Detention Pond
 - Underground Detention
- Forms are specific to type of BMP



Photo Credit: B&V

BMP Components

- There are difference sections calling out specifics that should be checked
- Yes/No/Notes
- Overall notes



Photo Credit: Amy Dietz

Overall BMP Condition

- Rate the BMP based on all the aspects of the inspection form, using the included criteria as an example.

Overall Rating	Description	Example Comment
Great	Looks the best it can, and nothing needs to be addressed or changed	Great!
Good	Functioning as it should, but might have some trash that needs to be removed	Trash needs to be removed, needs to be weeded
Fair	Functioning, but not as well as it can be. The BMP's function is impaired	Damage to inflow pipe.
Fail	BMP is not functioning as it should	Noxious weeds and dead trees are hiding trash in bmp

Operation and Maintenance Documents

O&M Materials

- Copies shall be retained by the owner of the post construction BMP and with the MS4 operator
- Electronically
- The MS4 operator shall retain copies of all inspection reports



Photo Credit: City of Saint Joseph

O&M Document Requirements – Inspection Forms

- Inspection dates and times
- Inspector name
- Inspection findings, and



Photo Credit: City of Saint Joseph

O&M Document Requirements – Inspection Forms - Continued

- Follow up actions including all enforcement actions
 - Follow up actions by the owner/operator shall include what maintenance items will be addressed and photos/documentation of these items



Photo Credit: Amy Dietz

Submit inspection documents (with pictures!) to the stormwater coordinator for evaluation

Practice Inspections!

How would we rate these BMPs?

Infiltration Basin



Photo Credit: Amy Dietz

Detention Basin



Photo Credit: Amy Dietz

Rain Garden



Photo Credit: City of Saint Joseph

Outfall Structure



Photo Credit: City of Saint Joseph

Questions?

We value your feedback....

Please turn in your anonymous

5 Question Course Evaluation:

