



# Visual Assessment of Industrial Storm Water Discharges

By Keith Noble

Observe the discharge to assess effectiveness of the control measures



# Visual Assessment components

1. Written procedures
2. Sample collection
3. Assessment
  - Discharge at time of collection
  - Sample collected at time of discharge
  - Documentation

# Visual Assessment of Storm Water Discharges

- Included as a component (part) of the comprehensive inspection
- Comprehensive inspections conducted quarterly
- Or on an department approved alternative schedule
- Conducted by the Industrial Storm Water Certified Operator

# Development of Written Procedures

## Sample

### Written Procedures Template for Conducting the Visual Assessment State of Michigan Industrial Storm Water Program

Michigan Department of Environmental Quality (DEQ)  
Water Resources Division (WRD)  
Document Date: 3/3/2015

1. List the discharge point(s) (as indicated on the SWPPP map):  
**001-Point of Discharge from detention pond to storm sewer on Schwarb Drive**  
**002-Outfall to Kammer Drain**
  - a) Is there substantially identical discharge points?  Yes  No  
If "Yes" then complete a) and b) below, if "No" go to Number 2.
  - b) Describe the justification for the substantially identical discharge points determination?
  - c) List the schedule for alternating the substantially identical discharge points:
2. Describe the monitoring (sampling) location for each discharge point:  
**001-From surface of detention pond in front of the outlet pipe to the storm sewer**  
**002-From the water coming out of the culvert that goes into the Kammer Drain**
3. List the Qualified Personnel that will collect the water sample:  
**Mark Storm I-00158**  
**David Waters I-09058**
4. Training for the Qualified Personnel includes viewing the Visual Assessment Webinar and/or the 3 Visual Assessment Tutorials on the DEQ, WRD Industrial Storm Water website. Check the appropriate box below:  
 Yes  
 No, however a copy of the training materials used are included with this procedure.
5. List the sampling equipment used for the collecting the water sample(s):  
**Sampling pole and glass quart canning jars**
6. Complete a) through c) below to describe the storm event information.
  - a) Describe how qualifying storm events are determined (including nature of the event):  
**A rain gauge is positioned on the lawn to the west of the office to record storm events. This is monitored and emptied after storm events. When a rain event occurs during working hours (Monday-Friday 700AM-5:00PM) we check to see if there has been any events in the last three days that caused a discharge. For the duration and intensity of the storm event we use the data from the NOAA web site and Channel 13 weather information.**
  - b) Describe how each discharge point was evaluated to determine when a discharge would begin:  
**Since we have paved surfaces and relatively flat areas we determined that we get a discharge after 0.2 inches of rain at discharge point 002. On days that rain is forecasted we watch for the rain and mobilize the sampling equipment. When the rain begins we send one of the Industrial Storm Water Certified Operators out to collect the sample based on the intensity of the rain event. For discharges from discharge point 001 we look at the water level at the outlet pipe**

# Develop Procedures

- Written procedures for conducting the visual assessment
  - Developed within **6 months** of Certificate of Coverage or Individual Permit issuance or reissuance
  - Incorporated into the Storm Water Pollution Prevention Plan, Comprehensive Inspection section
  - Determined to be acceptable as part of the SWPPP review.

# On the industrial storm water webpage of the storm water website

<http://www.Michigan.gov/deqstormwater>

- [Office of Environmental Assistance](#)
- [Compliance Assistance Guides](#)
- [Marina Operations Compliance Assistance](#)
- [Compost Operations Compliance Assistance](#)
- [Water Discharge Diagram for Yard Clippings Composting Facilities](#)

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## Conducting Visual Assessments of Industrial Storm Water Discharges

Conducting visual assessments of storm water discharges from areas of industrial activity is a new permit requirement for facilities in Michigan with industrial storm water permit coverage under the newly issued general permits and individual permits with storm water coverage. The visual assessment is part of the comprehensive inspection conducted by the Industrial Storm Water Certified Operator at the facility. The following compliance assistance documents, webinars and tutorials have been developed to help facilities better understand this permit requirement.

- [Visual Assessment of Industrial Storm Water Compliance Assistance Document](#)
- [Visual Assessment Question and Answer Document](#)
- [Instructions for Completing the Quarterly Visual Assessment Report](#)
- [Visual Assessment Report Form](#)
- [Visual Assessment Tutorials - Part 1, Part 2, Part 3](#)
- [Visual Assessment Written Procedures Outline Template](#)
- [Visual Assessment Written Procedures Outline Template\\_Sample](#)
- [Industrial Storm Water - Visual Assessment Webinar slides](#)
- [Industrial Storm Water - Visual Assessment Webinar recording](#)

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## Certificate of Entry Process for Unpermitted Facilities

The General Administrative Consent Order for Unpermitted Discharges No. ACO-UD12-100 (Consent Order) is for industrial storm water facilities that are currently discharging storm water to surface waters of the state without industrial storm water permit coverage from the Department of Environmental Quality (DEQ), Water Resources Division (WRD). Please review the compliance assistance document titled "Certificate of Entry Process for Unpermitted Facilities" below to see if your facility qualifies to use the Notice of Intent and Certificate of Entry application form (NOI/COE form). In order to fulfill the requirements of the Consent Order, eligible facilities must submit a completed NOI/COE form via [MiWaters](#).

- [Certificate of Entry Process for Unpermitted Facilities \(Compliance Assistance Document\)](#)
- [General Administrative Consent Order for Unpermitted Discharges No. ACO-UD12-100](#)

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## Storm Water Program Training Videos

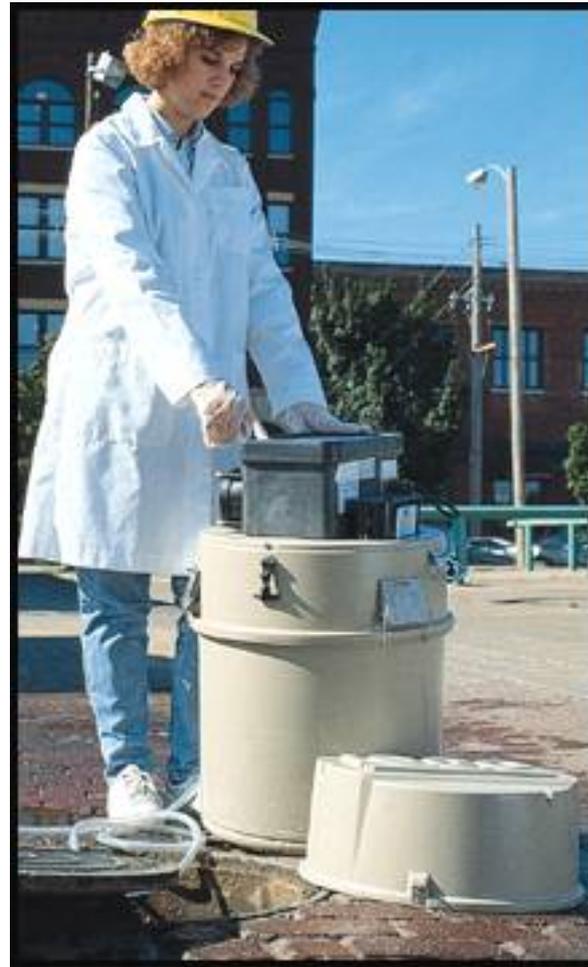
The video below was developed to help understand what is involved with the Industrial Storm Water Program

# Written Procedures Include

- Identifying those who will be conducting the visual assessment
  - Certified Operator must be a Industrial Storm Water Certified Operator
  - Staff working in conjunction with or under the supervision of the Certified Operator



# Written Procedures- Sample Collection



# Discharge Points

- Identification of Discharge Points-location where storm water is discharged from the property-Two types of Discharge points



Outfalls

- Stream
- County Drain
- Lake
- Wetland

Points of Discharge

- On site catch basins
- Trench drains
- In street catch basins
- Conveyance to road side ditch

# Discharge Points - Outfalls

- Direct discharges to surface waters





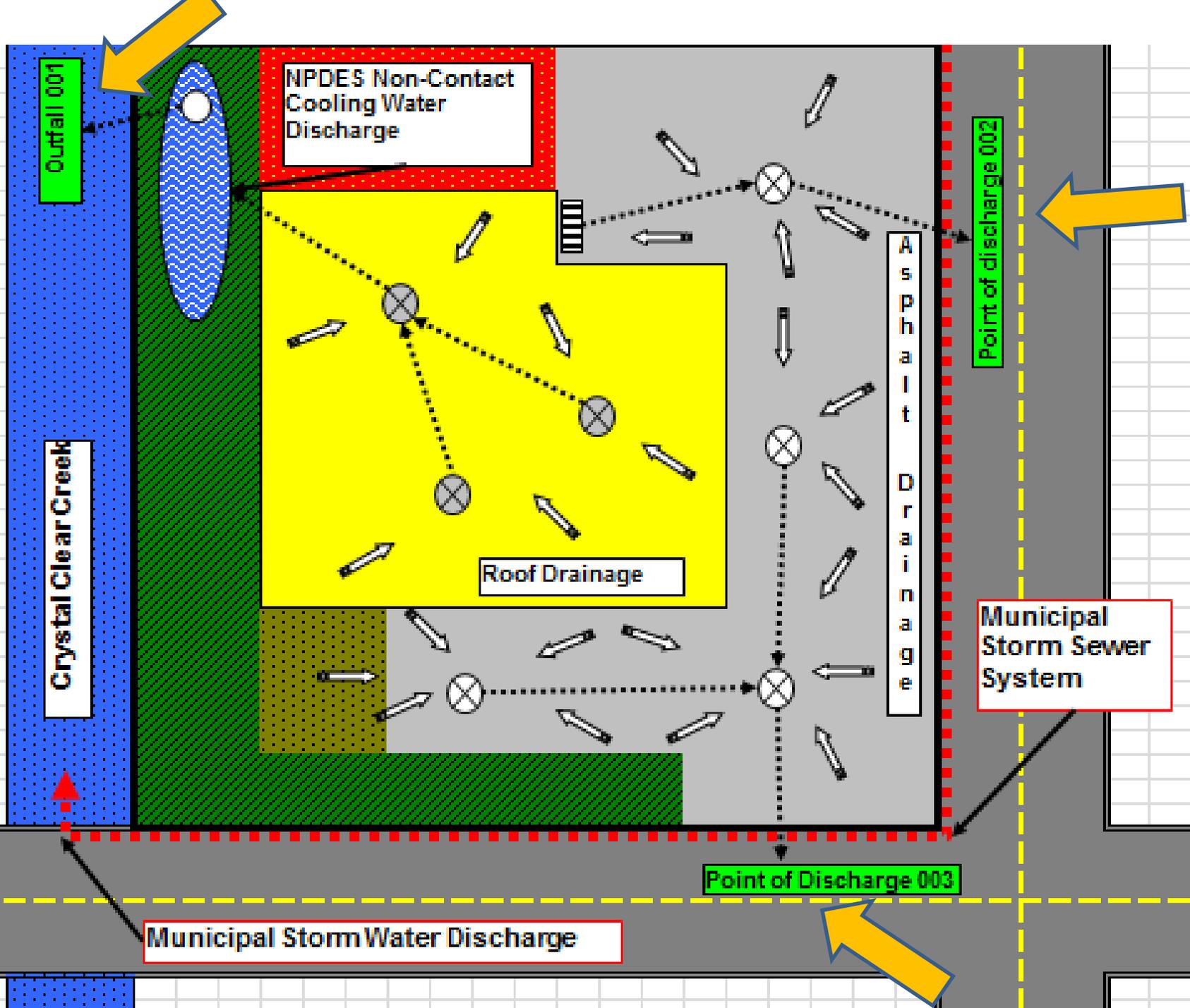
# Discharge Points-

Discharges to a separate storm sewer system



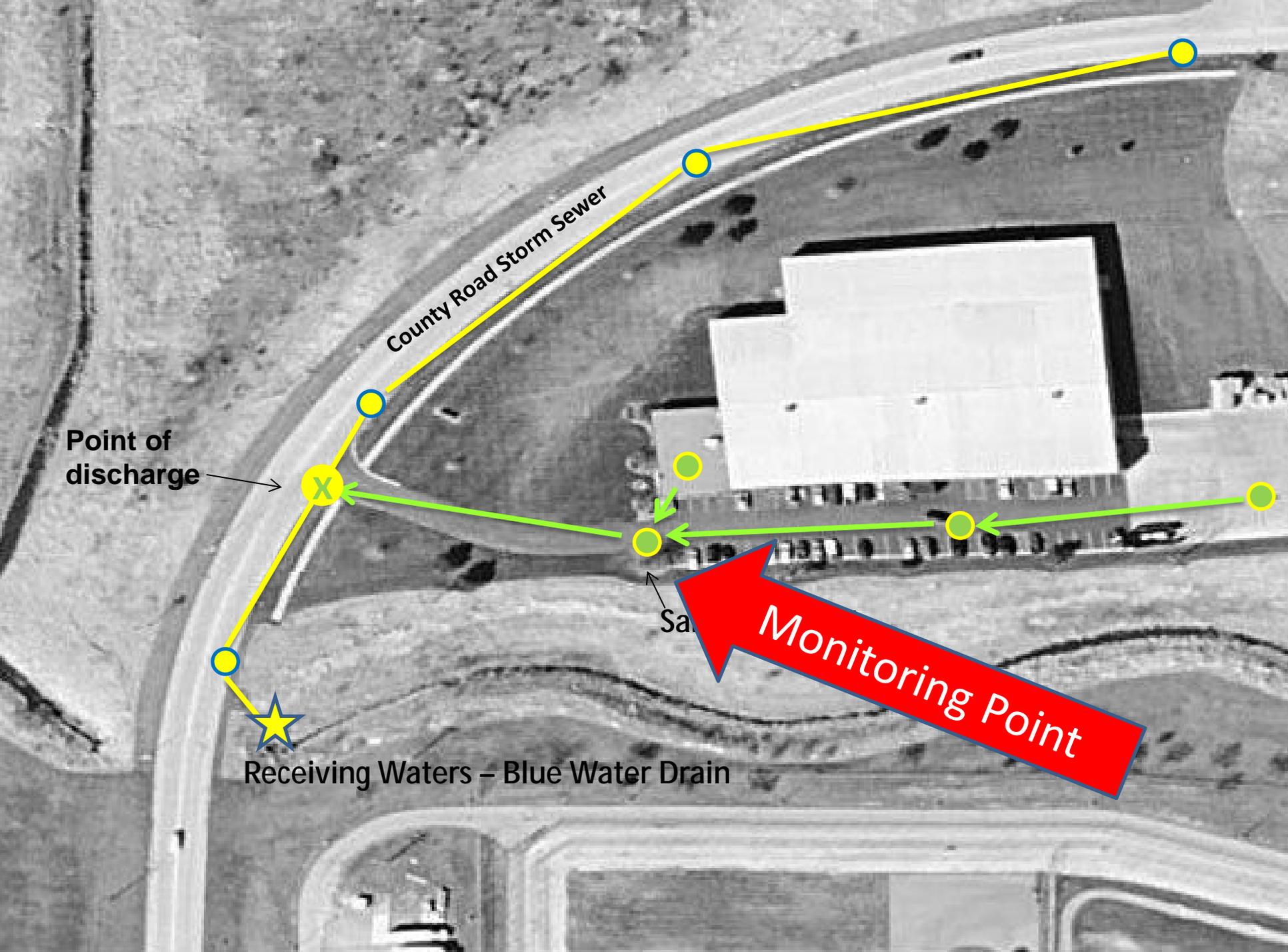
# Points of Discharge





# Monitoring Point





County Road Storm Sewer

Point of discharge

X

Receiving Waters - Blue Water Drain

Sa

Monitoring Point



OWS #2 –  
1500 gal

Fuel Transfer  
Area/OWS #1/  
Sump (19K Gal)

CB#2

CB#1

CB#4

CB#3 (Flow Through)

Outfall

Sample point

14th Ave S

# Multiple Discharge Points

- Substantially identical storm water effluent
- Conduct Visual Assessment at one of the discharge points

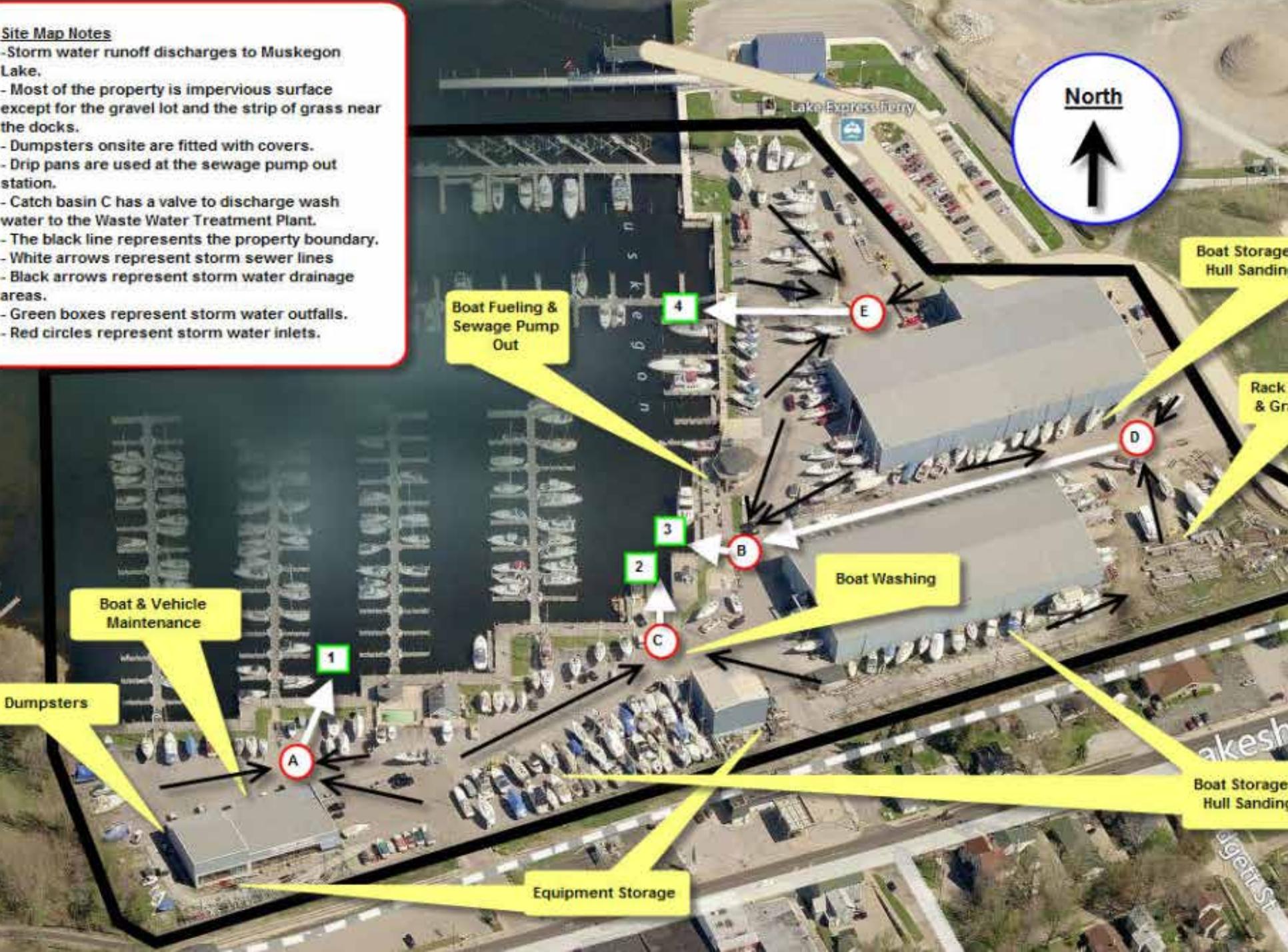


# Substantially Identical Discharge Points

- How is this determined?
  - Look at the significant materials evaluation or inventory
    - Significant materials
    - Industrial Activities
  - Indicated on SWPPP site map

### Site Map Notes

- Storm water runoff discharges to Muskegon Lake.
- Most of the property is impervious surface except for the gravel lot and the strip of grass near the docks.
- Dumpsters onsite are fitted with covers.
- Drip pans are used at the sewage pump out station.
- Catch basin C has a valve to discharge wash water to the Waste Water Treatment Plant.
- The black line represents the property boundary.
- White arrows represent storm sewer lines
- Black arrows represent storm water drainage areas.
- Green boxes represent storm water outfalls.
- Red circles represent storm water inlets.



North



Boat Fueling & Sewage Pump Out

Boat Storage Hull Sanding

Rack & Gr

Boat & Vehicle Maintenance

Boat Washing

Dumpsters

Boat Storage Hull Sanding

Equipment Storage

# Unregulated areas

- Areas without industrial activity
  - Customer or Employing Parking Areas
  - Lawn



# Unregulated discharges

- Areas that do not discharge directly or indirectly to surface waters
  - Combined sewer discharges
  - Ground water discharges
  - Sanitary sewer

# Written Procedures

- Component of the Storm Water Pollution Prevention Plan
- Part of the Comprehensive inspection
- Reviewed to determine if they meet requirements of permit
- Changes may be required

# Sample Collection and Discharge Observations:



# Sample Collection From Discharge Points



A dramatic sky filled with dark, heavy clouds, suggesting an approaching storm. The bottom of the image shows a dark silhouette of a tree line against a lighter, overcast sky. The text "Have your collection equipment ready" is overlaid in a bright yellow font across the middle of the image.

Have your collection equipment ready

# Frequency

- As often as the comprehensive inspection
  - Once in each quarter
    - January-March
    - April-June
    - July-September
    - October-December
  - According to Approved Alternative Schedule

# Sample Collection and Observations

- Timing
  - Within 1 month of the control measure observations



# Sample Collection and Observations Timing

- At least 72 hours from a previous storm event (qualifying storm event)
- Within 30 minutes of beginning of the storm water **discharge** (first flush)
- Within 60 minutes if not possible to do in 30 minutes (document why)





Discharge structure with valve

# Sample Collection and Observations

- Collect storm water discharge sample in a clean clear container
- Collect a sample that is representative of the discharge



# Detailed sampling procedures

- The written procedures must include the details as to how the sample will be collected



# Sampling flowing water



From a pipe just collect  
the water in a container



- Adverse Weather Conditions
  - If unable to conduct assessment
  - Conduct Assessment during next qualifying storm event



# Adverse weather conditions

- Defined:
  - Dangerous conditions or conditions that create inaccessibility for personnel
    - Flooding
    - Electrical Storms
    - High winds
    - Icy conditions



# Documentation for not conducting visual assessment

- Situations that make sampling impossible (no discharge)
  - Drought
  - Frozen conditions

Include the rationale for not conducting a visual assessment during that quarter



# Be Prepared



# Specialized Equipment



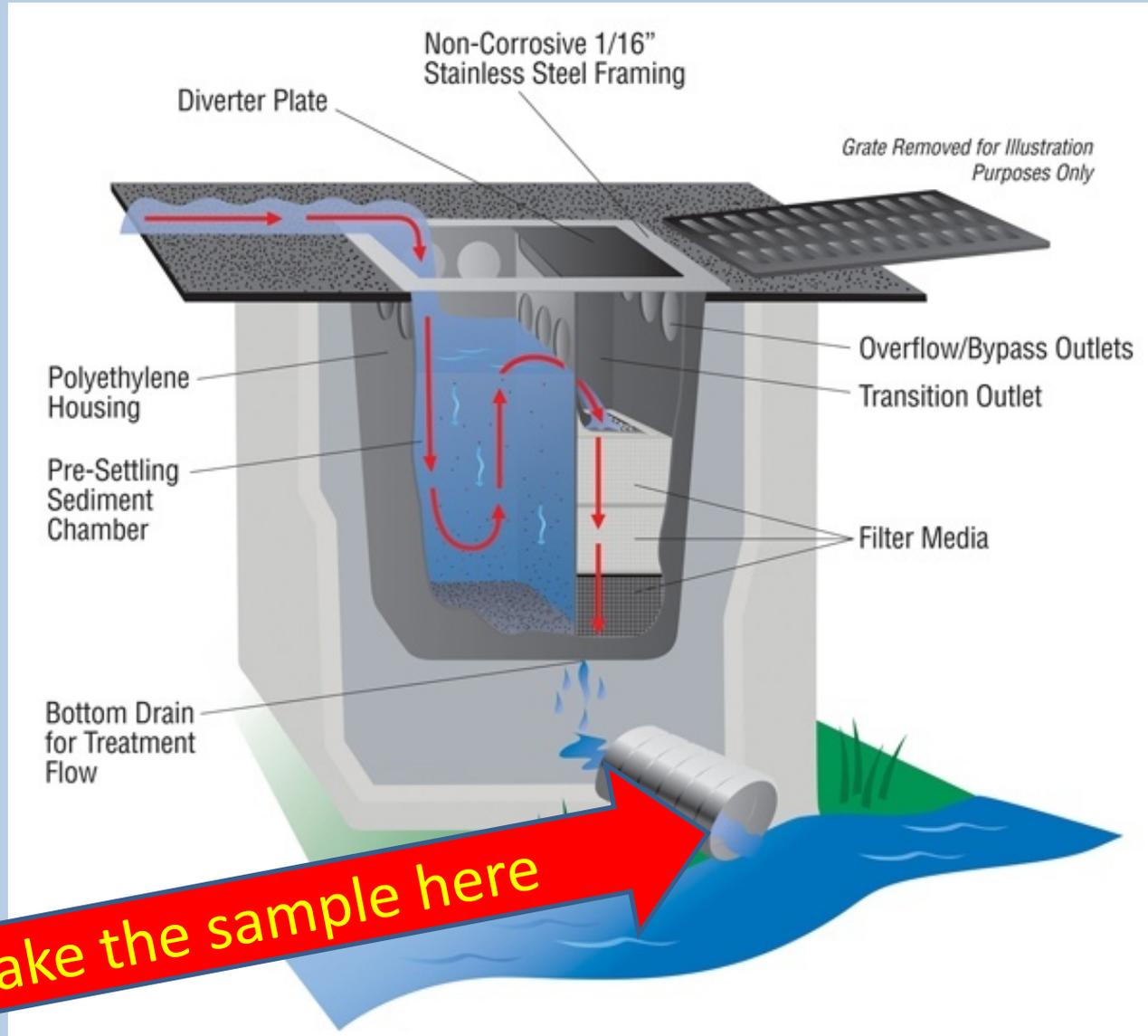
# Take the Necessary Precautions



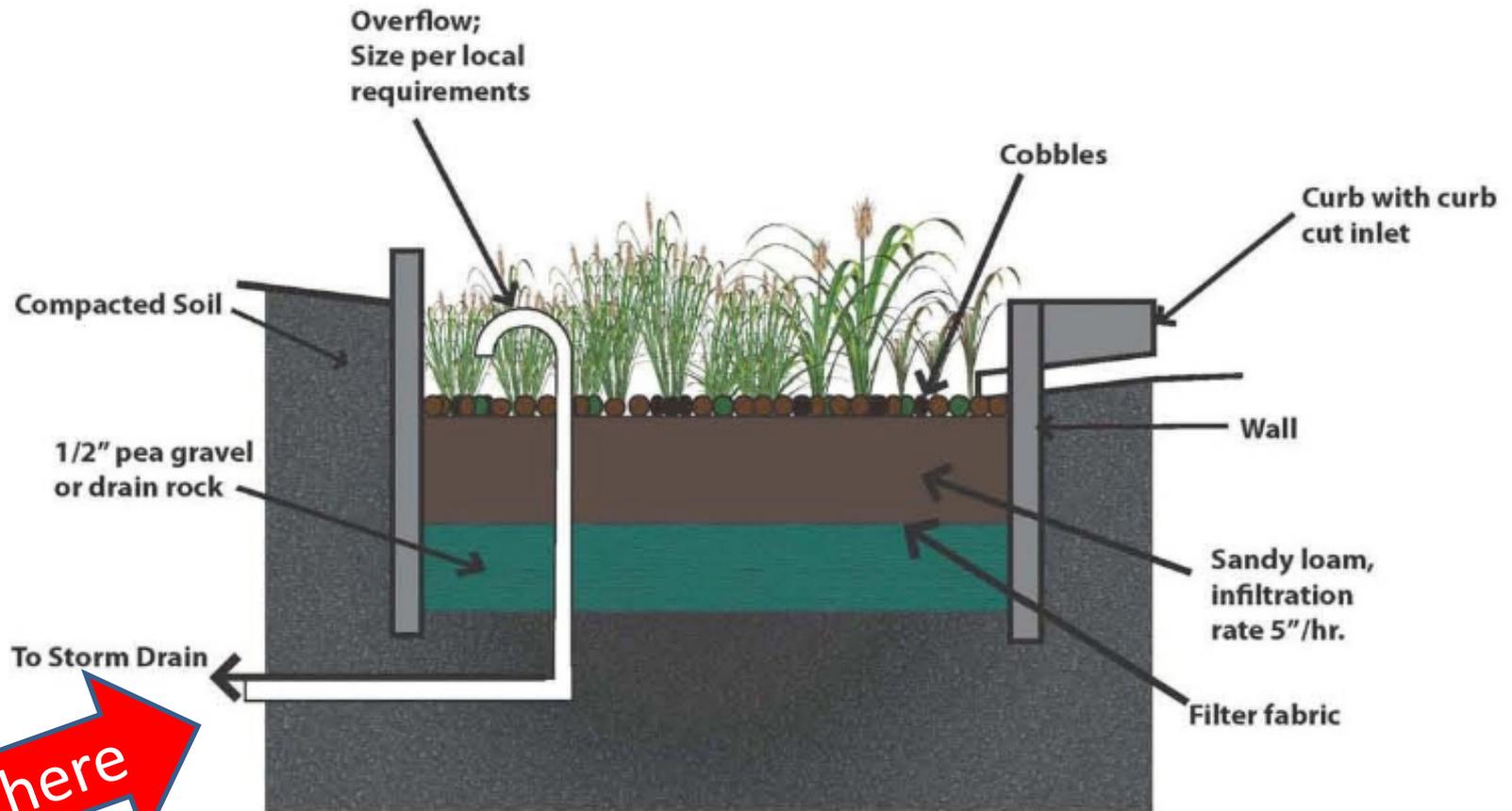
# Sample collection from Structural Controls



# Sample locations



# Sampling location



**Infiltration Basin**

**Sample here**

# Sampling location



Sample through the bypass

# Cold Weather Visual Assessments

- For snowmelt- during a period with a measureable discharge



# Sample Collection and Observation Alternatives?

- Automated samplers
  - The visual assessment of the sample must be conducted by the Certified Operator within 48 hours of sample collection
    - Mix prior to visual examination
  - Include in written procedures



# Alternatives

- Certified Operator is not available?
  - Use staff that have received appropriate training for taking the storm water sample
  - Use a device to visually record the discharge (optional)



# Staff Training

- View Visual Assessment webinar or u-tube videos
- Provide documentation that staff assisting in the visual assessment have received the appropriate training
- Included in Written Procedures



# Sample storage

- Assessed after collection or
- Ensure that the sample is properly stored
- Storage procedures  
Included in  
written procedures



# Visual Assessment

- Storm water discharging
- Sample collected at time of discharge



- Observations of the discharge

- Color
- Turbidity (cloudiness)
- Oil Film (sheen)
- Floating Solids
- Foams
- Settleable solids
- Suspended solids
- Odor



# Color



# Turbidity



# Petroleum Sheens or Films



# Floating Solids



# Foams



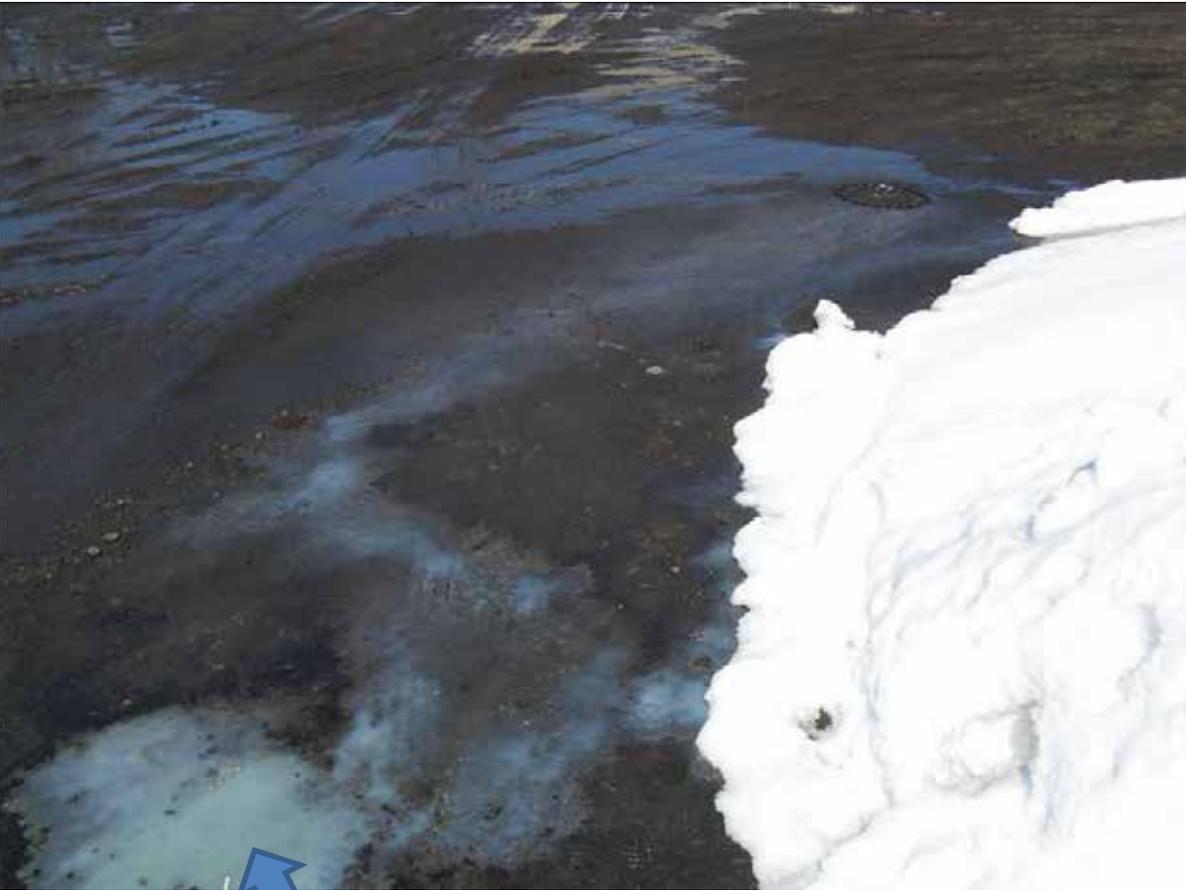
# Settleable Solids



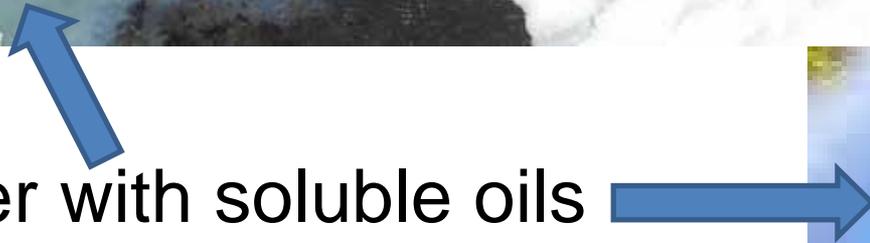
# Suspended Solids



# Suspended Liquids



Water with soluble oils



# Odors



# Combinations



# Combinations



# Naturally Occurring Variations



# Documentation



# Documentation of Visual Assessment

- Discharge points
- Storm event information
  - Date and time discharge began
  - Length (Hours)
  - Amount of precipitation (inches)
  - Duration of time since previous event or snow melt discharge



# Get a rain gauge

- Weather Underground:  
[www.wunderground.com](http://www.wunderground.com)  
[www.wunderground.com/history](http://www.wunderground.com/history)
- National Weather Service:  
[www.weather.gov](http://www.weather.gov)





MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER RESOURCES DIVISION  
**INDUSTRIAL STORM WATER PROGRAM**  
*Quarterly Visual Assessment  
Report Form*

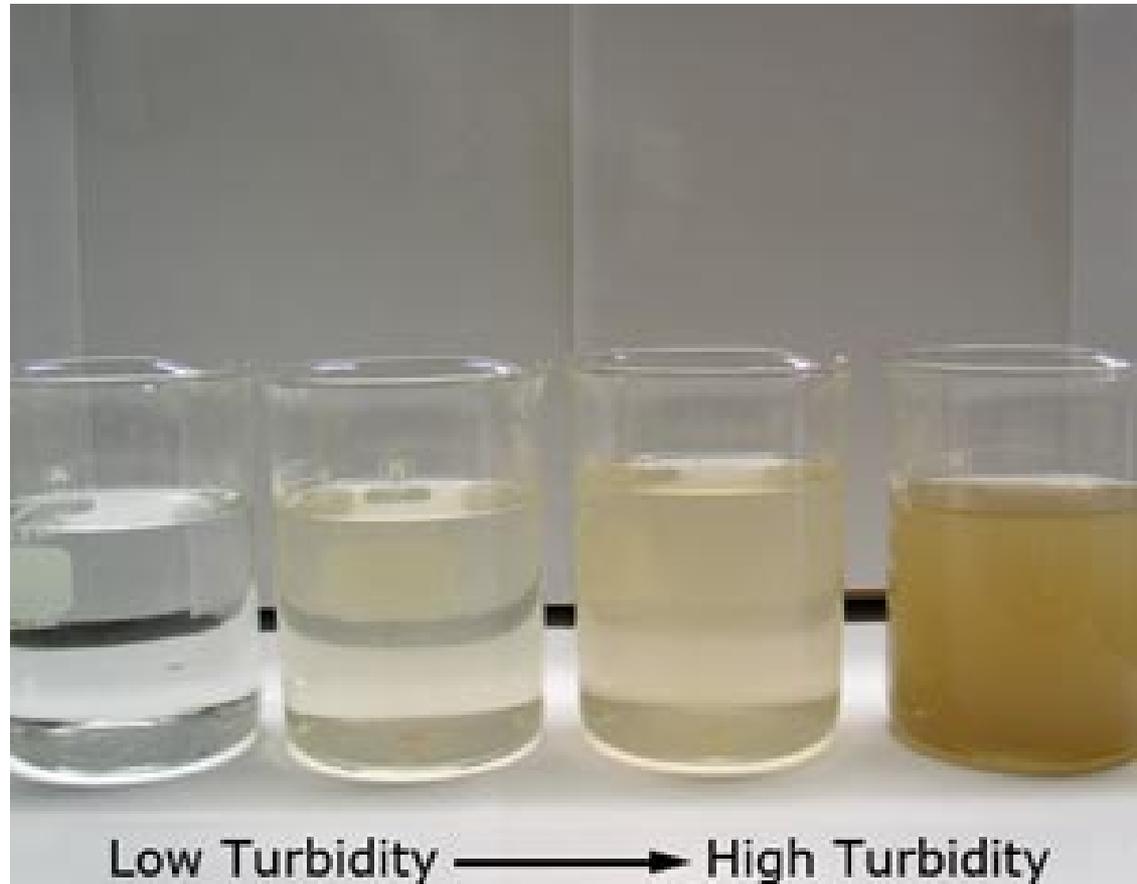
The intent of this compliance assistance document is to provide a Visual Assessment Report Form that ~~permitees~~ can use to meet the conditions of the National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge General Permit for Industrial Storm Water Discharges or NPDES Individual Permits. This document and other compliance assistance documents can be found at the DEQ, WRD Industrial Storm Water website [www.mi.gov/deqstormwater](http://www.mi.gov/deqstormwater) (then click on INDUSTRIAL PROGRAM).

<b>Facility Information</b>		
Designated Name:		Certificate of Coverage No. <u>or</u> Individual Permit No:
<b>Visual Assessment Information</b>		
Discharge Point#/Name:		Substantially Identical Outfall? <input type="checkbox"/> No <input type="checkbox"/> Yes List substantially identical outfalls
Name(s)/Title(s) collecting sample:		Name(s)/Title(s) examining sample:
Certified Operator? <input type="checkbox"/> Yes <input type="checkbox"/> No		Certified Operator? <input type="checkbox"/> Yes <input type="checkbox"/> No
Date & Time Discharge Began:	Date & Time Sample Collected*:	Date & Time Sample Examined:
Enter date & time	Enter date & time	Enter date & time
If sample was collected > 30 minutes from start of discharge, provide explanation:		
Substitute Sample? <input type="checkbox"/> Yes <input type="checkbox"/> No Identify quarter/year when sample was originally scheduled to be collected		
Nature of Discharge: <input type="checkbox"/> Rainfall <input type="checkbox"/> Snowmelt		
If Rainfall: Rainfall Amount in inches:		Previous Storm Ended > 72 hours Before Start of This Storm? <input type="checkbox"/> No <input type="checkbox"/> Yes
<b>Observations:</b>		
Color: <input type="checkbox"/> None <input type="checkbox"/> Other (describe)		Turbidity: <input type="checkbox"/> No <input type="checkbox"/> Yes
Oil Films/Sheens: <input type="checkbox"/> None <input type="checkbox"/> Flecks <input type="checkbox"/> Globs <input type="checkbox"/> Sheen <input type="checkbox"/> Slick <input type="checkbox"/> Other (describe)		Floating Solids: <input type="checkbox"/> No <input type="checkbox"/> Yes (describe)
Foam (gently shake sample): <input type="checkbox"/> No <input type="checkbox"/> Yes		Suspended Solids: <input type="checkbox"/> No <input type="checkbox"/> Yes (describe)
Settleable Solids (Observe for settled solids after allowing the sample to sit for approximately one-half hour): <input type="checkbox"/> Yes <input type="checkbox"/> No		
Odor: <input type="checkbox"/> None <input type="checkbox"/> Musty <input type="checkbox"/> Sewage <input type="checkbox"/> Sulfur <input type="checkbox"/> Sour <input type="checkbox"/> Other (describe)		
Clarity: <input type="checkbox"/> Clear <input type="checkbox"/> Slightly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Opaque <input type="checkbox"/> Other (describe)		
Other Obvious Indicators of Storm Water Pollution: <input type="checkbox"/> No <input type="checkbox"/> Yes (describe)		
Pictures Taken: <input type="checkbox"/> No <input type="checkbox"/> Yes (Required for documentation)		
<b>Follow-up:</b>		
Potential sources of observed storm water contamination: Insert details		
Corrective Action Taken? <input type="checkbox"/> N/A <input type="checkbox"/> No <input type="checkbox"/> Yes Insert details		

\*In accordance with permit requirements, samples are to be collected within the first 30 minutes of the start of a discharge. If it is not possible to collect the sample within the first 30 minutes, the sample shall be collected as soon thereafter as practical but not exceeding 60 minutes. For snowmelt, samples shall be collected during a period with measurable discharge from the site.

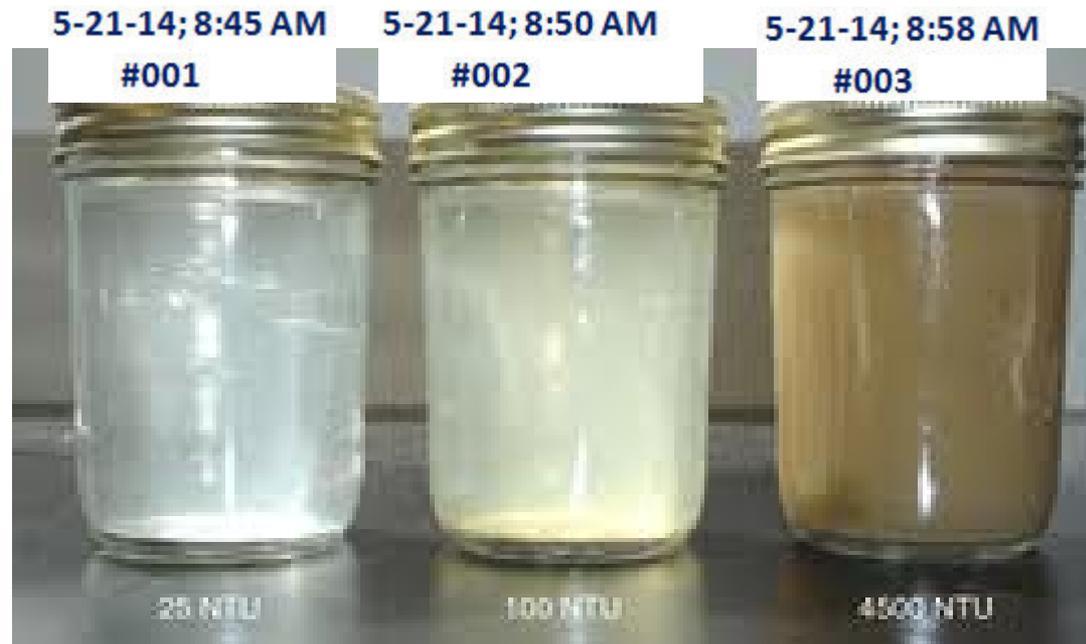
# Observing the sample (Assessment)

- By Certified Operator
  - In a well lit area
  - Within 48 hours of collection
  - Sample must be gently mixed



# Documentation-Labeling

- Sample collection
  - Discharge Point
  - Date and time
    - Collection
    - Beginning of discharge
  - Collector



# Slide Label

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

**Time:** \_\_\_\_\_

**Discharge Pt.:** \_\_\_\_\_

**Date/Time of Start of Discharge:**

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

\_\_\_\_\_

**Personnel:** \_\_\_\_\_



# Documentation-Report Form

- Collector
- Assessment
  - Certified Operator
  - Name
  - Title
  - Operator Certification Number

# Documentation

- Photographic evidence
  - Photo taken of the sample against a white background
  - Colored photo or
  - Electronic file



# Documentation

- Explanation why sample was not taken during the first 30 minutes of the storm event



# Documentation

- Nature of Discharge  
(Rain or snowmelt)



# Documentation

- Probable source of contamination

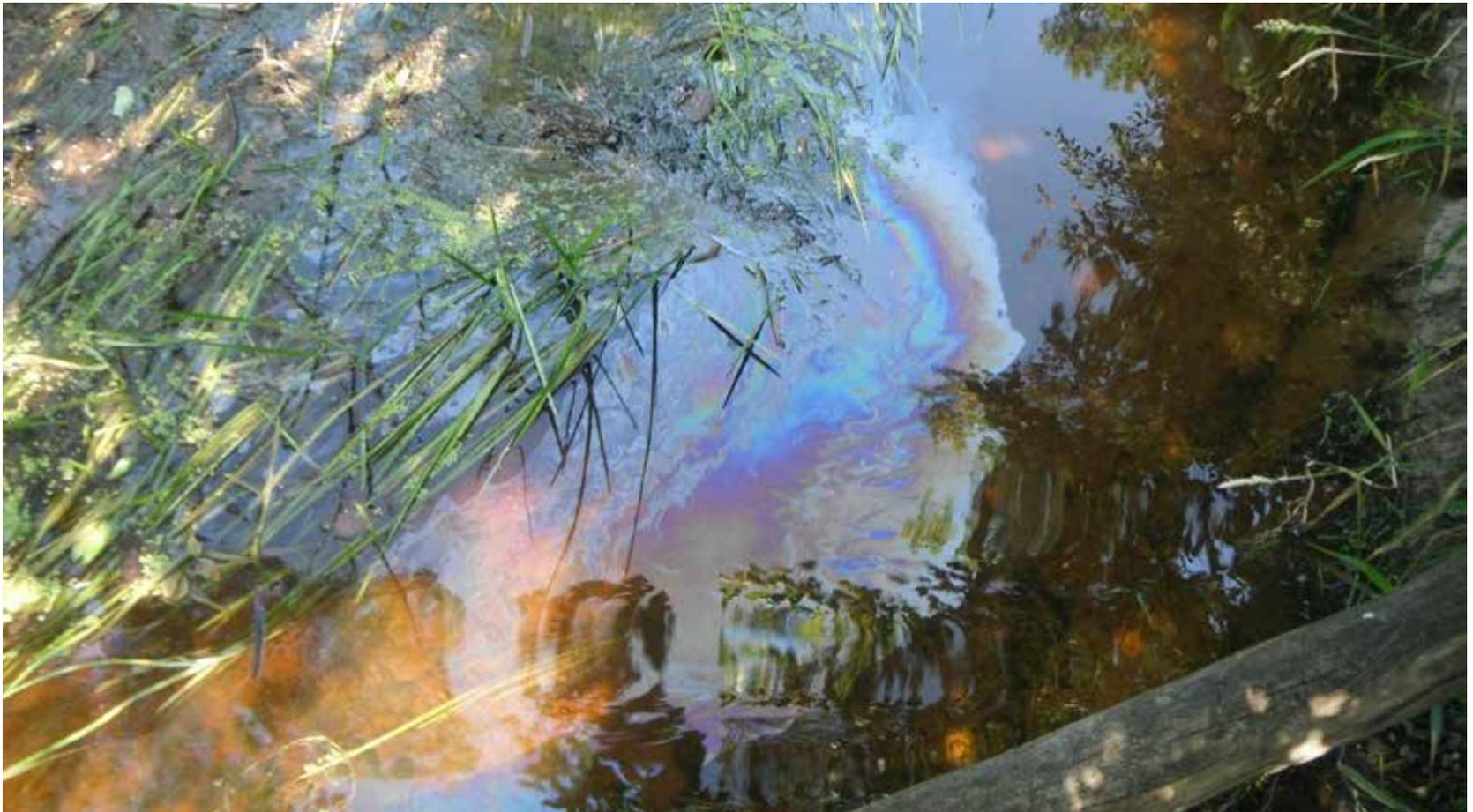


# Take Action



# Documentation

- Any unusual characteristics of the discharge shall be reported







# Summary

- Be Prepared
- Provide appropriate training and supervise the collection of the sample



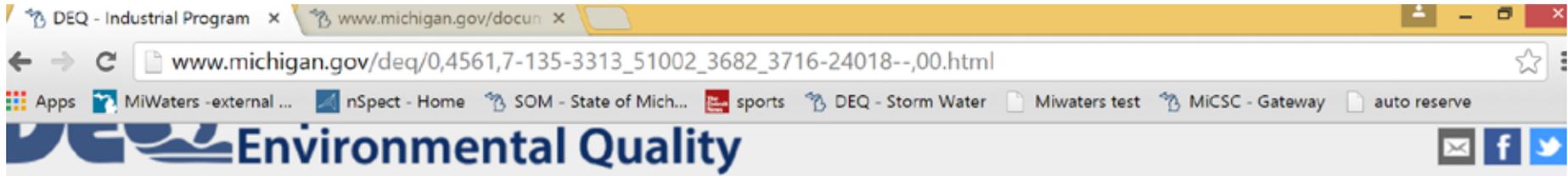
# Summary

- Document the characteristics of the discharge at the time of the discharge
- Certified Operator must visually assess the sample collected
- Document the visual assessment
  - Photograph
  - Written report
- Make corrective actions in a timely manner

# Assistance

- [www.michigan.gov/deqstormwater](http://www.michigan.gov/deqstormwater)
- Contact Industrial Storm Water Staff
- Compliance assistance documents on the webpage
  - FAQ sheet
  - U-tube videos
  - Written procedures outline
  - Report forms
  - Webinar

# Staff Contacts



DEQ / WATER / ONSITE WASTEWATER / SURFACE WATER

## Industrial Program

As a result of the federal regulations governing storm water discharges, the State of Michigan began issuing permit coverage in 1994. There are three types of permits available in Michigan: a general permit, a general permit with monitoring requirements, or a site specific individual permit. There are approximately 4,000 facilities with storm water discharge authorization.

Michigan's industrial storm water permit authorization requires facilities to obtain an industrial storm water certified operator who has supervision over the storm water treatment and control measures at the facility. In addition the facility must develop a Storm Water Pollution Prevention Plan (SWPPP) which describes nonstructural and structural controls implemented onsite and eliminate any unauthorized non-storm water discharges. The certification process for industrial storm water certified operators is currently an on going process in each of the district offices.

Please note that all activity is required to be done through [MiWaters](#).

SWPPP Annual Report Submittal - All facilities with industrial storm water permit coverage except for those covered by general permit MIS110000 must submit their SWPPP Annual Report by January 10, 2016. A webinar titled Submitting a Storm Water Pollution Prevention Plan (SWPPP) Annual Report in Miwaters will be presented on January 5, 2016. A [webinar](#) is available.

Introduction to MiWaters for Facilities Covered Under the [Cycle Year 1 Watersheds Industrial Storm Water General Permit webinar](#) (recorded 9/21/15).

[Industrial Storm Water Program Staff Contact Information](#)

## Related Content

- [MS4 Implementation Team](#)
- [Summary of NPDES Fees for storm water discharges](#)
- [Municipal Program / MS4 Compliance Assistance](#)
- [Storm Water Staff Contact Information](#)
- [Construction Site Program](#)

# Industrial Storm Water Staff

[Link to Industrial Storm Water program home page](#)

**Cadillac District Office:** 120 W. Chapin St, Cadillac 49601

**Gaylord Field Office:** 2100 West M-32, Gaylord 49735

**Grand Rapids District Office:** 5th Fl. 350 Ottawa Ave NW, Grand Rapids 49503

**Jackson District Office:** 301 E. Louis Glick Hwy, Jackson 49201

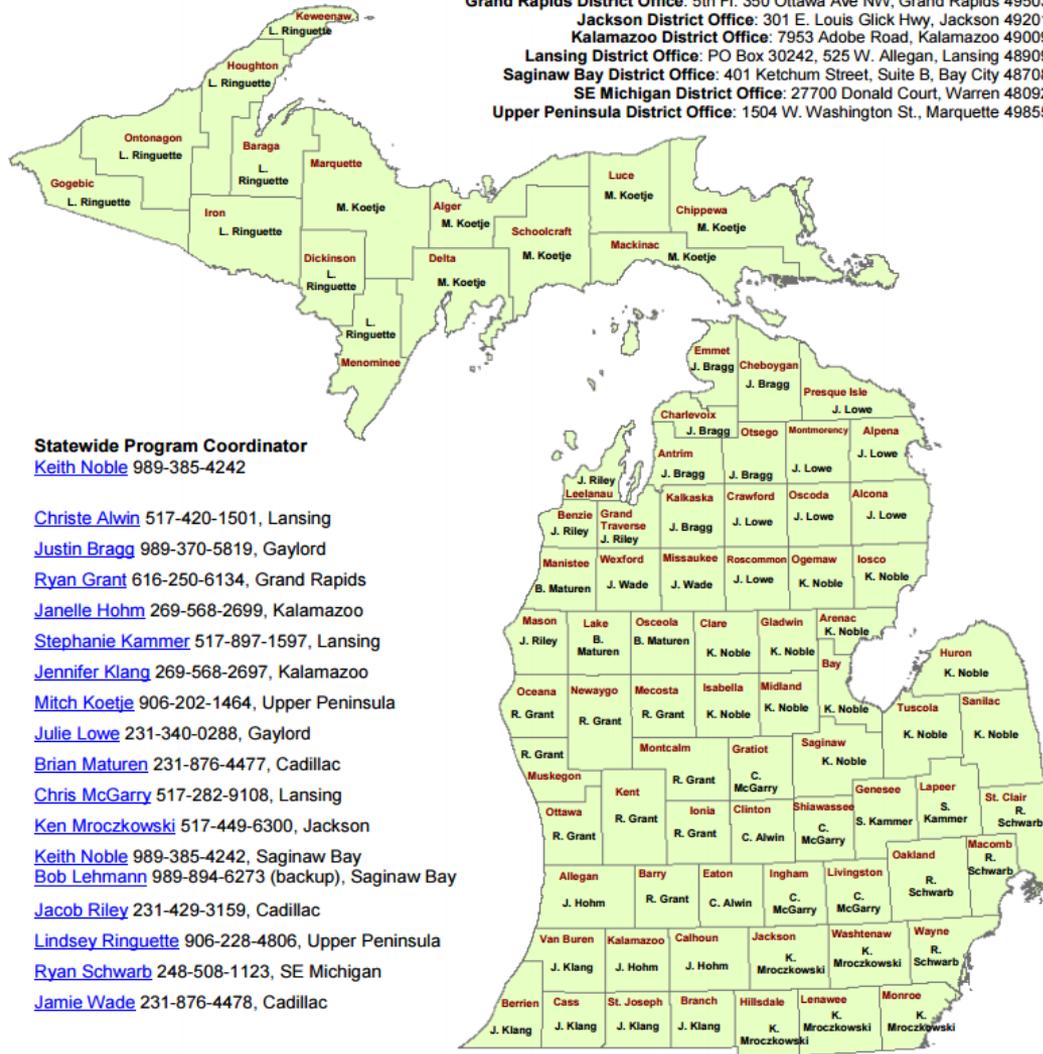
**Kalamazoo District Office:** 7953 Adobe Road, Kalamazoo 49009

**Lansing District Office:** PO Box 30242, 525 W. Allegan, Lansing 48909

**Saginaw Bay District Office:** 401 Ketchum Street, Suite B, Bay City 48708

**SE Michigan District Office:** 27700 Donald Court, Warren 48092

**Upper Peninsula District Office:** 1504 W. Washington St., Marquette 49855



## Statewide Program Coordinator

[Keith Noble](#) 989-385-4242

[Christe Alwin](#) 517-420-1501, Lansing

[Justin Bragg](#) 989-370-5819, Gaylord

[Ryan Grant](#) 616-250-6134, Grand Rapids

[Janelle Hohm](#) 269-568-2699, Kalamazoo

[Stephanie Kammer](#) 517-897-1597, Lansing

[Jennifer Klang](#) 269-568-2697, Kalamazoo

[Mitch Koetje](#) 906-202-1464, Upper Peninsula

[Julie Lowe](#) 231-340-0288, Gaylord

[Brian Maturen](#) 231-876-4477, Cadillac

[Chris McGarry](#) 517-282-9108, Lansing

[Ken Mroczkowski](#) 517-449-6300, Jackson

[Keith Noble](#) 989-385-4242, Saginaw Bay

[Bob Lehmann](#) 989-894-6273 (backup), Saginaw Bay

[Jacob Riley](#) 231-429-3159, Cadillac

[Lindsey Ringuette](#) 906-228-4806, Upper Peninsula

[Ryan Schwarb](#) 248-508-1123, SE Michigan

[Jamie Wade](#) 231-876-4478, Cadillac



Water Resources Division

517-284-5567

# Goal Clean Discharges



A photograph of a waterway, possibly a stream or canal, with a concrete structure and a wooden ramp. The water is dark blue and reflects the sky. The surrounding area is filled with dense, green and yellowish vegetation. In the background, there are some buildings and a red tractor. The word "Questions?" is written in large, bold, yellow letters across the top of the image.

# Questions?

Keith Noble  
Environmental Quality Specialist  
989-385-4242