Turbidity Monitoring During Construction

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Turbidity Monitoring

Excess turbidity is a sign that erosion and sediment control is not working, and that improvements are needed.
Turbidity Monitoring

Specification related to turbidity:

Standard Specification 00290.30 (a)(1)

“Do not cause turbidity to waters of the State and US outside of regulated levels.”

This is expanded in Special Provisions 00290.30(a):

- (7) Water Quality, and
- (8) Visual Turbidity Monitoring (or “Meter Turbidity Monitoring” or simply “Turbidity Monitoring”)

Turbidity Monitoring

Monitoring is required for

In-water work
(CWA 404 Permit: Section 401 Clean Water Certification)

Stormwater discharges
(NPDES 1200-CA)
**Nationwide 404 Permit 401 Certs: Special Note**

- US Army Corps of Engineer permits and associated 401 Water Quality Certifications are issued every 5 years.

- The current (2017) Nationwide 404 Permit’s 401 Certification has different turbidity monitoring requirements than previous versions of the Nationwide Permit:
  - Meter monitoring is required, except when specifically approved otherwise
  - 100-foot upstream and downstream measurement locations (doesn’t vary with stream width)
  - 2-hour monitoring intervals

**In-Water Work Monitoring**

Any work below the Ordinary High Water Level whether it is submerged or not
Turbidity Monitoring Methods

Visual monitoring allowed:
Stormwater: NPDES 1200-CA

Turbidity meter required:
In-water Work: All 401 certifications
(Individual and 2017 Nationwide) “unless another monitoring method is proposed and authorized by DEQ.”

Safety First!
Move the monitoring site or revert to visual monitoring if conditions are sketchy.
In-water Work
2017 Nationwide 401 Cert
General Conditions 15 (a)

Background:
100 feet upstream

Compliance Point:
100 feet downstream

Considerations

Non-Project Turbidity Sources

- Place the monitoring point between the non-project source and the Project activity or discharge point.
- Record on the monitoring form, and take a photograph.
Monitoring Protocol

Metered Monitoring Location
- Well-mixed stream: Away from the shore line
- Visible plume: In the plume
- Mid-depth of the stream

Turbidity Monitoring
Stormwater Discharge (1200-CA Criteria)
- Visual: A noticeable increase in turbidity
- Metered: 10% increase above background
  (For all practical purposes, up to a 5 NTU increase is permitted)
What is a visible plume/noticeable increase?

Any difference you can see between upstream and downstream, or across the stream at the compliance point.

Turbidity Monitoring for Stormwater:

Monitor daily during rain storms and within 24 hours of a 0.5-inch storm (1200-CA Schedule A 5a and Schedule B 7(d))

With exceedance of the criteria:

- Inspect the site to identify turbidity sources
- Immediately upgrade/repair erosion and sediment controls
- Repeat monitoring, inspection and upgrade until exceedances stop
- Record each inspection and remedial steps
Response to Metered Monitoring
Individual and 2017 Nationwide 401
General Conditions 15 (b)

2-hour Monitoring Interval

<table>
<thead>
<tr>
<th>Turbidity Level</th>
<th>Restrictions to Duration of Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4.99 NTU above background</td>
<td>No restrictions. Continue to monitor every 2 hours.</td>
</tr>
<tr>
<td>5 to 29.99 NTU above background</td>
<td>Work continues for 4 hours. If turbidity doesn’t abate, stop. Modify BMPs. Resume work when NTU is 0-4.99 above background.</td>
</tr>
<tr>
<td>30 to 49.99 NTU above background</td>
<td>Work continues for 2 hours. If turbidity doesn’t abate, stop. Modify BMPs. Resume work when NTU is 0-4.99 above background.</td>
</tr>
<tr>
<td>50 NTU or more above background</td>
<td>Stop work immediately and notify inspector/DEQ</td>
</tr>
</tbody>
</table>

Recording Turbidity for In-Water Work

- Location, date, time (tidal stage)
- Calibration documentation (date, reading of calibration samples)
- Background NTU
- Compliance NTU
- Difference between background and compliance readings
- Discussion of exceedances
- Actions to reduce turbidity/upgrade BMPs, effectiveness of the actions
### IN-WATER WORK TURBIDITY MONITORING REPORT

**1. For ODOT Use**
- Permit no.
- Army Corps of Engineers permit no.
- Instream work start date
- Instream work end date
- Extension date if applicable
- Nationwide permit no.

**Compliance Distance**
- Use 100 feet for 401 WQC

**Approximate downstream compliance point**
- 30 feet
- > 30 feet to 100 feet
- > 100 feet to 200 feet
- > 200 feet
- Lakes, ponds and reservoirs
- Individual permit (additional conditions)

**Record calibration and actions here**

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### Turbidity Monitoring of Stormwater Discharge

**Form 734-2361 (6/15)**

**EROSION AND SEDIMENT CONTROL MONITORING**

**1. Identify the erosion control measures from DECP:**

<table>
<thead>
<tr>
<th>EROSION CONTROL MEASURES</th>
<th>FUNCTIONAL DESCRIPTION</th>
<th>LOCATION OF DEPOT</th>
<th>DATE OF CONSTRUCTION</th>
<th>DATE OF CONSTRUCTION</th>
</tr>
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</table>

**2. Enter any additional information in this section:**

**3. Weekly rainfall amounts:**

**4. Other information**

Minimum Monitoring Requirements: Inspect at least every 7 calendar days on active sites and five weeks on inactive sites. Inspect daily during storms of 0.5 inches or more per 24-hour period. See Section 08230 for additional information.

**Distribution:** Original to Agency Project Manager

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**Enter turbidity monitoring data here**
Turbidity Criteria Exceptions

Anticipated Exceedances

- Negotiated ahead of time and included in the permit
- Still requires monitoring
- Extra conditions, including timing and duration restrictions may be imposed

Exceedances due to factors outside ODOT’s control (extreme weather, etc.)

- Must be reported
- E&SC must be immediately restored
- Violation, but not a problem if E&SC in place according to plan
Post-Construction Stormwater Management
Best Management Practices (BMPs)

BMPs are constructed facilities or elements of the roadside area used to:

- Clean up storm water
- Maintain site hydrology

Why we build stormwater treatment BMPs

- Clean Water Act
  - 401 Certification
  - NPDES MS4 Permit
- Endangered Species Act
  - FAHP Biological Opinion
  - Individual Biological Opinion
Stormwater Facilities Specifications (2018)

- 01010 – Stormwater Control, Water Quality Structures
- 01011 – Stormwater Control, Ponds (includes detention and bioretention ponds)
- 01012 – Stormwater Control, Water Quality Biofiltration Swale
- 01013 – Stormwater Control, Water Quality Bioslope (aka Media Filter Drain)
- 01014 – Stormwater Control, Water Quality Filter Strip
- 01030.13(f) – Types of Seed Mixes
- 00842 – Drainage Facility Markers

Stormwater BMPs include:

- Filter strips
- Bioswales; bioretention; infiltration facilities
- Media filter drains
- Detention / retention ponds
- Proprietary devices
Things to watch for:

- Grading, size, slope and elevation
- Correct placement and elevation of inlets, outlets, orifices
- Correct materials and plants: amended soil mixes, seed mixes, etc.
- Erosion control during plant establishment

Avoiding problems

- Make sure permanent erosion control is installed correctly.
- Do not open a facility for stormwater until construction and erosion control is completed.
- Do not route construction site runoff into a permanent stormwater BMPs (unless specifically called for).
Modification to BMP Designs

Always get approval from the Hydraulic Engineer for changes in:
- Size
- Configuration
- Materials

Making sure it gets done right!

A lot of this is new to everyone concerned, so
- Be familiar with the plans and specs
- Talk to the Designer – understand the purpose of the whole and the parts
- Talk to the Contractor and construction crew
- Provide feedback to the Designer