Outline of Topics

• Project Background
• Investigation, Feasibility Study, & Final Design
• Remedial Construction Highlights
• Initial O&M Observations
• Achievement of Cleanup & Community Success
• Questions
Results you can rely on

Project Background

- LNAPL, consisting of weathered crude-oil, has been venting through the sediment, causing sheening on a tributary within the Muskegon Lake AOC.

- Sheens and oil slicks documented in Fenner’s Ditch as early as 1978.

- An investigation performed in 2010 by the MDEQ indicated oil was migrating upward from depth.

Project Location, North Muskegon, MI
Site Setting

Fall 2016

Spring 2017
Historic Oil Production

Image Date: 1938
Image Scale: 1:6,000

SITE

#653 - Dolly M. Dam #4

BEAR LAKE

Imagery Archive: 517.355.3771
www.rsgis.msu.edu/archive.htm

2012 Imagery Source: USDA ARPS
Soil Source: NRCS
Wetlands Source: USFWS
Topography Source: USGS

© Michigan State University
2010 Investigation- Area of Impact

Scope of Work

- Vibracore Sediment Sampling
- Soil/Groundwater Sampling
- Geophysical Survey
- Residential Drinking Water Well Sampling
November 2016 Field Investigation

Barge-Mounted Geoprobe

Basal silty clay

Two horizons of apparent oil saturation
November 2016 Investigation Results
Remedy Selection

NAPL Trapping Cap®
Bench-Scale (Sand Box) Testing

Protection Layer
Hydrated Aquablok® Layer
Surrogate Oil
Transmission Layer
Design Overview

Primary & Secondary Turbidity & Oil Controls

Perimeter Key Trench

Collection Sumps
Design Overview

CROSS SECTION A

NOTES:
1. SELECT CRUSHED STONE TRANSMISSION ZONE TO BE MINIMUM 4 INCHES THICK BETWEEN TOP OF PIPE AND AQUELBLOC LAYER.
2. 
3. WELL PER PRODUCT RECOVERY SUMPS SPECIFICATION ON SHEET 10.
4. SEEDING TO BE PROVIDED.
5. PROVIDE GENERAL WASHED FILL AS REQUIRED TO REACH 6 INCHES BELOW FINAL GRADE.
6. CONTRACTOR TO GRADE GENERAL WASHED FILL AND TOP SOIL TO MATCH FINAL ELEVATION OF CAP AND RIPRAP AND EXISTING GRADATION BEYOND THE EXCAVATION LIMITS.
7. SEE PRODUCT RECOVERY SUMPS SPECIFICATION ON SHEET 10 FOR ACCEPTABLE PRODUCTS AND ADDITIONAL INFORMATION.

PRODUCT RECOVERY SUMP DETAIL
(NOT TO SCALE)
Expedited Remediation Timeline

- Construction Bidding & Award (Winter/Spring 2018)

- Permitting (Spring 2018)
  - Joint Permit obtained from the DEQ/US Army Corp of Engineers for work in the waterway.
  - MDNR approval for dredging during critical spawning window.
  - Contractor obtained local SESC Permit.

- Construction (June/July 2018)
  - 5 week duration from late June through July 2018.
  - Efforts coordinated with the July 4th holiday schedule and Township Park renovation schedule.
Remediation Overview

• Approximate Cap Area of 5,200 SF (65’ x 80’)

• Mechanical dredging resulted in the removal and disposal of approximately 480 CY of sediment
  
  – Sediment transported via hopper barge to staging area for T&D
  
  – Limited sediment stabilization required some water disposal-10,500 gal.
  
  – Primary and Secondary silt/oil containment (silt curtain, turbidity curtains, & absorbent oil booms)

• Backfilled to achieve design grades for each layer

• Restoration of shoreline
Remediation Overview - Excavation

Excavation & Grade Checking

Observed Oil During Excavation
Remediation Overview-Aquablok® Placement

Upland Aquablok® Placement

Protection Layer Placement
Before & After

Pre-Construction

Post-Construction
Initial O&M Observations

• Monthly Inspections performed
  – Sheens not observed in waterway.
  – Oil accumulation observed in 1 out of the 3 installed sumps (visual to 1.5” thickness in center sump)

• Preliminary Indicators of Biodegradation Observed
  – Gas readings in sump headspace indicate intrinsic biodegradation is occurring.
  – Low level methane (1%) and CO2 present (0% to 2%) within 3 months.
Achievement of Remediation and Community Success

• Remediation was effective
  – Mitigated sheen generation
  – Mitigated ambient odor issues
  – Low Long-Term Operation and Maintenance Costs for MDEQ

• Township & adjacent homeowners were pleased
  – Minimized waterway access limitations during construction
  – Minimized impacts to neighbors and community
  – Canal and shoreline have been restored and the Fenner’s Ditch community is able to enjoy this natural resource once again
Questions

Scott Pawlukiewicz, PE
TRC Environmental Corporation
spawlukiewicz@trcsolutions.com

John Rice, PE, PH
TRC Environmental Corporation
jrice@trcsolutions.com
Challenges

- Methods for hydrating of Aquablok® Material
- Management/Removal of submerged posts.
- Minor post-construction corrections of final grade near shore.
- Keeping channel open during peak summer months.
Community Outreach