Highland Park Golf Course Stream Restoration
Mill Creek Watershed in Highland Heights

Cuyahoga River Advisory Committee
January 23, 2018

Your Sewer District Keeping our Great Lake great.
Cuyahoga River Towpath Stabilization
Cuyahoga Valley NP in Valley View

Stormwater Construction Plan

Your Sewer District  Keeping our Great Lake great.
# Current Projects: Service Area Wide

![Project Chart](image_url)

## SW Stormwater

<table>
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<tr>
<th>Activity ID</th>
<th>Activity Name</th>
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Data Date: 31 Aug 17

© Pitney Bowes Graphix, Inc.
### Current Projects: Cuyahoga River South

#### Activity ID | Activity Name | Budgeted Total Cost | 2017 | 2018 | 2019 | 2020 | 2021
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NEORSD Projects |  | $8,203,397.00 | | | | | |
**SW Stormwater** |  | $8,203,397.00 | | | | | |
**SWCS Cuyahoga South** |  | $8,203,397.00 | | | | | |
1381 Cuyahoga River South & Main Stem SWMP Study |  | $5,184,397.00 | | | | | |
1500 Chippewa Creek Bank Stabilization CC00030 |  | $1,500,000.00 | | | | | |
SWD2016-0017 Chippewa Creek Culvert Repair in Broadview Heights- CC00167 |  | $130,000.00 | | | | | |
SWD2016-0014 Chippewa Creek Bank Erosion CC00122 |  | $754,000.00 | | | | | |
1501 Chippewa Creek Building Demolition- CC0032 |  | $20,000.00 | | | | | |
1498 Sioux Lane Culvert Replacement |  | $300,000.00 | | | | | |
1499 Chippewa Creek Bank Stabilization at Condominium- CC00032 |  | $315,000.00 | | | | | |
## 2017-2018 Stormwater Construction Projects

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# Current Projects: Lake Erie Directs

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Sioux Lane Culvert Replacement

Completion Date: 4Q 2017
Awarded Bid Amount: $265,059.99

Project Elements
- Replacement of 6 culverts with one large structure
- Improve transition from stream to culvert
- Provide scour and erosion protection along sides and outlet

The third barrel from RR has sediment accumulation blocking nearly half the culvert, the other barrels are relatively clean.

Sinkholes are in between pipes, not in the roadway.

Six-barrel CMP culvert, the inverts have heavy rust, and some have rusted through.

Sinkhole in the edge of the roadway, about 15' from DS end of pipe.
Chippewa Creek Bank Stabilization
CC00030

Design Commencing: 4Q 2017

Est. Construction Cost: $1.5 M

Project Elements
- Stabilize bank to protect structure and utility

Exposed 12” utility across stream channel
Exposed 1.5” pipe
Building corner is 5.5’ from the top of bank
Building wall is 5’ from the top of bank
Brecksville Condominium Bank Stabilization CC00032

Design Commencing: 4Q 2017
Construction Cost: $300,500
Project Elements
- Stabilize approximately 155 feet of eroding stream bank along condominium complex
- Stabilize exposed stormwater pipe and headwall
Cuyahoga River at the Towpath Bank Stabilization

Substantial Completion- Nov. 30, 2017

Est. Construction Cost: $1.614 M

Project Elements

● Riprap stabilization of 700 linear feet
● Large woody debris stream barbs
● Riparian enhancement
● Coordination with Cuyahoga Valley National Park
Spring Creek Culvert Rehabilitation

Construction Commencing: 1Q 2018

Est. Construction Cost: $675,000

Project Elements:

- Replace 120 linear feet of collapsed culvert
- Apply structural spray liner to rehabilitate the remainder of culvert
- Involves coordination with City of Cleveland, CSX railroad, and private property owners
Lower Twin Lakes Dam Repair

Anticipated Construction NTP 2Q 2018
Est. Design & Construction Cost: $300,000
Project Elements:
- Repair of sinkhole in the earthen portion of the dam
Anticipated Construction NTP April 2018

Est. Construction Cost: $1.5 M

Project Elements:

- Stabilization of eroding bank to protect sanitary infrastructure
- Stabilization of stream bed to reduce downcutting
- Riparian and floodplain enhancement
Big Creek Concrete Spillway Rehabilitation and Bank Stabilization

Anticipated Construction NTP July 2018
Est. Construction Cost: $4.5 M

Project Elements:
- Replacement of spillway with rock fill structure
- Adjacent bank stabilization
Baldwin Creek Bank Stabilization

Anticipated Construction NTP 2Q 2018

Est. Construction Cost: $600,000

Project Elements:
- Repair of failing retaining wall
- Bank stabilization to minimize risk to infrastructure and utilities
Design Commencing: December 2017

Est. Construction Cost: $1,262,500

Issue to Address:

• Eroding streambanks has exposed 150 Lf of 66” brick sewer

• Reduce or eliminate the adverse effect the erosion of Stickney Creek is having on the structural integrity of the combined sewer

• Repair and rehabilitate the existing combined sewer

• Stabilize/rehabilitate Stickney Creek

• Manage urban hydrology and reduce stream energy
West Creek Bank Stabilization
WC00046-WC00068

Planning/Procurement Commencing: 1Q 2018

Est. Construction Cost: $5M

Issue to Address:

- Stream eroding and destabilizing bank along railroad and parking lots.
Planning/Procurement Commencing: 1Q 2018

Est. Construction Cost: $300,000

Project Elements:
- Replace the current racks with new racks
- Providing a permanent access to the racks for maintenance
- Repair the damaged bank
Euclid Creek Concrete Channel Repair

Completion Date: June 23, 2017
Construction Cost: $335,187.46
BOP: 98.37%

Project Elements
Replacement/rehabilitation of sections of concrete lined channel sides and bottoms that have failed along the river-right immediately downstream of the Euclid Creek spillway
Shaw Brook Culvert Rehabilitation

Est. Completion Date: November 2017

Construction Cost: $945,200

Project Elements
Replacement and rehabilitation of 525 linear ft. of 10 ft. diameter corrugated steel culvert.
Completion Date: December 2017
Construction Cost: $3.2 M
Project Elements: 25,000 CY sediment removal
Euclid Creek Flood Control Channel Shoaling Removal

Est. Completion Date: January 2018
Construction Cost: $540,000

Project Elements
- Remove sediment, vegetation, debris etc. to a depth of 24 inches
- Project length approximately 1,500 LF
Anticipated Construction NTP- April 2018

Estimated Construction Cost: $3.6 M

Project Elements:
Bring two dams into ODNR Compliance and perform maintenance repairs to a third dam
Construction commencing: Summer 2018

Est. Construction Cost: $2.4 M

Project Elements:
- 850 LF Stream Restoration
- Bank Stabilization
- Reconnection to Floodplain
Beechers Brook Bank Stabilization

Construction Commencing: Spring 2018

Est Construction Cost: $1,500,000

Project Elements:

- Stabilization of eroded hillside slope
- Stabilization of stream bed for protection of infrastructure
- Coordination with Mayfield Village on trail connection
Pepper Creek Bank Stabilization

Construction Commencing: Summer 2018
Est Construction Cost: $1,400,000
Project Elements:
- Floodplain and riparian enhancement
Stormwater Construction Plan
Annual Review Process

Sioux Lane Culvert Replacement, Macedonia
Stormwater Construction Plan Process

- **Project Nomination**: Up to August
- **Validation**: August
- **Business Risk Exposure Scoring**: November
- **Stormwater Construction Plan**: Finalized in March

**Stormwater Inputs**
- Further Analysis Projects
- SW Master Plan Recommendations
- Community Identified Project
- Watershed Group Project
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<td>Unnamed Trib to Cuyahoga_Failed Gabions CH00156</td>
<td>CH00158 - CH00155</td>
<td>Cuyahoga River West</td>
<td>Independence</td>
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<td>Chevy Branch_Erosion and Bank Failure WB00108</td>
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<td>Big Creek West Branch</td>
<td>Cleveland</td>
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<td>Cuyahoga River_Erosion at BTU CY00103C_T001</td>
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<td>Cuyahoga River Mainstem (east)</td>
<td>Independence</td>
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<td>Hemlock Creek_Stream Erosion at HC00005</td>
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<td>Hemlock Creek</td>
<td>Independence</td>
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<td>Cuyahoga River_Erosion DS Fitzwater Rd CY00179A</td>
<td>CY00179A</td>
<td>Cuyahoga River Mainstem (east)</td>
<td>Valley View</td>
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<td>Big Creek_West Branch Stabilization -BC00351, WB000072, WB000104</td>
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<td>Big Creek</td>
<td>Parma</td>
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<td>Mill Creek_Erosion Control - MC00135, MC00057</td>
<td>MC00135, MC00057</td>
<td>Mill Creek</td>
<td>Highland Hills</td>
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<td>Mill Creek_Floodplain Restoration/Bank Stabilization in Highland Hills Park - MC00133</td>
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<td>Mill Creek</td>
<td>Highland Hills</td>
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<td>RSS Asset ID(s)</td>
<td>WAC Watershed</td>
<td>Subwatershed</td>
<td>Project Community</td>
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<td>Pepper Pike</td>
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<td>Chagrin River</td>
<td>Pepper Luce Creek</td>
<td>Pepper Pike</td>
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<td>Pepper Luce Creek</td>
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<td>Doan Brook_Erosion at Footbridge DB00161</td>
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<td>Lake Erie Direct Tributaries</td>
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<td>Shaker Heights</td>
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<td>BE00053, BE00051, BE00049</td>
<td>Lake Erie Direct Tributaries</td>
<td>Beechers Brook</td>
<td>Cleveland</td>
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<td>Dugway Brook_Lakeview Dam Regulatory Compliance - DW00025</td>
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<td>Lake Erie Direct Tributaries</td>
<td>Dugway Brook</td>
<td>Cleveland Heights</td>
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<td>Doan Brook_Sowinski Park Floodplain Connection DB00013</td>
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<td>Doan Brook</td>
<td>Cleveland</td>
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<td>E. Br. Euclid Creek_School of Innovation Restoration EE00376</td>
<td>EE00375 and EE00376</td>
<td>Lake Erie Direct Tributaries</td>
<td>Euclid Creek East</td>
<td>Willoughby Hills</td>
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</tbody>
</table>
Cuyahoga River South
August '16 through 4th Qtr '18

Cuyahoga River North
February '17 through 4th Qtr '19

Rocky River
August '17 through 3rd Qtr '19

Chagrin River & Lake Erie
RFP 3rd Qtr '18

Direct Tributaries
Stormwater Master Plans
Goals and Objectives

Operational Performance Evaluation

Modeling & Alternatives

Alternatives Evaluation (Chapter 8)

Screen SCMs
- ID Opportunities/Constraints
- Protect Existing Function
- Increase Function
  - Reduce Runoff/ Restore Stream-Floodplain
  - Enhance Storage—Conveyance
- Buyout/Reduce ALR
- Formulate 2 Alternatives

Evaluate Alternatives
- Size to achieve ALR
- Estimate cost
- Define multiple benefits
- ID Business Case (TBL)
- Select Alternative
- Check watershedwide performance

Recommendations and Report

Results: Prioritized list of construction and maintenance projects at the Watershed-level and Program-level
- Total Study Area: 184,000 acres
  - 9 Subwatersheds
  - 24 Member Communities
- Notice to Proceed: 8/8/2016
- 27 months
- $5.20 million
• Total Study Area: 99,000 acres
  – 11 Subwatersheds
  – 23 Member Communities
• Notice to Proceed - February 10, 2017
• 31 Month study
• $8.02 million
Stormwater Master Plans
Cuyahoga River South – Phase I

• Phase I: Indian Creek
  – Draft Phase I Alternatives Development
    • 4th Qtr 2017
  – Draft Phase I SWMP Recommendations
    • 1st Qtr 2018
Indian Creek – Alternatives Development for Problem Areas
Stormwater Master Plans
Cuyahoga River South – Phase II

• Phase II Watersheds
  – Brandywine Creek
  – Chippewa Creek
  – Tinkers Creek

• Draft Phase II Alternatives Development
  – 1st Qtr 2018

• Draft Phase II SWMP Recommendations
  – 2nd Qtr 2018
Stormwater Master Plans
Cuyahoga River South – Phase II

Modeling - Tinkers Creek example

Flow

Stage

Figure 9-6

Figure 9-7
Calibration Event Stage Timer-Series Comparison at Tinkers Creek USGS Stream Gage (5/30/2015 – 6/2/2015)
Stormwater Master Plans
Cuyahoga River South – Phase III/IV

- Phases III Watersheds
  - Furnace Run
  - Mud Brook
  - Sagamore Creek
  - Yellow Creek
  - Small Tribs of Cuyahoga River Mainstem East
  - Small Tribs of Cuyahoga River Mainstem West

- Phase IV Watershed: Cuyahoga River Mainstem

- Alternatives development / SWMP
  Recommendations: 2018

- Project Completion: November 2018
Field Condition Assessment

Stats:
- 150 Stream locations
- 259 Crossings
- 21 Basins
- 7,000 feet of Culverted Stream

* Continue to inform WTL of water quality and flooding and erosion concerns along regional system
Stormwater Master Plan
Spherical Data
Stormwater Master Plan
Spherical Data
Stormwater Master Plan

Monitoring: Rainfall Data

• New data source: District subscription for gauge-adjusted radar rainfall

• Verify NEORSD rainfall data for selected events with:
  – Nearby rain gauges by other entities
  – Gauge-adjusted radar rainfall
Stormwater Master Plan

Monitoring: Stream/Flow Data

- Trail Cams and stream gauges
- High water mark gauges
- Flow Meters
Stormwater Master Plan
Modeling: Impervious Area inside Service Area

Cuyahoga Co. road polygons
Summit Co. centerline offset

District impervious layer
Stormwater Master Plan  
Asset Condition & Criticality  

Compare model results to FEMA  
• ID BTUs added / removed from 100YR flood area
Preparation for Master Plans
Stream Gages

https://maps.waterdata.usgs.gov/mapper/index.html
SWIM Inspections:
Cuyahoga River South
2017 Summary

188 Total Inspections
(911 in SWSA)

64 Customer Inquiries
(157 in SWSA)
SWIM Recommendations:
Cuyahoga River South
2017 Summary

31 Assets recommended for SW Master Plan
(84 in SWSA)

45 Assets recommended for Further Analysis
(131 in SWSA)
SWIM Inspections
Cuyahoga River North: 2017 Summary

257 Total Inspections (911 in SWSA)

32 Customer Inquiries (157 in SWSA)
SWIM Recommendations
Cuyahoga River North: 2017 Summary

30 Assets recommended for Stormwater Master Planning (84 in SWSA)

45 Assets recommended for Further Analysis (131 in SWSA)
SWIM Inspections
Lake Erie Tributaries: 2017 Summary

153 Total Inspections (911 in SWSA)

19 Customer Inquiries (157 in SWSA)
3 Assets recommended for Stormwater Master Planning (84 in SWSA)

13 Assets recommended for Further Analysis (131 in SWSA)
SWIM Maintenance
Cuyahoga River South
2017 Summary

39 Maintenance projects
(154 in Service Area)

1,008 CY sediment and debris removed
(5,241 CY in Service Area)
SWIM Maintenance
Cuyahoga River North: 2017 Summary

55 Maintenance Projects
(154 in SWSA)

1,563 CY sediment and debris removed
(5,241 in SWSA)
SWIM Maintenance
Lake Erie Tributaries: 2017 Summary

24 Maintenance Projects
(154 in SWSA)

892 CY sediment and debris removed
(5,241 in SWSA)

Lake Erie Tributaries Watershed
Maintenance Projects
Stormwater Maintenance: Debris Removal
Cuyahoga River South: Brandywine Creek
Sagamore Hills: Brandywine Ski Resort
Asset ID: BR00004
Maintenance Project: Tree Removal (32 CY)

Pre-Maintenance

Post-Maintenance
Stormwater Maintenance
Cuyahoga River – North: Big Creek
Cleveland
Asset ID: BC00029
Maintenance Project: Large Woody Debris Removal (24 CY)
Stormwater Maintenance
Lake Erie Tributaries: Euclid Creek West
South Euclid: Liberty Road
Asset ID: EW00092
Maintenance Project: Tree Removal Project (125 CY)
SW Maintenance
Non-Routine Maintenance Projects: Pilot Update

Currently Piloting:
- Streambank Maintenance
- Basin Maintenance (e.g., Dredging)
- Structural Maintenance

Contact SWIM or WTL to discuss other potential locations

Your Sewer District  Keeping our Great Lake great.
SW Inspection and Maintenance
Planned Activities 2018

• Implement Recommended Maintenance Projects from SWMPs

• Continue Piloting Non-Routine Maintenance Projects

• Inspect RSS assets and BTUs without condition scores

• Request Record Drawings from Member Communities
Community Cost-Share

Garfield Heights
East 135th Sanitary Sewer Replacement

Parma
Stormwater Equipment Purchase
Community Cost-Share

- CCS Funds Balance (9/30/2017): $16,303,570
- 45 approved projects: $4,629,622
- CCS Funds available to Member Communities: $11,673,948
- 9 approved allocation agreements: $4,607,183
- 31 Member Communities currently participating
Questions

Meiring Borcherds
216-881-6600 Ext. 6159
borcherdsm@neorsd.org

Stormwater Program: Community Resources
http://www.neorsd.org/communitystormwaterresources.php