



**Where Have You *Bean*?
*Outreach and Innovation to Avoid
Sewer Failure at Bean Creek***

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Citizens Energy Group**



Overview

- Project Location & History
- Project Need
- Summary of Evaluation and Improvements
- Engaging Stakeholders and Public Outreach
- Post-Construction and Lessons Learned
- Questions

Project Location & History

- Site location: Garfield Park
- The problem...
 - 48” sanitary sewer interceptor with shallow cover under Bean Creek
 - Complicated stream dynamics and long history of issues

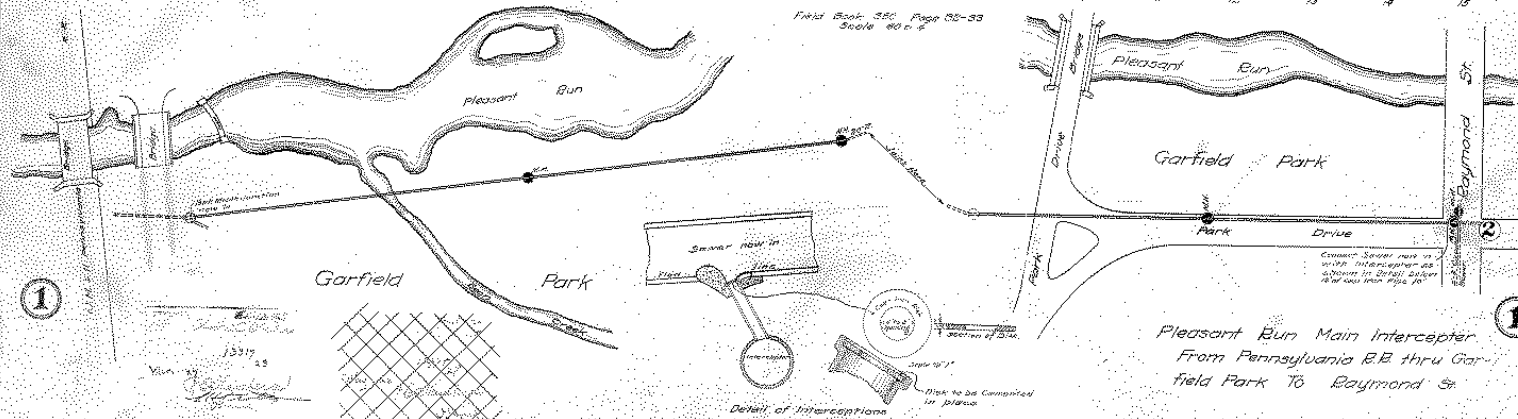
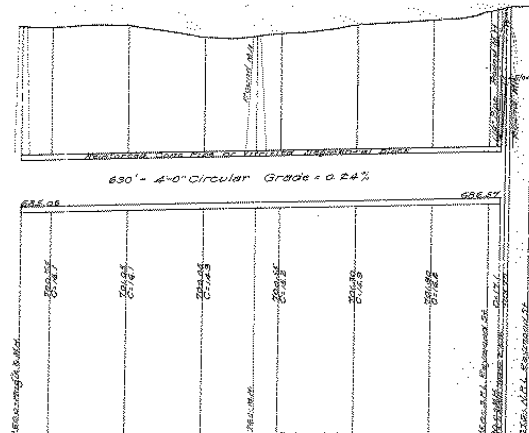
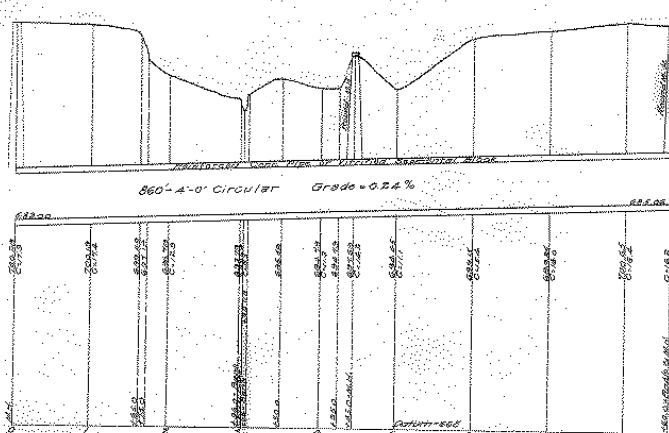


Project History

PLEASANT RUN MAIN SANITARY INTERCEPTER

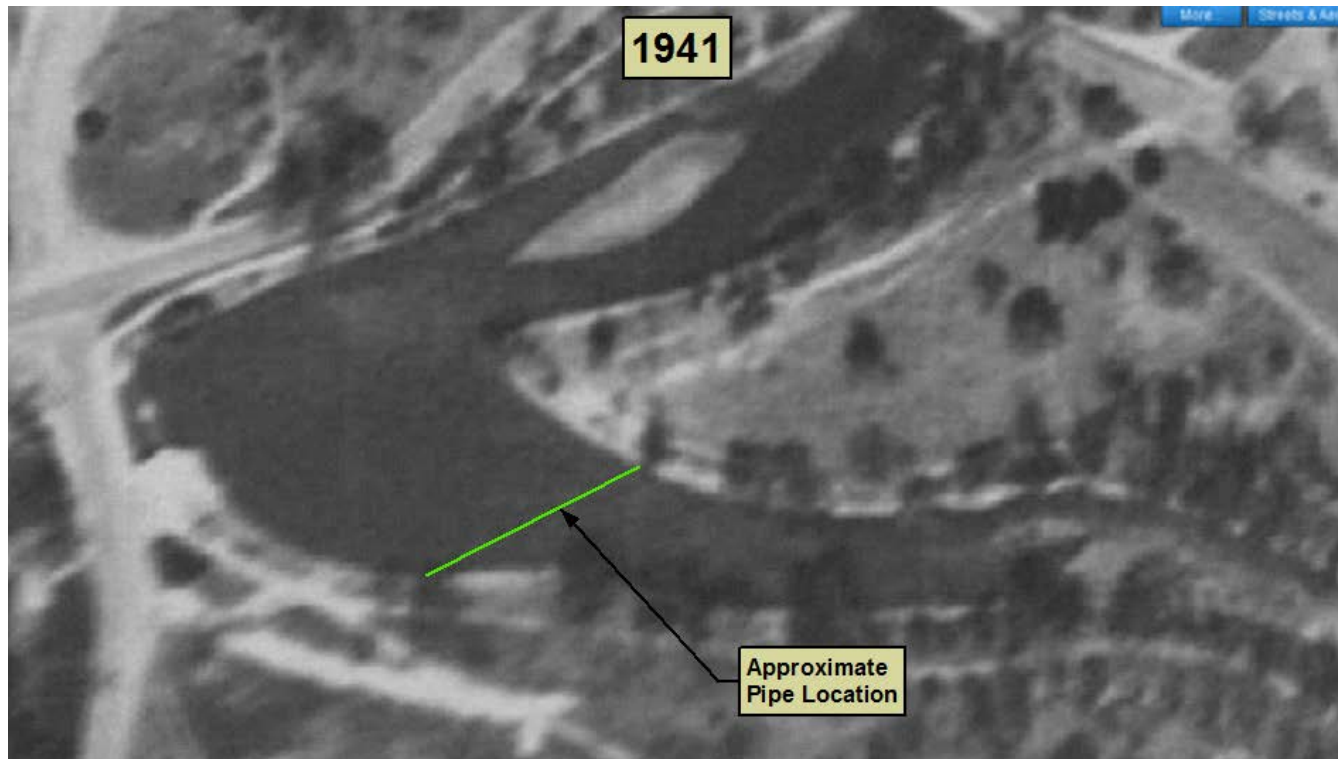
January 1926
March 1927

Charles Schmitt, C.E. Engr.
Chester C. Oberleas, C.C. Engr.



Project History – Cont'd

- 'Pleasant Lake' configuration



Project History – Cont'd

- By 1972, the confluence of Bean Creek & Pleasant Run had taken on its current configuration



Project History – Cont'd

- By 2000, the interceptor line was becoming visible in the bed of Bean Creek



Project History - 2010



Project History - 2014

- A large storm event in 2014 caused a significant bank failure and completely exposed the pipe



Project History - March 2014



Project History - March 2014



Project History

2015 Emergency Repairs

Rip Rap Cover



CIPP Lining



Project History – CIPP Lining

- Rehabilitation of exposed segment
- Cured-in-Place Pipe (CIPP) lining
 - 520 LF of 48-inch interceptor
 - Existing on-call contract with Layne Inliner and Wessler Engineering



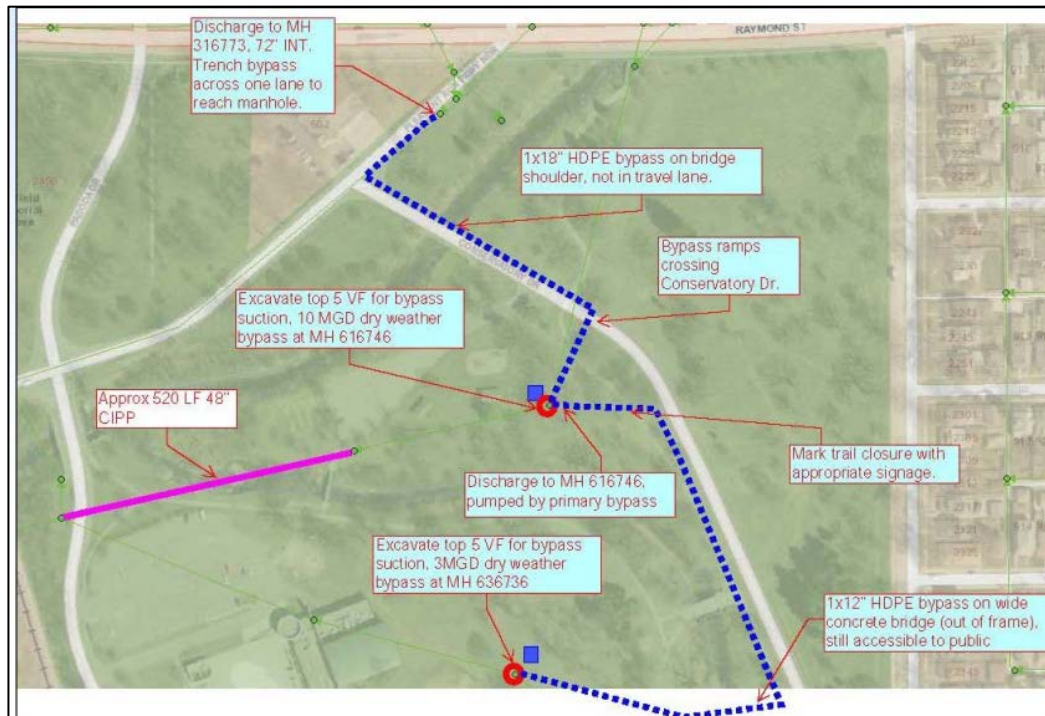
Pre-CCTV Condition



Finished CIPP liner

Project History – CIPP Lining

- Bypass pumping
 - 2,000 LF and 13 MGD total
- Results
 - Eliminated leaks
 - Increased structural stability



Project Planning and Design

- Long-term concerns:
 - Further undercutting of pipe
 - Additional bank erosion that may impact:
 - Interceptor
 - Greenway
 - Release of sediment
 - Ecological resources



Project Planning and Design – Identifying Areas for Improvement

- Detailed 2D Model used
 - Evaluate impact of various storms
 - Assess effectiveness of conceptual solutions
- Model showed that flow has qualities leading to channel instability
 - Flow is poorly aligned, directed at channel bank
 - High flow velocities, capable of substantial erosion
 - Downstream of sewer, channel incised and actively degrading

Project Planning and Design – Identifying Areas for Improvement

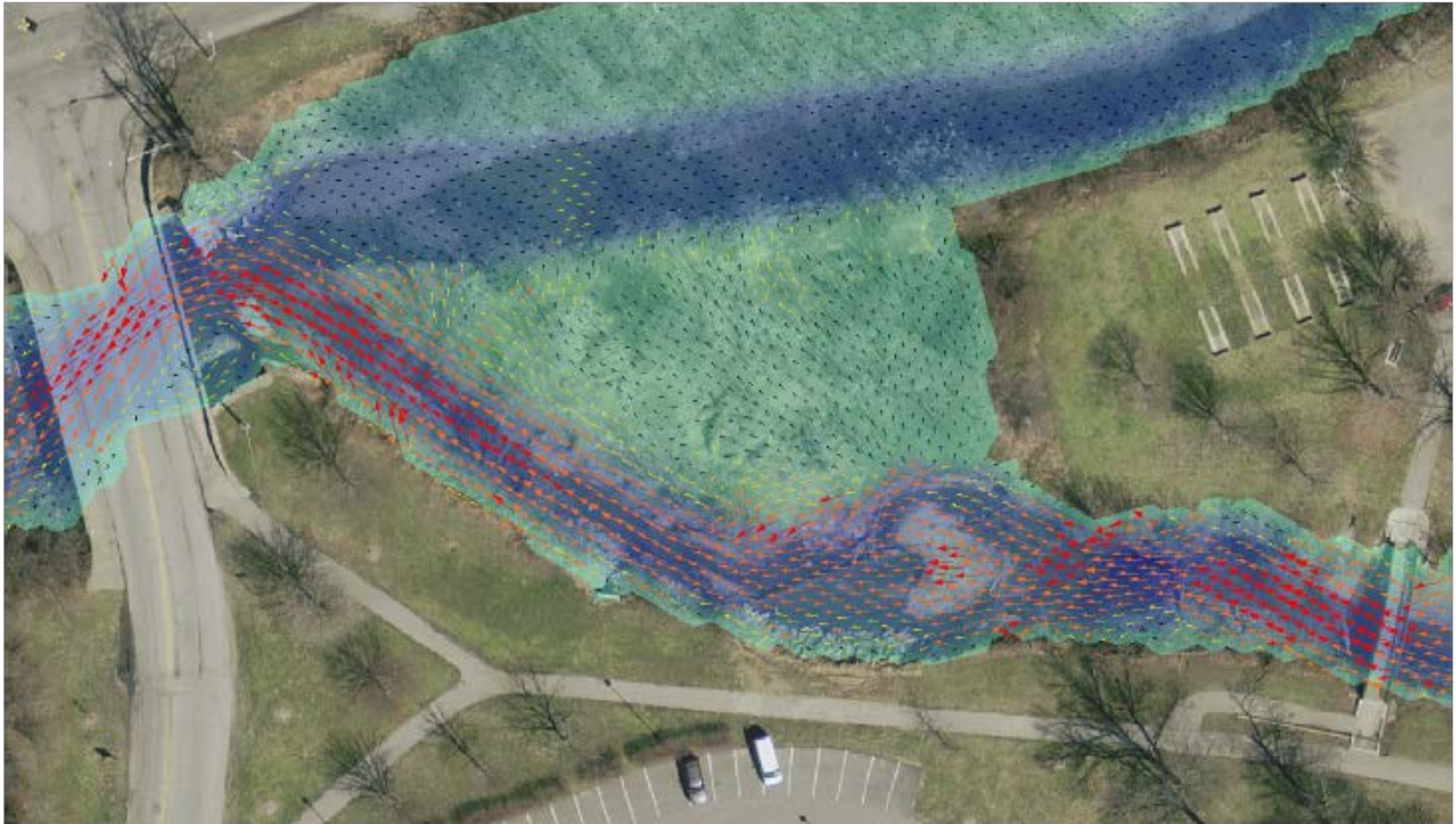
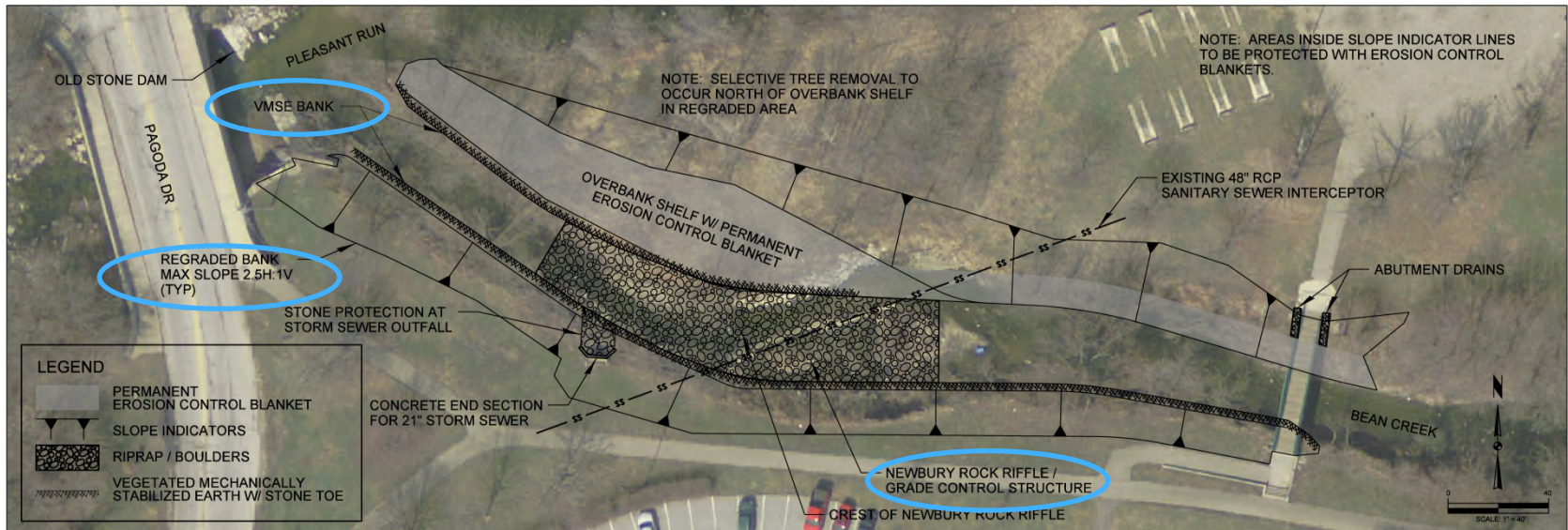


Figure 2: Existing Condition Isolated 100-year, 12-hour Storm Event – Peak Velocity Vectors & Flow Depth

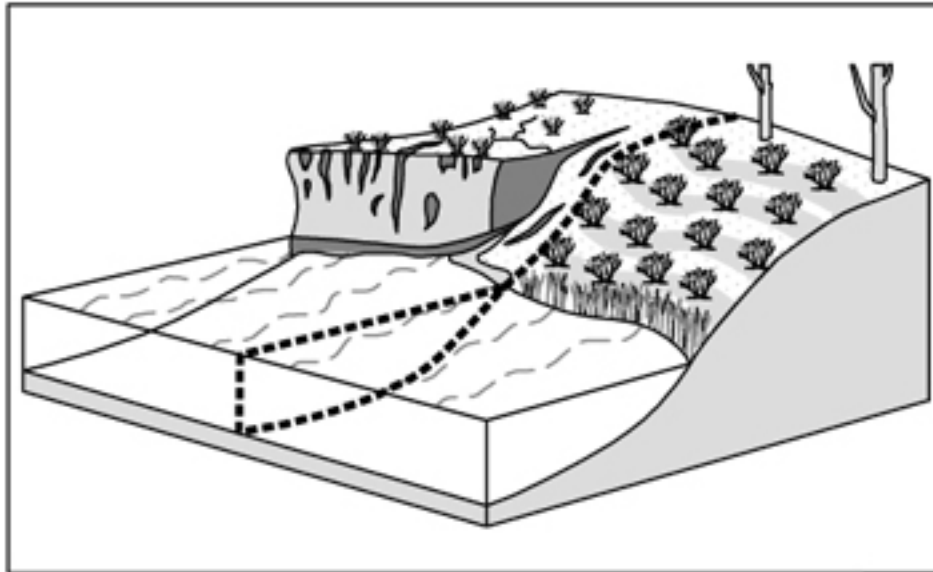
Project Design – Improvement Components



- Designed to stabilize channel and reduce susceptibility to erosion
 - Improved slope and alignment to reduce velocity
 - Vegetated Mechanically Stabilized Earth (VMSE) Bank
 - Newbury Rock Riffle for grade control

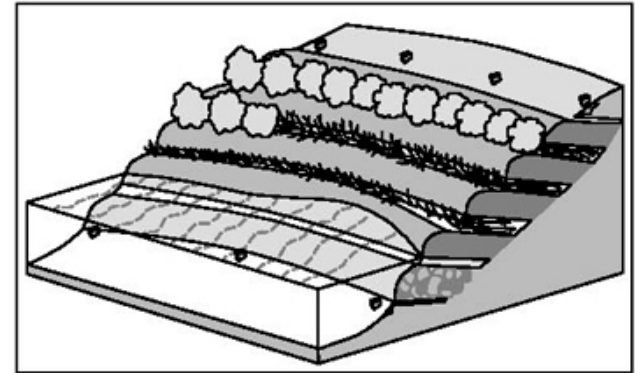
Proposed Improvements – Improved Slope

- Lower velocity, Less erosion
- Increases stability of the channel bank



Proposed Improvements – VMSE Banks

- Vegetated ‘green’ solution
- Substantial erosion resistance that continues to increase as vegetation becomes more dense



Phase 1 – Post Construction



Phase 2 – Grass Established



Phase 3 – Willows Established

Proposed Improvements – Newbury Riffle

- Protect toe of channel to avoid erosion
 - Cause of previous instability
- Fixed channel elevation to provide minimum pipe cover
- Flow redirected to center of stream

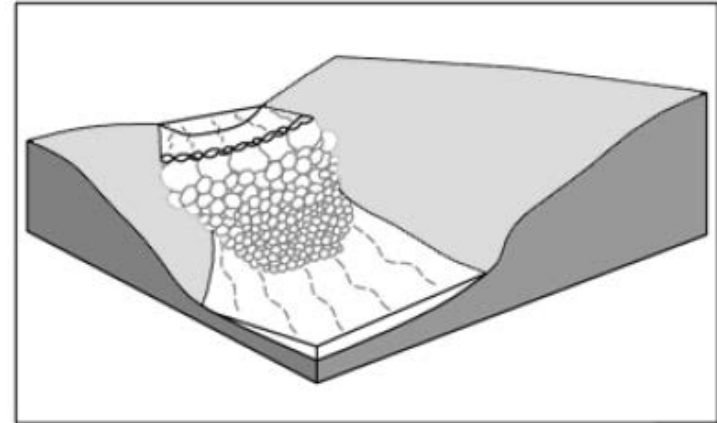


Figure 1: Schematic Drawing of Newbury Rock Riffle



Benefits of Design

- Long-term protection of interceptor pipe
- Stabilization of banks
- Reduction of flow velocity
 - Less erosion
 - Protection of Park and Greenway Users
- Correction of misaligned flow
- Similar approach to previous Indy Parks projects to maintain aesthetic value

Pre-Construction



Construction - Excavation



Construction - Excavation



Construction – Installing VMSE Banks



Construction – Installing VMSE Banks



Construction - Restoration



Construction – Final Product



Construction – Final Product



The Bean Creek Transformation



Outreach and Education



Bean Creek Sewer Erosion Mitigation Project

01/19/2016

Citizens Energy Group is working to protect the existing large sewer pipe running across the creek; improve the bank stabilization and water flow of Bean Creek.

The Problem

Bean Creek, flowing through Garfield Park, has a 48" sanitary sewer interceptor with shallow water cover running under the creek. Currently, the sewer is visible in the creek and could be in danger of damage from debris. In addition, the current stream flow has resulted in a long history of problems, including the erosion of the banks of Bean Creek.

Longterm concerns include further undercutting of the exposed sewer and additional bank erosion, which could impact the sewer and Greenway.

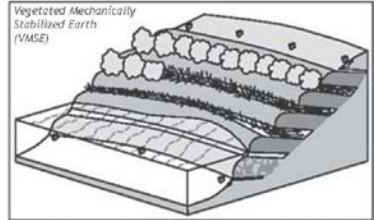


The Solution

As the proposed solution, Citizens plans to stabilize the creek banks to prevent destructive erosion in the vicinity of the 48" sewer pipe. The proposed method will utilize similar techniques as previous Indy Parks projects to maintain the look and aesthetic value of the park.

In an effort to be consistent with other Indy Parks projects, Citizens will use a green (natural) solution known as Vegetated Mechanically Stabilized Earth (VMSE) to provide substantial erosion resistance that will improve over time as the vegetation fills in and becomes more dense.

The slope of the area will also be improved to assist with the water flow by lowering the flow's velocity and thus resulting in less erosion. Ultimately, this improvement will increase the overall stability of the channel bank.



Task No.	Task Name	2015				2016												
		Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
Phase 1	Data Gathering																	
Phase 2	Design																	
Phase 3	Permitting																	
Phase 5	Construction																	
S.1	Tree Clearing																	
S.2	Channel Improvements																	
Construction Restrictions																		
No Tree Clearing (41 - 5/30)																		
No Work in Waterway (41 - 6/30)																		

CitizensEnergyGroup.com

- Stakeholder public meetings
- Regulatory engagement
 - DNR hearing



Outreach and Education

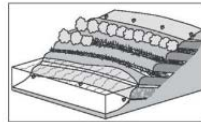
What's going on at Bean Creek?

Fall 2016 to Spring 2017

Problem: A large storm event in 2014 caused a significant bank failure and completely exposed the pipe



Solution: Stabilize the stream bed and stream bank to protect the pipe and prevent future erosion



Phase 1 - Post Construction



Phase 2 - Grass Established



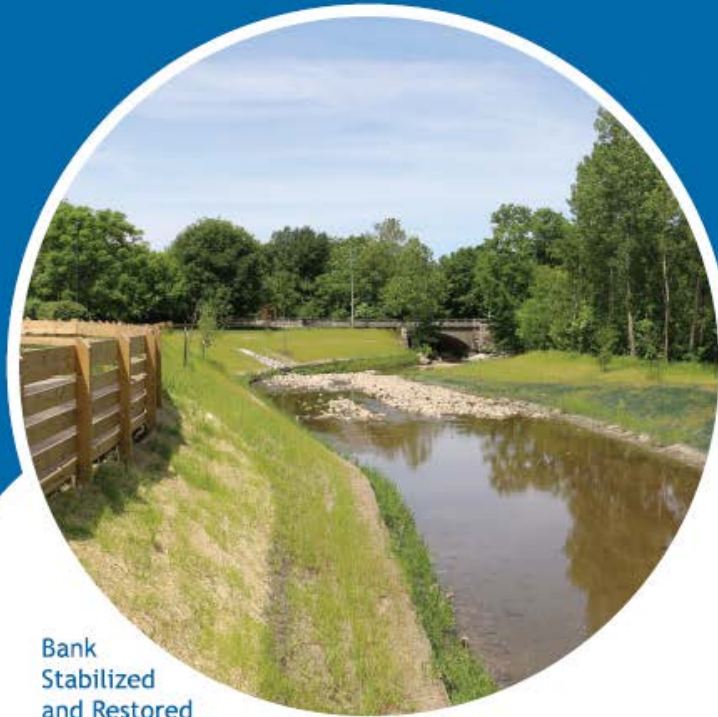
Phase 3 - Willows Established



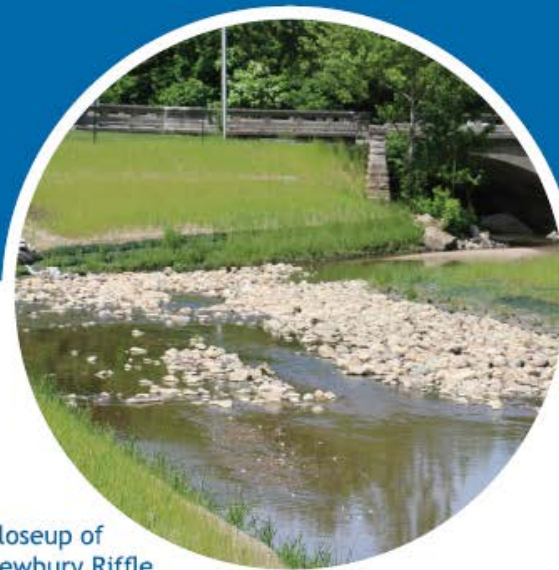
For more information visit:
CitizensEnergyGroup.com/Construction

- Proactive education
- Identify stakeholder concerns
- Meaningful location

BEAUTIFULLY RESTORED BEAN CREEK



Bank
Stabilized
and Restored



Closeup of
Newbury Riffle



Previously
Exposed
Sewer Pipe
in the Creek



Did you know?

In 2014, a large storm event caused a significant bank failure along Bean Creek and completely exposed the once buried sewer pipe crossing underneath. Utilizing sustainable solutions like Newbury Riffle (boulders in the channel designed to simulate the natural creek bed and provide controlled streamflow), willow stakes and native grass, Bean Creek restoration was completed in 2017 to protect the creek banks and the existing large sewer beneath the creek.

Citizens Energy Group is investing billions of dollars in Indianapolis' wastewater system to virtually eliminate combined sewer overflows to Marion County waterways, including Bean Creek. These investments will lead to cleaner rivers

and creeks, enhanced recreational opportunities and community revitalization.

Friends and neighbors of Garfield Park are encouraged to enjoy the view of a now better flowing and protected Bean Creek. We can all continue to do our part to protect the creek by staying on designated walking paths to prevent further erosion; picking up after our pets; and putting litter in appropriate containers to keep waste out of the the creek.



Lessons Learned

- Regulatory Implications – Bring in ES
 - Stream fill – USACE, IDNR
 - Riparian Impacts – IDNR
- Coordination with IndyParks and DNR for Tree Mitigation
- 2D Modeling provided understanding of variable flow conditions across entire stream cross section
 - Confirmed feasibility of proposed solution
- Case study for future projects
 - Stream Crossing Evaluation

Questions?