

Hamilton County Phase 2A Fact Sheet

Indices 218-222 CSO 402-406 Regulator Improvements

Name	CSO 402-406 Regulator Improvements		
Dependency	Muddy Creek EHRT Index 215B		
Technology	Regulator Improvements		
WWIP ROV	CSO 402: 7.2 MG/Typ Year CSO 403: 3.6 MG/Typ Year CSO 404: 16.2 MG/Typ Year CSO 405: 3.7 MG/Typ Year CSO 406: 9.0 MG/Typ Year		
Phase 2A Scope	Construction		
Original Cost (2006\$) WWIP Attachment 2	\$1,213,300	Updated Project Cost (2006\$)	\$11,721,947
Phase 2A Spending (2006\$)	\$9,732,447		
Modeled % Control	To be determined – model not fully calibrated and validated	Current Overflow	To be confirmed with calibrated and validated model.
		Project Overflow Reduction	
Project Category	Attachment 2 Projects Index 218-222		

The WWIP Attachment 2 includes separate index numbers for each CSO 402 (Index 218), CSO 403 (Index 219), CSO 404 (Index 220), CSO 405 (Index 221) and CSO 406 (Index 222). To expedite construction and since these CSOs are located near each other and tie into the same interceptor, all improvements will be constructed under one project, titled CSO 402-406 Regulator Improvements. Planning and design for this project will be done as part of the Bridge Plan Schedule. The description for this project in the current WWIP includes modifying the regulator at each CSO diversion chamber to set target flow rates into the interceptor to achieve CSO reduction. This work will still be performed. Additional work be performed to address river water intrusion and floatables control as listed below:

- Regulator chambers moved upslope where possible to higher elevation to protect against river water intrusion.
- Floatable controls.
- Self-contained universal bi-directional actuated (SCUBA) sluice gates on the underflow capable of operation during submerged conditions.
- Backflow valves or gates on the overflow pipe for additional river water intrusion prevention.
- New underflow pipes sized in coordination with the Muddy Creek EHRT.
- Grit chamber upstream of the regulator chamber or upstream of the diversion to reduce grit entering the interceptor or CSO.

The design for the regulator structures will include installation of an automated gate that can regulate the underflow to the interceptor to achieve remaining annual volumetric overflow performance criteria under the WWIP. The new chambers will include floatables

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control for all discharges to the Ohio River and the installation of backflow prevention to provide river water intrusion prevention during times of elevated river levels. In addition, a grit/stone pit will be constructed on the underflow line to remove heavier inorganic materials that could cause sediment buildup in the interceptor sewer.

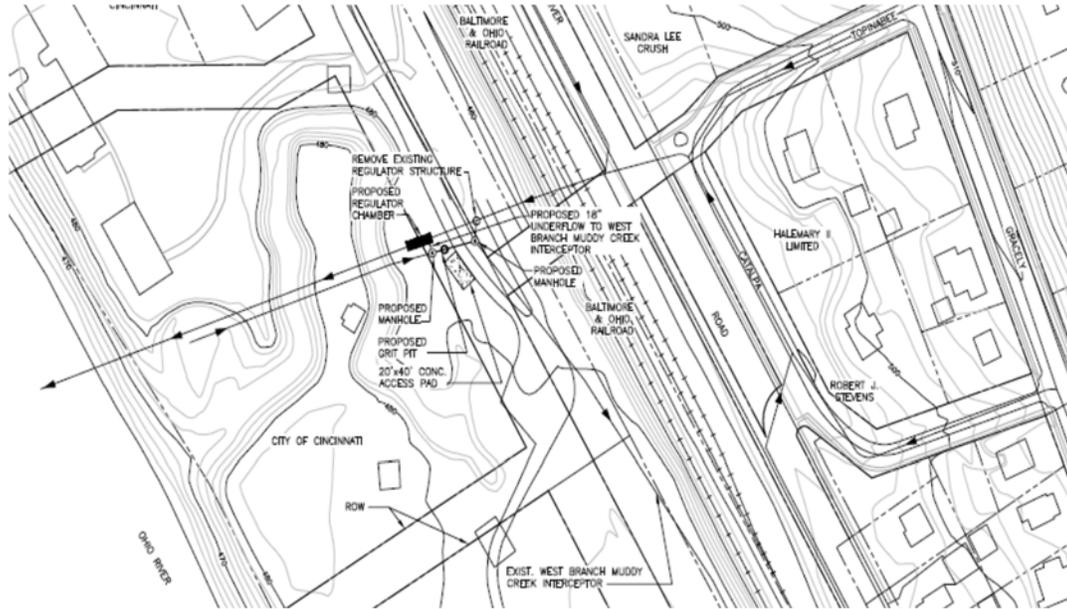


Figure. CSO 402 Regulator Improvements Project

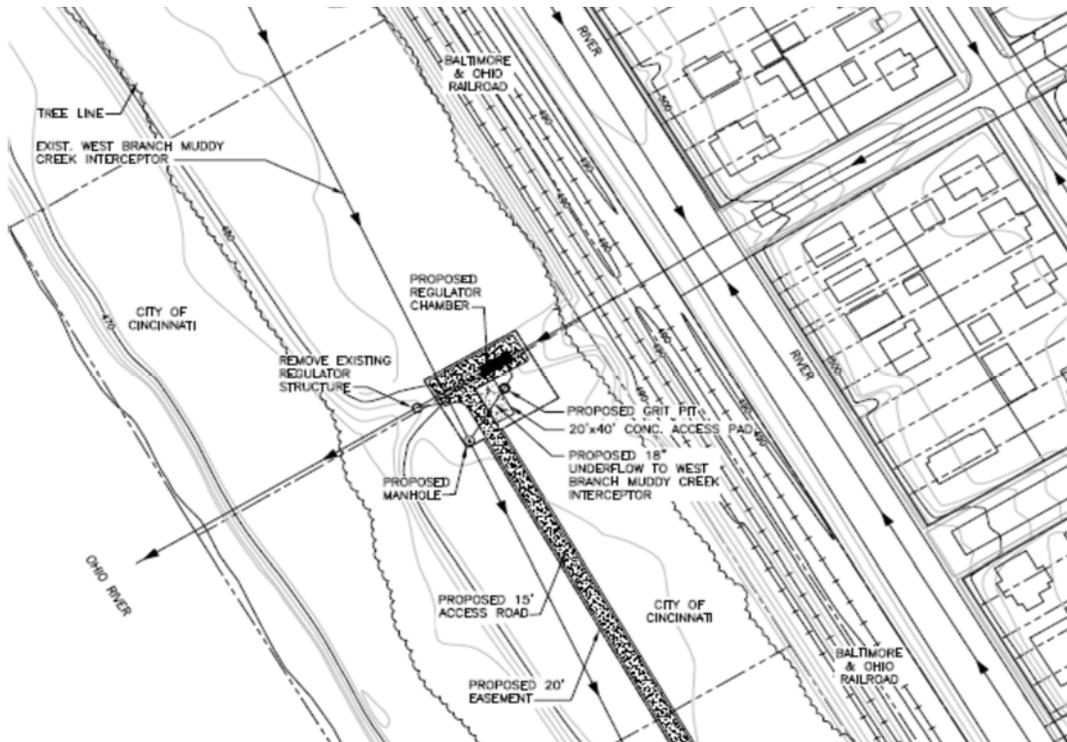


Figure. CSO 403 Regulator Improvements Project

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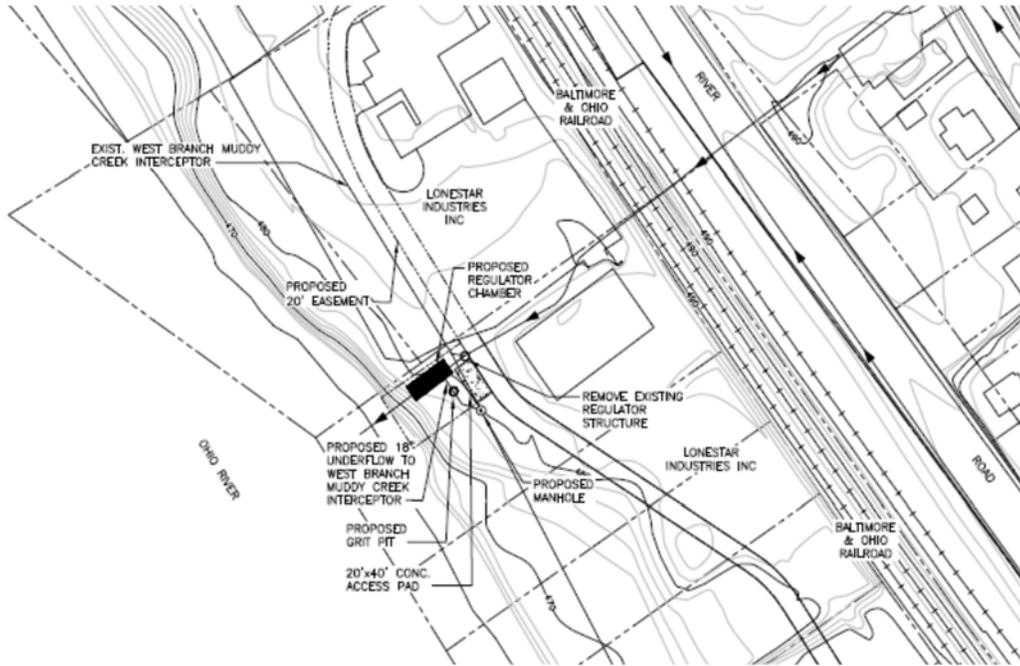


Figure. CSO 404 Regulator Improvements Project

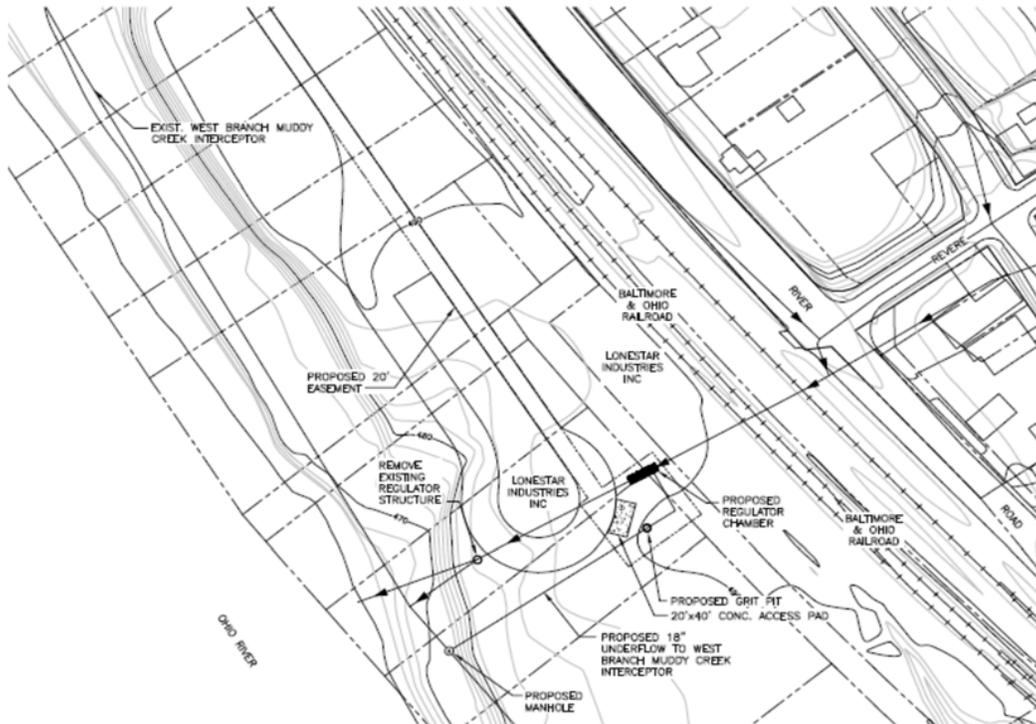


Figure. CSO 405 Regulator Improvements Project

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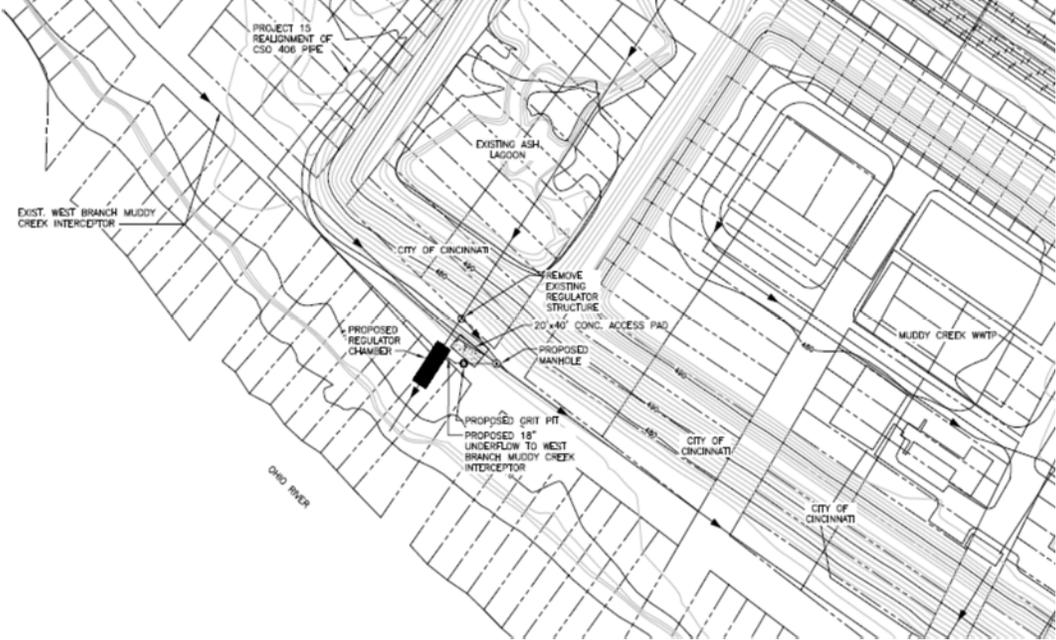


Figure. CSO 406 Regulator Improvements Project

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**Index 236 - Muddy Creek @ Westbourne Enhanced High Rate Treatment (EHRT)
Facility proposed to add new Index 236B - CSO 198 Partial Separation/SBU
Mitigation (to complement Index 236)**

Name	CSO 198 Partial Separation/SBU Mitigation (Index 236B)		
Dependency	None		
Technology	Partial Separation		
WWIP ROV	61.2 MG/Typ Year (CSO 198)		
Phase 2A Scope	Planning, Design & Construction		
Original Cost (2006\$) WWIP Attachment 2	N/A	Total Project Cost (2006\$) (to be confirmed with ongoing planning)	\$8,200,000
Phase 2A Spending (2006\$)	\$8,200,000		
Modeled % Control	To be determined – model not fully calibrated and validated	Current Overflow	To be confirmed with calibrated and validated model.
		Project Overflow Reduction	
Project Category	Attachment 2 proposed added project as Index 236B (adapted project)		

This project is located in the Muddy Creek watershed. This project partially replaces the project at Index 236 – Muddy Creek @ Westbourne EHRT. Since the time Index 236 was originally developed many years ago, new information has been obtained during WWIP Phase 1 about the flows in the collection system and the extent of the SBUs upstream of CSO 198. Previous SBU solutions have focused on individual house grinder pump installations with backflow prevention. The SBU Prevention Program approach has limited success. This project is intended to address the SBUs with a cost effective engineered solution, that will include detaining and separating stormwater entering the existing combined sewer system upstream of CSO 198 to address a number of the chronic SBUs, reduce surface flooding emanating from the sewer system, and reduce CSO 198 volume.

Stormwater from impervious surfaces associated with the large approximately 60-acre shopping center, Glenway Crossing, contributes significantly to the flows to the SBU locations and CSO 198. Separating and/or detaining the stormwater from this site along with the roadways downstream are being evaluated. The final limits and scope of the partial stormwater separation are currently being further planned under the integrated planning approach. Remaining CSO volume after the partial separation will be addressed with additional improvements at the EHRT facility at CSO 198 (Index 236), which is planned to be constructed after Phase 2A. Because the original cost estimates for EHRTs in the WWIP have significantly increased, this project approach will assist with right-sizing the necessary EHRT and help to reduce the overall cost to address CSO 198.

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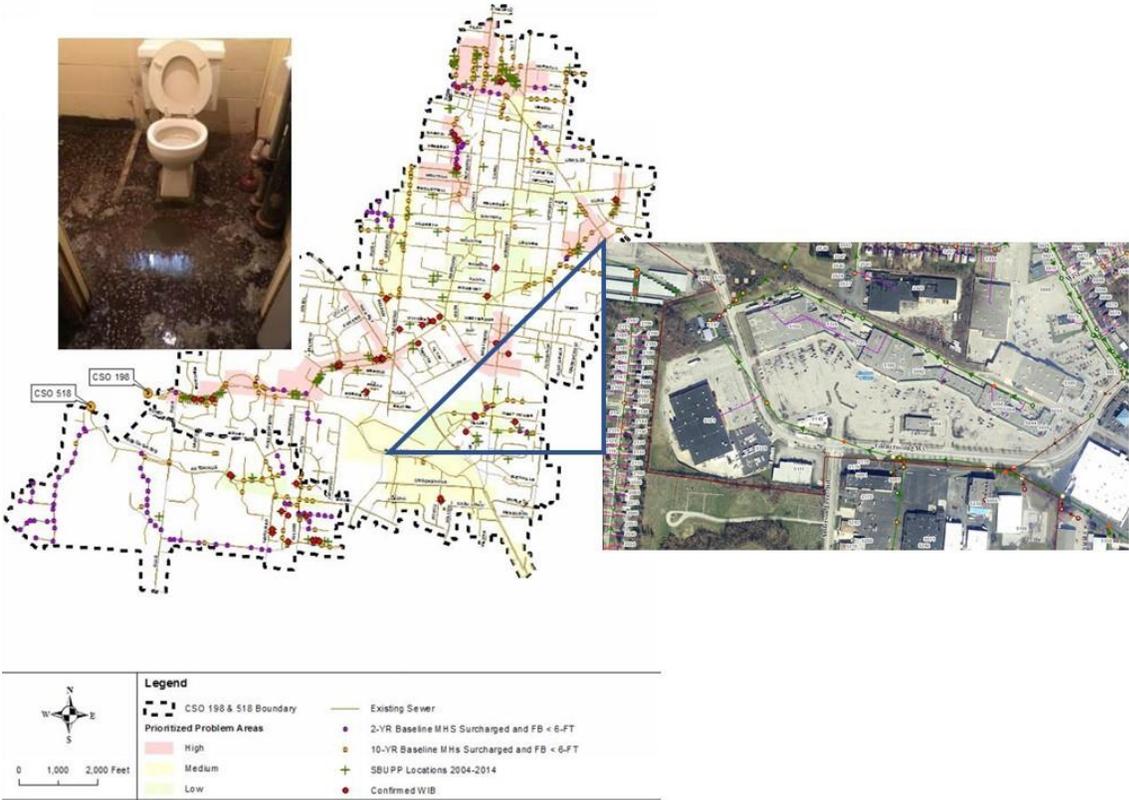


Figure. CSO 198 Partial Separation/SBU Mitigation

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Index 240-244 – East Branch Muddy Creek Interceptor (Part 1)

Dependency	Index 215B Muddy Creek WWTP EHRT		
Technology	Conveyance		
WWIP ROV	None listed		
Phase 2A Scope	Planning & Design		
Original Cost (2006\$) WWIP Attachment 2	\$60,315,458	Partial Project Cost (2006\$) (to be confirmed with ongoing planning)	\$1,000,000
Phase 2A Spending (2006\$)	\$1,000,000		
Modeled % Control	N/A	Current Overflow Project Overflow Reduction	N/A
Project Category	Attachment 2 Projects Index 240-244		

The East Branch Muddy Creek interceptor is located in the Muddy Creek sewershed and conveys combined sewer flows generally along River Road from CSO 416 (located near Riverside Sports Complex) to the Muddy Creek WWTP. The interceptor is located on the Ohio River side of River Road and receives flows from the combined sewer areas tributary to CSOs 416, 415, 414, 413, 412, 411, 410, 223, 654, 408, and 541.

Four (4) pump stations (PSs) are located in series arrangement along the interceptor to pump flows in the interceptor to the Muddy Creek WWTP. The 4 PSs moving from east to west are Fithian PS, Anderson Ferry PS, Foley Road PS, and Rapid Run PS. The 4 PSs are influenced by elevated Ohio River levels and experience Ohio River intrusion throughout a typical year. The 4 PSs were constructed in 1956 with a steel dry well/wet well configuration. Their conditions have deteriorated due to exposure to weather, high ground water levels, Ohio River flooding, and with poor cathodic protection. The deteriorated condition of the metal walls has become a safety concern for personnel entering the dry well. Replacement or improvements to each PS is needed for protection of occupational health and safety, functionality, and maintenance reasons.

Since the time Index 240-244 East Branch Muddy Creek Interceptor project was developed, new information has been learned during WWIP Phase 1 regarding the flows in the collection system. For example, the existing East Branch interceptor has approximately 2 times the conveyance capacity as each of the existing PSs' rated capacity which provides the opportunity to convey more wet weather flow to the Muddy Creek WWTP for treatment. In addition, during planning for the original interceptor replacement project, poor soils and constructability challenges were identified that increased the capital cost from \$60.3M (2006\$) to over \$100M (2006\$).

This project will perform planning and design work for wet weather and reliability improvements to the 4 East Branch PSs and the East Branch interceptor consistent with

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Index 240 – 244 and in coordination with Index 215B Muddy Creek WWTP EHRT and integrated planning currently underway. A combination of improvements to the 4 PSs, maximizing the existing conveyance capacity of the East Branch interceptor, source control upstream of each of the CSOs, and additional relief sewer capacity will be planned and designed.

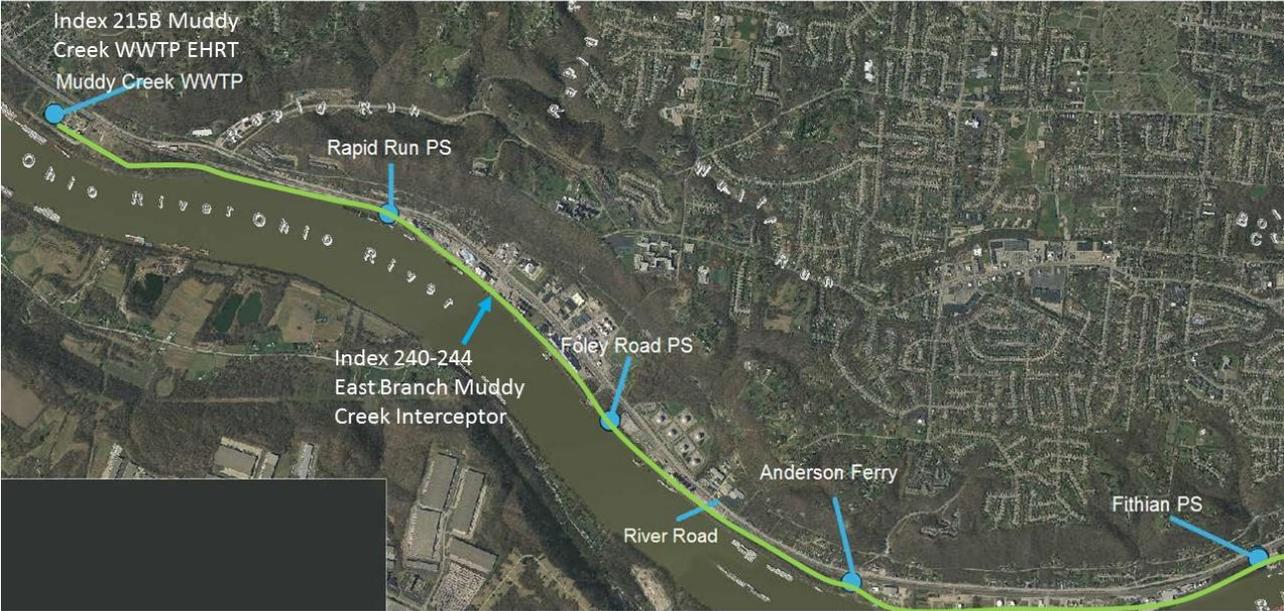


Figure. East Branch Muddy Creek Interceptor (Part 1) Project

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Index 248 – Mill Creek WWTP Chemical Enhanced Primary Treatment (complete diversion chamber, second stage)

Dependency	Mill Creek WWTP CEPT “Bridge” Project (Project ID 10144882)		
Technology	Chemical Enhanced Primary Treatment (CEPT)		
WWIP Perf.:	No Change		
Phase 2A Scope	Design & Construction		
Original Cost (2006\$)	\$25,215,765	Updated Total Project Cost (2006\$) Diversion Chamber, stage 1 & stage 2	\$12,049,111
Phase 2A Spending (2006\$)	\$4,585,111		
Modeled % Control	Not available. Model needs to be updated to calibrate and validate.	Current Overflow Project Overflow Reduction	To be determined with updated model
Project Category	Attachment 2 project		

The existing Mill Creek Wastewater Treatment Plant (WWTP) Raw Sewage Pump Station (PS) consists of two physically separate pumping stations: The North PS and the South PS. The North PS was constructed in the mid-1950’s and consists of nine vertical centrifugal pumps rated at 40 MGD each (320 MGD firm capacity). The South PS was constructed in the late 1980’s and consists of three vertical centrifugal pumps with two rated at 65 MGD each and one rated at 30 MGD (95 MGD firm capacity). Flow from four interceptors (Mill Creek, Mill Creek Auxiliary, East Branch Ohio River, and West Branch Ohio River) is conveyed to the pumping stations through a diversion chamber. The diversion chamber was constructed at the same time as the North PS.

The WWIP anticipates a future wet weather treatment facility at the Mill Creek WWTP and this project will continue to advance the initial phases of a future CEPT or HRT facility. The future wet weather treatment facility may be located near where the existing pump stations are now located, north of Gest Street and within the WWTP fence line.

MSD has identified the location for a proposed diversion chamber and developed conceptual options for a wet weather influent pump station and future wet weather treatment facility at the Mill Creek WWTP. Advancing the first stage of construction allows for flexibility in future stages of construction where rerouting of plant utilities and possible demolition of structures may be required. The first stage of construction is being built in 2019 as part of the Bridge Plan Schedule. An existing gate has malfunctioned in the existing diversion chamber that needs to be corrected. Replacement of the gate requires bypass pumping that is not able to be accomplished without creating hydraulic disturbances that damage the existing Raw Sewage Pumps. The existing diversion chamber concrete is also suspected to be deteriorating in areas and in need of repair.

This project (second stage) will complete construction of the new diversion chamber, construct connections to the Mill Creek Interceptor and Auxiliary Interceptor, and construct the needed modifications to the existing diversion chamber.

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This project is the second stage in a multi-staged project to implement a future wet weather influent pump station and CEPT or HRT facility at the Mill Creek WWTP.



Figure. Site of Mill Creek Diversion Chamber at Mill Creek WWTP

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Index 248 – Mill Creek WWTP Chemical Enhanced Primary Treatment (design WWTP wet weather influent pump station)

Dependency	Mill Creek WWTP CEPT (Diversion Chamber, second stage)		
Technology	Chemical Enhanced Primary Treatment (CEPT)		
WWIP Perf.:	No Change		
Phase 2A Scope	Design		
Original Cost (2006\$)	\$25,215,765	Updated Total Project Cost (2006\$) Pump Station only	\$65,796,345
Phase 2A Spending (2006\$)	\$4,585,111		
Modeled % Control	Not available. Model needs to be updated to calibrate and validate.	Current Overflow Project Overflow Reduction	To be determined with updated model
Project Category	Attachment 2 project		

The existing Mill Creek Wastewater Treatment Plant (WWTP) Raw Sewage Pump Station (PS) consists of two physically separate pumping stations: The North PS and the South PS. The North PS was constructed in the mid-1950's and consists of nine vertical centrifugal pumps rated at 40 MGD each (320 MGD firm capacity). The South PS was constructed in the late 1980's and consists of three vertical centrifugal pumps with two rated at 65 MGD each and one rated at 30 MGD (95 MGD firm capacity). Flow from four interceptors (Mill Creek, Mill Creek Auxiliary, East Branch Ohio River, and West Branch Ohio River) is conveyed to the pumping stations through a diversion chamber. The diversion chamber was constructed at the same time as the North PS.

The WWIP anticipates a future wet weather treatment facility at the Mill Creek WWTP. This project advances the initial phases of a future CEPT or HRT facility by designing a WWTP wet weather influent pump station for a future wet weather treatment facility within the WWTP fence line.

The existing WWTP PS lacks the ability to isolate both the existing influent diversion chamber and the North PS wet well, making this a known risk. Additionally, a recent physical scale model and computation fluid dynamics (CFD) studies have shown that it is not feasible to increase WWTP pumping capacity with the existing wet wells, so building additional pumping capacity and a new larger diversion chamber at the Mill Creek WWTP site is required. The new proposed diversion chamber is being completed as a separate project within WWIP Phase 2A. This project proposes to design a new WWTP wet weather influent pump station to facilitate a future CEPT or HRT facility. The construction of the WWTP wet weather influent pump station and design and construction of the CEPT or HRT facilities will be advanced after WWIP Phase 2A.

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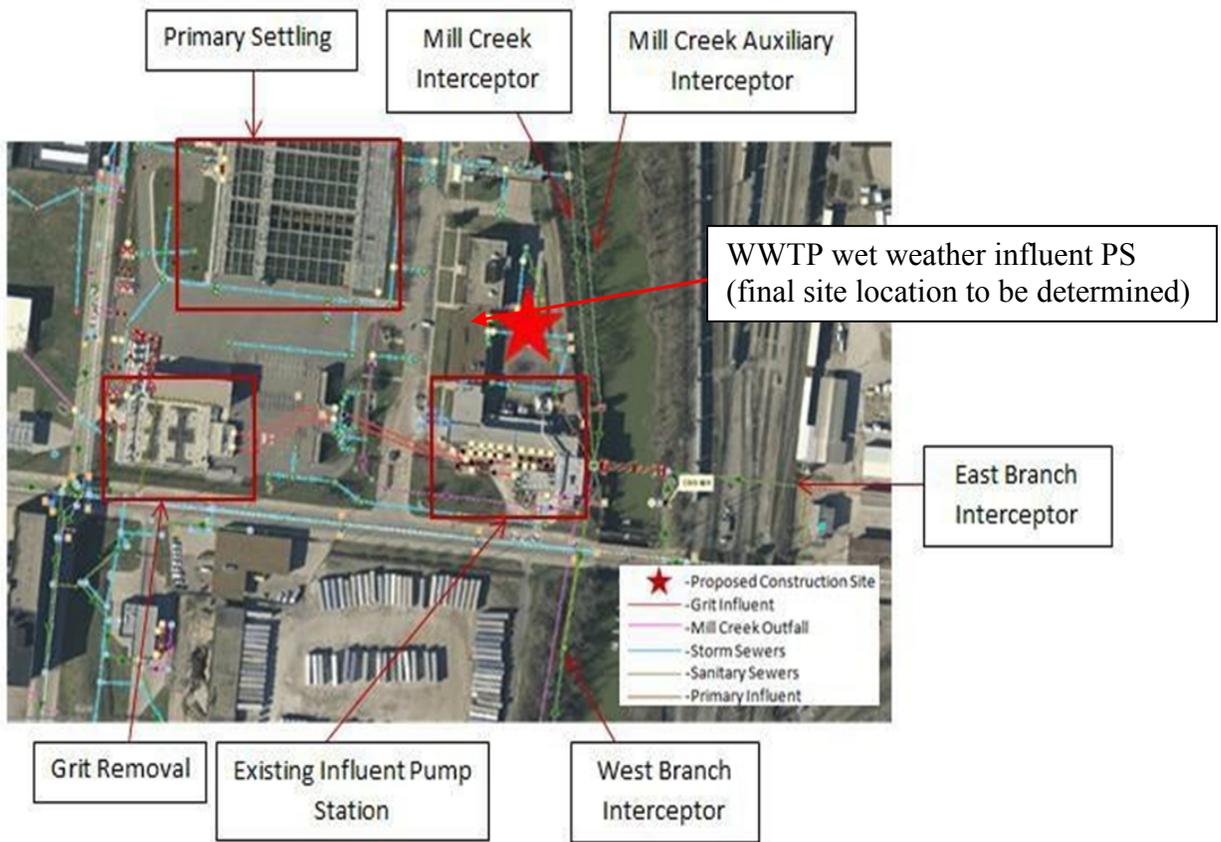


Figure. Site of Mill Creek WWTP wet weather influent pump station

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Index 317 – Berkshire HRT proposed to add new Index 317B Mt. Washington Source Control Implementation (to complement Index 317)

Name	Mt. Washington Source Control Implementation		
Dependency	None		
Technology	Partial Separation		
WWIP ROV	18.3 MG/Typ Year (CSO 182)		
Phase 2A Scope	Planning, Design & Construction		
Original Cost (2006\$) WWIP Attachment 2	N/A	Total Project Cost (2006\$) (to be confirmed with ongoing planning)	\$8,200,000
Phase 2A Spending (2006\$)	\$8,200,000		
Modeled % Control	To be determined – model not fully calibrated and validated	Current Overflow	To be confirmed with calibrated and validated model.
		Project Overflow Reduction	
Project Category	Attachment 2 proposed added project as Index 317B (adapted project)		

The Mt. Washington Source Control implementation project is located in the Little Miami watershed. Since the time Index 317 was originally developed, new information has been obtained during WWIP Phase 1 about the flows in the collection system and the extent of the SBUs upstream of CSO 182. Approximately 46 homes with sewer backups have been reported on the streets of Mayland Drive, Woodlark Drive, and Lusanne Terrace tributary to CSO 182. Some homes have experienced multiple sewer backups. The homes are currently being evaluated as part of the MSDGC Sewer Backup Prevention Program (SBUPP) for installation of SBU prevention devices. To protect these properties, a device or combination of devices (e.g., sewage pump, stormwater pump, backflow valve, etc.) will be installed on the building's sewer lateral to prevent the combined sewer from backing up into the homes. All stormwater connections upstream of the installed device that tie into the building lateral will be rerouted downstream of the installed device.

With the potential scenario that prevention devices at every home within the project area, it is likely there will be an increase of the Hydraulic Grade line (HGL) downstream potentially causing SBUs at other properties and increasing overflow volume at CSO 182. To address these issues and help reduce CSO 182 volume, this project will implement stormwater source control solutions to reduce stormwater entering the combined sewer system tributary to the SBUs and CSO 182. The possible stormwater source control solutions under consideration include:

- Addressing stormwater on private property through disconnections and routing to rain gardens, infiltration trenches, or other green infrastructure on private property or in the public right of way;
- Better control of stormwater within the subdivision through possible modification of the existing detention system, construction of new detention, or a combination

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thereof.

- Utilizing local inline pipe or offline storage within the right of way in combination with the source control solutions.

The final scope of the project will be determined through the integrated planning approach before proceeding to design. Remaining CSO 182 volume after implementation of source control will be addressed with an EHRT if necessary at CSO 182 (Index 317), which would be constructed after Phase 2A. The original cost estimates for EHRTs in the WWIP have significantly increased, so this project will assist with right-sizing the necessary EHRT and help to reduce the overall cost to address CSO 182.

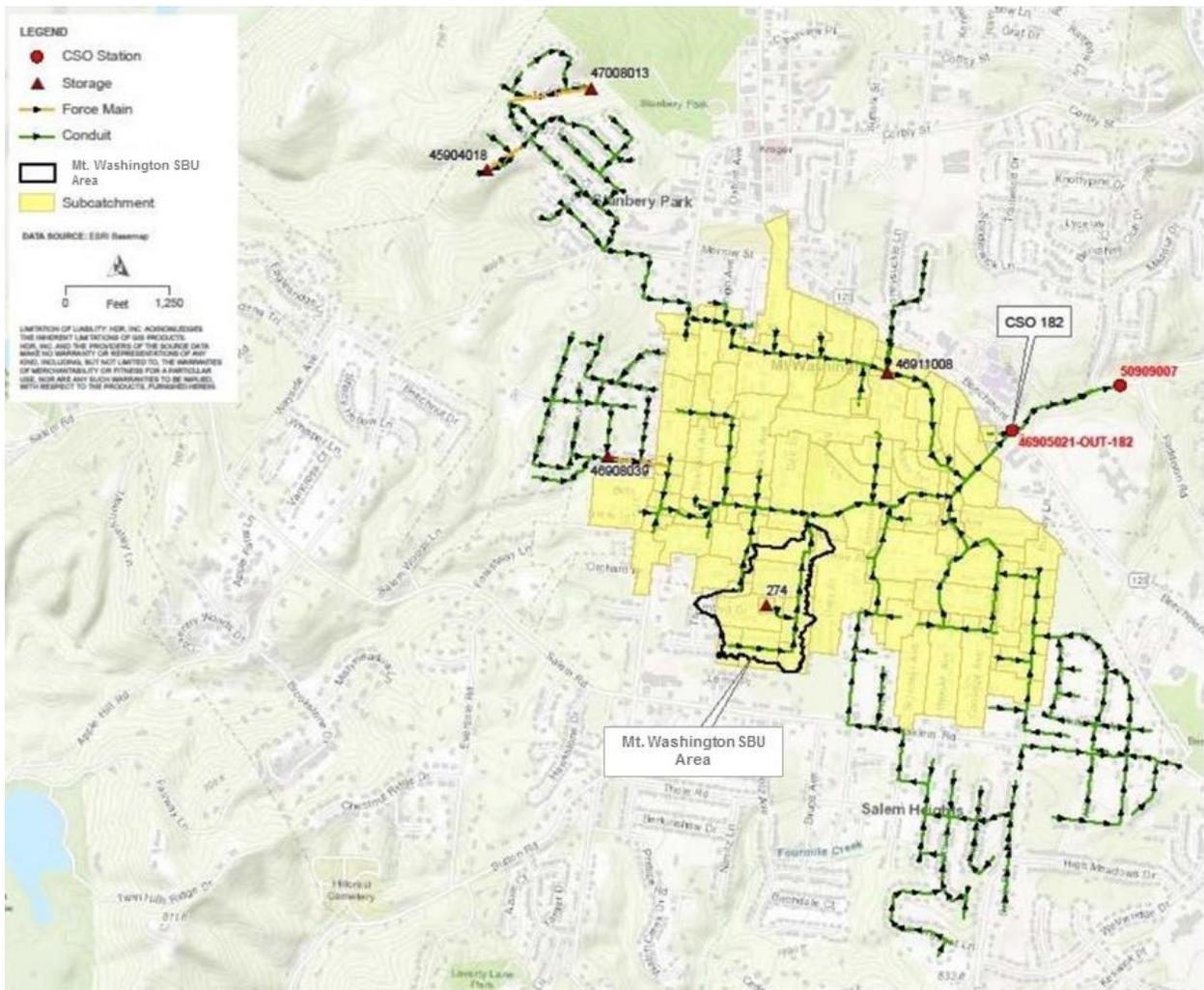


Figure. Mt. Washington Source Control Implementation Project Area