Hamilton County Phase 2A Fact Sheet

Index 193 - CSO 552 Improvements proposed to be changed to Index 193R - CSO 552 Partial Separation

Renamed	CSO 552 Partial Separation		
Dependency	None		
Technology	Partial Separation		
WWIP ROV	18.6 MG/Typ Year		
Phase 2A Scope	Planning & Design		
Original Cost (2006$) WWIP Attachment 2	$242,109	**Updated Total Project Cost (2006$)**	$1,581,449
Phase 2A Spending (2006$)	$316,290		
Modeled % Control	28% (Little Miami 2013): model not fully calibrated and validated	**Current Overflow**	112.7 MG/Typ Year
		Project Overflow Reduction	To be confirmed with calibrated and validated model.
Project Category	Attachment 2 project (proposed Index 193R adaptively managed)		

The original Attachment 2 conceptual project was a Regulator Improvement with a goal of 19.4 cfs underflow capacity. The original project was planned to upgrade the Regulator with floatables control and a larger diameter underflow pipe. The CSO 552 increase in underflow capacity needed to be completed in conjunction with reductions in the upstream CSO underflow capacities associated with CSOs 170, 549, 550 and 500 which are to be routed to a future Upper Duck EHRT facility. Constraints relative to this approach include limited available interceptor capacity downstream to accept these higher flows which was not fully understood at the time of the WWIP project development. The proposed Little Miami EHRT will also increase interceptor capacity in this area affecting the necessary underflow capacity for CSO 552.

The intent of the Adapted CSO 552 Partial Separation project is to move forward with an interim project to separate storm flows before they reach the combined sewer to reduce peak storm flows and volumes entering the combined sewer. Because this project is partial separation it can be implemented independently of other Upper Duck All Bundle projects, including the Upper Duck EHRT and the Little Miami EHRT to provide immediate CSO reduction benefits. The final project to achieve the Final WWIP Remaining Overflow Volume (ROV), if necessary, will be determined and implemented in a future Phase 2 project.

Partial separation of 30 acres of area along Ridge Avenue is proposed. Existing inlets to the CSO sewer will be plugged. Stormwater flow will be transferred to an improved storm outlet in the adjacent CSO 214 watershed. The existing storm sewer outlet will be upgraded to convey the additional storm flows. The separated storm flow will be routed into proposed storm piping and into a proposed underground detention storage facility to be located in an existing parking lot. Bioretention/storage cells are also proposed to be added within the parking lot areas to reduce stormwater runoff peak flows. The project will collect stormwater flows from 4 sources: flow from the northern neighborhoods, the

west side of the Cintas property, the former Kmart parking lot, and a former bank parking lot. These flows will then be slowly released either back into the combined sewer or into a new storm sewer coordinated with the CSO 214 partial separation project (being constructed in the WWIP Bridge). The project components and sizing will be refined based upon discussions with existing property owners and also to provide sufficient stormwater treatment BMPs to treat the separated stormwater. Floatables control will be added to the existing CSO 552 overflow along with other miscellaneous upgrades to the regulator chamber.

The proposed project will be designed to maximize CSO reduction with any additional project work to meet the WWIP ROV occurring in a future Phase 2 project. The collection system model in this area requires further calibration and validation to confirm the remaining overflow volume for this partial separation project.

The following graphics illustrate the location of the originally planned CSO 552 regulator improvements and the planned stormwater partial separation project.

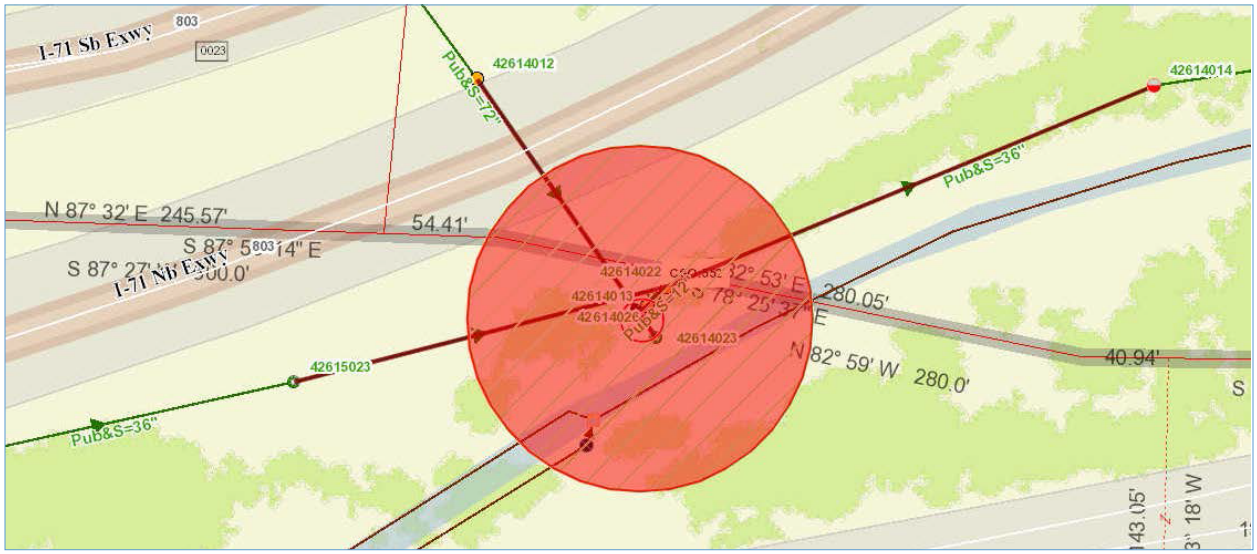

Figure 1. CSO 552 Regulator Improvements

Hamilton County Phase 2A Fact Sheet

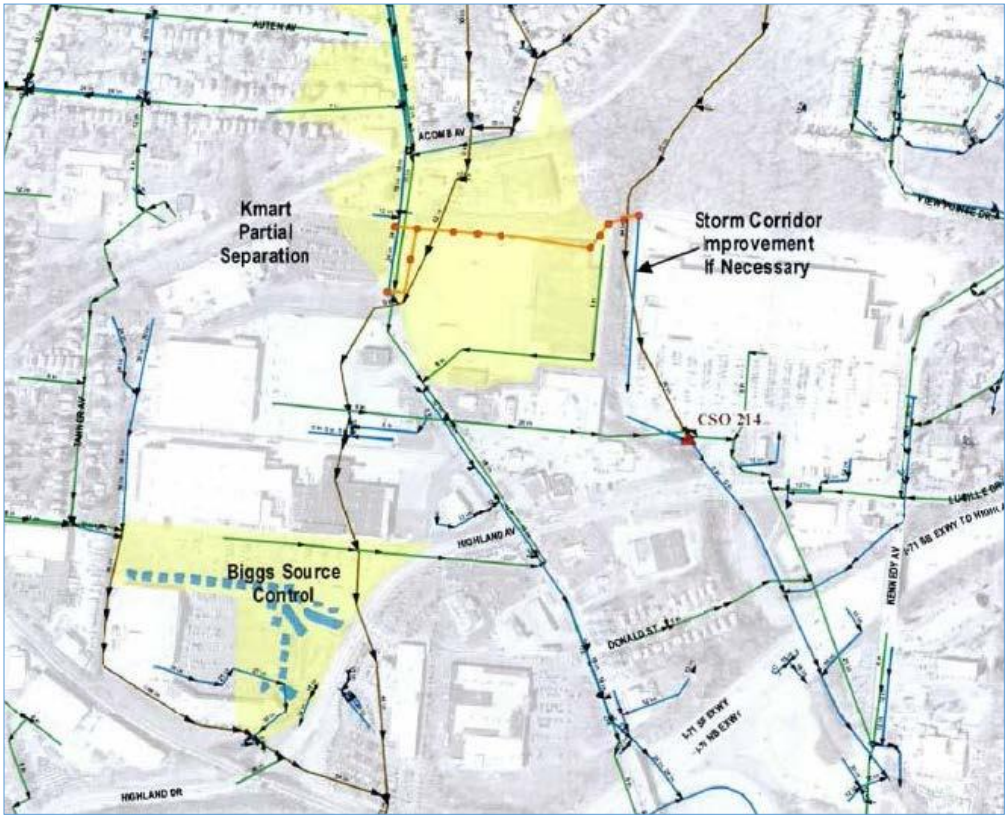

Figure 2. Proposed CSO 552 Stormwater Removal Project

Hamilton County Phase 2A Fact Sheet

Indices 195, 196, 198, 205, 206 – Little Miami WWTP bundled projects proposed to be changed to Indices 195R, 196R, 198R, 205R, 206R - LMWWTP PS Upgrades for EHRT Part 1 & Part 2

Renamed	Little Miami WWTP PS Upgrades for EHRT (Part 1 & Part 2)		
Dependency	WWTP EHRT		
Technology	WWTP EHRT		
WWIP ROV	Project complete and in service at specified capacity		
Phase 2A Scope	Part 1 - Planning, Design & Construction Part 2 – Planning & Design		
Original Cost (2006$) WWIP Attachment 2	$45,551,497	**Partial Project Cost (2006$) (to be confirmed with ongoing planning)**	$17,007,903 (Part 1) $13,185,695 (Part 2)
Phase 2A Spending (2006$)	$17,007,903 (Part 1) $2,637,139 (Part 2)		
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 projects (proposed Indices 195R, 196R, 198R, 205R & 206R adaptively managed)		

The current WWIP Little Miami WWTP (LMWWTP) Bundle (Attachment 2 Indices 195 – 206) was developed to increase the wet weather treatment capacity of the LMWWTP from 85 MGD to 100 MGD and address several asset management needs at the LMWWTP. The bundle was also developed with the assumption that the Little Miami Incinerator would remain in-use for sludge disposal.

Since the time this bundle was originally developed, new information has been learned during WWIP Phase 1 about the flows in the collection system and the WWTP Auxiliary Outfall overflow volume. In addition, new emission regulations were enacted by EPA that necessitated a shutdown of the LMWWTP incinerator. Subsequently, dewatered sludge was planned by MSDGC to be hauled to the Mill Creek WWTP for central incineration, however, this plan was later stopped by the Mayor of Cincinnati to curtail hauling sludge across the City and odor concerns. The County directed the City to develop a coordinated and holistic District-wide solids management master plan. The County also directed the master plan consider the disposal of food waste in coordination with the Hamilton County Solid Waste District. The master plan is currently under development with completion expected by the end of 2018. Currently, dewatered sludge from the LMWWTP is hauled to a landfill.

In addition, it was learned during WWIP Phase 1, that existing conveyance capacity to the LMWWTP is available to currently convey more than 100 MGD to the LMWWTP. MSDGC reports indicate peak wet weather flows in the range of 250 MGD to 300 MGD

can currently be conveyed to the LMWWTP. These larger peak flows are not only a root cause of CSOs upstream in the collection system, but also lead to large overflow volumes at the LMWWTP through the Auxiliary Outfall. MSDGC's current model, which is not yet calibrated and validated, reports 725 – 750 MG of overflow volume in the typical year from the WWTP Auxiliary Outfall. It was also learned during WWIP Phase 1 that prior versions of the WWIP included an EHRT at the LMWWTP and the existing RTC chamber was built to accommodate a future connection to an EHRT. This EHRT was not included in the approved Final WWIP and may have inadvertently been left out because the current Final WWIP does not include a project(s) to address the Auxiliary Outfall overflow volume.

Because of the new hydraulic information and the lack of a long-term solids handling strategy for the LMWWTP, this bundle of projects needs to be modified. The planning of an EHRT and modified bundle projects at the LMWWTP is occurring as part of the WWIP Bridge. The EHRT is proposed to provide significantly greater CSO reduction than the current LMWWTP bundle as well as address the Auxiliary Outfall. It is also expected that by utilizing the available conveyance capacity and treating more wet weather flow at the LMWWTP, during extreme storm events, this can help reduce flooding and upstream basement backups driven by system hydraulic grade line (HGL) issues. An EHRT at the LMWWTP will also allow dynamic underflow control projects to be considerably more effective because additional treatment capacity will be available to treat the dynamic flows directed to the interceptors.

Construction of the EHRT will be constructed in multiple projects to address affordability limitations. The first project is the necessary pump station (PS) upgrades at the WWTP to add wet weather pumping capacity for the future EHRT. Peak wet weather flows in the range of 250 MGD to 300 MGD will need to be pumped for treatment at the LMWWTP. Part 1 of the wet weather capacity PS upgrades is being planned, designed and constructed in Phase 2A. Part 2 of the wet weather capacity PS upgrades is being planned and designed in Phase 2A.

Asset management needs at the WWTP, including standby power and process upgrades, will be coordinated with the EHRT and addressed through the other listed WWIP projects for Phase 2A (Index #s 197, 198, 204 & 206) and with asset management funding. The final total project cost and sizing of the EHRT will be determined through the planning process so the final overflow volume reduction benefit is not known at this time, and will be provided as soon as the information is available.

Hamilton County Phase 2A Fact Sheet

Figure 1. Potential EHRT Location at Little Miami WWTP

Hamilton County Phase 2A Fact Sheet

Index 204 – Little Miami WWTP Standby Power & Little Miami WWTP Standby Power – Duke Rider Cost

Dependency	Little Miami EHRT, District-wide Solids Handling Master Plan		
Technology	WWTP		
WWIP ROV	Project complete and in service at specified capacity		
Phase 2A Scope	Planning, Design & Construction		
Original Cost (2006$) WWIP Attachment 2	$7,141,778	**Partial Project Cost (2006$) (to be confirmed with ongoing planning)**	$4,285,071 (Standby Power) $822,454 (Duke Utility Rider)
Phase 2A Spending (2006$)	$5,107,525		
Modeled % Control	N/A	**Current Overflow Project Overflow Reduction**	N/A
Project Category	Attachment 2 project		

Since the time the Little Miami Bundle planning was originally developed, the electric utility has introduced a new reserve capacity fee, or Duke Utility Rider, that imposes an additional fee on redundant, or standby power feeds at the distribution level of the electric utility. The LMWWTP currently has dual power feeds through two separate substations. MSDGC is evaluating options with respect to the utility rider, including on-site standby power generation options.

The project includes design and construction of standby power generators as a backup power source for the LMWWTP facilities, as required by the Ten-States Standards, in lieu of annual payments for utility reserve capacity charges. Improvements to the LMWWTP electrical feeders and grid will also be performed to integrate the generators into the WWTP's electrical system. MSD will pay the Duke Utility Rider through approximately 2021 or until generators are installed and operational.

Hamilton County Phase 2A Fact Sheet

Index 215 - Muddy Creek Basin Storage & Conveyance Sewer proposed to add new Index 215B - Muddy Creek WWTP Pump Station (for EHRT) & Muddy Creek WWTP EHRT (to complement Index 215)

Renamed	Muddy Creek WWTP PS & EHRT		
Dependency	None		
Technology	WWTP EHRT		
WWIP ROV	Project complete and in service at specified capacity		
Phase 2A Scope	Planning, Design & Construction		
Original Cost (2006$) WWIP Attachment 2	$120,122,277	**Partial Project Cost (2006$) (to be confirmed with ongoing planning)**	$32,898,173 (PS) $32,898,173 (EHRT)
Phase 2A Spending (2006$)	$32,898,173 (PS) $32,898,173 (EHRT)		
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 proposed added project as Index 215B (adapted project)		

The current WWIP project is a 1.6 mile long, 25 feet diameter tunnel to primarily store wet weather flows above 35 MGD for treatment at the Muddy Creek WWTP. MSDGC through their 2010 planning efforts identified that this tunnel could be downsized to 8.5 feet diameter with the addition of a 35 MGD EHRT for treatment of the wet weather flows. This project was also developed with the assumption that the Little Miami WWTP Incinerator would remain in-use for Muddy Creek WWTP sludge disposal. Muddy Creek WWTP sludge was hauled to the LMWWTP for disposal. Because a district-wide solids handling master plan has not yet been developed, as described under Adaptive Management Item 2 (LMWWTP Bundle) above, the Muddy Creek sludge is currently being hauled to a landfill.

Since the time Index 215 Muddy Creek Basin Storage & Conveyance Sewer (tunnel) project was developed, new information learned during WWIP Phase 1, regarding the flows in the collection system, identified that there is a significant amount of creek and river water intrusion that enters the interceptors through the CSOs and Muddy Creek interceptor from the Ohio River and Muddy Creek. This river water intrusion has prevented the collection system hydraulic model from properly matching observed flows and meeting model calibration and validation industry standards. This issue provides limited confidence in properly sizing a number of the WWIP Attachment 2 projects, including the WWIP tunnel project (Index 215), until this river water intrusion is addressed.

In addition, it was learned, during WWIP Phase 1, that existing conveyance capacity to the Muddy Creek WWTP is currently available to convey more than 35 MGD to the Muddy Creek WWTP. These larger peak flows, exceeding the capacity of the Muddy Creek WWTP

(currently 28 MGD) are the root cause of CSOs upstream in the collection system, including along the existing east branch and west branch interceptors.

Because of the new hydraulic information, the lack of a long-term solids handling strategy for the Muddy Creek WWTP, and the significant creek and river water intrusion into the interceptors from the CSO outfalls and portions of the Muddy Creek interceptor (interceptor tributary to the Muddy Creek Pump Station), the Index 215 project needs to be modified. The current project is proposed to be modified to construct an EHRT at the Muddy Creek WWTP in Phase 2A to provide immediate and significant CSO reduction. Phase 2A also includes construction of regulator improvements at CSOs 402 – 406 (Index 218) to protect each CSO regulator from Ohio River intrusion. The WWIP Bridge includes strategic repair and replacement of the Muddy Creek interceptor (Index 234) to eliminate Muddy Creek water intrusion. These projects once completed will then allow proper representation of flows in the Muddy Creek hydraulic model. In addition, the Muddy Creek integrated watershed plan, currently underway, will provide the necessary planning for the watershed to properly size future projects in later phases of WWIP Phase 2. The need for and final sizing of a tunnel will be determined after EHRT construction and monitoring and the tunnel will be constructed, if needed, after Phase 2A.

An EHRT at the Muddy Creek WWTP will also allow dynamic underflow control projects to be considerably more effective because additional treatment capacity will be available to treat the dynamic flows directed to the interceptors.

The pump station and EHRT are tentatively sized at 35 MGD, however, the final cost and sizing of the EHRT is currently being determined as part of the WWIP Bridge. The final overflow volume reduction benefit is not known at this time, and will be provided as soon as the information is available.

Hamilton County Phase 2A Fact Sheet

Figure 1. Potential EHRT Location at Muddy Creek WWTP

Hamilton County Phase 2A Fact Sheet

Index 235 - Addyston PS Elimination proposed to add new Index 235B - Addyston Extraneous Stormwater Removal (to complement Index 235)

Renamed	Addyston Extraneous Stormwater Removal		
Dependency	Addyston Pump Station Elimination Project (Index 235)		
Technology	Partial Separation		
WWIP Perf.:	Plan CAPP: 2-yr		
Phase 2A Scope	Planning, Design & Construction		
Original Cost (2006$)	N/A	**Updated Total Project Cost (2006$)**	$5,319,573
Phase 2A Spending (2006$)	$5,319,573		
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 proposed added project as Index 235B (adapted project)		

This adapted project complements the Addyston Pump Station Elimination project and will provide street-load separation of stormwater runoff to reduce overflows in the area and to reduce the flows conveyed to the Muddy Creek Pump Station. The extraneous stormwater removal (ESR) will reduce surcharging and reduce the peak flow from Addyston to also reduce overflows upstream of the Muddy Creek Pump Station for the 2-year, 24-hour event. This project will also reduce the peak flow and volume that the Muddy Creek PS will need to convey to the existing interceptor, minimizing long term treatment costs and tunnel/EHRT sizes.

This project includes installation of 5,800 LF of storm sewer to offload street inlets from existing combined sewers. Sufficient stormwater BMPs to treat the separated stormwater will also be constructed.

The Addyston PS elimination project will be coordinated with available downstream capacity to be determined after this ESR project and the Muddy Creek EHRT project are completed and post-construction flow monitoring is performed. The Addyston PS elimination project will then be evaluated for implementation after Phase 2A. The graphic below provides an overview of the general locations of the extraneous stormwater removal.

Hamilton County Phase 2A Fact Sheet

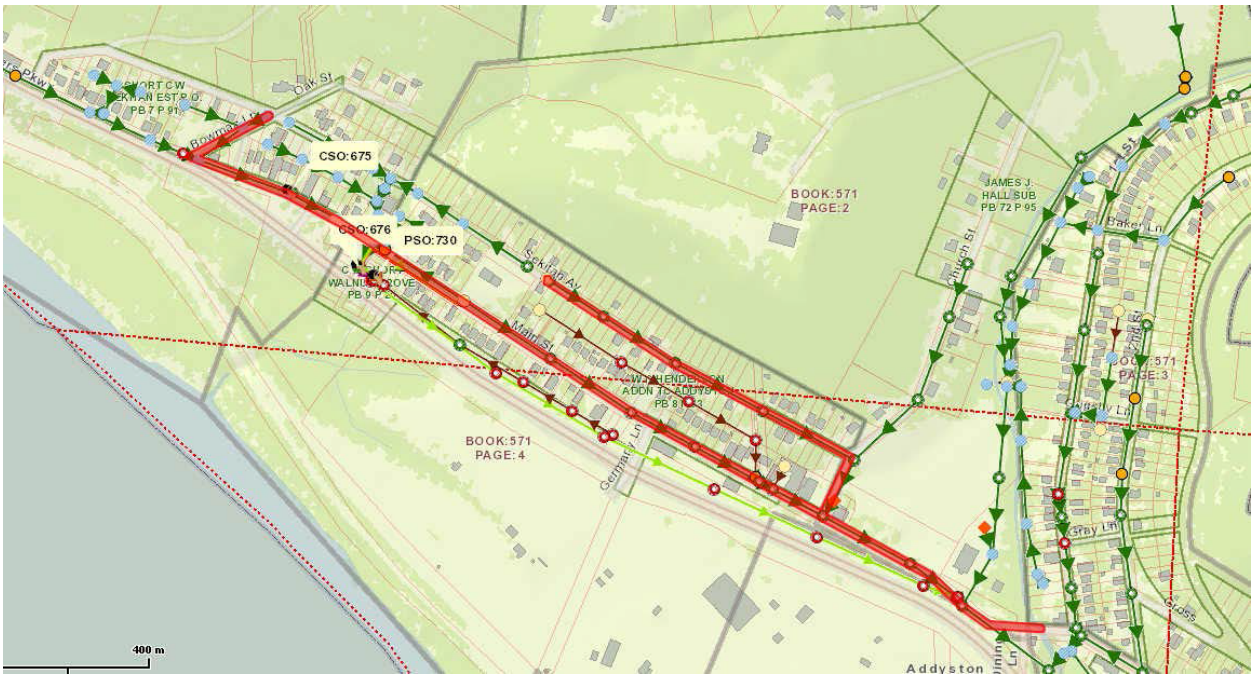

Figure 1. Addyston Extraneous Stormwater Removal Project