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Project No.: 11530000

Project Name: Upper Muddy Creek Interceptor Replacement

Document Type: Business Case Evaluation

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Upper Muddy Creek Interceptor Replacement

Business Case Evaluation

PROJECT GROUNDWORK
Prepared by HNTB Team
11530000
Final Revision 3 - CFCT Review
April 18, 2012
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Appendix A – Sheet Nos. 10A – 10F, Project 10 Muddy Creek Interceptor Upsizing
Section 1 – Executive Summary

The existing 12,100-foot long Upper Muddy Creek Interceptor (UMCI) starts at Werk Road as a 22- and 24-inch diameter sewer and runs along Westbourne Drive. It increases in diameter to 30-inch and runs along Muddy Creek Road. Near the Muddy Creek oxbow (location where creek makes 360° turn; see Figure 3), it reduces in size to 24-inch, where it connects to a section of 36-inch diameter interceptor that was installed in the mid-1990s. Most of the sewer segments of the interceptor were TV-inspected between 2007 and 2011. Many locations have severe root intrusion, are in poor condition and are partially collapsed or deformed and broken. Field investigations performed in January and February 2010 documented that creek water enters low-lying manholes and cracked pipe along the creek bed causing unenumerated SSOs along the UMCI. These segments also have capacity issues and surcharge as frequently as the 6-month storm. These segments have a high degree of shape loss and deformation that are difficult to maintain and cannot be lined.

In addition to capacity limitations and structural deficiencies of the UMCI, replacement of the UMCI is critical to the success of the Werk & Westbourne EHRT facility in achieving Phase I milestones. Therefore, the Upper Muddy Creek Interceptor Replacement Project was nominated as a separate project by the Planning and Business Development Division in September, 2011.

The selected alternative is to replace the existing UMCI with approximately 3,407 lineal feet of new 30-inch diameter interceptor from CSO 522 to CSO 198 (Asset Management portion) and approximately 9,248 lineal feet of 36-inch diameter pipe from CSO 198 to the creek oxbow (WWIP portion). This could be accomplished by a combination of open-cut and trenchless technology methods. The majority of the new interceptor alignment would be along Westbourne Drive and Muddy Creek Road with creek crossings minimized to the extent practical. The alternative also replaces approximately 373 linear feet of 15-inch diameter pipe with 24-inch diameter sewer to eliminate SSO 1061 up to a 10-year, 24-hour design event. It also includes the installation of approximately 578 linear feet of 12-inch diameter sewer along Picwood Drive to serve existing sanitary sewer connections that currently discharge into a section of the existing interceptor that is failing and will be abandoned.

The selected alternative would also install dynamic underflow control at CSOs 522, 198 and 518 to control the underflow to the interceptor from these CSOs during wet weather and will eliminate SSO 1061 for events up to a 10-year, 24-hour design event.

The project is an urgent capacity project with an estimated construction cost of $23,956,500 and project cost of $31,153,600. It is anticipated the project can be turned over to Project Delivery in May 2012 and construction completed by 2016. The planning for the replacement project is being performed under 10130001, but the design (beginning in 2012) and construction will be funded as a capital improvement project under 11530000. However, the design and construction will be credited as an urgent capacity project. Figure 3 is a map of the existing UMCI.
Section 2 – The Problem

Section 2.1 Problem Statement

The existing 12,100-foot long Upper Muddy Creek Interceptor (UMCI) starts at Werk Road as a 22- and 24-inch diameter sewer and runs along Westbourne Drive. It increases in diameter to 30-inch and runs along Muddy Creek Road. Near the Muddy Creek oxbow, it reduces in size to 24-inch, where it connects to a section of 36-inch diameter interceptor that was installed in the mid-1990s. Most of the sewer segments of the interceptor were TV-inspected between 2007 and 2011. Many locations have severe root intrusion, are in poor condition and are partially collapsed or deformed and broken. Field investigations performed in January and February 2010 documented that creek water enters low-lying manholes and cracked pipe along the creek bed causing unenumerated SSOs along the UMCI. These segments also have capacity issues and surcharge as frequently as the 6-month storm. These segments have a high degree of shape loss and deformation that are difficult to maintain and cannot be lined.

There is currently a horizontal conflict between the existing UMCI and the footprint of the proposed Werk & Westbourne EHRT facility.

Section 2.2 Condition Assessment

The existing UMCI contains vitrified clay pipe. The sewer segments from CSO 522 to CSO 198 were installed as early as 1922 and the sewer segments downstream of CSO 198 were installed in 1935.

The majority of the pipe segments are in the moderate- to high-risk categories for structural failure, based upon National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) condition grading system of CCTV results. Shape loss in one segment is greater than 30%. The interceptor segments also exhibit severe root intrusion and separation at the joints with large amounts of infiltration and/or exfiltration. Examples are shown in Photos 1 and 2.

Photo 1 – Root Intrusion
The majority of the pipe sections was also noted to have longitudinal cracking and is in danger of collapsing. Using the PACP condition grading system, many segments have numerous areas receiving a grade of 5, with one segment having more than 20 areas receiving a grade of 5. A grade 5 area is an area requiring “immediate attention” and the “Pipe has failed or will likely fail within the next five years.” An example of these areas is shown in Photo 3.

Field investigations of low lying and inflowing and overflowing manholes as well as exposed cracked interceptor pipe along the Muddy Creek bed were documented in the Preliminary Summary Report, Muddy Creek Interceptor, Task 3018, March 2010, prepared as part of the West Branch Muddy Creek Project Bundle planning study. Photos 4, 5 and 6 illustrate some of the findings.
Photo 4 – Overflowing manhole #16006007 west of Ebenezer Bridge during a wet weather event

Photo 5 – Exposed and cracked interceptor, pipe segment (16005007 – 16006007), located under Ebenezer Bridge and upstream of the overflowing manhole in Photo 4
In addition, the Muddy Creek Interceptor is undersized to receive 3.5 times dry weather flow from the underflows from CSOs 522, 198 and 518 and peak sanitary flows during a 2-year event. The underflows from CSOs 522, 198 and 518 into the Muddy Creek Interceptor will be dynamically controlled to 3.5 times dry weather flow, matching the ratio of the peak hour to daily average treatment capacity of the Muddy Creek Wastewater Treatment Plant, while providing sufficient capacity in the interceptor to receive peak flows from the separate sanitary sewers.

**Section 2.3 Problem Diagnosis**

A majority of the segments of sewer pipe of the UMCI exhibit severe deformation and root intrusion at the segment joints. The exact cause of deformation is not possible to determine from the TV inspections. However, given the age and material of the pipe (80-year-old vitrified clay), it is reasonable to conclude the problem results from installation practices of the era and/or changing external loading over time. Also, sections of the interceptor along the creek have become exposed and have cracked.

**Section 2.4 Boundary of the Analysis**

The boundary of the analysis includes the sewer segments from CSO 522 to the intersection of Muddy Creek Road and Devil's Backbone shown in Figure 3, a proposed sewer on Picwood Drive that will eliminate sanitary laterals directly connected to the interceptor, and a short section of pipe between SSO 1061 and the interceptor. Also, consideration was given to a future sewer extension north of Werk Road.
Section 2.5 Project Objectives

The objectives of the project are:

1. Repair or replacement of the failing and under-capacity sewer segments to provide no surcharging during a 2-year wet weather event (2-year level of service), while controlling the underflow from CSOs 522, 198 and 518 to 3.5 times dry weather flow (which is equivalent to the minimum underflow rate during a 2-year wet weather event). Provide 10-year level of service by further control of underflow from CSOs 522, 198 and 518.
2. Eliminate SSO 1061 up to a 10-year, 24-hour design event.
3. Relocate UMCI outside of the footprint of the proposed Werk & Westbourne EHRT facility.
4. Not increase interceptor overflows downstream of the UMCI project limits.
5. Reroute sanitary flows along Picwood Drive.
6. Accommodate potential future extension of the UMCI north of Werk Road.
7. Be an integral part of meeting the WWIP objectives for the West Branch Muddy Creek Bundle.
8. Provide adequate and safe access to the Dynamic Underflow Control (DUC) structure serving CSO 518.
Section 3 – Strategies

Section 3.1 Strategy Development and Initial Screening of Strategies

3.1.1 Strategy 0: Do Nothing
This strategy is to continue to operate the existing system in its current condition. This strategy was screened out for the following reasons:
1. Excessive infiltration/exfiltration and high risk of structural collapse due to the high degree of shape loss in some segments, the number of defective taps, pipe cracking and joint failures.
2. Capacity deficiencies do not allow for flow rates necessary to meet the goals of the Wet Weather Improvement Program and the District’s Consent Decree.
3. Although some sewer cleaning and repairs have recently been made to the existing interceptor, additional repairs are still needed.

3.1.2 Strategy 1: Repair and Selective Replacement
This strategy is to repair or replace sections of defective pipe using pipe bursting or other forms of trenchless technology. Slip lining is not a viable strategy because it could not provide the capacity required. Rock in the area would not allow pipe bursting to increase the diameter sufficiently to meet the capacity requirements of defective sections of pipe and would not provide the required wet weather capacity. This strategy was screened out, because sections of pipe with insufficient capacity would remain in service.

3.1.3 Strategy 2: Replacement by New Construction
This strategy involves the replacement of the entire UMCI with new larger diameter sewer pipe using open-cut installation and trenchless technology at selected locations. See Figure 3 for the location of the existing UMCI and the boundary as defined in Section 2.4.

Section 3.2 Analysis of Strategies
Only Strategy 2 meets the project objective of eliminating SSOs within the project limits, including SSO 1061, up to a 10-year, 24-hour design event while controlling the underflows from CSOs 522, 198 and 518 to 3.5 times dry weather flow.
Section 4 – Alternatives

Section 4.1 Alternative Development Methodology

Construction of a new sewer by open-cut and trenchless technology was the strategy selected. The existing sewer elevations, topographic maps and aerial photographs were used to select a proposed alignment for the sewer. Also, a future sewer extension planning effort has been completed and affected the starting invert of proposed sewer.

Section 4.2 Alternative Analysis Methodology

The alternative was evaluated using the Triple Bottom Line (TBL) analysis using MSD’s TBL tool. MSD’s cost-estimating tool was used for the financial analysis portion of the TBL to compare the alternatives using a 25-year net present value (NPV). Selection of the recommended alternative is based on the following factors:

- Affordability, maintainability, flexibility, operability, reliability and adaptability;
- TBL analysis;
- Positive impact it could have to MSD and the community;
- Involvement of key stakeholders;
- Regulatory requirements;
- Various risks associated with the project; and
- Impact and integration with the Werk & Westbourne EHRT Facility.

Details of this analysis were presented in 3WBMU Task 30411 West Branch Muddy Creek Project Bundle, Alternative Analysis Report, Final Rev. 0, May 2010, pages 8-1 through 8-10.

Section 4.3 Alternatives

4.3.1 Alternative 1 - Replace the Upper Muddy Creek Interceptor and Install Dynamic Underflow Control

This alternative would replace the entire UMCI with new 3,407 lineal feet of 30-inch diameter sewer from CSO 522 to CSO 198 and approximately 9,248 lineal feet of 36-inch diameter pipe from CSO 198 to the creek oxbow by open-cut and trenchless technology. The majority of the new interceptor alignment would be along Westbourne Drive and Muddy Creek Road and creek crossings would be minimized to the extent practical. The starting invert elevation of the new interceptor will accommodate a future extension north of Werk Road. This future extension would provide management of solids upstream of Werk & Westbourne EHRT facility, provide an operational cost savings by using fewer chemicals for treatment at the EHRT, and help mitigate the risk of the EHRT not meeting the Consent Decree objectives for CSO 522. See Sheet Nos. 10A through 10F for preliminary plan and profiles of the sewer in Appendix A.

This alternative would also install dynamic underflow control (DUC) at CSOs 522, 198 and 518. As modeled, DUC would maximize the underflow from the three CSOs while providing interceptor capacity for flows from separate sanitary sewers up to a 10-year, 24-hour design event. During the vast majority of storm events that comprise the typical year, throttling of underflow from these three CSOs to less than 3.5 times dry weather flow would not be required by the DUC system. The DUC system would simply monitor, in real time, the flow conditions in the interceptor and determine when throttling of underflows would be required to prevent exceeding the maximum capacity in the Muddy Creek Interceptor.
The DUC system would consist of the installation of motor operated sluice gates/valves on the underflow sewers from CSOs 522, 198 and 518; a SCADA control system; flow/level monitoring station downstream of SSO 1061; and telemetry between the units. The motor operated sluice gates would be modulated opened and closed with feedback based on interceptor flow/level monitoring.

The major advantages of this alternative are as follows:

a) Provides maximum flexibility and adaptability for current and future operations.

b) Sewer will be easily accessible for future maintenance.

c) Satisfies all of the project objectives:

1) Repair or replacement of the failing and under-capacity sewer segments to provide no surcharging during a 2-year wet-weather event (2-year level of service), while controlling the underflow from CSOs 522, 198 and 518 to 3.5 times dry weather flow.

2) Eliminate SSO 1061.

3) Relocate UMCI outside of the footprint of the proposed Werk & Westbourne EHRT facility.

4) Not increase interceptor overflows downstream of the UMCI project limits.

5) Reroute sanitary flows along Picwood Drive.

6) Accommodate potential future extension of the UMCI north of Werk Road.

7) Be an integral part of meeting the Phase II goals for the West Branch Muddy Creek Project Bundle.

The major disadvantages of this alternative are as follows:

a) A significant number of easements are required.

b) There are approximately seven (7) stream crossings which may add special requirements to the project.

Regulatory Requirements/Restrictions
Alternative 1 will require a Permit-to-Install (PTI) from the Ohio Environmental Protection Agency (OEPY) due to the increase in pipe diameter and the total length of the project exceeding 1,000 feet. A street-opening permit will be required from Hamilton County. A statewide or individual permit will be required from US Army Corp of Engineers, and which permit will be determined prior to the 30% design submittal.

Impact to WWIP Schedule/Impact on Other Work in the Sewershed
The section of the interceptor along Westbourne Drive between Werk Road and Muddy Creek Road needs to be completed as soon as possible to allow for construction of the proposed Werk & Westbourne EHRT facility to begin.

Key Stakeholders
Implementation of this work will require coordination of WWT and WWC Divisions and other stakeholders – US Army Corps of Engineers, Hamilton County Engineers and Ohio Environmental Protection Agency.

TBL Analysis
The initial construction cost of Alternative 1 is $23,956,500. With the future replacement and maintenance costs factored into the project, the NPV of this alternative is $31,761,000. The NPV analysis included a yearly maintenance cost of $29,200. The value is $1,833 per linear foot of sewer replaced and underflow control. This alternative received an environmental score of 68 and a social score of 14.
Affordability
Legislation was drafted to add this project as a capital improvement project to the future year's CIP. Design and construction are planned to be accomplished in different years.

Risk
Alternative 1 will involve long periods of bypass pumping. There is a risk that large wet weather events during bypass pumping could increase wet weather overflows at CSOs 522, 198 and 518 and cause overflows from manholes onto Westbourne Drive and Muddy Creek Road. Moving the bypass pumping as construction progresses will also increase construction time.

Replacement of the Upper Muddy Creek Interceptor requires installation in rock. This may result in increased construction costs. Additional geotechnical borings are recommended during design to minimize the risk to MSDGC of change orders during construction for additional rock excavation.

This alternative will require temporary and/or permanent easements on approximately 53 parcels from 48 different owners which may delay the timely start of construction.

This alternative requires numerous crossings of the Muddy Creek. There is a risk that either OEPA or US Army Corp of Engineers may require the alignment to be revised to limit the number of creek crossings. This risk may be minimized by involving both agencies in the 30% design review meeting, if not sooner.

Until the Muddy Creek Basin Storage and Conveyance Sewer is constructed, there will be an interim risk of hydraulically overloading the lower section of the Muddy Creek Interceptor, resulting in overflowing manholes. This risk can be mitigated by a combination of raising or constructing pressured manholes and by reducing underflows from CSOs 522, 198 and 518 to less than 3.5 times dry weather flow during severe wet weather events.

Project delays could occur due to delays in the acquisition of permanent and construction easements.

A detailed Project-Level Risk Register is available for the UMCI Replacement, Project ID 11530000.

Alternative 1 is the preferred alternative.

4.3.2 Other Alternatives
A value engineering study, West Branch Muddy Creek CSO Watershed Planning, August 2011 was performed as part of the West Branch Muddy Creek Project Bundle (Note: Office of Director has not yet reviewed and accepted the VE recommendations) and proposed Alternative R-26 as an alternative to the recommended alternative. This alternative would combined the high-rate treatment facilities at CSOs 522 and 198 and the proposed storage tank at CSO 518 in one location and replace a portion of the UMCI with a 10-foot diameter storage and conveyance tunnel. This alternative was subsequently rejected by the HNTB team because it did not provide service for separate sanitary sewers tributary to the UMCI and was calculated to have an initial cost of about $15M higher than the recommended alternative.

A complete evaluation of all alternatives evaluated can be found in the 3WBMU – West Branch Muddy Creek Project Bundle, Task 304J1, Alternative Analysis Report.
### Section 4.4 Summary Comparison of Alternatives

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<td>$1,833 per linear foot of sewer replaced and underflow controlled.</td>
<td>NPV: $31,761,000</td>
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<td>Repair/Replace defective sections</td>
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**Notes:**
1. *Maintenance cost of $1.45 per linear foot assumed for gravity sewers.*
Section 4.5 Recommendation

The recommended alternative is to replace the upper Muddy Creek Interceptor from CSO 522 to CSO 198 with a new 30-inch diameter interceptor and replace the interceptor from CSO 198 to the oxbow in Muddy Creek with a 36-inch diameter interceptor.

This alternative will:
   a) Replace all of the existing sewer segments greater than 77 years old;
   b) Require a PTI from OEPA due to greater than 1,000 feet in length and a size increase;
   c) Require new easements (temporary and permanent);
   d) Generate ERC credits for rehabilitation of deteriorated sewers in riparian areas;
   e) Not violate any MSDGC minimum standards listed in the Rules and Regulations;
   f) Eliminate SSO 1061, up to a 10-year, 24-hour design event;
   g) Prevent the need to temporarily relocate the interceptor to accommodate the footprint of the Werk & Westbourne High-Rate Treatment Facility;
   h) Eliminate surface failures within the project limits and not increase existing downstream overflows during a 2-year, 24-hour event;
   i) Provide dynamic underflow control at CSOs 522, 198 and 518; and
   j) Provide new sanitary sewer along Picwood Road.
Section 5 – Execution Plan

Section 5.1 Budget

5.1.1 Cost Estimate
A planning level (class IV) estimate was completed for the recommended alternative by the MSDGC cost-estimating group:

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Right-of-way costs have been provided by Project Delivery’s Right-of-Way Section.

5.1.2 Legislative History
The project was legislated under CIP 11530000 for design, project administration, miscellaneous expense and right-of-way for 2012.

5.1.3 Proposed Legislation and Funding Sources
This project is funded as a capital improvement project and credited as an urgent capacity project to be revised in the 2012 CIP. It is recommended for design in 2012 and 2013, and construction starting in 2014. To ensure the interceptor is relocated prior to the start of construction of the Werk & Westbourne EHRT facility, the interceptor construction may begin in 2013.

This project is a candidate for the WPCLF program.

Section 5.2 Schedule

There are no stipulated penalties associated with the project; however, there is a stipulated penalty for the Werk & Westbourne EHRT facility. Therefore, this project must be finished and commissioned by late 2016, so that the commissioning of Werk & Westbourne EHRT facility will not be delayed.
Proposed schedule is as follows:

| Project Turnover: | 2012 |
| Design: | 2012-2014 |
| Easements: | 2012-2014 |

To ensure that the interceptor is relocated prior to the start of the Werk & Westbourne EHRT facility, the interceptor construction may commence in 2013. Also the construction could be phased if easement acquisition would delay the entire project.

The federally mandated milestones for the Werk & Westbourne EHRT facility are as follows:
- PTI Submittal – 12/31/13
- Start Construction – 12/31/14
- End Construction – 12/31/17

**Section 5.3 Scope**

5.3.1 Summary of Project Scope
This project is to replace the existing upper portion of the Muddy Creek Interceptor with a new 30- and 36-inch diameter interceptor in a new alignment. This project will install dynamic underflow control (DUC) on CSOs 522, 198 and 518. Detailed description of the project is contained in the Conceptual Design Report, Task 311, Final Rev. 1, December 2010, as Projects 10 and 23, pages 6-13, 14, 30 and 31.

5.3.2 Functional Requirements and Design Basis

**Design Criteria**
The system is designed to convey a 2-year wet weather event without surcharging. The peak flow in the 36-inch section for this event is 32.56 MGD with DUC limiting underflow from CSOs 522, 198 and 518 to 3.5 times dry weather flow. Further DUC will eliminate SSO 1061 during any storm event. Until the Muddy Creek Basin Storage and Conveyance Sewer is in operation, peak flows from the UMCI can be reduced by further DUC, in order to not increase existing overflow conditions in the lower section of the Muddy Creek Interceptor.

Additional flow from any future build-out would be insignificant compared to the 2-year, 24-hour flow. HSTS priority areas were considered in the 3WBMU planning and would not generate significant flow compared to the 2-year, 24-hour flow.

**Alignment and Depth of Sewer**
The proposed alignment is along Westbourne Drive and Muddy Creek Road. The deepest manhole will be approximately 40 feet deep.

**Easement Requirements**
Temporary and/or permanent easements will be required on approximately 53 parcels from 48 different owners.

**Permits Anticipated**
A street-opening permit will be required from Hamilton County and a Permit-to-Install will be required from OEPA. A nationwide or individual permit will also be required from US Army Corps of Engineers for the creek crossings and construction within the riparian areas.
**Temporary Bypass Plan**

Bypass pumping will be required for several segments of the project. There is a risk that large wet weather events during bypass pumping could increase wet weather overflows at CSOs 522, 198 and 518 and cause overflows from manholes onto Westbourne Drive and Muddy Creek Road. Moving the bypass pumping as construction progresses may also increase construction time. It is required that the construction contractor develops and submits a temporary bypass plan (CTBP) for each segment of the project requiring bypass pumping.

**5.3.3 Work Performed in Planning/Anticipated Work in Design**

**Utility Information**

OUPS was contacted for the study phase of the project and drawings provided by member utilities. A Level 3 Telecommunications line was discovered and is shown on the preliminary drawings. OUUPS should be contacted during design to have all utilities marked in the field and surveyed.

**Survey and Fieldwork**

A detailed survey will be required during the design phase of the project. Due to the large area, an aerial LiDAR (Light Detecting And Ranging) survey is recommended.

**Geotechnical**

Geotechnical investigation was not performed as part of this supplemental planning effort. Some geotechnical work was performed as part of the 3WBHU – West Branch Muddy Creek Project Bundle. Additional soil borings are recommended as part of the design process at every 500 feet along the proposed alignment.

**Monitoring and Modeling**

Modeling was completed and determined the 30- and 36-inch diameter pipe is sized correctly for a 2-year level of service, based upon completion of the recommended West Branch Muddy Creek Project Bundle as presented in the Conceptual Design Report, Task 311, Final Rev. 1, December 2010. Dynamic underflow control is required to limit the underflows from CSOs 522, 198 and 518 into the interceptor to 3.5 times dry weather flow. During more severe wet weather events, modeling of the 2-year, 5-year and 10-year events confirmed that the dynamic underflow controls will further reduce the underflows from the CSOs in order to maintain capacity for the separate sanitary sewer flows and eliminate SSO 1061. Also, until the Muddy Creek Basin Storage and Conveyance Sewer (identified as the Hillside Conveyance Sewer and Storage Tunnel in the Conceptual Design Report) is in operation, the dynamic underflow control will reduce the underflows from the CSOs, in order to not increase existing overflows along the Muddy Creek Interceptor downstream of the project limits.

**Environmental Site Assessment**

No formal environmental site assessment was performed during planning. Site visits showed no signs of discolored soils or stressed vegetation. A Phase I environmental site assessment will be required during design on all properties requiring easements. A list of properties based upon the conceptual alignment of the interceptor has been provided.

**Miscellaneous Reports, Studies, Analysis, etc.**

The recommended alternative consists of projects from the West Branch Muddy Creek Project Bundle (Project 10 and Project 23). The complete alternative analysis and recommendations can be found in the Alternative Analysis Report, Task 304J, Final Rev. 0, May 2010, pages 7-1 through 7-17, 8-1 through 8-10 and 9-1.
Section 5.4 Roles and Responsibilities

The Technical Review Committee for the planning effort consisted of the following individuals:

- Rob Kneip – Supervising Engineer, Project and Business Development/Strategic Asset Planning
- Tom Crawford – Principal Engineer, Project & Business Development/Strategic Asset Planning
- Tom Schwieters – Superintendent, Project and Business Development
- Matt Spidare – Senior Engineer, Project and Business Development/Strategic Asset Planning
- Mark Belclik – Principal Engineer, Project Delivery/Engineering and Quality Assurance
- Pat Arnette – Principal Engineer, Project Delivery/Project Management and Construction
- Bill Wooton – Supervising Engineer, Project Delivery/Project Management and Construction
- Todd Trabert – Engineer Intern, Wastewater Collection
- Bill Lutz – Supervising Engineer, Project Delivery/Engineering and Quality Assurance
- Randy Schneider – Engineer Intern, Wastewater Collection
- Len Bauer – Supervising Engineer, Project Delivery/Project Management and Construction
- Mike Ryan – Staff Supplementation, Project Delivery/Project Management and Construction

Since this is a replacement of a major interceptor sewer, the responsibilities belonging to the Wastewater Collections Division will not change. Wastewater Collections Division has agreed to the replacement of the sewer and did not have any comments when presented at the February 7, 2012 monthly coordination meeting with Project and Business Development. Since the DUC concept is relatively new to MSDGC, additional coordination with Wastewater Collections Division will be needed during the design phase of the dynamic underflow control system.

MSD Project delivery will complete the design and oversee construction.

Section 5.5 Project Risks

5.5.1 Easements
Temporary and/or permanent easements will be required on approximately 53 parcels from 48 different owners. One or more property owners may object to the easements and cause a delay in construction. Meetings with the property owners should start as early as possible in the design phase.

5.5.2 Timely Review of Project Deliverables
Delays in the review of project deliverables could cause a delay in the start of construction.

5.5.3 OEPA Review Requires Substantial Changes to Design
Untimely OPEA review for Permit-to-Install may require substantial changes to the design. Early OPEA meetings to discuss the project will be required.

5.5.4 Draining HRT and Storage Facilities
Draining of EHRT and storage facilities may overload the Muddy Creek Pump Station in dry weather, requiring an increase to the pump station capacity.

5.5.5 Wet Weather Flows
Until the Muddy Creek Basin Storage and Conveyance Sewer is constructed, there will be an interim risk of hydraulically overloading the lower section of the Muddy Creek Interceptor, resulting in overflowing manholes. This risk can be mitigated by a combination of raising or constructing...
pressed manholes and by reducing underflows from CSOs 522, 198 and 518 to less than 3.5 times dry weather flow during severe wet weather events. Unanticipated large wet weather events during bypass pumping could cause sewer backups (SBU) and possible overflows from manholes onto Muddy Creek Road and Westbourne Drive and into Muddy Creek.

5.5.6 Geotechnical
Harder than anticipated rock or shallower rock may be encountered during construction. The risk can be reduced during design by conducting additional soil borings to get an accurate rock profile.

5.5.7 Noise, Odor and Traffic
Due to the depth of the sewer along Muddy Creek Road, traffic disruption along Muddy Creek Road and Westbourne Drive during construction may occur.

5.5.8 Construction Safety
Open-trench construction will be involved during construction. The contractor job site safety meetings and onsite training will be required.

5.5.9 Trench Dewatering
Due to the depth of the sewer along the Muddy Creek trench dewatering may be required. This risk will be mitigated by additional geotechnical drilling along the proposed alignment and inclusion of the cost of dewatering in those areas identified.

5.5.10 Failure to Meet Stipulated Completion Date of Werk & Westbourne EHRT
There is a risk of schedule delay on the Werk & Westbourne EHRT construction if the Muddy Creek Interceptor is not relocated from outside the proposed footprint of the Werk & Westbourne EHRT by March 2014.

5.5.11 Project Risk Register
A detailed project risk register has been developed which includes the above-discussed risks and other additional risks, and contains risk ratings.
Section 6 – MSD Review Signature Sheet

Nominator/Operating Division:

Concurrence:  

Mike Pittinger, Sewers Chief Engineer  [Date]  

Project and Business Development:

Concurrence:  

Rob Kneip, Supervising Engineer  [Date]  

Concurrence:  

Tom Crawford, Principal Engineer  [Date]  

Approval:  

Tom Schwiers, Sewers Chief Engineer  [Date]  

Project Delivery:

Concurrence:  

Pat Arnette, Branch Manager  [Date]  

04/18/2012  
MSDGC DC RCVD 4/19/2012 3:38 PM
# Summary of Cross-Functional Core Team Meeting Held on April 17, 2012

MSD's Cross-Functional Core Team approved the BCE recommendation.

A list of CFCT Members present at the meeting and how the member voted is as follows:

<table>
<thead>
<tr>
<th>CFCT Member, Job Title</th>
<th>Approve</th>
<th>Approve with Conditions</th>
<th>Request Additional Information</th>
<th>Reject</th>
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<tr>
<td>Leisha Pica, EM</td>
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<td>Tom Schwiers, PBD</td>
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<td>MaryLynn Lodor, EP</td>
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<td>Ralph Johnstone, PD</td>
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<td>Christopher T. Hall, DIW</td>
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<td>Jack Rennekamp, Legislation</td>
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<td>Mike Pittinger, WWC</td>
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<td>Don Linn, WWT</td>
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A summary of the major comments from the CFCT and MSD's action items is as follows:

<table>
<thead>
<tr>
<th>CFCT Member</th>
<th>Comment</th>
<th>MSD Action Item</th>
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</table>

04/18/2012
Section 8 – Major References

The following documents can be found at [WWE\Planning\Projects\11530000 Upper Muddy Creek Interceptor Replacement]:

Cost Estimates
TBL Social and Environmental Score Sheets
Risk Register
APPENDIX A

SHEET NOS. 10A - 10F
PROJECT 10 MUDDY CREEK INTERCEPTOR UPSIZING
Appendix B – April 3, 2012 CFCT Proposed BCE Reformattting Suggestions

1. **What are the related projects, both predecessor and successor projects and what is their timing if known?**
   
   There are eight (8) known related projects. They are as follows:
   
   
   b) Muddy Creek @ Westbourne EHRT (10130700) – Phase 2 WWIP Project (After 2018)
   
   c) CSO 518 Improvements (10130720) – Phase 2 WWIP Project (After 2018)
   
   d) Stonebridge Apts Sewer Study (12230045) and associated adaptive projects – In Planning
   
   e) Lower Muddy Creek Interceptor SSO Remediation (12230002) – In Planning
   
   f) Muddy Creek Basin Storage & Conveyance Sewer (10130000) – Phase 2 WWIP Project (After 2018)
   
   g) Muddy Creek Pump Station Upgrade (10130160) – Phase 2 WWIP Project (After 2018)
   
   h) West Branch Ohio River Interceptor (10131120) – Phase 2 WWIP Project (After 2018)

2. **What type of intergovernmental construction coordination will be necessary, why is it needed and when is it needed? (example, ODOT, DOTE, Public Works, Parks, CRC, Jurisdictional Agencies)? If there is not any coordination identified, then state so.**

   Intergovernmental coordination will be necessary with Green Township and Hamilton County Engineer’s Office pertaining to traffic control.

3. **Statement that the current version of the Financial Analysis Manual, dated March 2011 (Revision 0), was used. A 25-year life cycle analysis was conducted.**

   The most current version of the Financial Analysis Manual, dated March 2011 (Revision 0), was downloaded from the MyMSD Estimating SharePoint site and used for this project. A 25-year life cycle cost analysis was conducted.

4. **What is the bigger picture and how does this BCE fit in it?**

   Although part of this project is identified in the 2010 Revised Final WWIP for construction in Phase 2 (after 2018) as the CSO 518 Muddy Creek Conveyance Sewer (10130040), the project in its entirety was identified and analyzed with the West Branch Muddy Creek Bundle (10130001) planning effort. This project contributes to meeting the objectives of the West Branch Muddy Creek Bundle (10130001) as well as integrates with the current Werk & Westbourne EHRT Facility (10130740) plan and facility location. This project replaces a failing sewer that was constructed in 1929 and 1935 and is reaching the end of its useful service life. Therefore, the means to adequately convey wastewater to the Muddy Creek Pump Station and to eliminate unenumerated SSOs along the Muddy Creek Interceptor while the Ohio River is at pool stage is provided.
5. What are the hot button points or unique characteristics with the BCE that the CFCT needs to know? (this can relate to the ‘quadruple’ bottom line, if known)

The Upper Muddy Creek Interceptor Replacement project (11530000) includes the following (see Figure 3 in the BCE):

a) Replacement of the Muddy Creek Interceptor between CSO 522 and CSO 198 (Asset Mgmt).

b) Replacement of the Muddy Creek Interceptor between CSO 198 and the oxbow in Muddy Creek (WWIP). This is in the 2010 Revised Final WWIP as ‘CSO 518 Muddy Creek Conveyance Sewer (10130040).’

c) Dynamic Underflow Control (DUC) at CSO 522, CSO 198, and CSO 518.

d) Replace ~300 LF of sewer in an effort to eliminate SSO 1061.

The portion of the project described in a) above is a WWIP Phase 2 construction project and is requested to be brought forward from Phase 2 of the WWIP. The group formerly known at the PAC approved moving forward with planning and design on a) and b) above during a vote at a PAC meeting on February 11, 2010 for the West Branch Muddy Creek Bundle (10130001).

Via an email on October 7, 2011, Ms. Leisha Pica recommended that a), b), and d) be placed in the CIP book in 2012 for design and 2014 for construction. The DUC in c) was added to the Upper Muddy Creek Interceptor Replacement Project (11530000) to improve the function of the proposed interceptor.

It is currently not understood by the project the impact of the above due to the request by the Board of County Commissioners in their December 21, 2011 adoption of the resolution requesting MSD obtaining Board approval before proceeding with the planning, design, or construction of any WWIP project (a) which varies from the scope of that identified in the WWIP or (b) when a WWIP project is shifted from one phase of the WWIP to another phase of the WWIP.
### Metropolitan District of Greater Cincinnati
Cross Functional Core Team (CFCT) Voting Summary Sheet

<table>
<thead>
<tr>
<th>Project Name: Upper Muddy Creek Interceptor Replacement</th>
<th>Meeting Date/Time: 5/1/12, 10:30 AM</th>
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</thead>
<tbody>
<tr>
<td>Project ID: 11530000</td>
<td>Location/Room: Room 105 MSD Administration Building</td>
</tr>
</tbody>
</table>

**Question presented to the CFCT:** Does the CFCT approve moving forward with construction of the Upper Muddy Creek Interceptor Replacement project consistent with the approved 2012 CIP Book (including shifting a project from Phase 2 of the WWIP to Phase 1 of the WWIP)?

<table>
<thead>
<tr>
<th>Voting CFCT Member (or representative)</th>
<th>Division</th>
<th>Vote</th>
<th>Signature</th>
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<tbody>
<tr>
<td>Tom Schwiers</td>
<td>PBD</td>
<td>✔</td>
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<td>Ralph Johnstone</td>
<td>PD</td>
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<td>OOD Enterprise Management</td>
<td>✔</td>
<td>(Signature)</td>
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<tr>
<td>Mary Lynn Lodor</td>
<td>OOD Environmental Programs</td>
<td>✔</td>
<td>(Signature)</td>
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</tbody>
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If “Other,” specify: Mitigation techniques for stream/land shadow impacts of crossing alignment

Revised permitting & community engagement risk.