

# Lower Mill Creek Partial Remedy Alternatives Evaluation Preliminary Findings Report

## OVERVIEW



In its negotiations with Regulators to meet requirements of a federal Consent Decree (see box), MSD sought the opportunity to study a sustainable solution as an alternative to a tunnel originally proposed as the default solution. MSD negotiated time to refine the tunnel design and develop updated cost estimates; and to develop a source control alternative approach that achieves equal or greater control of CSO annual volume as the default and can be completed by the end of Phase 1. For more than 2 years, MSD has extensively evaluated both options under consideration for the Lower Mill Creek Partial Remedy (LMCPR). The Alternatives Evaluation Preliminary Findings Report provides the technical, economic, and feasibility analysis of the options including findings related to alternative analysis, costing, water quantity, and water quality. Findings must be submitted to the Regulators by December 31, 2012, and MSD is actively seeking community input on the alternative that is preferred for recommendation to the federal agencies.

Under Phase 1, the original default tunnel concept had to be revised to overcome constructability and safety concerns. MSD has taken the tunnel concept a step further and identified the cost-effective grey project that would be built today. At the same time, MSD has advanced a detailed planning and design for source control approach that is conducive to integrated watershed planning. Phase 1 alternatives were developed by selecting suites of projects from each concept that would meet the 2.0 billion gallon CSO volume reduction goal for the least life cycle cost.

### Phase 1 - Grey Alternative

Both Phase 1 alternatives include the four existing real-time control (RTC) facilities and recently completed West Fork Channel grate modifications. The Phase 1 Grey Alternative is comprised of a 25-foot diameter deep tunnel extending to CSO 14 (Station Avenue, just south of the confluence of West Fork Channel and Mill Creek); an 84 million gallon per day (mgd) deep tunnel pump station; and an 84 mgd enhanced high rate treatment (EHRT) at the Mill Creek Wastewater Treatment Plant.

### Phase 1 – Sustainable/Hybrid Alternative

MSD has focused on leading with source control and removal of stormwater from the combined sewer system cost effectively and strategically to advance CSO reduction and community goals. By strategically separating sewers, MSD can prioritize significant opportunities to remove stormwater from the combined sewer system. Using best management practices, stormwater can be returned to the natural environment, peak flows and volumes can be managed, and water quality can be improved. USEPA has been actively engaging MSD during the analysis, and has acknowledged that the source control approach aligns with USEPA's integrated watershed planning approach. USEPA has indicated that the primary means of determining if green control measures are equivalent to a planned grey infrastructure control measure will be model runs.

#### What is the CONSENT DECREE?

In the late 1990s, increased scrutiny from the U.S. Department of Justice and U.S. Environmental Protection Agency brought the issue of combined sewer overflows (CSOs) to the forefront, and enforcement action was leveled against large cities out of compliance with the Clean Water Act, including MSD. In 1999, MSD, which had already begun addressing the elimination of its SSOs and reducing CSOs, entered into negotiations with the agencies to establish a formal remediation program that would be recognized and supported by the government, but also was affordable for local ratepayers. The resulting agreement is called the Consent Decree. It mandates that MSD capture, treat, or remove 85% of the 14 billion gallons of CSOs and eliminate all sanitary sewer overflows (SSOs), about 100 million gallons. More about the Consent Decree is at [http://msdgc.org/consent\\_decree/](http://msdgc.org/consent_decree/)

View the full Alternatives Evaluation Preliminary Findings Report at  
[www.projectgroundwork.org/projects/lowermillcreek/community.htm](http://www.projectgroundwork.org/projects/lowermillcreek/community.htm)



The Phase 1 Sustainable/Hybrid Alternative consists of sustainable infrastructure projects in Lick Run, West Fork Channel and Kings Run, including large-scale sewer separations, stormwater detention basins, naturalized and new channels, stream restoration and combined storage; a RTC facility in Bloody Run; and a 2.0 million gallon combined storage facility for CSO 488. The Phase 1 Sustainable/Hybrid Alternative is very flexible, as it enables the selection of a sustainable option or a hybrid option for Phase 2.

Phase 1 Benefit	Grey Alternative	Sustainable/Hybrid Alternative
Phase 1 achieves > 2 billion gallons CSO reduction	✓	✓
Fewer assumptions in modeled results	✓	
Higher volume flow treated at WWTP or EHRT	✓	
More operational flexibility for interceptor maintenance	✓	
Accommodates multiple solutions for Carthage & SSO 700	✓	
Surface improvements and increased public acceptance		✓
Opportunity to leverage private/public funding		✓
Construction jobs available for local workforce & SBEs		✓
Less purchased energy		✓
Flexibility for future long-term decision making		✓
Water quality improvements	✓	✓
Brownfield remediation		✓
Repurposing of land		✓
Reduction in wet weather volume to WWTP		✓
Right-size Phase 2 infrastructure		✓

Phase 1 Risk	Grey Alternative	Sustainable/Hybrid Alternative
Long-term solution not adaptable	X	
Complex construction methods	X	
Limited local construction participation	X	
Higher energy demand & cost	X	
Larger carbon footprint	X	
Additional assumptions for modeling		X
Potential future stormwater regulations	X	X
Future NPDES regulations	X	X
Potential large variance with cost for tunnel construction	X	

## Phase 2

For the formal LMC Study submittal to USEPA, a detailed Phase 2 plan is not required. However, any alternative submitted must be able to reasonably fit into a long-term concept. MSD developed LMC Final Remedy concepts for each alternative considered for comparison purposes. The specific projects to be proposed in Phase 2 must be submitted to USEPA by December 31, 2017. Highlights of Phase 2 include a tunnel from CSO 14 to Mitchell Avenue (CSO 482), 20 million gallon combined storage in Bloody Run, 67 mgd EHRT for Wooden Shoe (CSO 217), and upper watershed storage and partial separations.

Alternative	Key Characteristics
Grey Alternative	<ul style="list-style-type: none"> <li>Highest Phase 1 cost</li> <li>Lowest cost to achieve 85% at every CSO</li> <li>Least adaptive</li> <li>Least deviation from existing approved WWTP</li> <li>Provides more alternatives for Carthage and SSO 700 solutions</li> </ul>
Sustainable Option	<ul style="list-style-type: none"> <li>Lowest Phase 1 Cost</li> <li>Lowest Total Capital Cost</li> <li>Lowest WWTP O&amp;M Cost</li> <li>Community Based</li> <li>Lowest overall CSO control</li> </ul>
Hybrid Option	<ul style="list-style-type: none"> <li>Lowest Phase 1 Cost</li> <li>Highest Overall Capital Cost</li> <li>Provides more alternatives for the Carthage and SSO 700 Solutions</li> <li>Achieves 85% control at every CSO</li> </ul>

PHASE 1	Grey Alternative	Sustainable/Hybrid Alternative
Lick Run Watershed	\$ -	\$ 195,449,000
West Fork Watershed	\$ -	\$ 73,503,000
Bloody Run Watershed	\$ -	\$ 3,421,000
Kings Run Watershed	\$ -	\$ 34,423,000
CSO 488 Storage	\$ -	\$ 10,651,000
Tunnel	\$ 312,671,000	\$ -
Consolidation Sewers	\$ 88,927,000	\$ -
Tunnel Pump Station & EHRT	\$ 135,811,000	\$ -
<b>Total</b>	<b>\$ 537,409,000</b>	<b>\$ 317,447,000</b>

PHASE 2	Grey Alternative	Sustainable Option	Hybrid Option
Denham Watershed	\$ -	\$ 58,181,000	\$ -
Ludlow Run Watershed	\$ -	\$ 33,727,000	\$ -
Bloody Run Watershed	\$ -	\$ 83,526,000	\$ 58,305,000
Upper Watersheds Part Septs	\$ 74,768,000	\$ 29,345,000	\$ 45,104,000
EHRT & Storage Facilities	\$ 186,568,000	\$ 25,813,000	\$ 25,813,000
Carthage EHRT	\$ 65,979,000	\$ 65,979,000	\$ 65,979,000
Regulator Improvements	\$ 15,918,000	\$ 15,918,000	\$ 15,918,000
Tunnel Pump Station & EHRT	\$ -	\$ -	\$ 135,811,000
Tunnel	\$ 218,130,000	\$ -	\$ 414,584,000
Consolidation Sewers	\$ 83,123,000	\$ -	\$ 165,718,000
<b>Total</b>	<b>\$ 644,486,000</b>	<b>\$ 312,489,000</b>	<b>\$ 927,232,000</b>
<b>TOTAL LMCFR</b>	<b>\$ 1,181,895,000</b>	<b>\$ 629,936,000</b>	<b>\$ 1,244,679,000</b>

### Your Input is Encouraged!

MSD encourages you to view the full Lower Mill Creek Alternatives Evaluation Preliminary Findings Report at [www.projectgroundwork.org/projects/lowermillcreek/community.htm](http://www.projectgroundwork.org/projects/lowermillcreek/community.htm). You may submit feedback by contacting MSD Engineering Customer Service at (513) 557-3594 or [MSD.Communications@cincinnati-oh.gov](mailto:MSD.Communications@cincinnati-oh.gov).