



DWSD Wholesale Customer Rates Meeting Sewage Disposal System

Meeting #1 – Capital Improvement Program Summary

October 20, 2011

The Sewer System's investment in capital improvements has varied over the years

- During the 1990s, DWSD invested approximately \$730 million (~\$73 million annually) in capital improvements to the sewer system
- During the 2000's, the corresponding figure is \$2.49 billion (~\$249 million annually)
- Estimated figures for FY's 2012-2016:
 - 2003 Master Plan = \$1.88 billion (\$376 million per year)
 - 2008 CIP = \$1.61 billion (\$323 million per year)
 - 2010 CIP = \$730 million (\$146 million per year)
 - 2011 CIP = \$572 million (\$114 million per year)



The CIP contains projected expenditures for a 5-year period, but rates provide funding for the first two years

- For the July 2011 CIP, the plan presents projected expenditures for FYs 2012 through 2016
- The financing plan for the FY 2013 rates will focus on requirements for FYs 2012 and 2013
- The “Funded” portion of the CIP consists of FYs 2012 and 2013 (the first two years of the CIP)
- The CIP also denotes remaining projected expenditures beyond the five years
 - This column often reflects projects that have been deferred pending additional review



The 5-year CIPs total approximately \$1.1 billion of projected expenditures, approximately half of which is in the “Funded” portion (*\$ millions*)

	Water Supply System	Sewage Disposal System	DWSD Total
FY 2011-12	90.97	125.56	216.53
FY 2012-13	142.79	145.14	287.94
Subtotal “Funded”	233.76	270.70	504.47
FY 2013-14	137.72	137.10	274.82
FY 2014-15	98.61	106.38	204.99
FY 2015-16	85.93	57.50	143.42
Total 5-year CIP	556.02	571.69	1,127.70
Remaining beyond 2016	167.14	36.68	203.82
Total CIP	723.16	608.37	1,331.53

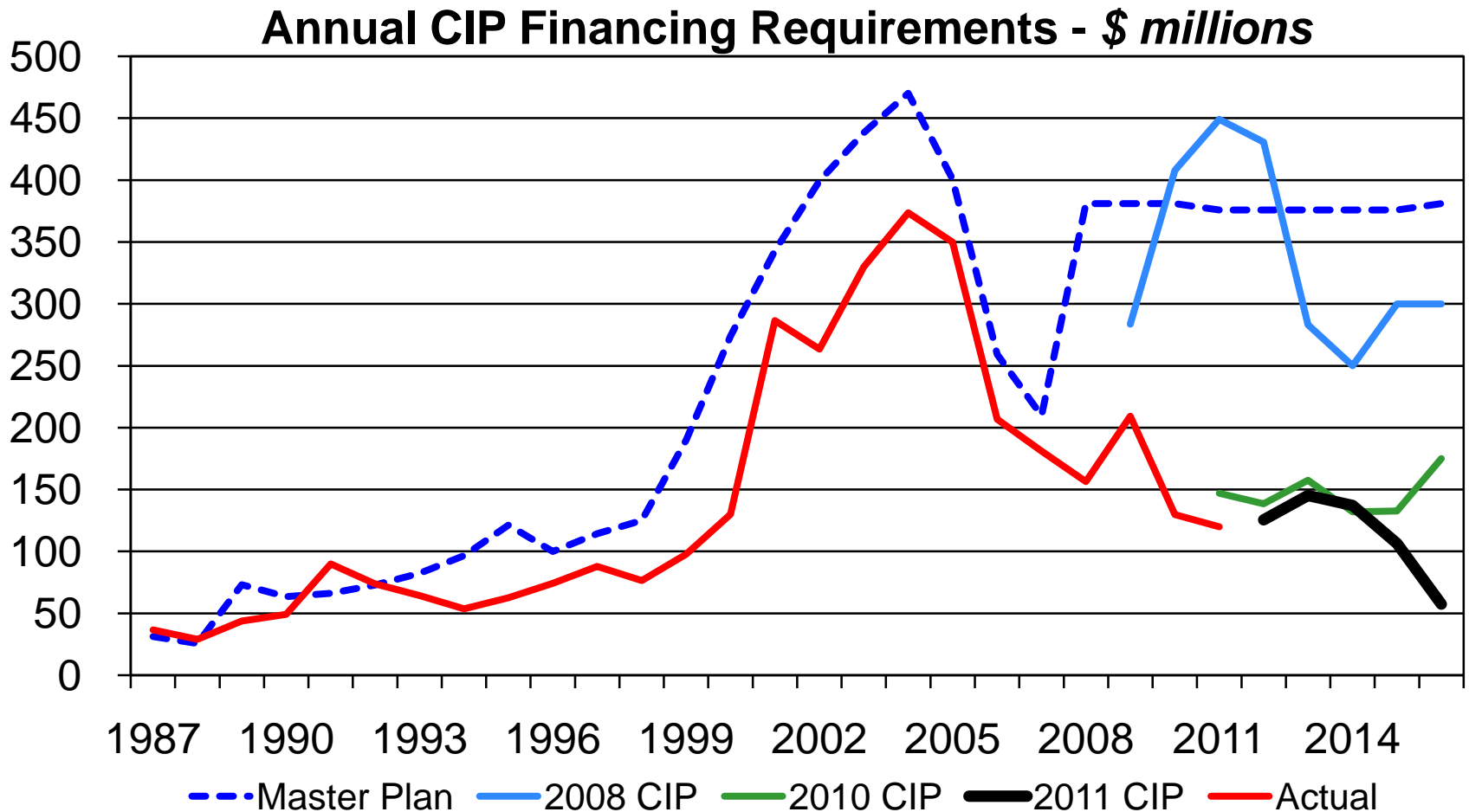


The CIP reports categorize projects based on their “Active” status

- **ACTIVE Projects:**
 - Work is underway – the CIP contains projected expenditures necessary to complete these ongoing projects
- **UNDER PROCUREMENT Projects:**
 - Project is about to begin. A DRMS number (accounting code) has been assigned, but notice to proceed has not yet been issued
- **NEW Projects:**
 - Project proposal has been approved but procurement process has not yet been initiated

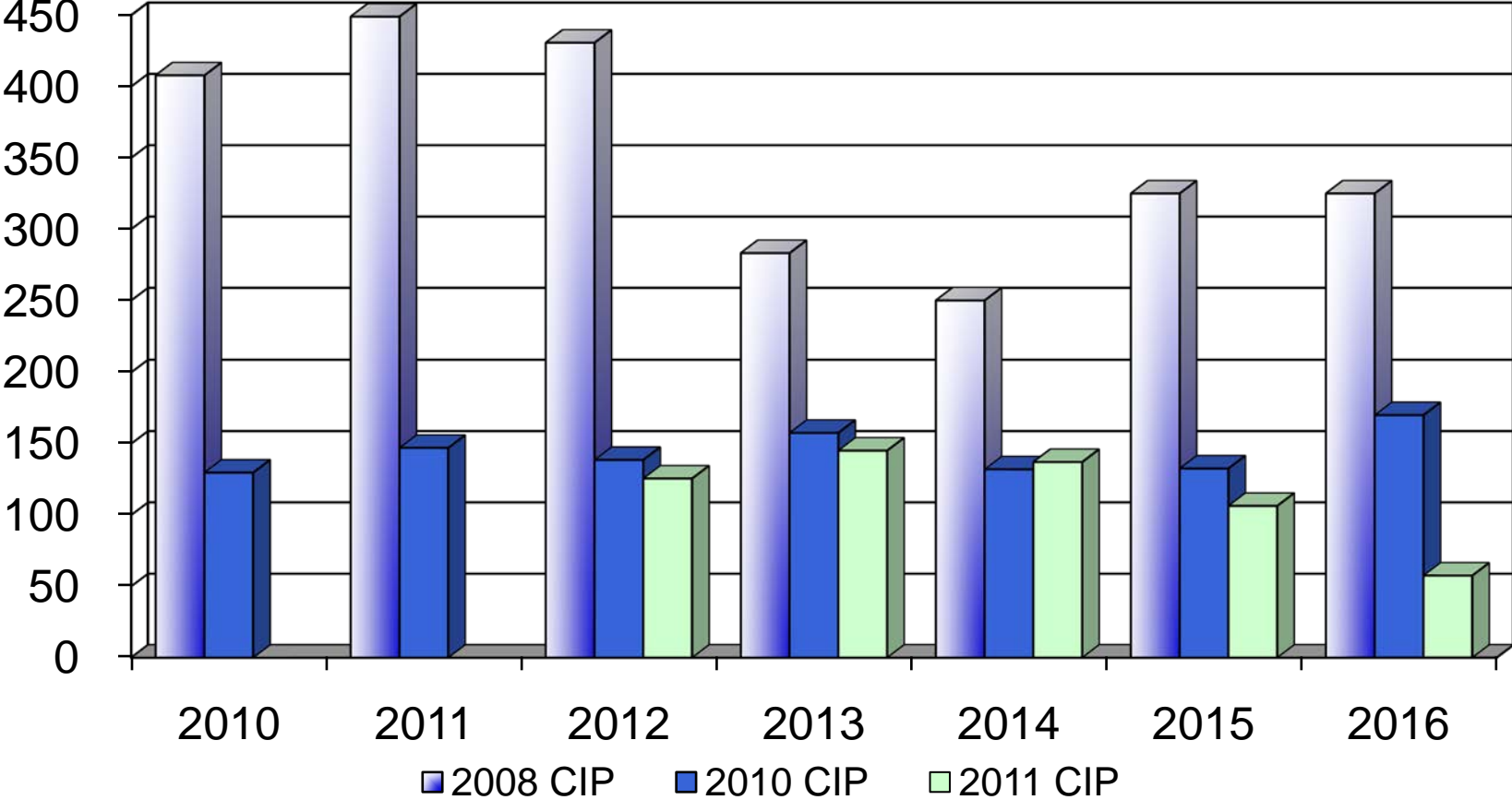


The 2003 Sewer Master Plan identified an aggressive CIP, which has been modified recently to reflect more reasonable expectations



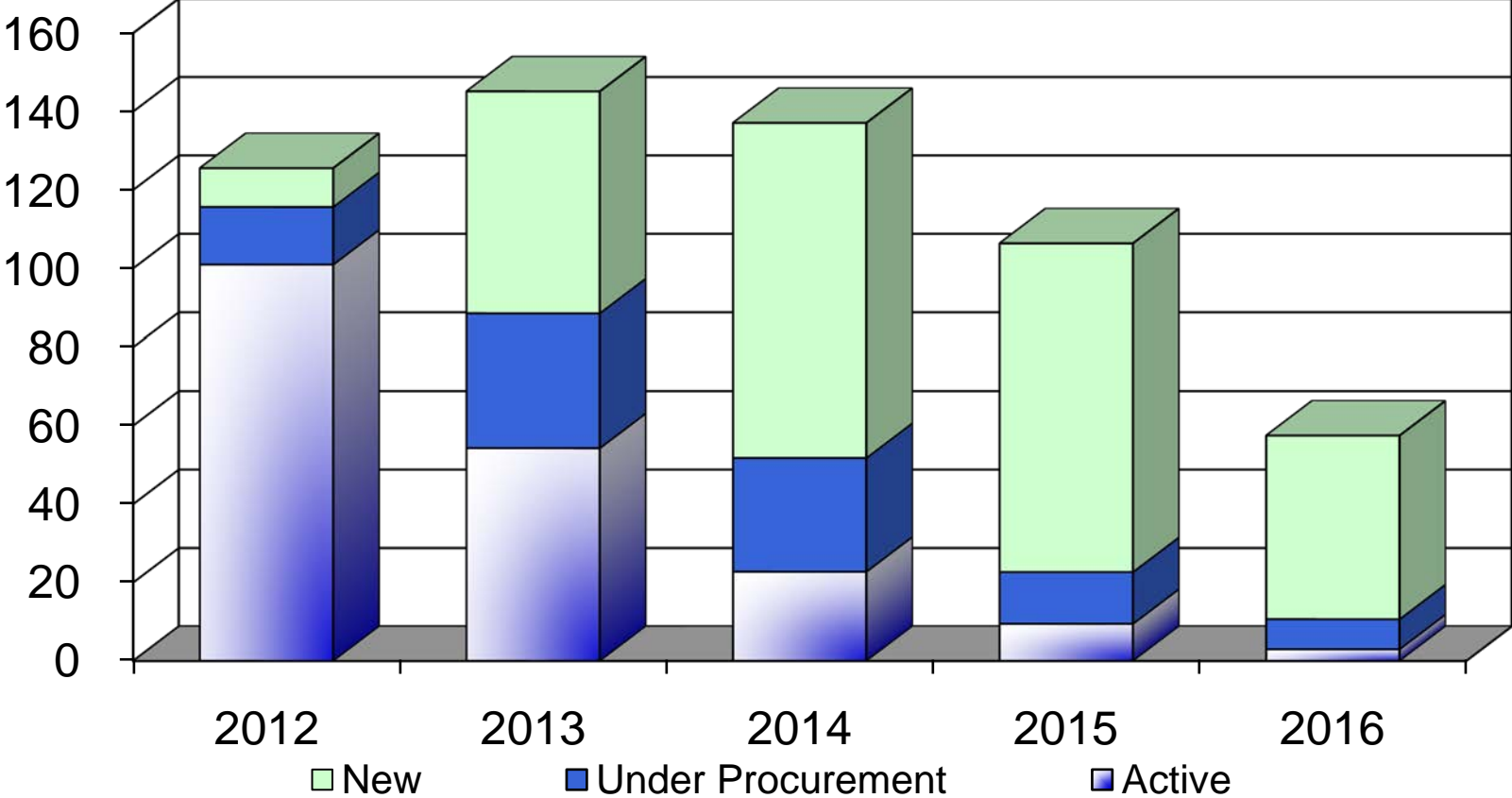
Starting with the July 2009 CIP, DWSD reduced and/or deferred several major Capital Improvement Program projects

Annual CIP Financing Requirements - \$ *millions*



As you would expect, the early years of the Sewer CIP are focused on ACTIVE projects, and the out years on NEW projects

Annual CIP Financing Requirements - \$ millions



The CIP report contains criteria designed to identify project purpose and allocation status

- Criteria in Report
 - Primary Project Purpose
 - 1 – Directly Mandated for Regulatory Compliance
 - 2 – Necessary for Regulatory Compliance Mandates
 - 3 – System Reliability
 - 4 – Technological Advance / Efficiency
 - 5 – New Service Areas
 - Allocation Status
 - D - Detroit Only
 - S - Suburban Only
 - OMI - Oakland Macomb Interceptor District Only
 - 83/17 - New Wet Weather Facilities
 - CTA - Common to all



The Sewer CIP addresses the short, mid, and long term goals of the CAP

- Efforts at the WWTP are largely focused on permit compliance and equipment rehabilitation
- The capital cost estimate for the “Long-Term Biosolid Disposal Alternative” project has been reduced from \$400 million in prior CIP to ~ \$0
 - Anticipated that the selected alternative will involve investment by other entities
 - Impact on DWSD will be in the operating budget, not the CIP



DWSD is currently reviewing proposals for long term biosolids management (PC 781)

- In general, proposed solutions include:
 - Fluidized bed incineration with energy recovery
 - Anaerobic digestion
 - Land application and/or land fill
 - Drying and pelletizing
 - Rehabilitation of existing incinerators



DWSD is currently reviewing proposals for long term biosolids management (PC 781) – Status:

- Committee of 8 DWSD staff evaluating proposals
- Supported with expert financial and technical resources
- EPA regulation change expected 3rd quarter 2015
- DWSD discussing support building options prior to award



The Sewer CIP also addresses the other projects agreed to with State regulators

- The Rouge River Outfall #2 project
- The revised Long-Term CSO Control Plan
 - Work at Oakwood and Baby Creek facilities
 - Commitment to “Green Infrastructure Improvements” is reflected in the operating budget, not the CIP



DWSD responded to the Economic Crisis of 2008 by modifying capital plans

- Requested Permit Modification to adjust requirements based on financial capability;
- Terminated construction of \$1 Billion Upper Rouge CSO Tunnel and initiated evaluation of less costly CSO Control Measures to satisfy MDNRE's regulatory requirements and meet state Water Quality Standards;
- Terminated construction of \$300 Million Detroit River Outfall #2 project and evaluated less costly ways to provide disinfection and de-chlorination of all wet weather flows discharged from the wastewater plant.



DWSD's 2010 NPDES Permit Modification

- Established limitations and requirements for a new Rouge River Outfall (RRO-2) to provide disinfection and de-chlorination to all wet weather discharges from the wastewater plant, and to meet state Water Quality Standards in the receiving waters, and required DWSD to prepare a design report;
- Evaluate less costly CSO Control Options and prepare a recommended implementation schedule consistent with Detroit's financial capability



The CIP contains a new RRO-2 Outfall project

- Will provide disinfection and de-chlorination to all wet weather discharges from the wastewater treatment plant to the Rouge River and meet state Water Quality Standards;
- Estimated cost: ~ \$130 million (as compared to \$300 million for the terminated DRO-2 outfall);
- *Cost estimate is now \$150 million*
- Construct in 2 segments and complete design of Segment 1 by March 1, 2011;
- Complete construction and place outfall into service by October, 2018



The RRO 2 project has a complicated history

1997:	<ul style="list-style-type: none">■ DWSD decides to construct new Detroit River Outfall (DRO-2) and de-activate RRO■ Use existing chlorination/dechlorination facilities for both DRO-1 and DRO-2 outfalls
1999:	<ul style="list-style-type: none">■ Construction of deep rock DRO-2 tunnel started (PC-709)
2003:	<ul style="list-style-type: none">■ Project halted by flooding in April, 2003 with tunnel about 1/3 complete■ Contract subsequently terminated by DWSD



The RRO 2 project has a complicated history

2006:	<ul style="list-style-type: none">■ DWSD abandons deep rock tunnel; starts design on a shallow rock tunnel outfall■ Project to be built using State-of-the-Art “pressurized face” Tunnel Boring Machine to limit groundwater intrusion
2007:	<ul style="list-style-type: none">■ Design of modified DRO-2 tunnel project completed■ Pre-bid cost estimate = \$ 179 million
2008:	<ul style="list-style-type: none">■ Only one bid received for project: \$ 299 million■ DWSD awards PC-771 construction contract with low interest SRF loan assistance■ City experiences dramatic economic downturn after Wall St. collapse, GM & Chrysler bankruptcy



The RRO 2 project has a complicated history

2009:	<ul style="list-style-type: none">■ DWSD petitions MDEQ and Federal Court for modification of permit requirements based on financial constraints■ DWSD terminates PC-771 construction contract with concurrence of MDEQ and Court■ DWSD completes Feasibility Study of new Rouge River Outfall
2010:	<ul style="list-style-type: none">■ MDEQ modifies NPDES Permit to delete the requirement to build DRO-2 outfall■ DWSD begins design of new Rouge River Outfall using shallow conduit in lieu of tunnel

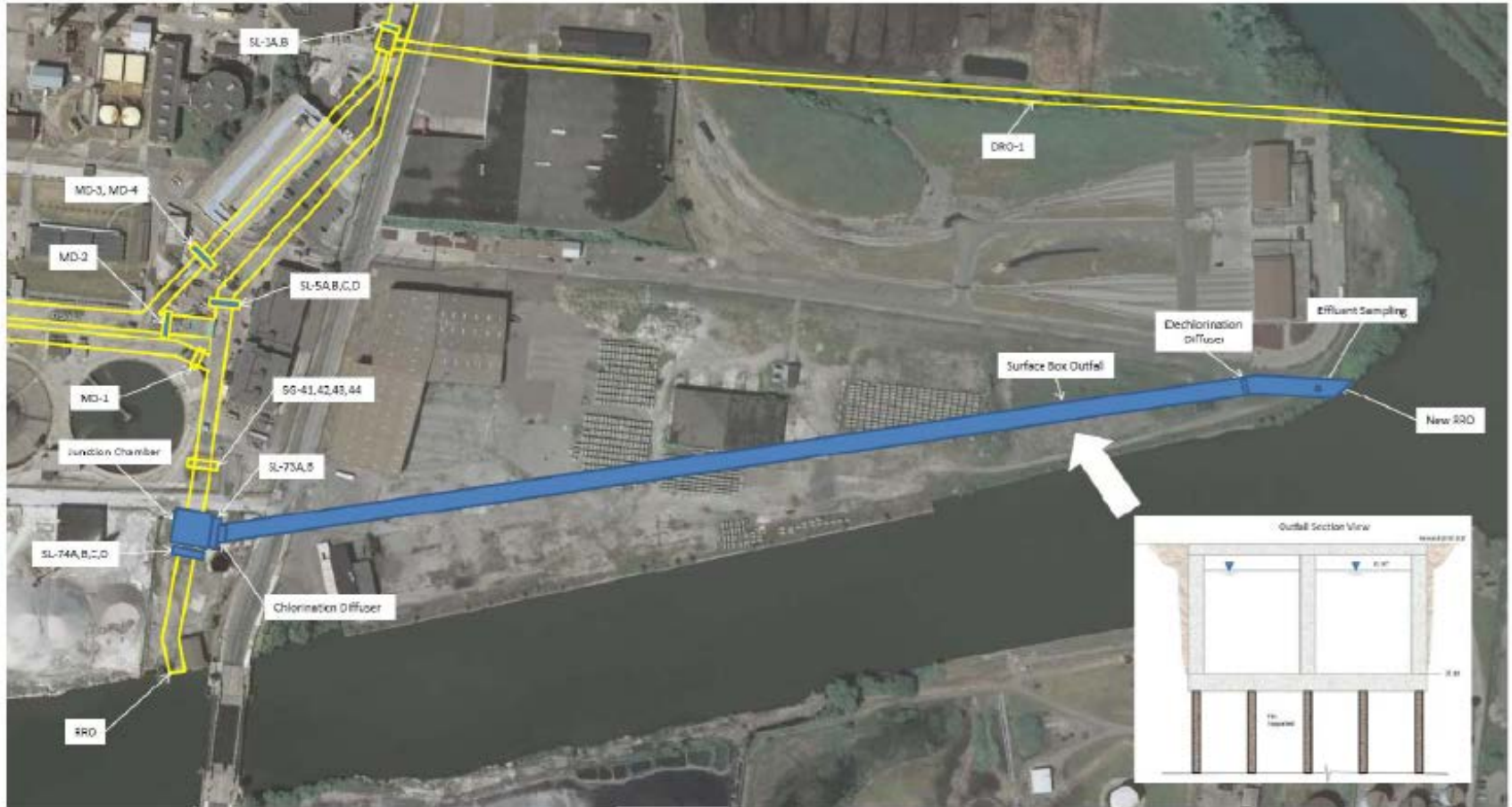


DWSD considered 3 alternative solutions for the RRO2 Project Plan

1. Construct new outfall as a shallow conduit with a discharge near the mouth of the Rouge River (across from Zug Island)
2. Construct new outfall tunnel to the Detroit River under Zug Island using State-Of-The Art “pressurized face” Tunnel Boring Machine
3. No Action



Schematic Drawing of Alternative 1 New Rouge River Outfall Conduit (RRO-2)



Cost Comparison of RRO 2 Alternatives

	Alternative 1: New Rouge River Outfall Conduit (RRO-2)	Alternative 2: New Detroit River Outfall Tunnel (DRO-2)
Capital Cost	\$145.7 M	\$327.2 M
Annual O&M	\$350,000	\$175,000
Total Present Worth	\$134.1 M	\$281.7 M
Equivalent Annual Cost	\$10.4 M	\$21.9 M



Non-monetary factors for RRO 2 Alternatives

	Alternative 1 Rouge River Outfall Conduit (RRO-2)	Alternative 2 Detroit River Outfall Tunnel (DRO-2)
Constructability	Straightforward; low risk open cut conduit	Very difficult; high risk tunneling
Reliability	Very reliable	Very reliable
Ease of Operation	Intermittent usage: requires gates to be operated during wet weather events	Continuous usage: flows routed the same way in dry and wet weather
Performance	Able to meet NPDES Permit limits	Able to meet NPDES Permit limits
Public Acceptability	OK	OK



DWSD opted for Alternative 1, which is contained in the July 2011 CIP

- 2,500' conduit: two 24' x 14' concrete channels
- Discharge up to 1,000 mgd to Rouge River
- Disinfect and de-chlorinate all effluent to meet NPDES Permit requirements
- Modify/renovate flow control gates at WWTP
- Provide instrumentation & controls
- Construct in 2 Segments:
 - WWTP improvements (2012 – 2014)
 - Outfall conduit (2015 – 2018)



RRO 2 Implementation Schedule

Finalize Project Plan	June, 2011
Complete Design – Segment 1	Complete
Bid Advertisement – Segment 1	October, 2011
Start Construction – Segment 1	April, 2012
Complete Construction – Segment 1	October, 2014
Complete Design – Segment 2	June, 2014
Bid Advertisement – Segment 2	January, 2015
Start Construction – Segment 2	October, 2015
Complete Construction – Segment 2	October, 2018



The CIP contains new strategies for CSO control, based on alternatives evaluated

Conventional CSO Technologies:

- Storage Tunnels
- Retention Treatment Basins
- Vertical Shafts
- West Arm Interceptor Extension
- Screening & Disinfection
- First Flush Tanks
- Disposable Nets w/Disinfection
- Vortex Separators
- In-System Storage

Green Infrastructure Options:

- Downspout disconnection
- Re-vegetate vacant lots
- Bioswales & rain gardens
- Rain Barrels
- Green roofs
- Tree planting/Urban Forest
- Demolish abandoned structures
- Porous Pavement
- Curb bump outs
- Roadside Tree Trenches



Recommended Conventional CSO Control Projects

Complete Ongoing CSO Control Projects:

Oakwood RTB & Sewer System: \$59 Million (in addition to funds already incurred)

Baby Creek Remedial Measures: \$3 Million

TRC Minimization & In-Stream Assessments: \$1 Million

Design/Construct New Low Cost Innovative CSO Control Facilities:

Install new CSO Technology to control all Rouge River outfalls @ ~ \$425 Million:

- First Flush Storage Tanks;
- Disposable Nets for screening;
- Innovative “In-Pipe” disinfection system

NOTE: A Pilot Project will be built to demonstrate the feasibility of the new CSO Control Technology to the satisfaction of MDNRE and Detroit before similar controls are installed throughout the City at other outfalls

Hubbell-Southfield Basin Improvements: \$2 Million

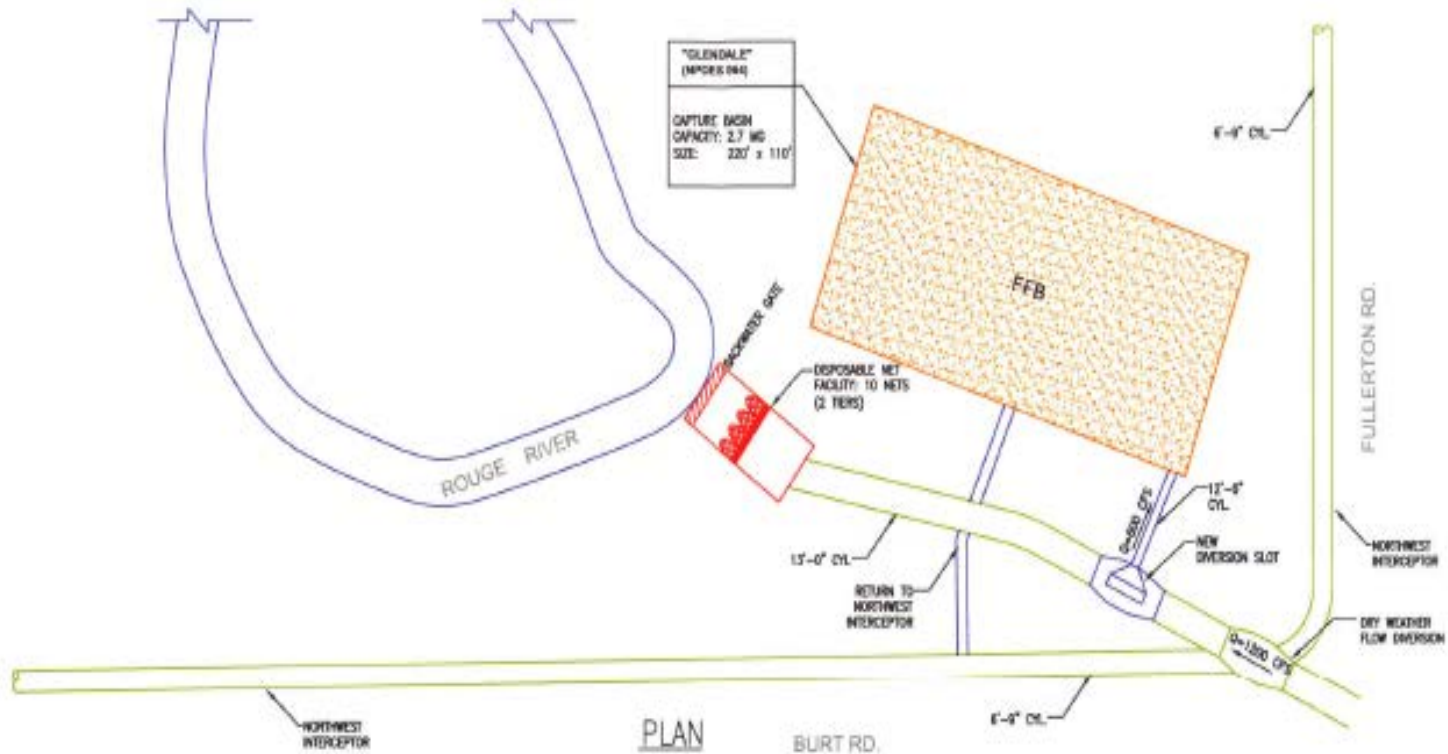
Carbon, Fort St. Outfall eliminations: \$1 Million

Glenhurst outfall diversion and pump station \$3 Million



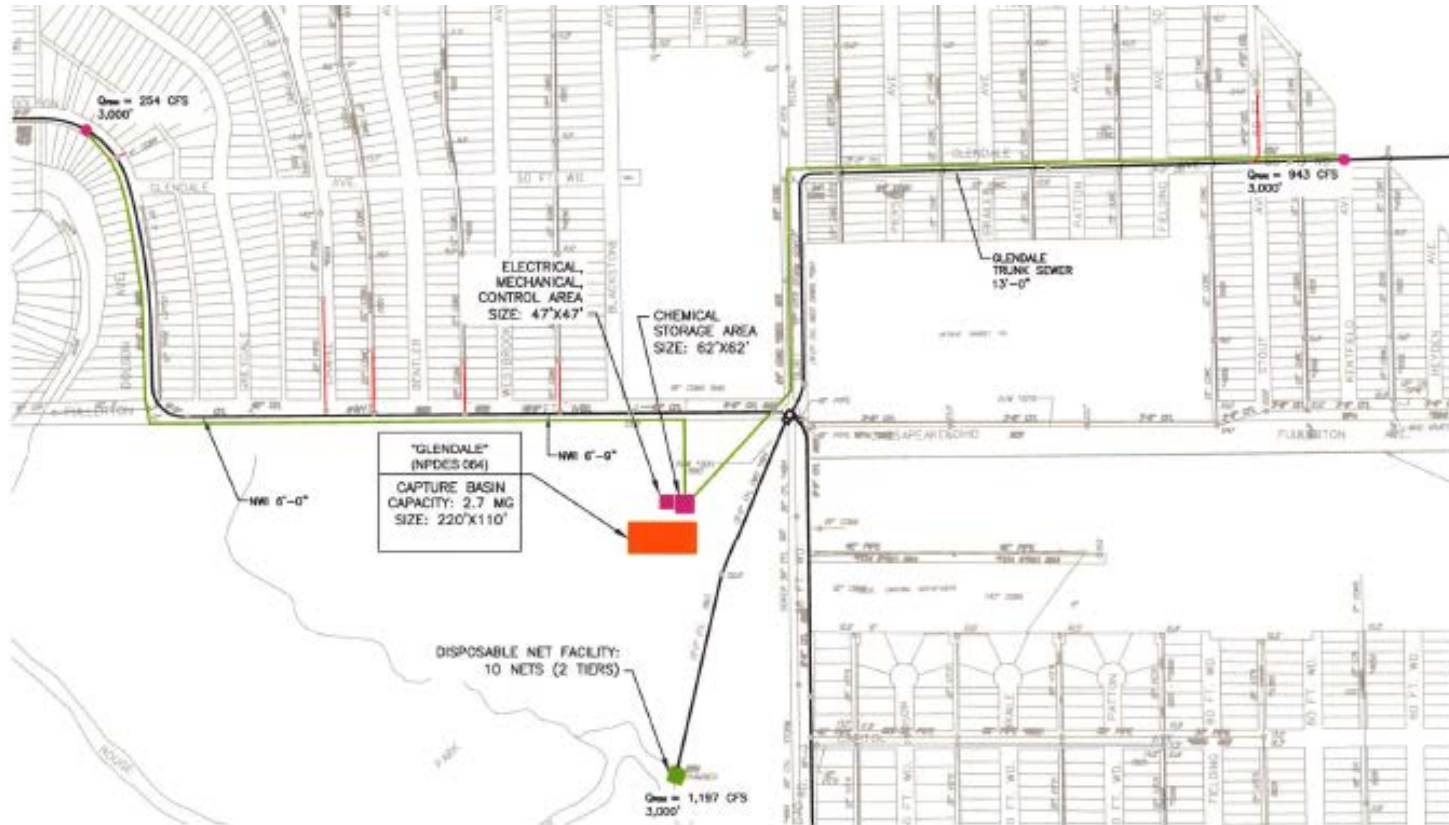
Diagram of Proposed CSO Control Technology

Glendale CSO Outfall: First Flush Tank with Disposable Nets



Schematic Layout of "In-Pipe" Disinfection System

Glendale Outfall In-Pipe Disinfection System Configuration



Recommended “Green Infrastructure” Activities

- Disconnect residential downspouts and, where feasible, commercial and industrial downspouts;
- Demolish and remove vacant structures, seal pipes and re-vegetate the parcel to return it to pervious cover;
- Use bioswales and tree trenches along roadways and parking lots to intercept runoff and reduce stormwater inputs;
- Plant trees for uptake and evapotranspiration along roadways and open spaces;
- Implement activities on municipally-owned land, focusing on managing stormwater runoff in under-utilized parks

Green Infrastructure program expected to reduce wet weather flows into combined system by 10% -20%



Phasing Of Recommended Projects

- Stage Projects in Five 5-Year Phases;
- Spread out new CSO Project construction to average <\$35 Million per year as a target “manageable” level of new debt;
- Accelerate funding of Green Infrastructure projects early in the implementation plan to achieve immediate beneficial results while conventional facilities are designed and built;
- Implementation schedule will extend to 2035 to address Rouge River CSO discharges, and beyond for some Detroit River outfalls

- Green Infrastructure Budget Recommendation:
 - \$3 Million/Year for first 10 years (2010 – 2019)
 - \$2 Million/Year for next 10 years (2020 – 2029)



Comparison of Original and Revised CSO Control Program Costs - Annual Debt Load - \$ *millions*

