

PUBLIC INFORMATION MEETING

Re: Proposed NPDES Permit Modification for
the Detroit Water & Sewerage Department



February 23, 2011

Pre-1995 Combined Sewer System

Presented by: Richard Henson

- 76 permitted outfalls
(33 to Rouge River and 43 to Detroit River)
- ~ 50 discharge events/year (average);
- ~ 20 billion gallons discharged/year;
- Major impact on Rouge River water quality:
 - Dissolved Oxygen depletion
 - Bacteria exceedances
 - Sediment deposits, sanitary trash & bank erosion problems
- Lesser impacts on Detroit River water quality:
 - Bacteria exceedances
 - Occasional sanitary trash complaints

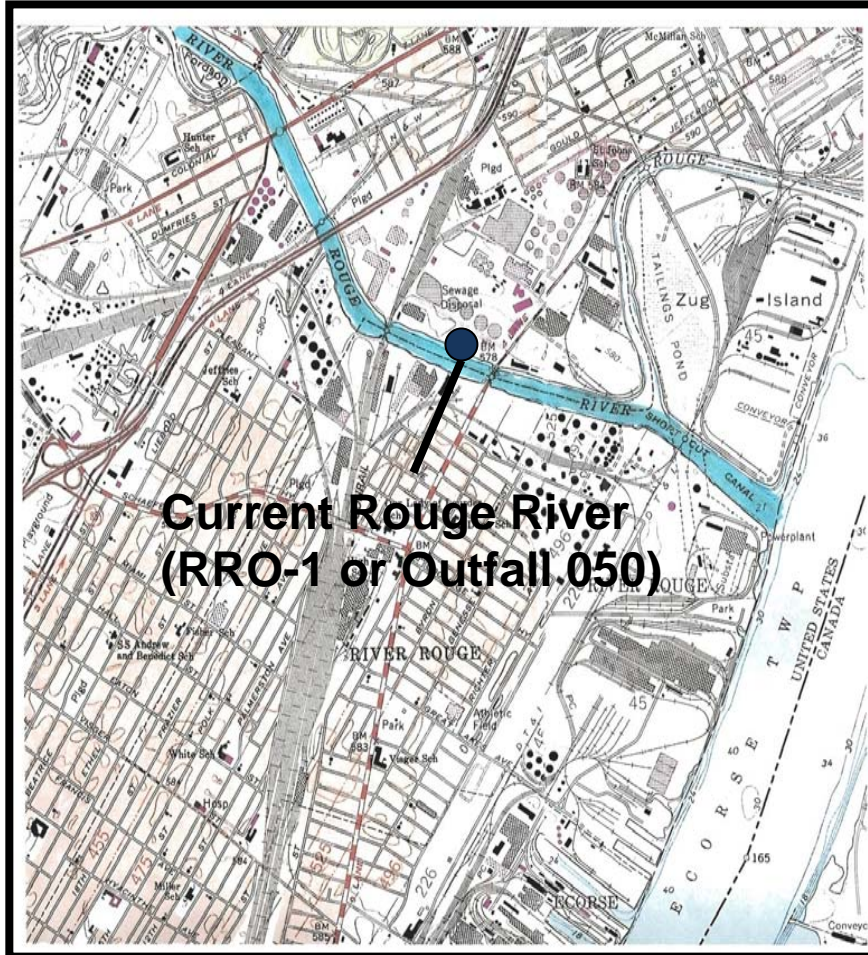
Regulatory Controls on CSO Discharges

Presented by: Richard Hension

- “Adequate treatment” requirements imposed as part of 1989 NPDES Permits issued by MDNRE to all Rouge River CSO Communities;
- Initial control efforts undertaken as part of the Rouge River National Wet Weather Demonstration program;
- Detroit required to prepare/file a Long Term CSO Control Plan in July, 1996
- CSO Control Projects from Detroit’s Long Term Plan incorporated into the NPDES Permit with compliance schedules

Wastewater Plant Rouge River Outfall

Presented by: Richard Henson



- Intermittent discharge of primary treated wastewater which is not currently disinfected
- Used when primary Detroit River Outfall (DRO) has insufficient capacity during wet weather periods
- Frequency has increased from ~8 events/yr to 30+ events/yr due to expanded WWTP capacity to provide primary treatment of wet weather flows up to 1.7 Billion gpd

CSO Control Projects: 1995 - 2008

(Construction Start)

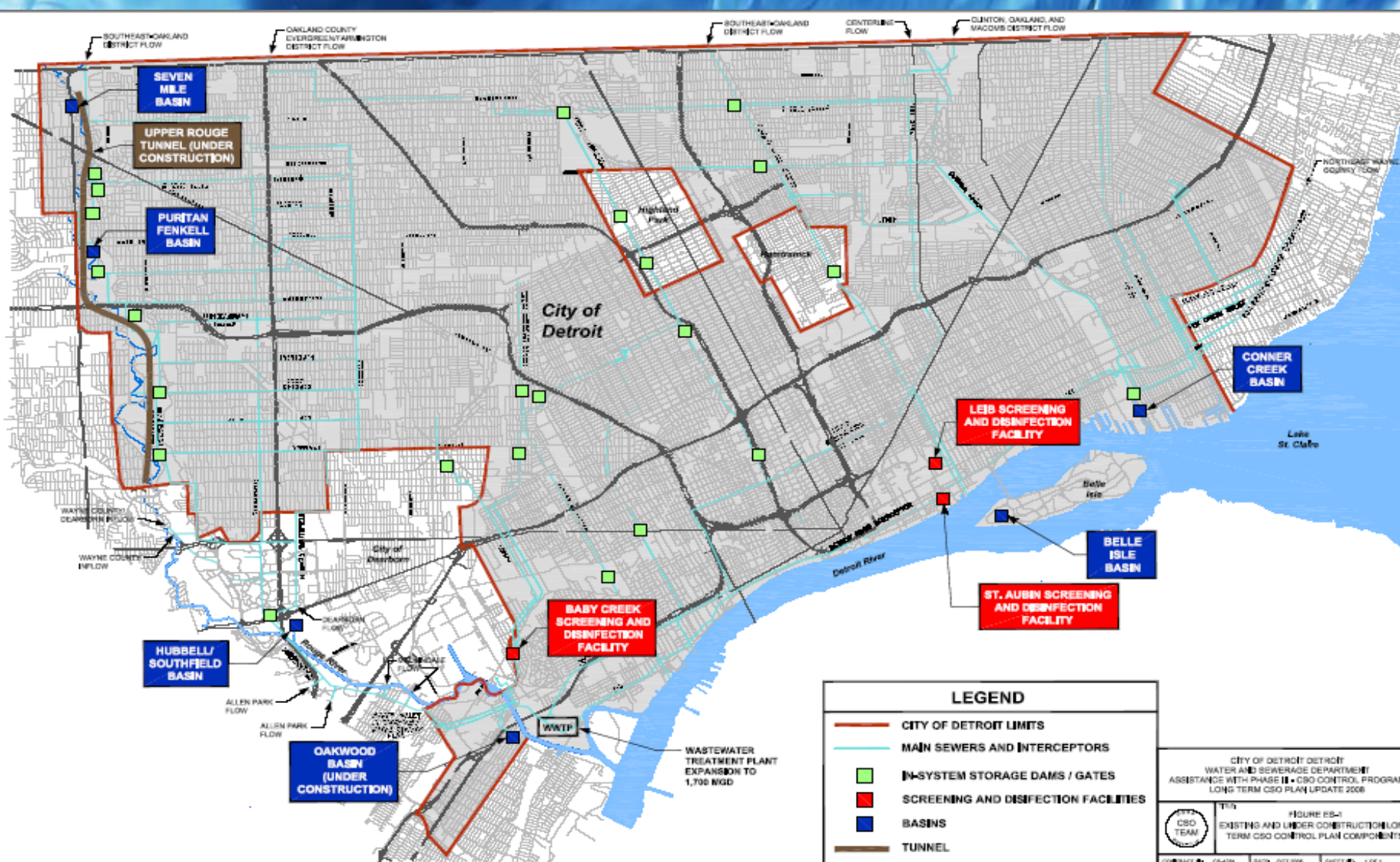
Presented by Richard Henson

- Hubbell-Southfield Basin (1995): \$ 58.9 M
 - Puritan-Fenkell Basin (1995) \$ 18.1 M
 - 7 Mile Basin (1996): \$ 14.9 M
 - Task 1 In System Storage (1996): \$ 3.4 M
 - St. Aubin S&D Facility (1999): \$ 19.8 M
 - Leib S&D Facility (1999): \$ 33.4 M
 - WWTP Expansion (2000): \$ 101.2 M
 - Conner Creek CSO Basin (2001) \$ 201.4 M
 - In-System Storage Devices (2002): \$ 30.8M
 - Baby Creek S&D Facility (2003): \$ 76.1 M
 - Belle Isle CSO Basin (2005): \$ 16.1 M
 - Oakwood Basin & P. Sta. (2007) \$ 168.7 M currently under construction
 - Oakwood Sewer Improvements (2008) \$ 15.0 M currently under construction
- \$ 757 M

NOTE: 83% of project costs allocated to City of Detroit customers

Detroit's CSO Facilities (as of 2008)

Presented by: Richard Henson



LEGEND

- CITY OF DETROIT LIMITS
- MAIN SEWERS AND INTERCEPTORS
- IN-SYSTEM STORAGE DAMS / GATES
- SCREENING AND DISINFECTION FACILITIES
- BASINS
- TUNNEL

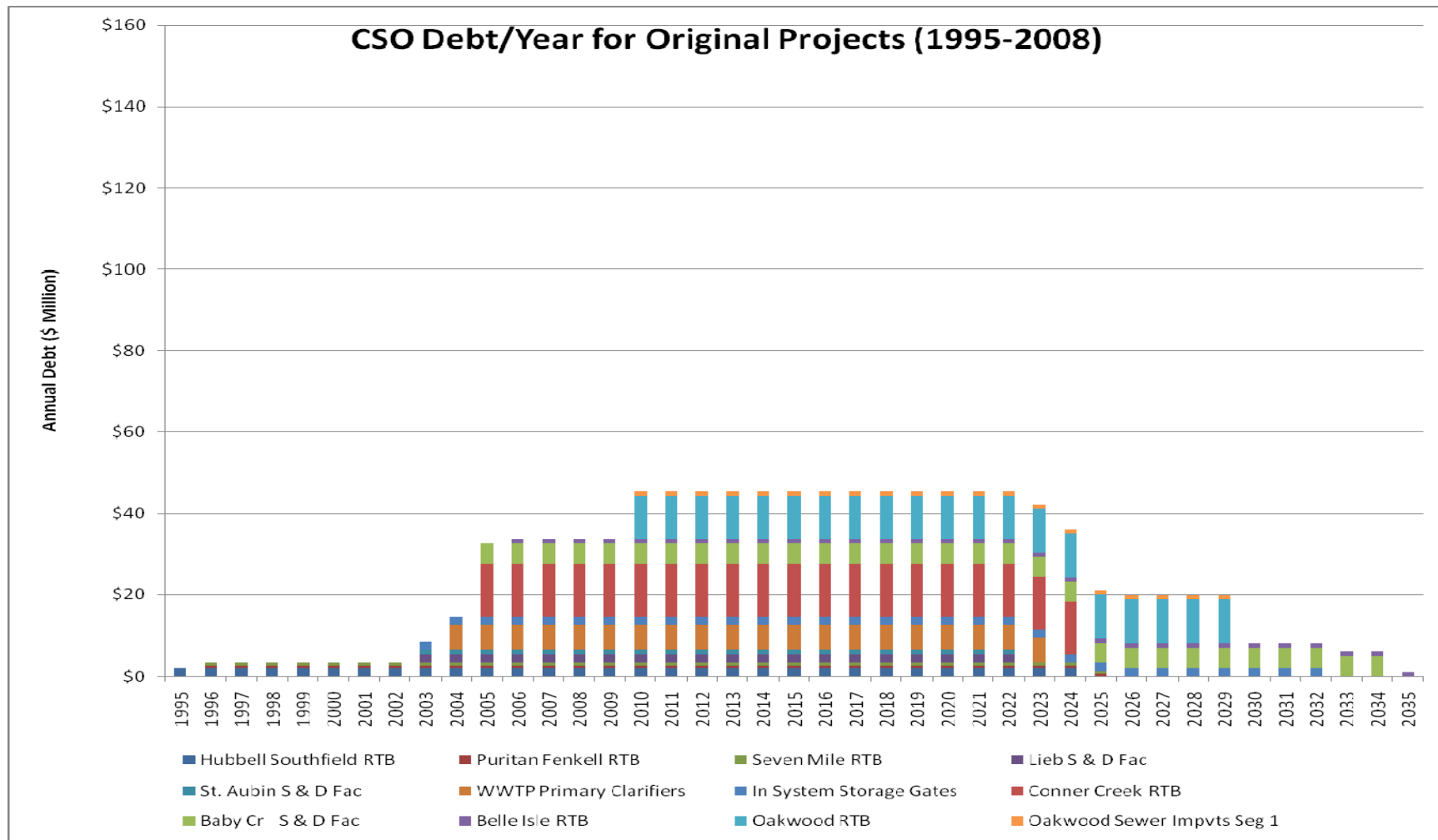
CITY OF DETROIT DETROIT WATER AND SEWERAGE DEPARTMENT ASSISTANCE WITH PHASE II CSO CONTROL PROGRAM LONG TERM CSO PLAN UPDATE 2008

FIGURE ES-1 EXISTING AND UNDER CONSTRUCTION LONG TERM CSO CONTROL PLAN COMPONENTS

CONTRACT # 05-028 DATE 001.2008 SHEET # 1 OF 1

Annual Debt Load for Detroit's CSO Initial CSO Projects (1995 - 2008)

Presented by: Richard Henson



NOTE: 83% of the CSO debt paid by City of Detroit customers

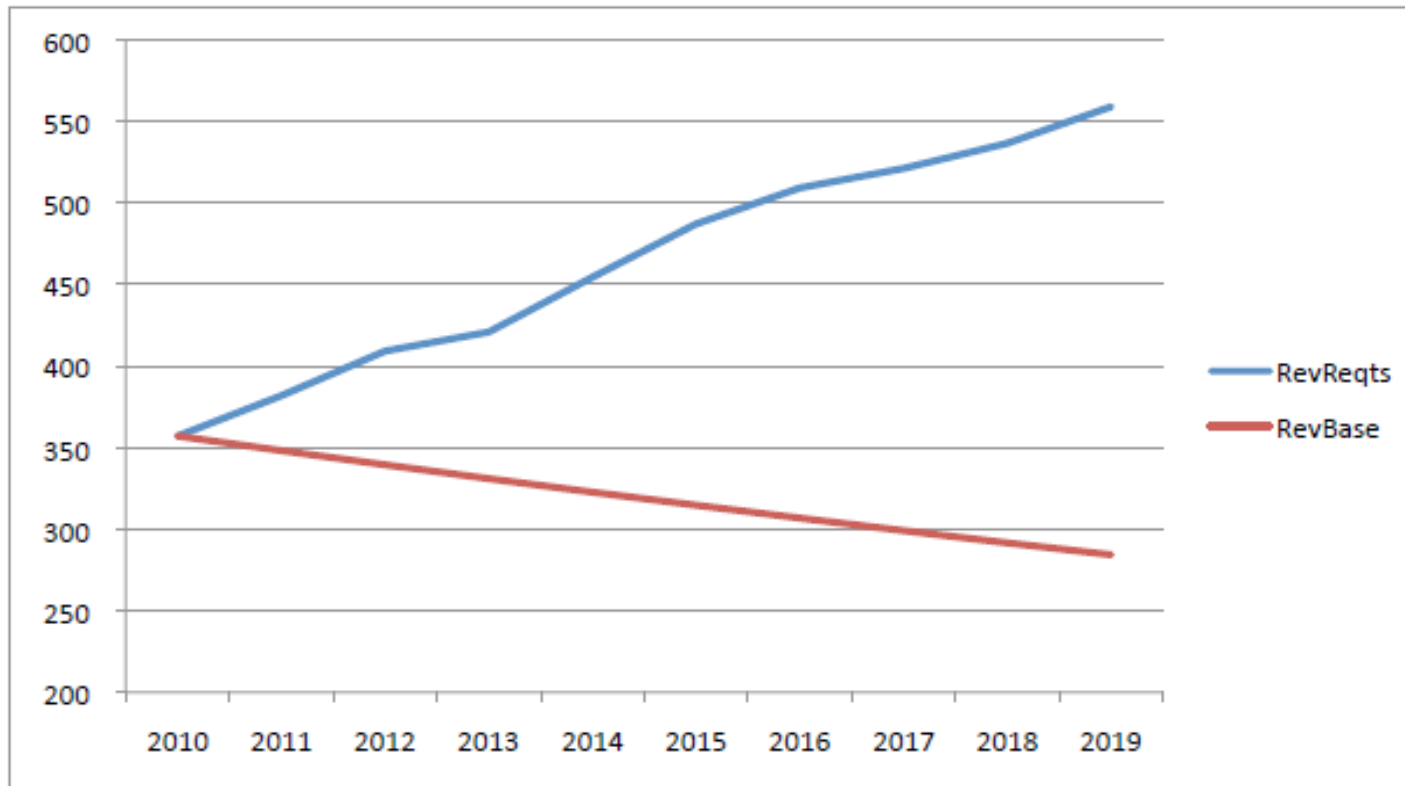
The Economic Crisis of 2008

Presented by: Richard Henson

- Credit Market Collapse on Wall St: forces DWSD to re-finance variable rate debt;
- Bankruptcy of GM, Chrysler: Loss of jobs and manufacturing declines;
- Population Loss and Major Reduction in Water Sales which affects revenues and increases rates
- Decline in Property Value and loss of tax revenue
- Escalation of Costs for major Capital Improvement Projects: Upper Rouge Tunnel (URT) and new Detroit River Outfall (DRO-2)

Projected Sewer Revenues and Rates

Presented by: Richard Henson



Average Annual Revenue Requirement Increase = 5.0%
Average Annual Change in Revenue Base = -2.5%
Average Annual Rate Increase = 7.7%

Detroit Economic Hardship: EPA Financial Capability Rating System

| <u>Indicator Measure</u> | <u>Detroit Value</u> | <u>EPA Rating/Score</u> |
|---|----------------------|-------------------------|
| 1. Sewer Cost as % of Median Household Income | 2.35% | Weak (>2.0%) |
| 2. Bond Rating (S&P) | <BBB | Weak |
| 3. Net Debt as % of Taxable Value | 11.4% | Weak |
| 4. Unemployment Rate vs. National Rate | 29.0% vs 7.6% | Weak |
| 5. Median Annual Household Income | \$29,100 | Weak |
| 6. Property Tax Revenue as % of Taxable Value | 2.6% | Weak |
| 7. Property Tax Collection Rate | 93.6% | Weak |
| OVERALL SCORE | | WEAK |

MDNRE concurred with Detroit's financial analysis under the EPA Guidance and agreed that the CSO compliance schedule could be extended due to Detroit being classified as a "High Burden" community.

DWSD's Response to Economic Crisis

Presented by: Richard Henson

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

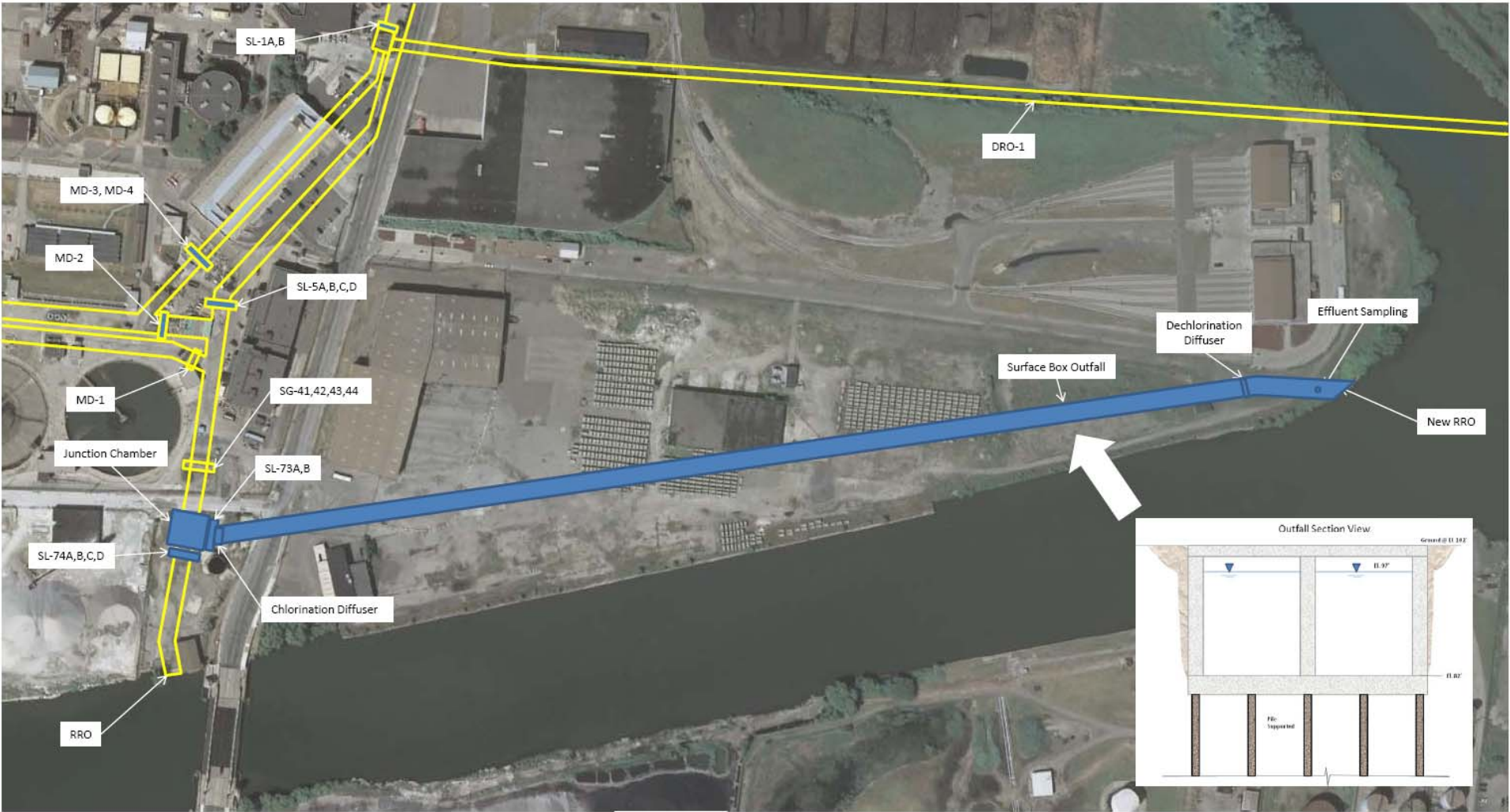
DWSD's 2010 NPDES Permit Modification

Presented by: Richard Henson

- 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

RRO-2 Schematic Drawing

Presented by: Richard Hension



- Legend**
- Existing Facilities
 - Modified Facilities
 - New Facilities

New RRO-2 Outfall

Presented by: Richard Henson

- 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);
- Construct in 2 segments and complete design of Segment 1 by March 1, 2011;
- Complete construction and place outfall into service by October, 2018

CSO Alternatives Evaluated by DWSD

Presented by: Richard Henson

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

Presented by: Richard Henson

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:
 - o First Flush Storage Tanks;
 - o Disposable Nets for screening;
 - o Innovative "In-Pipe" disinfection system

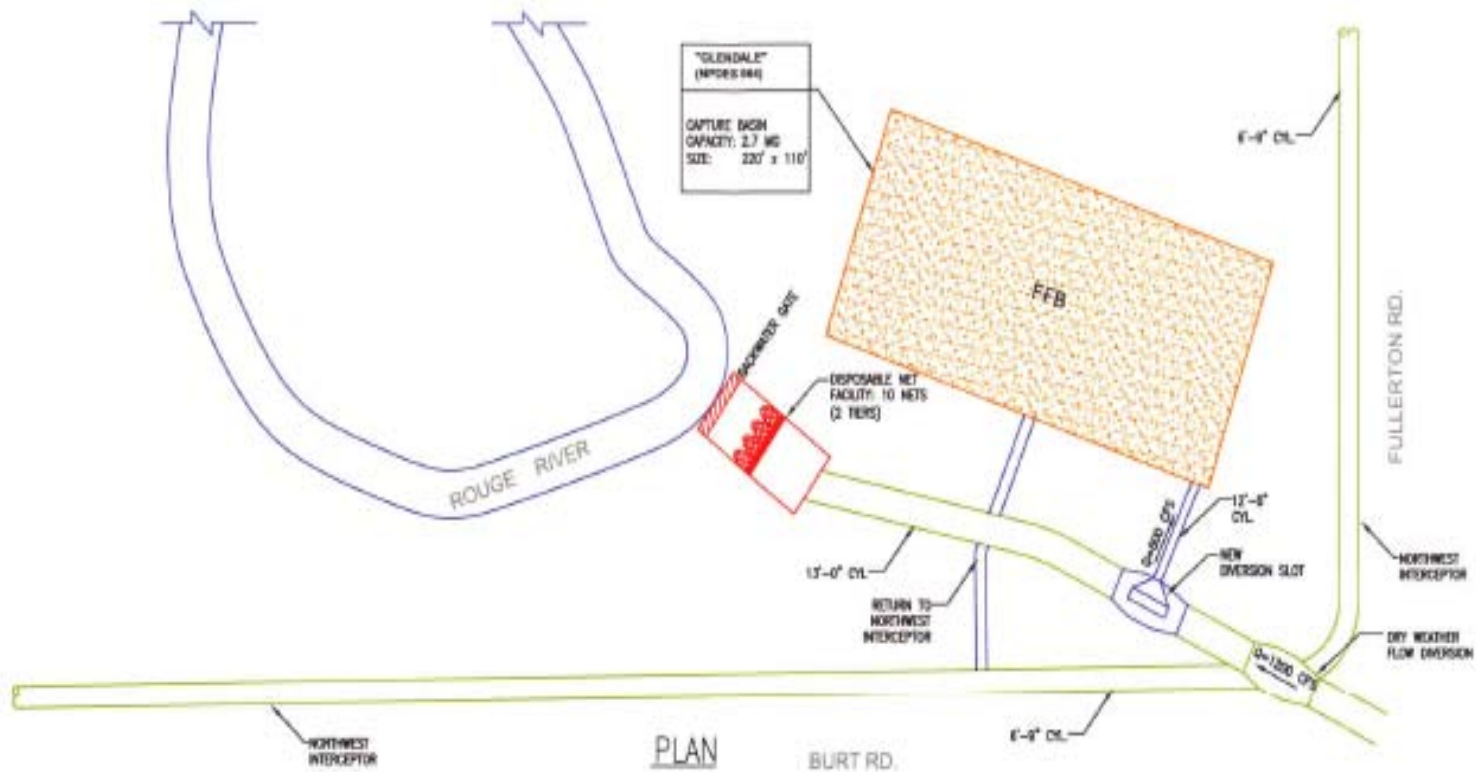
NOTE: A Pilot Project will be built to demonstrate the feasibility of the new CSO Control Technology to the satisfaction of MDNRE and Detroit before similar controls are installed throughout the City at other outfalls

- 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

Presented by: Richard Henson

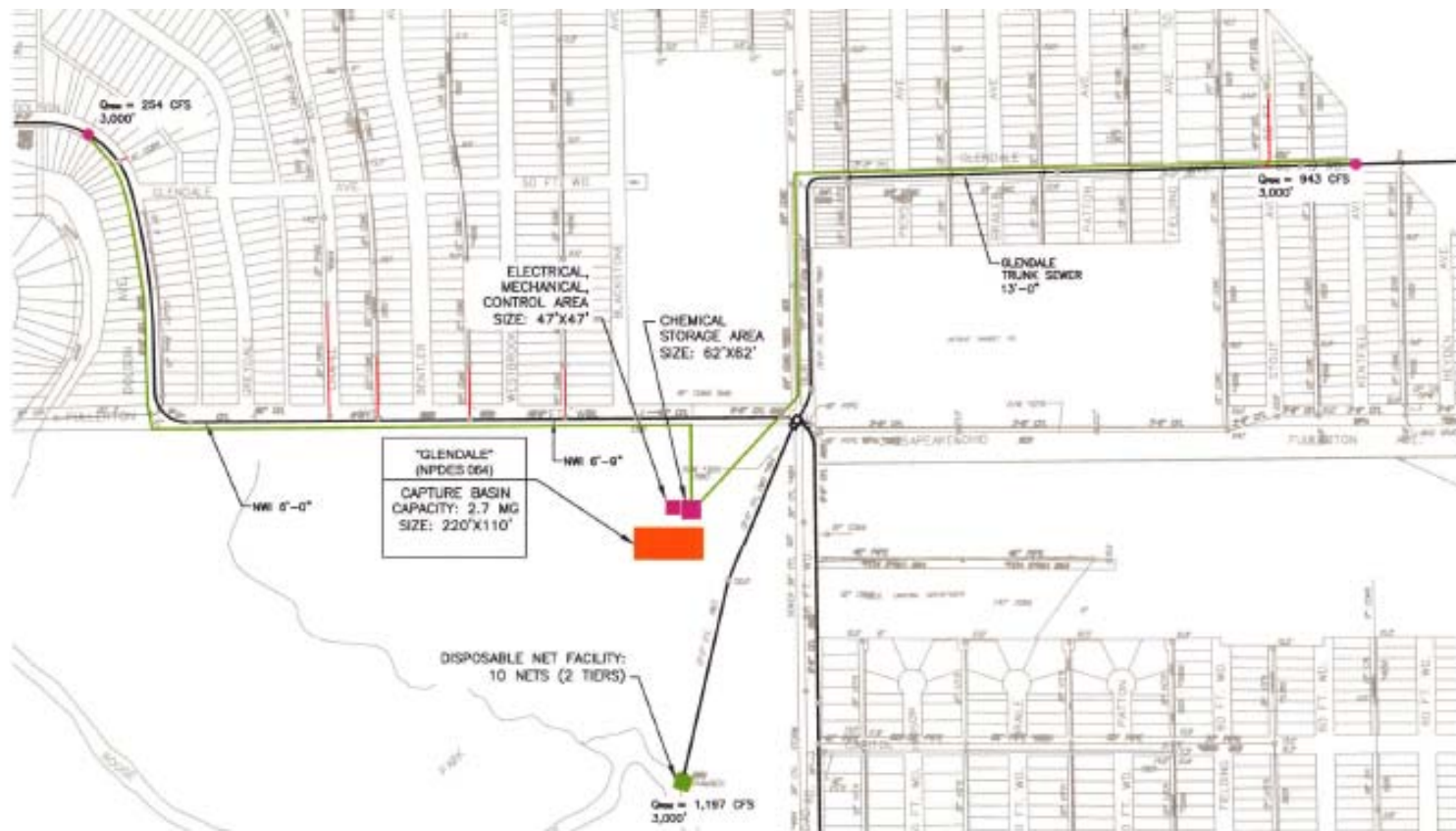
Glendale CSO Outfall: First Flush Tank with Disposable Nets



Schematic Layout of "In-Pipe" Disinfection System

Presented by: Richard Henson

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%

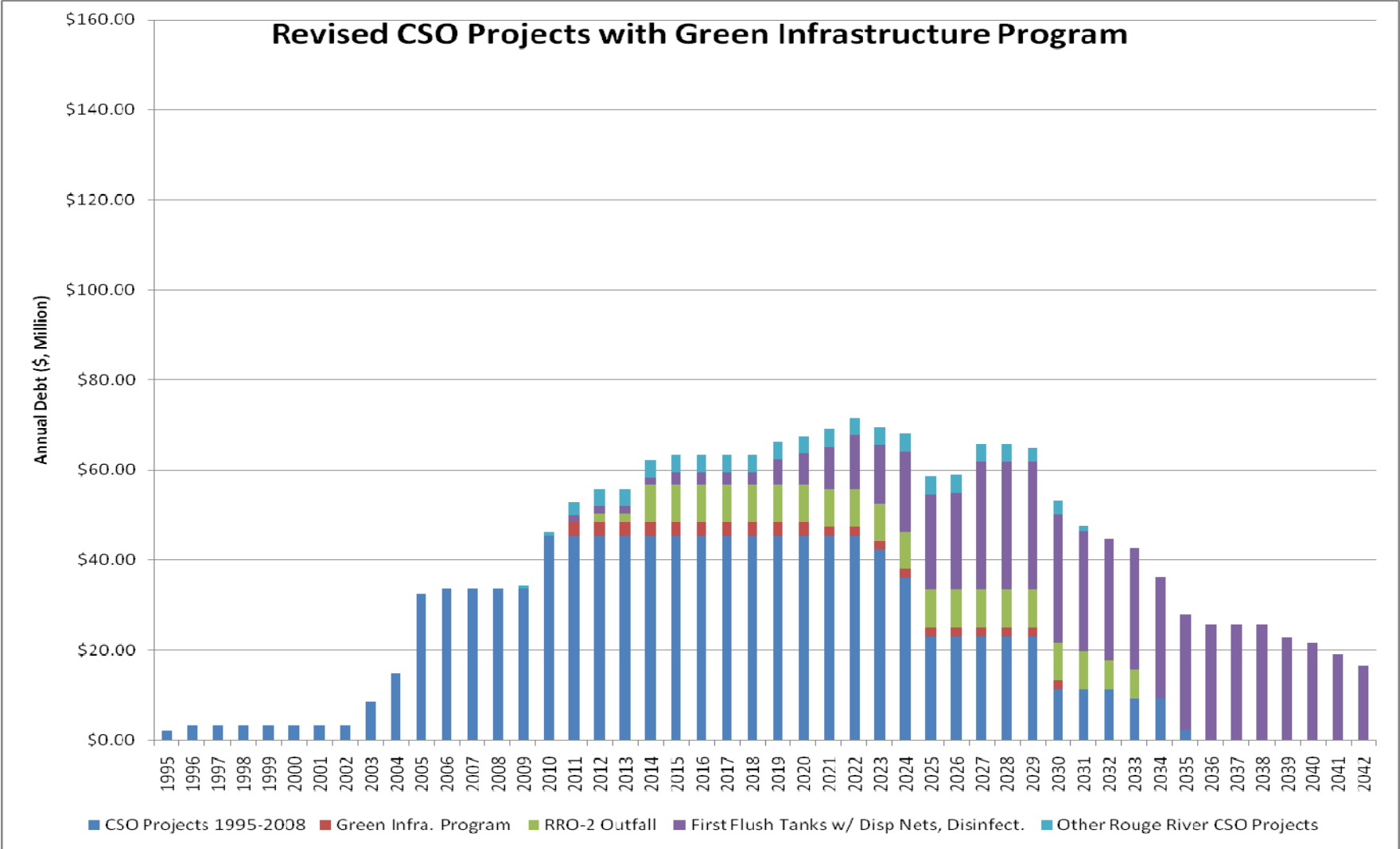
Phasing Of Recommended Projects

- 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 beyond 25 years to address all CSO discharges, including Rouge River and Detroit River outfalls

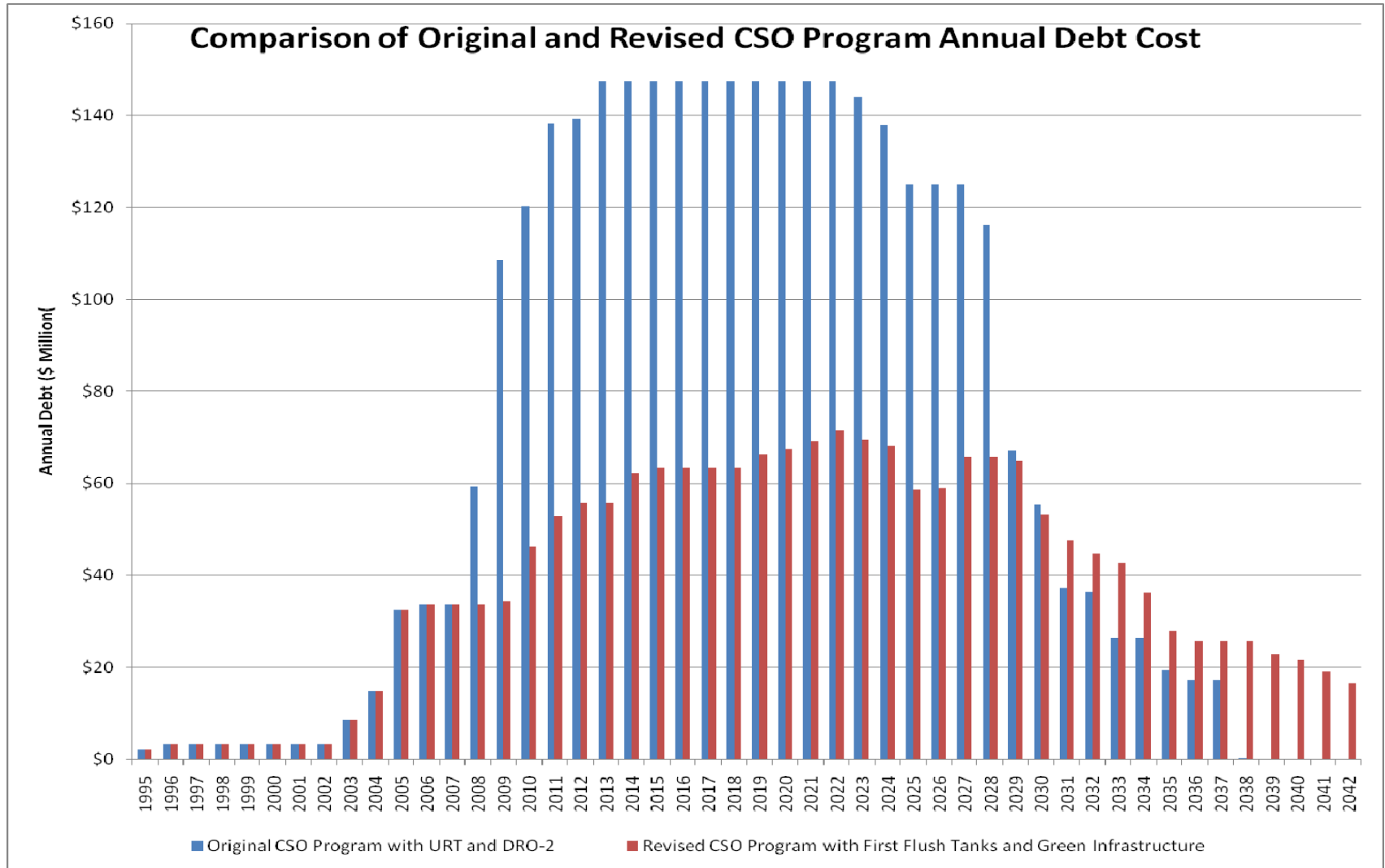
Green Infrastructure Budget Recommendation:

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

Debt Load for Revised CSO Program with Green Infrastructure Initiative



Comparison of Original and Revised CSO Control Program Costs (Annual Debt Load)



Permit Modifications

- Replace the terminated Upper Rouge Tunnel and control 17 DWSD CSOs and 11 suburban CSOs
 - Construct pilot first flush basin with in-pipe screening/disinfection at Pembroke CSO by 2015
 - Implement Green Infrastructure Program
 - Based on a positive demonstration at the pilot facility, the remaining CSOs downstream of McNichols will be controlled using 7 first flush basins with associated screening/disinfection by 2035

Permit Modifications

- Construct second first flush basin at 7 Mile East CSO with screening/disinfection by 2022

- Eliminate the Glenhurst CSO by 2022

- Connect Redford Township and Dearborn Heights CSOs into 3 DWSD first flush basins, schedule to be determined
 - 8 Redford Township CSOs (MI0051829 and MI0051535)
 - 3 Dearborn Heights CSOs (MI0051489)

Permit Modifications – RRO2

- RRO2 is already authorized. It will discharge wet weather flow currently using the RRO at Jefferson
 - Primary treated
 - Eventually disinfected and dechlorinated
 - The permit contains effluent limits and conditions that are protective of water quality in the Rouge River
- Construct WWTP gates and other changes necessary for the new outfall to the Rouge River by 2014
- Construct the new conduit to the Rouge River
 - Disinfect and dechlorinate all flows
 - Meet all permit conditions by 2018

Permit Modifications – Other Detroit Modifications

| | |
|---|------|
| Renovate 6 Rouge River CSO in-stream storage gates | 2013 |
| Revise Oakwood District relief sewer dates: | |
| Complete Segment 2 | 2012 |
| Complete Segment 3 | 2014 |
| Complete Segment 4 | 2016 |
| Construct 3 screening/disinfection facilities to control 6 CSOs along Detroit River | 2022 |
| Construct Hubbell-Southfield CSO RTB improvements | 2013 |

Permit Modifications - Overall

- Financial evaluation, per EPA guidelines, repeated with each permit reissuance
- Total spending for all long-term CSO projects will average \$30-35 million/year unless modified (+/-) using financial evaluation
- Schedule to be set in 5 year increments for all Rouge River CSOs to meet WQS by 2035 and remaining Detroit River CSOs after that date
- Note that predicted annual spending capability will allow some, but not all Detroit River CSOs to be corrected before 2035

Modified Rouge River *E. coli* Total Maximum Daily Load



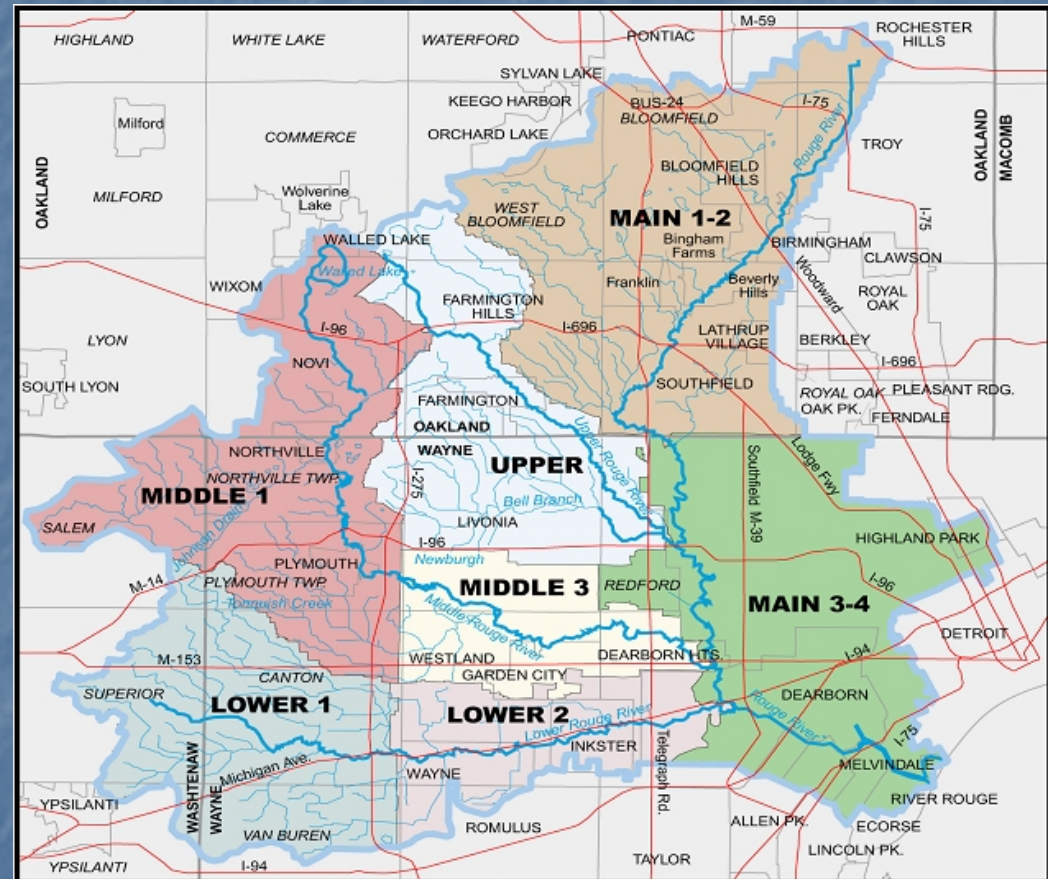
Main River Rouge at Maple Rd. Photo courtesy of CDM

Michigan Department of Natural Resources and Environment, Water Division

February 23, 2011

Background

- Entire Rouge River watershed impaired due to exceedances of water quality standards for *E. coli*
- Original TMDL approved by the United States Environmental Protection Agency in September, 2007



What is a TMDL?

- Section 303(d) of the Clean Water Act requires development of TMDLs for waterbodies that are not meeting water quality standards.
- $TMDL = \sum WLA_s + \sum LA_s + MOS$
 - WLA = waste load allocation (point sources)
 - LA = load allocation (nonpoint sources)
 - MOS = margin of safety

Why is a TMDL modification necessary?

- Current TMDL does not provide waste load allocations for Detroit's first flush basins
 - Modified TMDL consistent with the updated Long-term CSO control plan
- National Pollutant Discharge Elimination System Permit (NPDES) must be consistent with TMDL waste load allocations

Updated TMDL

- Provides same water quality protection as original TMDL
 - First flush basins designed to meet concentration based water quality standard
 - Recognizes additional time Detroit needs to complete CSO work

Specific Changes to the TMDL

- Land use, loading and rationale tables (Tables 14-22)
- NPDES discharges (Figures 9-12)
- Sections:
 - Loading Capacity for all branches (Section 7)
 - Combined Sewer Overflow control (Section 10.2.1)
 - Sanitary Sewer Overflow control (Section 10.2.2)
- Appendices:
 - Load duration curves (Appendices G-J)
 - NPDES permitted discharges (Appendix L)
 - Gage information (Appendix N)

Public Comment

- Modified TMDL and 4 NPDES permits on public notice until March 31, 2011

- Written comments may be sent to:
 - Michigan Department of Natural Resources and Environment
 - Constitution Hall
 - 525 W. Allegan 2nd floor
 - Lansing, MI 48933

- NPDES permits – Stephanie Swart, Swarts@michigan.gov
- TMDL – Christine Alexander, Alexander@michigan.gov