Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Capital Improvement Program

Technical Memorandum
Original Date: May 8, 2003
Revision Date: May 31, 2003
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Table of Contents

1. Purpose 1

1.1 Methodology 1

2. Results and Conclusions 23

2.1 Results 23

3. Conclusions 23

Capital Improvement Program

1. Purpose

The Wastewater Master Plan (WWMP) being performed for DWSD has a task to provide capital improvement program (CIP) cost estimates for work recommended to be performed on the DWSD sewer system by the year 2050. These cost estimates are needed for input to the rate model, run by Black and Veatch, which are used to set future sewer rates for customer communities. To this end, the WWMP team has developed several categories of recommended system improvement work and applied cost estimates to this work. The basis of cost estimates for conveyance and treatment facilities can be found in the technical memo entitled "Basis of Cost Estimates." The unit costs investigated for that memo were then applied to identify CIP tasks.

1.1 Methodology

The CIP task costs were calculated for two CIP scenarios with varying levels of task effort and completion. These two scenarios, called Upper Range and Lower Range, were provided to Black and Veatch to calculate their impacts on future rates. DWSD can then review the tasks in this "envelope" and their impacts to decide how to proceed with performing the recommended tasks. Both CIP estimates use the same categories and types of work. The assumptions for their affects on the rate model are described in section 1.2.1. These categories and their different applications for the CIPs are described in section 1.2.2.

1.2.1 CIP Assumptions

The Wastewater Master Plan recommendations allocate expenditures in five-year blocks, which will need to be allocated annually within each block. The WWMP team has assumed that all costs in the current Capital Improvement Program (CIP) through 2007 will remain unchanged and be expended by 2007 or in years that are designated by Black and Veatch. We have not included any 2002-07 CIP costs or any roll over amounts in the total. The total remaining costs from the current CIP are estimated to be approximately $804 million to be distributed in the rate model after 2008 by Black and Veatch.

The two different CIPs are called Upper Range and Lower Range CIP. The Upper Range considers the highest level of task effort deemed appropriate for this system. This CIP uses a balanced approach to the tasks, falling on the lower side of the approach for many other cities, and contains moderate rehabilitation and replacement of the sewer infrastructure components. For example, the Upper Range considers the inspection of sewer laterals and connectors at a rate of 5% per year, just below the 8-15% seen in similar cities. The Lower Range is a lower level of effort, considered to be a more basic effort. This range has a reduced level of effort representing a minimum level of service necessary to maintain the system.

For example, the inspection of sewer laterals and connectors is recommended at a rate of half the Upper Range, or 2.5% per year. The total costs and the cost breakdowns for these CIP's are found in Section 2.1.

1.2.2 Summary of CIP Projects

The CIP tasks are broken down into several programs and subprograms for application to the Black and Veatch rate modeling. These categories describe specific tasks to be performed, with the CIP describing the tasks, costs, and the time frame they are recommended to be performed within.

1.2.2.1 Program 1: Sewer Infrastructure Program

The subprograms in this program deal with the infrastructure of the sewer system. This covers the actual sewer pipes in the ground, as well as sewer structures, such as manholes and catch basins, and sewer pump stations.

Subprogram No. 1A: Lateral and Connector Sewers - Cleaning, Sediment Disposal, and Condition Assessment

This subprogram, as the name implies, covers inspection and cleaning of lateral and connector sewers in the system. CS-1314 Lateral Sewers and Connection Sewers technical memorandum, revised May 2003, indicates that there are 2,258 miles of sewer laterals and 559 miles of sewer connectors in the DWSD system. All are considered to be within the city of Detroit, which mean any CIP costs should be applied to city of Detroit rates only. A lateral sewer collects flows from homes and businesses for discharge into trunk sewers. These sewers range in size from 6" to 24" in diameter, with an average size of 18". A connector sewer is a pipe that carries the wastewater flow from a lateral sewer to a trunk sewer. Connector sewers range from 24" in diameter to a 4' by 6' egg shape, with an average size of 30" in diameter.

Lateral and Connector Sewers Inspection

The first task for this subprogram is the inspection of these lateral and connector sewers. This inspection involves the use of televising equipment to view the interior of the pipes and the subsequent assessment of their condition. The level of effort here varies, depending on the CIP.

Upper Range CIP

This policy recommends inspecting all laterals and connectors on a 20-year cycle, or 5% of the total per year.

Lower Range CIP

The Lower Range CIP increases this cycle to 40 years, or 2.5% per year, resulting in a 50% reduction in inspection costs through 2050.

Lateral and Connector Sewers Cleaning

The second task for this subprogram is the cleaning of laterals and connectors. This cleaning is either light or heavy cleaning, depending on the condition of the pipe revealed during inspection. Both CIPs assume that after inspection, 45% of the sewers

inspected need heavy cleaning, 35% need light cleaning, and 20% do not need any cleaning.

These assumptions can be found in the technical memorandum for CS-1314 entitled Physical Inspection of Lateral and Connector Sewers, revised 2003, which reviewed a pilot project of sewer inspections conducted by Inland Waters Pollution Control in 2002.

Upper Range CIP
This policy, with a 5% of the total number of laterals and connectors per year inspection rate, would heavy clean 2.25% of the total laterals and connectors per year, light clean 1.75% per year, and not clean 1% per year.

Lower Range CIP
This policy, with an inspection rate half of the Upper Range inspection rate, would clean half as much. This means heavy cleaning 1.125% per year, light cleaning 0.875% per year, and not cleaning 0.5%.

Lateral and Connector Sewers Sediment Testing
The last task for this subprogram involves the testing and disposal of the sediments removed during the cleaning process. Current practice is for the removed sediments to be washed down the sewers for subsequent removal at the WWTP. This removed sediment should be tested for hazardous materials prior to disposal. It is assumed that 10 trucks would be needed for every mile of sewer cleaned to remove these sediments. Testing and disposal is estimated at $200 per truck load, derived from the costs for two tests at $100 each, for mercury and PCB's.

Upper Range CIP
This policy cleans 4% of the lateral and connector sewers, or 113 miles, every year, resulting in 1,113 truck loads being tested per year.

Lower Range CIP
This policy cleans half as many laterals and connectors as the Upper Range. This equates to 2% of the sewers, or 56 miles, every year, resulting in 560 truck loads being tested per year.

Subprogram No. 1B: Interceptor and Trunk Sewers - Condition Assessment
This subprogram covers the condition assessment, or inspection, of the interceptor and trunk sewers in the DWSD system. According to the CS-1314 Interceptor and Trunk Sewers technical memorandum, revised May 2003, there are 483 miles of trunk sewers in the system, all within the city of Detroit. There are 83 miles of interceptors, with 43 miles considered common use, serving both city of Detroit and suburban customers, and 40 miles considered to be serving only suburban customers. A trunk sewer collects flows from lateral sewers for discharge into interceptor sewers. These sewers are generally large than laterals, ranging in size from 18" to 10' in diameter. An interceptor sewer is a large sewer that carries the wastewater flow from a number of trunk sewers to the wastewater treatment plant. Interceptor sewers are generally

larger than trunk sewers (10′ or larger). These sewers move flows by gravity, though they are sometimes surcharged.

Interceptors and Trunk Sewers Inspection
The inspection of these sewers can be accomplished through televising or diving. The rates of inspection vary, depending on the CIP.

Upper Range CIP
This policy assumes the entire system of interceptors and trunk mains will be inspected by 2010, with subsequent inspections done in 20-year cycles, or 5% per year.

Lower Range CIP
This CIP has a different take on these inspections, assuming that all the interceptors (83 miles) and a third of the trunk sewers (161 miles) would be inspected by 2010, with the remaining trunk sewers (322 miles) inspected in the next 20 years (2011-2030). The entire interceptor and trunk sewer system would then be inspected on a 20-year cycle. Additionally, for every mile identified to be inspected, only 10% of that mile would actually be inspected and assumed to be representative of that entire mile when assessing the pipe's condition.

Subprogram No. 1C: Lateral and Connector Sewer Improvements
This subprogram considers the improvements needed to lateral and connector sewers as identified from inspection results.

Lateral and Connector Sewers Relining
Both CIP's assume that 35% of the laterals and connectors inspected would have to be rehabilitated. This rehabilitation is accomplished through relining using cured-in-place-pipe (CIPP). This assumption can be found in the technical memorandum for CS-1314 entitled Physical Inspection of Lateral and Connector Sewers, revised 2003, which reviewed a pilot project of sewer inspections conducted by Inland Waters Pollution Control in 2002.

Upper Range CIP
Under this policy, 1.8% of the total laterals and connectors are relined per year.

Lower Range CIP
Under this policy, 0.9% of the total laterals and connectors are relined per year.

Subprogram No. 1D: Interceptor and Trunk Sewer Cleaning, Sediment Disposal, and Improvements
This subprogram covers the cleaning, repair, and improvements of the interceptor and trunk sewers part of the DWSD system. These tasks are dependent on the rate of inspections for these sewers.

Interceptors and Trunk Sewers Structural Repairs
The first task in this subprogram covers structural repairs needed for the interceptors and trunk sewers. In developing the CIP's, TYJT reviewed inspection reports for select interceptors in the DWSD system, found in the CS-1158 report called Long

Term CSO Plan for the Detroit and Rouge Rivers, 1996. Both CIP's use this previous estimate of work needed on these larger sewers, which estimated $18,000,000 in repairs needed for 886,400 linear feet of interceptors and trunk sewers, with the assumption that these repairs are indicative of the entire interceptor and trunk sewer system.

Upper Range CIP
This policy assumes that the repairs for the entire system (2,988,480 LF) would occur by 2010, with subsequent repairs coming in 20-year cycles. Additionally, these costs would increase by 20% for each cycle, due to age and pipe degradation.

Lower Range CIP
This CIP uses this previous estimate-to-estimate repair on all interceptors and a third of the trunk sewers (1,288,320 LF) by 2010, the remaining trunk sewers from 2011-2030 (1,700,160 LF), and the entire system (2,988,480 LF) from 2031-2050.

Interceptors and Trunk Sewers Cleaning
The second task of this subprogram is the cleaning of the interceptors and trunk sewers. Both CIP's assume that 10% of all inspected interceptors and trunk sewers would need to be heavy cleaned. These inspection reports can be found in the CS-1158 report called Long Term CSO Plan for the Detroit and Rouge Rivers, 1996.

Upper Range CIP
For this policy, 10% of the system would be heavy cleaned by 2010, then 10% in each 20-year cycle (2011-2030, 2031-2050), or 0.5% cleaned per year, through 2050.

Lower Range CIP
Under this policy, 10% of all interceptors and 10% of a third of the trunk sewers would be heavy cleaned by 2010. From 2011 through 2030, 10% of the remaining 2/3 trunk sewers would be heavy cleaned. From 2031-2050, 10% of the total interceptor and trunk sewers system would be cleaned, or 0.5% cleaned per year.

Interceptors and Trunk Sewers Sludge Removal
The third task in this subprogram is sludge removal from interceptors and trunk sewers. Both CIP's use a previous estimate for sludge disposal for these larger pipes, which estimated $1,867,043 for 886,400 linear feet of interceptors and trunk sewers, with the assumption that this sludge disposal are indicative of the entire interceptor and trunk sewer system. This estimate is based on inspection reports found in the CS-1158 report called Long Term CSO Plan for the Detroit and Rouge Rivers, 1996.

Upper Range CIP
This policy assumes that the sludge removal for the entire system (2,988,480 LF) would occur by 2010, with subsequent sludge removals coming in 20-year cycles.

Lower Range CIP
This policy assumes the sludge removal for all interceptors and a third of the trunk sewers (1,288,320 LF) by 2010, the remaining 2/3 trunk sewers from 2011-2030 (1,700,160 LF), and the entire system (2,988,480 LF) from 2031-2050.

Interceptors and Trunk Sewers Sediment Testing and Disposal
Sludge testing, as outlined for laterals and connectors, is estimated at $200 per truck load. Sludge quantities were estimated for the 886,400 feet of interceptors and trunk sewers used for sludge removal in the above section using inspection reports found in the CS-1158 report called Long Term CSO Plan for the Detroit and Rouge Rivers, 1996.

Upper Range CIP
This policy assumes that the sediments from the sludge removal for the entire system would be tested and disposed of by 2010, with subsequent testing and disposals coming in 20-year cycles.

Lower Range CIP
This policy assumes that the sediments from the sludge removal for all interceptors and a third of the trunk sewers (1,288,320 LF) would be tested and disposed of by 2010, the remaining trunk sewers from 2011-2030 (1,700,160 LF), and the entire system (2,988,480 LF) from 2031-2050.

New Relief Sewers
The fifth task of this subprogram involves possible new relief sewers. DWSD previously identified areas of the system where relief sewers were needed. These areas were defined in Status Report on Storm Relief Sewer Program, by DWSD, issued July 1975, reissued July 1978. The Wastewater Master Plan (WWMP) team has reviewed these relief sewers (CS-1314 Local Alternatives for SSO control technical memorandum, revised May 2003) and concluded that some may still be needed.

Upper Range CIP
This policy assumes these five new relief sewers will be constructed and their costs spread out over 2019 to 2038.

Lower Range CIP
This CIP has a different take on these relief sewers. It is assumed that there will be the implementation of an aggressive source control program by 2010 and then monitor selected areas from 2010-2050. CIP costs come from the anticipated need for half of the identified new relief sewers, implemented from 2019 to 2038 in the CIP.

Modeling of Additional Relief Sewers
The sixth task involves the need to run a model for data from Segmented Facilities Plan. Both CIP's assume that this computer-modeling task will be accomplished in 2008 to 2009.

Redundant Oakwood Interceptor
The seventh task in this subprogram is an individual project to install a new, redundant sewer system parallel to the Oakwood Interceptor section of the NW

Interceptor. This estimate was performed by Tetra Tech MPS and can be found in the CS-1314 technical memorandum entitled Conceptual Plan for Oakwood Northwest Interceptor, revised May 2003. Both CIP's assume this work will be accomplished and funded from 2010 through 2014.

Macomb Meter Stop Gates
The eighth task identified for this subtask involves the installation of stop gates at two sewer meters in Macomb County. This estimate was performed by Spalding Dedecker Associates as part of a review of CIP programs in Macomb County, found in the CS-1314 technical memorandum entitled Capital Improvement Programs for Macomb County, revised May 2003. Both CIP's assume the installation of stop gates at meters CV-3 and MB-25 will take place and be funded in 2008.

North Gratiot Interceptor Sewer
The ninth construction task in this subprogram is to install the new North Gratiot Interceptor Sewer (NGIS) in Macomb County. This estimate was performed by Spalding Dedecker Associates and can be found in the CS-1314 technical memorandum entitled Capital Improvement Programs for Macomb County, revised May 2003. Both CIP's assume this construction and funding will over the ten years from 2008 to 2017.

Northwest Interceptor Sewer Improvements
The tenth task identified for this subtask is also an identified construction / repair project. This estimate was performed by Tetra Tech MPS and can be found in the CS-1314 technical memorandum entitled Conceptual Plan for Oakwood Northwest Interceptor, revised May 2003. Both CIP's assume that improvements to the Northwest Interceptor Sewer (NWIS) from 8 Mile Road to the WWTP will be accomplished and funded from 2010 through 2014.

Subprogram No. 1E: Manhole and Catch Basin Improvements
This subprogram covers the inspection and repair of manholes and catch basins in the DWSD sewer system, as well as the replacement of manholes and the cleaning of catch basins. There are approximately 57,700 manholes and 200,000 catch basins in the system, according to a GIS review of DWSD section map data provided to the WWMP team by DWSD.

Manhole and Catch Basin Inspection
The first task for this subprogram is the inspection of manholes and catch basins. These structures are assumed to be inspected at the same time.

Upper Range CIP
The Upper Range CIP assumes these structures are inspected on consecutive 3-year cycles, or 33% per year, with 16 cycles needed by 2050.

Lower Range CIP
The Lower Range CIP assumes these structures are inspected at the same rate as the sewers in a 40-year cycle, or 2.5% per year.

Manhole Repairs
The second task outlined in the CIP's for this subprogram is the repair of manholes. Both CIP's assume that the repairs taking place in each cycle are as follows:

- 5% need manhole wrapping
- 8% need external chemical grout
- 10% need manhole shelf repair
- 10% need manhole channel repair
- 10% need pipe connection repair
- 15% need raising / replacing manhole frames
- 42% need no repairs

Upper Range CIP
The Upper Range CIP assumes that repairs will take place in a 20-year cycle, even though they are inspected more frequently.

Lower Range CIP
The Lower Range CIP assumes these repairs will occur in a 40-year cycle that coincides with the inspections.

Manhole Repairs
The third task in this subprogram is the replacement of manholes. Both CIP's assume the average manhole is 4 feet in diameter, 15 feet deep, and needs to be replaced at a rate of 2% per cycle.

Upper Range CIP
This policy uses a 20-year replacement cycle, with 0.1% of the total manholes replaced every year.

Lower Range CIP
The Lower Range CIP uses a 40-year replacement cycle, with 0.05% replaced per year.

Catch Basin Cleaning
The fourth task for this subprogram is the cleaning of catch basins.

Upper Range CIP
This CIP assumes that all catch basins are cleaned at the same rate of inspections, or on a 3-year cycle (33% per year).

Lower Range CIP
The Lower Range CIP assumes these structures are cleaned in 10-year cycles (10% per year).

Catch Basin Repairs
Task 5 in this subprogram is the repair of catch basins. These repairs are assumed to consist of connection repair and frame replacement at the rate of 5% for each type of repair per cycle.

Upper Range CIP
The Upper Range CIP assumes this repair cycle is 20 years.

Lower Range CIP
The Lower Range CIP assumes a 40-year cycle coinciding with the inspection rate.

Subprogram No. 1F: Regulators, Outfalls, Backwater Gates, and In-System Storage
This subprogram calculates CIP costs for the inspection, rehabilitation, and replacement of outfall flow regulators, outfalls, backwater gates, diversion dams, in-system storage devices and system gates. There are 41 outfall flow regulators, 81 outfalls, 54 backwater gates, 55 diversion dams, and 53 system storage devices or gates (ISSD) in the DWSD sewer system. These totals, as well as inspection, rehabilitation, and replacement intervals, came from the CS-1314 technical memorandum entitled Review of Collection System Regulators and Outfalls, revised May 2003. For the most part, the Upper Range and Lower Range CIP's contain the same tasks, costs, and timing.

Outfall Flow Regulator Inspection
The first task of this subprogram is the inspection of outfall flow regulators. Both CIP's assume that all of these devices would be inspected on a 5-year cycle, or 20% per year.

Outfall Flow Regulator Rehabilitation
The second task for this subprogram is the rehabilitation of the outfall flow regulators. Both CIP's assume that these regulators will be rehabilitated every 15 years, with 5 years needed for this work. The first rehab is not scheduled until 2028, as replacement of these regulators is scheduled for 2013.

Outfall Flow Regulator Replacement
The third task for this subprogram actually occurs before the second. Both CIP's assume that all 41-outfall flow regulators would be replaced over 5 years.

Upper Range CIP
The Upper Range CIP has these replacements starting in 2013.

Lower Range CIP
The Lower Range CIP shifts the start of these replacements to 2019.

Outfall, Backwater Gate, and Diversion Dam Inspection
The fourth task for this subprogram is the inspection of outfalls, backwater gates, and diversion dams. Both CIP's assume these structures would be inspected at the same time on 5-year intervals.

Outfall Rehabilitation
The fifth task in Subprogram No. 1F is the rehabilitation of the outfalls. Both CIP's assume that half of the outfalls would need to be rehabbed by 2050. These rehabilitations are scheduled for the 10-year time frame of 2035 through 2044.

Outfall Replacement
Task six in this subprogram is the replacement of outfalls. Both CIP's assume that 4 outfalls will need to be replaced by 2050. These replacements are scheduled for 2010, 2020, 2030, and 2040.

Backwater Gate Rehabilitation
The seventh task for this subprogram is the rehabilitation of backwater gates. Both CIP's assume that all backwater gates will need to be rehabbed every 10 years, with five years needed for each repair cycle. For example, all backwater gates will be rehabbed from 2008 through 2012, then again from 2018 through 2022, and so on.

Backwater Gate Replacement
The eighth task is the replacement of backwater gates. Both CIP's assume that half of the backwater gates would need to be replaced by 2050. This replacement is currently scheduled for 2028 through 2032.

Diversion Dam Rehabilitation
The ninth task for this subprogram is the rehabilitation of diversion dams. Both CIP's assume these structures would be repaired with the same schedule as backwater gates, or every 10 years with 5 years needed to complete each repair cycle.

Diversion Dam Replacement
Task 10 is the replacement of diversion dams. Both CIP's assume that half of the diversion dams would need to be replaced by 2050. This replacement is currently scheduled for 2028 through 2032.

In-System Storage Device Inspection
The 11th task in this subprogram is the inspection of in-system storage devices or gates. Both CIP's assume that all 53 ISSD's would be inspected every year from 2008 through 2050.

In-System Storage Device Rehabilitation
The 12th task for this subprogram is the rehabilitation of ISSD's. Both CIP's assume that all of these structures would be repaired in each cycle with 5 years needed to complete each repair cycle. The first rehab is scheduled from 2015 through 2019. The next repair cycle is 2038 through 2043. The last repair cycle starts in 2048 and rehabs 60% of the ISSD's through 2050.

In-System Storage Device Replacement
The 13th task for this subprogram is the replacement of ISSD's. Half of the total numbers of ISSD's are assumed to be replaced in both CIP's, with the replacements

scheduled for the 10 years from 2025 through 2034. No rehabs of ISSD's are scheduled while these devices are being replaced.

Subprogram No. 1G: Pump Stations
This subprogram deals with inspection, repair, major rehabilitation, and improvements for the 12 existing pump stations in the DWSD system.

Pump Station Inspection
The first task for this subprogram is the inspection of the pump stations. Both CIP's assume that these inspections occur yearly from 2008 through 2050, with the cost related to the number of pumps in each station.

Pump Station Rehabilitation
Task two of the pump station subprogram is the rehabilitation of the sewer pump stations. Both CIP's have these repairs are scheduled in 5-year intervals, meaning all stations are repaired every five years, starting in 2008.

Pump Station Major Rehabilitation
The third task for this subprogram is the major rehabilitation or replacement of the pump stations.

Upper Range CIP
This policy assumes that all stations will be replaced, or rebuilt, through 2050, with the costs spread over 2008 through 2050.

Lower Range CIP
This CIP policy uses the same time frame, but assume that all components except the concrete will be replaced, resulting in half the cost as the Upper Range CIP.

Pump Station Energy Management
The fourth task for this subprogram is the installation of variable frequency drives (VFD) on the pumps at the Clintondale and Woodmere pump stations. TYJT reviewed the effectiveness of installing VFD's at various pump stations, concluding that these two stations would benefit from this installation. This VFD installation will help lower pumping costs at these locations. This VFD review can be found in the May 2003 CS-1314 technical memorandum entitled Energy Management. Both CIP's assume this work will be done in 2008 through 2009.

Subprogram No. 1H: Meters
This subprogram involves the maintenance and replacement of the sewer meters in the DWSD system, as well as the installation of odor controls at the Macomb County meters. There are 65 sewer meters in Detroit and 12 in Macomb County. These quantities are from the CS-1314 technical memorandum Wastewater Facility Inventory: Pump Stations and Meters revised May 2003.

Meter Maintenance
The first task is the maintenance of sewer meters. Both CIP's assume all meters have maintenance costs yearly from 2008 through 2050.

Meter Replacement
The second task is the replacement of the sewer meters. Both CIP's assume that all meters will be replaced once from 2008 through 2050.

Macomb County Odor Control
The third task for this subprogram is the installation of odor control measures at the 12 Macomb County meters. This estimate was performed by Spalding Dedecker Associates and can be found in the CS-1314 technical memorandum entitled Capital Improvement Programs for Macomb County, revised May 2003. Both CIP's have this work scheduled for 2008 through 2009.

1.2.2.2 Program 2: CSO and SSO Control Program

This program deals with the combined and sanitary sewer overflows in the DWSD system. Currently, the CIP only deals with the CSO's.

Subprogram No. 2A: CSO Control
This subprogram deals with several CSO construction projects, some ongoing and in the current CIP, as well as the management of a CSO program and CSO rehabilitation.

Upper Rouge Tunnel
The first task is the continuation of construction and funding for the Upper Rouge Tunnel. Both CIP's list the $362,000,000 rolled over from the current CIP, but do not include the costs in their summaries. It is assumed that Black and Veatch will include these, and any other, rollover costs when they run the rate model.

Source Control
The second task is the continuation of the source control project of disconnecting downspouts directly tied into the sewer system. Both CIP's list the $165,000,000 rolled over from the current CIP, but do not include the costs in their summaries. It is assumed that Black and Veatch will include these, and any other, rollover costs when they run the rate model.

Lower Rouge Outfalls
The third task for this subprogram is the construction of outfalls on the Lower Rouge River. Both CIP's have this $25,000,000 task scheduled for the five years from 2010 through 2014.

Detroit River CSO
The fourth task for the CSO subprogram is the construction of the Detroit River CSO. Both CIP's have this task scheduled for funding for the 20 years from 2017 through 2036.

Upper Range CIP
This policy assumes that the Detroit River CSO project will ultimately cost $750,000,000.

Lower Range CIP
This policy assumes that the Detroit River CSO project will ultimately cost half of the Upper Range estimate, or $375,000,000.

Oakwood Pump Station
The fifth task is another rollover from the current CIP, with both WWMP CIP's listing the $86,000,000 in the current CIP for work at the Oakwood Pump Station / CSO Basin, but not including these costs in their summaries. It is assumed that Black and Veatch will include these, and any other, rollover costs when they run the rate model.

Program Management
Task six in the CIP's is the roll over of $4,759,000 for program management from the current CIP. It is assumed that Black and Veatch will include these, and any other, rollover costs when they run the rate model.

CSO Rehabilitation
The seventh task for this subprogram is the rehabilitation of the CSO's in the DWSD system. Both CIP's assume rehabilitation ill occur at all locations yearly from 2008 through 2050.

Upper Range CIP
The Upper Range CIP assumes that this rehabilitation should cost 1% of the new construction costs for the ten existing CSO's.

Lower Range CIP
This CIP assumes a rehabilitation cost of $6,000,000 per year.

1.2.2.3 Program 3: System Control and Wastewater Treatment Program
Subprogram No. 3A/3B/3C/3D/3E: Headwork's Facilities, Liquid Train, Biosolids Train Facilities, Biosolids Reuse Program, Regional Operations Plan & SCADA
Currently, the WWMP CIP's only consider one part of this program. Both assume that the Wastewater Treatment Plant needs yearly rehabilitation from 2008 through 2050, using $150,000,000 per year for this task. The development of this cost can be found in the CS-1314 technical memorandum Basis of Cost Estimates, revised May 2003.

1.2.2.4 Program 4: Environmental Program
The only task in this program is to connect any septic system remaining in the city of Detroit to the sewer system. Both CIP's assume this will cost $250,000,000 and will be funded from 2008 through 2050.

1.2.2.5 Program 5: Customer Service Program
This program does not have any specific tasks included in the CIP development. However, some customer service costs have been included in the O & M budget in both CIP's.

1.2.2.6 Program 6: Human Resources, Facilities & Technology Program

This program does not have any specific tasks included in the CIP development. However, some costs from this category have been included in the O & M budget in both CIP's.

1.2.3 CIP Cost Allocations

The CIP costs from the programs and subprograms described in the above section are applied to the Black and Veatch rate model. In order to determine their impacts on rates, these costs need to be allocated to the impacted customers. Application of the allocations may be different in the actual Black and Veatch rate model than has been presented here. The WWMP has assumed these allocations fall into four categories for planning purposes; Detroit, Common-to-All, CSO, and Suburban. The following tables list the programs, subprograms, CIP specific tasks, and the cost allocations.

Table 1-1a: Upper Range Programs, Tasks, and Allocations
Subprograms 1.A – 1.D

No.	Program	Project	Cost Assumptions	Cost Allocation
1.A	Lateral and Connector Sewer - Cleaning, Sediment Disposal, & Condition Assessment	Inspection	Yearly inspection of 5% of the system	Detroit
		Cleaning - light and heavy	Of the 5% of system inspected, assume 45% needs heavy cleaning, 35% needs light cleaning, and 20% does not need cleaning.	Detroit
		Sediment testing, removal, and disposal	Each load is sampled and disposed according to sample results.	Detroit
1.B	Interceptor and Trunk Sewers - Condition Assessment	Inspection	Inspect entire system by 2010, and then inspect 5% of system per year.	Common-to-all & Suburban (Interceptors) & Detroit (Trunk)
1.C	Lateral and Connector Sewer Improvements	Relining	Reline 35% of sewers inspected per year (1.8% of the system)	Detroit
1.D	Interceptor and Trunk Cleaning, Sediment Disposal, & Sewer Improvements	Structural Repairs	Repairs follow inspections every 20 years. Repairs increase by 20% each inspection.	Common-to-all & Detroit
		Cleaning	Entire system cleaned by 2010 (for inspection). After 2010, 5% of the system is inspected per year, 10% of these sewers require heavy cleaning. Remaining sewers do not require cleaning.	
		Sludge Removal	For cleaning before 2010, sediment quantity estimated from current information on quantities in large sewers, extrapolated to the rest of the system. After 2010, assume sediment deposits removed decline by 50% in each cleaning cycle	
		Sediment testing and disposal	Each load of sediment is sampled prior to disposal.	
		Relief sewers:	Provide 5 relief/trunk sewers evaluated and identified in the 1978 report on an as-needed basis.	Detroit
		7 Mile Rd.		
		Fenkell		
		Schoolcraft		
		Hubbell		
		Joy/Clark		

Table 1-1b: Upper Range Programs, Tasks, and Allocations
Subprograms 1.D – 1.F

1.D	Interceptor and Trunk Cleaning, Sediment Disposal, & Sewer Improvements	Modeling of additional relief sewers	Individual project cost estimate	Detroit, some may be Common-to-all
		Clintondale P.S./ 15 Mile Rd. improvements	Individual project cost estimate	Suburban
		Stop gates at meters CV-3, MB-25	Individual project cost estimates	Suburban
		New N. Gratiot Interceptor	Individual project cost estimate	Suburban
		Install new redundant sewer system parallel to the Oakwood Interceptor section of the NW Interceptor	New installation of 8.7M plus contingencies	Detroit
		NW Interceptor Improvements or connection to tunnel	For estimating purposes: Rehabilitate 20% and replace 10% of the interceptor.	Common-to-all below Ford Rd., Suburban & Detroit N. of Ford Rd., portion owned by Wayne Co.
1.E	Manholes and Catch Basin Improvements	Manhole Inspections	Inspect manholes with catch basins on a three year interval	Detroit
		Manhole Repairs	5-15% of manholes need various minor repairs.	
		Manhole Replacement	2% of manholes need replacement every 20 years	
		Catch Basin Cleaning & Inspection	Clean all catch basins every 3 years.	
		Repair catch basins	5% of catch basins are repaired per 20 year cycle	
1.F	Regulators, Outfalls, Backwater Gates, and In-System Storage	Outfall Flow Regulators Inspection	41flow regulators inspected every 5 years.	Common-to-all
		Outfall Flow Regulator Rehab	41 flow regulators rehabbed every 15 years. No rehabs until 2028 because of replacement event earlier.	
		Outfall Flow Regulator Replacement	50% of regulators replaced every 30 yrs. One replacement event from 2013-2018.	
		Outfall, Backwater Gate, & Diversion Dam Inspection	Inspect 81 outfalls every 5 yrs.	
		Outfall Rehabilitation	50% of outfalls need rehab in 50 years.	
		Outfall Replacement	4 outfalls need replacement in 50 yrs.	
		Backwater Gate Inspection	Inspect 54 BW gates during outfall inspections (every 5 years).	

Table 1-1c: Upper Range Programs, Tasks, and Allocations
Subprograms 1.F – 2.A

1.F	Regulators, Outfalls, Backwater Gates, and In-System Storage	Backwater Gate Rehab	Rehab 54 BWGs every 10 yrs.	Common-to-all
		Replace Backwater Gates	Replace 50% of BWGs every 50 yrs.	
		Diversion Dam Inspection	Inspected during outfall inspections.	
		Diversion Dam Rehabilitation	Rehab 55 dams every 10 yrs. over 40 yrs. (4 rehab intervals)	
		Diversion Dam Replacement	50% of dams are replaced every 50 yrs.	
		In-System Storage Devices & System Gate Inspection	Inspect all 53 gates/devices every year.	
		In-System Storage Devices & System Gate Rehab	53 gates/devices rehabbed every 10 yrs.	
		In-System Storage Devices & System Gate Replacement	50% of gates/devices replaced every 30 yrs. (one replacement cycle in 50 years, cost spread over 50 yrs.)	
1.G	Pump Stations	Pump Station Inspection	All pump stations electrical/mechanical yearly inspection.	Suburban, Detroit, Common-to-all - TBD?
		Pump Station Rehabilitation	Yearly rehab cost based on PC-744 Asset Audit.	
		Pump Station Replacement	13 pump stations replaced in 50 years, cost spread over 50 years.	
		Hydraulic Capacity Evaluation	Included under Pump Station Inspection Cost	
		Evaluate and install energy-conserving improvements by 2010 (VFDs in pump stations)	Individual project cost for VFD Installation at Clintondale and Woodmere PS included.	
1.H	Meters	Meter maintenance (ongoing inspection & rehab)	Ongoing maintenance cost per year based on CS-1249.	Suburban
		Meter replacement (structural, mechanical, electrical)	All meters replaced once over 50-year period.	
		Macomb Meter Odor Control	Installation of odor control measures at the meters in Macomb County	
2.A	CSO Control	Upper Rouge or combined tunnel	Remaining CIP estimated cost after 2007.	CSO
		Source Control Project	Remaining CIP estimated cost after 2007.	
		Lower Rouge Outfalls	Cost for one CSO basin.	
		Detroit River CSO Control (possible tunnel)	Installation of selected alternative at a cost of $750M.	

Table 1-1d: Upper Range Programs, Tasks, and Allocations
Subprograms 2.A - 6

2.A	CSO Control	Oakwood CSO Basin & P.S.	Remaining CIP estimated cost after 2007.	CSO
		Program Management - CSO Program	Remaining CIP estimated cost after 2007.	
		CSO facilities rehabilitation	Rehab of CSO facilities estimated at $13 M/year (1% of capital cost).	
2.B	SSO Control	Study to identify capital improvements needed to accept 10-yr., 1-hr. storm	$0	Common-to-all
3.A, B, C, D, E	WWTP	WWTP capital improvements	$150M per year to cover ongoing rehabilitation and replacement, system control improvements, and major treatment unit replacement.	Common-to-all
4	Environmental Protection Program	Install new gravity sewer to sewer remaining septic tanks in the City	Gravity sewer will be extended as necessary. Assume a total cost of $2.5M. *Costs are allocated to the O+M budget.*	Detroit
		Sediment testing	Assume laboratory testing for contaminants is done on every truck load ($200 per load).	Detroit
5	Customer Service Program	Customer Service	*Costs are allocated to the O+M budget.*	Detroit
6	Human Resources, Facilities & Technology Program	Human Resources & Facilities	*Costs are allocated to the O+M budget.*	Detroit

Table 1-2a: Lower Range Programs, Tasks, and Allocations
Subprogram 1.A

No.	**Program**	**Project**	**Cost Assumptions**	**Cost Allocation**
1.A	Lateral and Connector Sewer - Cleaning, Sediment Disposal, & Condition Assessment	Inspection	Yearly inspection of 2.5% of the system	Detroit
		Cleaning - light and heavy	Of the 2.5% of system inspected, assume 45% needs heavy cleaning, 35% needs light cleaning, and 20% does not need cleaning.	Detroit
		Sediment testing, removal, and disposal	Each load is sampled and disposed according to sample results.	Detroit

Table 1-2b: Lower Range Programs, Tasks, and Allocations
Subprograms 1.B – 1.D

1.B	Interceptor and Trunk Sewers - Condition Assessment	Inspection	Inspect all interceptors and 1/3 of the trunk sewers by 2010 and the remaining 2/3 trunk sewers by 2030. Inspect all trunk mains and interceptors from 2031-2050 (5% per year). Inspect only 10% of the system as a good representative.	Common-to-all & Suburban (Interceptors) & Detroit (Trunk)
1.C	Lateral and Connector Sewer Improvements	Relining	Reline 35% of sewers inspected per year (0.9% of the system)	Detroit
1.D	Interceptor and Trunk Cleaning, Sediment Disposal, & Sewer Improvements	Structural Repairs	All interceptors and 1/3 of the trunk sewers rehabilitated by 2010 2/3 of the trunk sewers rehabilitated by 2030. The entire system rehabbed from 2031-2050.	Common-to-all & Detroit
		Cleaning	All interceptors and 1/3 of the trunk sewers cleaned by 2010 2/3 of the trunk sewers cleaned by 2030. The entire system cleaned from 2031-2050.	
		Sludge Removal	For cleaning before 2010, sediment quantity estimated from current information on quantities in large sewers, extrapolated to the rest of the system. After 2010, assume sediment deposits removed decline by 50% in each cleaning cycle	
		Sediment testing and disposal	Each load of sediment is sampled prior to disposal.	
		Relief sewers:	Rehabilitate lateral and connector sewers identified in the tributary area of the 5-relief/trunk sewers listed. Complete rehabilitation from 2003-2010. By 2010, monitor flows to determine the need for relief sewers along these trunk sewers.	Detroit
		7 Mile Rd.		
		Fenkell		
		Schoolcraft		
		Hubbell		
		Joy/Clark		
		Modeling of additional relief sewers	Individual project cost estimate	Detroit, some may be Common-to-all
		Clintondale P.S./ 15 Mile Rd. improvements	Individual project cost estimate	Suburban
		Stop gates at meters CV-3, MB-25	Individual project cost estimates	Suburban

Table 1-2c: Lower Range Programs, Tasks, and Allocations
Subprograms 1.D – 1.F

1.D	Interceptor and Trunk Cleaning, Sediment Disposal, & Sewer Improvements	New N. Gratiot Interceptor	Individual project cost estimate	Suburban
		Install new redundant sewer system parallel to the Oakwood Interceptor section of the NW Interceptor	Individual project cost estimate. New installation of 8.7M plus contingencies	Detroit
		NW Interceptor Improvements	For estimating purposes: Rehabilitate 20% and replace 10% of the interceptor.	Common-to-all below Ford Rd., Suburban & Detroit N. of Ford Rd., portion owned by Wayne Co.
1.E	Manholes and Catch Basin Improvements	Manhole Inspections	Inspect 2.5% of manholes per year in conjunction with sewer inspections.	Detroit
		Manhole Repairs	5-15% of manholes need various minor repairs out of the 2.5% manholes inspected per year.	
		Manhole Replacement	2% of manholes inspected need replacement out of the 2.5% of manholes inspected per year.	
		Catch Basin Cleaning & Inspection	Clean every 10 years	
		Repair catch basins	Of the 10% of catch basins inspected per year, 2.5% require repair.	
1.F	Regulators, Outfalls, Backwater Gates, and In-System Storage	Outfall Flow Regulators Inspection	41flow regulators inspected every 5 years.	Common-to-all
		Outfall Flow Regulator Rehab	41 flow regulators rehabbed every 15 years. No rehabs until 2028 because of replacement event earlier.	
		Outfall Flow Regulator Replacement	50% of regulators replaced every 30 yrs. One replacement event between 2019-2023.	
		Outfall, Backwater Gate, & Diversion Dam Inspection	Inspect 81 outfalls every 5 yrs.	
		Outfall Rehabilitation	50% of outfalls need rehab in 50 years.	
		Outfall Replacement	4 outfalls need replacement in 50 yrs.	
		Backwater Gate Inspection	Inspect 54 BW gates during outfall inspections (every 10 years).	
		Backwater Gate Rehab	Rehab 54 BWGs every 10 yrs.	

Table 1-2d: Lower Range Programs, Tasks, and Allocations
Subprograms 1.F – 1.H

1.F	Regulators, Outfalls, Backwater Gates, and In-System Storage	Replace Backwater Gates	Replace 50% of BWGs every 50 yrs.	Common-to-all
		Diversion Dam Inspection	Inspected during outfall inspections.	
		Diversion Dam Rehabilitation	Rehab 55 dams every 10 yrs. Through 2050, skipping when there is replacement (4 rehab intervals)	
		Diversion Dam Replacement	50% of dams are replaced every 50 yrs.	
		In-System Storage Devices & System Gate Inspection	Inspect all 53 gates/devices every year.	
		In-System Storage Devices & System Gate Rehab	53 gates/devices rehabbed every 10 yrs.	
		In-System Storage Devices & System Gate Replacement	50% of gates/devices replaced every 30 yrs. (one replacement cycle in 50 years, cost spread over 50 yrs.)	
1.G	Pump Stations	Pump Station Inspection	All pump stations electrical/mechanical yearly inspection	Suburban, Detroit, Common-to-all - TBD?
		Pump Station Rehabilitation	Yearly rehab cost based on PC-744 Asset Audit.	
		Pump Station Major Rehabilitation	13 pump stations replaced in 50 years, cost spread over 50 years. Replace all components except the concrete. Assume 1/2 the total cost of the mig-range estimate.	
		Hydraulic Capacity Evaluation	Included under Pump Station Inspection cost.	
		Evaluate and install energy-conserving improvements by 2010 (VFDs in pump stations)	Individual project cost for VFDs included.	
1.H	Meters	Meter maintenance (ongoing inspection & rehab)	Ongoing maintenance cost per year based on CS-1249.	Suburban
		Meter replacement (structural, mechanical, electrical)	All meters replaced over 50 yrs.	
		Macomb Meter Odor Control	Installation of odor control measures at the meters in Macomb County	

Table 1-2e: Lower Range Programs, Tasks, and Allocations
Subprograms 2.A – 6

2.A	CSO Control	Upper Rouge or combined tunnel	Remaining CIP estimated cost after 2007.	CSO
		Source Control Project	Remaining CIP estimated cost after 2007.	
		Lower Rouge Outfalls	Cost for one CSO basin.	
		Detroit River CSO Control (possible tunnel)	Removal of CSOs (alternative not yet selected) estimated at $375M.	
		Oakwood CSO Basin & P.S.	Remaining CIP estimated cost after 2007.	
		Program Management - CSO Program	Remaining CIP estimated cost after 2007.	
		CSO facilities rehabilitation	Rehab of CSO facilities estimated at $6M/year.	
2.B	SSO Control	Study to identify capital improvements needed to accept 10-yr., 1-hr. storm	$0	Common-to-all
3.A, B, C, D, E	WWTP	WWTP capital improvements	$150 M per year to cover ongoing rehabilitation and replacement and system control improvements.	Common-to-all
4	Environmental Protection Program	Install new gravity sewer to sewer remaining septic tanks in the City	Gravity sewer will be extended as necessary. Assume a total cost of $2.5M. *Costs are allocated to the O+M budget.*	Detroit
		Sediment testing	Assume laboratory testing for contaminants is done on every truck load ($200 per load).	Detroit
5	Customer Service Program	Customer Service	*Costs are allocated to the O+M budget*	Detroit
6	Human Resources, Facilities & Technology Program	Human Resources & Facilities	*Costs are allocated to the O+M budget*	Detroit

2. Results and Conclusions

2.1 Results

Table 2-1 shows a summary of total costs for the three CIP's in 2003 dollars. Tables 2-2, and 2-3 show the summaries from the three WWMP CIP's.

Table 2-1: WWMP CIP Comparison

CIP	O & M Costs	Total Costs
Upper Range	$8,720,500,000	$25,204,993,000
Lower Range	$8, 720,500,000	$22,073,420,000

3. Conclusions

The WWMP team has developed two reasonable CIP programs for implementation through 2050. This information has been provided to Black and Veatch and inputted into the DWSD rate model for analysis of future rates.

Table 2-2: Upper Range Costs

Cost Summary Wastewater Master Plan, 2000-2050 - Upper Range Costs									
	5-Year Intervals								
Program	**2008-2010**	**2011-2015**	**2016-2020**	**2021-2025**	**2026-2030**	**2031-2035**	**2036-2040**	**2041-2045**	**2046-2050**
Program 1: Sewer Infrastructure									
City of Detroit	$ 359,571,000	$ 591,250,000	$ 553,200,000	$ 553,200,000	$ 553,200,000	$ 556,272,000	$ 515,356,000	$ 488,079,000	$ 488,079,000
Suburban	$ 28,666,000	$ 34,444,000	$ 22,444,000	$ 14,444,000	$ 14,444,000	$ 14,698,000	$ 14,698,000	$ 14,698,000	$ 14,698,000
Common To All	$ 9,436,000	$ 28,808,000	$ 2,060,000	$ 2,060,000	$ 2,060,000	$ 2,334,000	$ 2,334,000	$ 2,334,000	$ 2,334,000
Total	**$ 397,673,000**	**$ 654,502,000**	**$ 577,704,000**	**$ 569,704,000**	**$ 569,704,000**	**$ 573,304,000**	**$ 532,388,000**	**$ 505,111,000**	**$ 505,111,000**
Program 2: CSO New*									
CSO Program	$ 70,516,000	$ 99,235,000	$ 257,440,000	$ 262,038,000	$ 330,776,000	$ 301,251,000	$ 315,596,000	$ 207,640,000	$ 79,800,000
Program 3: System Controls/ WWTP									
Common To All	$ 450,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000
Other Programs and Miscellaneous**	$ 225,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000
CIP Subtotal	**$ 1,143,189,000**	**$ 1,878,737,000**	**$ 1,960,144,000**	**$ 1,956,742,000**	**$ 2,025,480,000**	**$ 1,999,555,000**	**$ 1,972,984,000**	**$ 1,837,751,000**	**$ 1,709,911,000**
O & M**	$ 586,500,000	$ 1,011,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000
Total CIP and O&M	**$ 1,729,689,000**	**$ 2,890,237,000**	**$ 2,977,644,000**	**$ 2,974,242,000**	**$ 3,042,980,000**	**$ 3,017,055,000**	**$ 2,990,484,000**	**$ 2,855,251,000**	**$ 2,727,411,000**
* Estimates for new CSO programs starting in 2008 (not currently included in the DWSD CIP).									
** Other Programs and Miscellaneous category includes Environmental Protection, Customer Service, and Human Resources, Facilities, and Technology Programs. Technology upgrades, engineering and computer services are also included.									

Table 2-3: Lower Range Costs

Cost Summary Wastewater Master Plan, 2000-2050 - Lower Range Costs									
	5-Year Intervals								
Program	**2008-2010**	**2011-2015**	**2016-2020**	**2021-2025**	**2026-2030**	**2031-2035**	**2036-2040**	**2041-2045**	**2046-2050**
Program 1: Sewer Infrastructure									
City of Detroit	$ 147,293,000	$ 258,447,000	$ 253,777,000	$ 303,847,000	$ 303,847,000	$ 309,856,000	$ 289,398,000	$ 258,712,000	$ 258,712,000
Suburban	$ 25,764,000	$ 31,139,000	$ 19,139,000	$ 11,139,000	$ 11,139,000	$ 11,625,000	$ 11,625,000	$ 11,625,000	$ 11,625,000
Common To All	$ 7,684,000	$ 27,536,000	$ 788,000	$ 788,000	$ 788,000	$ 1,311,000	$ 1,311,000	$ 1,311,000	$ 1,311,000
Total	**$ 180,741,000**	**$ 317,122,000**	**$ 273,704,000**	**$ 315,774,000**	**$ 315,774,000**	**$ 322,792,000**	**$ 302,334,000**	**$ 271,648,000**	**$ 271,648,000**
Program 2: CSO New*									
CSO Program	$ 48,450,000	$ 54,591,000	$ 145,663,000	$ 139,379,000	$ 200,249,000	$ 170,724,000	$ 185,069,000	$ 114,613,000	$ 47,645,000
Program 3: System Controls/ WWTP									
Common To All	$ 450,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000	$ 750,000,000
Other Programs and Miscellaneous**	$ 225,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000	$ 375,000,000
CIP Subtotal	**$ 904,191,000**	**$ 1,496,713,000**	**$ 1,544,367,000**	**$ 1,580,153,000**	**$1,641,023,000**	**$ 1,618,516,000**	**$ 1,612,403,000**	**$ 1,511,261,000**	**$ 1,444,293,000**
O & M	$ 586,500,000	$ 1,011,500,000	$ 1,017,500,000	$ 1,017,500,000	$1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000	$ 1,017,500,000
Total CIP and O&M	**$ 1,490,691,000**	**$ 2,508,213,000**	**$ 2,561,867,000**	**$ 2,597,653,000**	**$2,658,523,000**	**$ 2,636,016,000**	**$ 2,629,903,000**	**$ 2,528,761,000**	**$ 2,461,793,000**
* Estimates for new CSO programs starting in 2008 (not currently included in the DWSD CIP).									
** Other Programs and Miscellaneous category includes Environmental Protection, Customer Service, and Human Resources, Facilities, and Technology Programs. Technology upgrades, engineering and computer services are also included.									