Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Review of DWSD Practices and Policies

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Review of DWSD Practices and Policies

1. Objective

The objective of this report is to document practices and policies within DWSD related to the wastewater collection and treatment systems. The primary area of focus was practices and policies related to development and expansion of the wastewater system. Policies and practices related to rates, engineering standards and regulatory compliance were also reviewed.

2. Scope of Work

The work under this task was divided into four phases. The first phase was a data collection phase. All relevant DWSD documents and internal memoranda that pertain to the wastewater policies and practices were collected and reviewed. In the second phase, officials within DWSD who were conversant with DWSD wastewater policies and practices were identified, and interviews were set up with these officials. These officials included staff from various DWSD divisions such as Engineering Services, Wastewater Treatment (including staff at the wastewater treatment plant), Financial Planning, Water Supply Operations and Administrative Support. During the third phase, interviews were conducted with the identified DWSD officials to obtain their views and understanding of DWSD wastewater policies and practices that affect their divisions. Individual memoranda were prepared to document findings from these interviews. In the final phase, all the individual memoranda were combined into a final technical memorandum (this report) that describes DWSD's wastewater policies and practices.

3. Background

DWSD's sewerage system serves an area of approximately 904 square miles in the City of Detroit, and communities in Wayne, Oakland and Macomb Counties. Sewerage service is provided on a retail basis within the City of Detroit and on a wholesale basis to approximately 76 communities in the three counties. The sewerage system serves a total population of about 3.2 million people, of which approximately 1 million people live within the City of Detroit.

The major components of the sewerage system include the wastewater treatment plant, a collection system within the City of Detroit (including approximately 3,800 miles of trunk and lateral sewers), 14 pumping stations, 4 major interceptors within the City of Detroit, and 39 miles of interceptors outside the City of Detroit limits. DWSD has provided wholesale service to an increasing number of surrounding municipalities since 1940 when the newly constructed Wastewater Treatment Plant was put into operation. Currently, DWSD has service contracts for wastewater service with a number of customers outside the City of Detroit. Many of these customers are County agencies, sewer districts or authorities, which in turn have contracted with individual communities.

The Detroit Wastewater Treatment Plant (WWTP) is located on a 123-acre site in southwest Detroit at 9300 Jefferson Avenue, at the confluence of the Detroit River and the Rouge River. The raw sewage flows into the WWTP through four main interceptors – Detroit River Interceptor (DRI), Oakwood and Northwest Interceptors (O-NWI), and the North Interceptor East Arm (NI-EA). Facilities at the WWTP include two pumping stations (Pump Stations 1 and 2) with a combined firm capacity of approximately 1,663 million gallons per day (which will increase to 1,800 mgd after completion of PC-744), screening with bar racks, grit removal, primary treatment (using both rectangular and circular primary clarifiers), secondary treatment (utilizing both air and pure oxygen aeration basins and circular secondary clarifiers), solids handling (sludge blending and storage tanks, belt filter presses, centrifuges and incinerators), chlorine disinfection, and outfalls to the Detroit and Rouge Rivers.

Wastewater flow in the collection system is monitored and controlled remotely by the Systems Control Center located in the Water Board Building.

4. Data Collection Phase

One of the important documents obtained was DWSD's Directive No. 98-6, "System Expansion Policy", that was signed and approved by the Director of DWSD in November 1998. This policy was approved as an extension of the "DWSD Growth Policy" adopted by the City of Detroit Board of Water Commissioners (BOWC) in August 1996. The DWSD System Expansion Policy established a new policy for DWSD that allows charging capital to customers who wish to either extend DWSD service to their community or to expand their current DWSD service. The policy applies to both water and sewer services.

Another important document obtained was the report titled "Long Term CSO Plan for the Detroit and Rouge Rivers". This study report was completed in 1996, and addressed the long term CSO plan for the City of Detroit and surrounding communities. In addition, this report also addressed treatment capacity at the Wastewater Treatment Plant.

Also, copies of some of the existing customer service contracts were obtained. The following DWSD officials were contacted, and interviewed.

- Mr. Awni Qaqish P.E., Assistant Director of Engineering Services
- Mr. Gary Fujita P.E., Assistant Director of Wastewater Treatment
- Mr. James George, Assistant Director of Financial Planning
- Mr. Bharat Doshi P.E., Head Engineer – Water Systems Design Group
- Mr. Andre` Lowe P.E., Head Engineer – Wastewater Design Group
- Ms. Louise Lieberman P.E., Chief Sewage Plant Engineer
- Mr. Sidney Bailey III P.E., Technical Advisor to the Chief Sewage Plant Engineer
- Mr. Stephen Kuplicki P.E., Manager – Industrial Waste Control Division
- Mr. George Haberer P.E., Engineer of Water Systems - Planning

- Ms. Joan Hughes, Manager – Office of Program Management Assistance

5. Findings

5.1 DWSD Contracting Policy

On the wastewater side, DWSD usually contracts with municipal entities and public sewage disposal districts or authorities. However, it does have service contract agreements with a few corporate customers.

In addition to the City of Detroit, DWSD has service contracts with the following municipal customers in Wayne County:

- Northeast Wayne County
- Wayne County Area #3
- Wayne County Area #6
- Rouge Valley
- Allen Park
- Dearborn East
- Dearborn Northeast
- Dearborn West
- Grosse Pointe
- Grosse Pointe Farms
- Grosse Pointe Park
- Hamtramck
- Harper Woods
- Highland Park
- Melvindale
- Redford Township

In Oakland County, DWSD has service contracts with:

- Clinton-Oakland district
- Evergreen-Farmington district
- Farmington
- Southeast Oakland County district

In Macomb County, DWSD has service contracts with:

- Center Line
- Macomb County

5.2 System Expansion Policy

5.2.1 Stated Policy

The System Expansion Policy, adopted in November 1998, establishes a policy that allows charging capital to customers who wish to extend or expand water and/or sewer service within their community. Prior to this policy, when customers requested

addition to the DWSD system or expansion of their service to the DWSD system, additionally incurred capital costs were distributed among the entire customer base. Under this new policy, DWSD established that only those customers that will benefit from the extended or expanded service would incur capital costs.

By requiring customers to project their future growth and to determine their water and wastewater needs for a prescribed period (say, 10 years), the policy encourages customers to only request those services that the customer deems necessary and able to finance. In effect, this policy addresses concerns that DWSD's earlier policies were encouraging urban sprawl.

The policy recognizes that increasing the customer base will help spread the operations and maintenance costs over a larger customer base thus lowering the unit price. The policy is also clear in stating that existing customers should not subsidize growth costs for new customers, and that "Growth must support itself". Currently, all of DWSD's wastewater customers are within Wayne, Oakland and Macomb counties.

However, the policy does not state any geographic limits for its customers. It is assumed that this policy does not restrict customers outside the three counties from joining the DWSD sewerage system as long as they meet the stipulations of this policy.

5.2.2 Implementation Procedures

The System Expansion Policy is more of an overall policy and philosophy statement. The policy does not offer formal procedures for DWSD staff to implement provisions in the policy. Since the policy was adopted in November 1998, no new customers have joined the DWSD wastewater system. The last new customer to join the DWSD collection system was the City of Rochester in 1994.

Customer applications, either for new service or expanded service, are usually sent to the DWSD Director, Deputy Director or one of the Assistant Directors. The application is then evaluated through an internal evaluation process. The evaluation process includes a technical feasibility study conducted by the Engineering Services division, and a rate evaluation study conducted by the Financial Services division. Customers are also required to submit a copy of the application to the Michigan Department of Environmental Quality (MDEQ) for regulatory approval under Act 451, Part 241.

If the customer connection requires new infrastructure within the customer service area (for example, construction of a new interceptor within the customer service area to bring flow to one of Detroit's three main interceptors), construction costs will be borne by the customer. DWSD will be in charge of this construction and DWSD will recover these costs from the customer either through an up front payment of the full sum as calculated by DWSD, a fixed monthly surcharge payment designed to amortize the cost of investment over an agreed time period, or a combination of the above two alternatives.

If construction is required to add capacity or improve reliability of DWSD's "back bone" infrastructure, the capital costs will be borne by all the customers. The "back bone" infrastructure consists of the WWTP, the four main interceptors and the sewage pumping stations.

The issue of ownership of meters and interceptors in suburban communities should be addressed in the service contracts. In the past, lack of a clear definition of ownership in service contracts has prolonged problem resolutions. Issues such as liability and operation and maintenance costs are tied to ownership.

5.3 Rate Setting Procedures

DWSD's Financial Services and Financial Planning divisions are in charge of the rate setting process for all the customers.

The wholesale rate (cost per unit flow) is established for the entire service area and is common to all the customers. The wholesale rate is based on projected total operation and maintenance costs for the primary collection system (main interceptors and sewage pumping stations) and treatment system (wastewater treatment plant), and any capital costs incurred on the "back bone" infrastructure. The backbone infrastructure includes the wastewater treatment plant, the three main interceptors and the sewage pumping stations. The wholesale rate is calculated at the beginning of each year.

In 1989, DWSD started a "look back" program, which provides for a rate adjustment at the end of each year based on actual flows and costs. If at the end of the year, a customer is overcharged, the difference will be reimbursed to that customer. If a customer is undercharged, the difference will be added to that customer's wholesale rate the following year.

Proposed rates are presented to each customer early in the annual cycle. Feedback is sought from each customer, and the basis for the rate is explained. The rates are then presented to the Board of Water Commissioners (BOWC) for their approval and then to the Detroit City Council for their approval. Representatives from suburban customers are invited to attend both these meetings to present their concerns on the rate-setting process.

For some customers, DWSD may have built additional infrastructure within the customer service area, and surcharge rates are charged only to those customers for amortization of the infrastructure investment costs. In addition to the wholesale cost, all wholesale customers will determine their own retail costs. Hence, the costs incurred to build new trunk and lateral sewers, and to maintain the existing sewers within the City of Detroit will be borne only by the City of Detroit residents as a retail cost. Similarly, the suburban customers will charge retail costs to residents living in those customer service areas.

Currently, most of the service contracts do not have provisions to charge a surcharge for those customers discharging in excess of the flow or volume stipulated in the contract. Five service contracts (Center Line, Evergreen-Farmington District, Farmington, Northeast Wayne County, and Southeast Oakland County District) have language on charging a surcharge and a surcharge rate (excess flow charge). However, these surcharge rates were determined in the past and are no longer appropriate. These surcharge rates need to be updated and indexed.

In 1999, the City of Detroit and the suburban customers reached an agreement wherein the City of Detroit will pay 83 percent of the capital costs for the construction of CSO Control Program within the City of Detroit. The remaining 17 percent of the cost will be borne by the suburban customers. This decision was reached via the Federal Court (under the Honorable Judge Feikens). The 83/17 split is for "Non-Detroit Only" and "Non-Common to All" facilities only. The Leib/St. Aubin/Chene CSO control facilities are "Detroit Only" facilities and capital costs for these facilities will be borne only by the City of Detroit rate payers.

5.4 Capacity Evaluation

The DWSD wastewater system includes the wastewater conveyance system and the treatment system.

The conveyance system includes the three main interceptors (DRI, O-NWI and NI-EA) and lift stations. Within the City of Detroit, the conveyance system also includes three combined sewer overflow (CSO) retention basins. The treatment system includes the wastewater treatment plant (WWTP) and the two outfalls (Detroit River outfall and Rouge River outfall) that discharge the WWTP effluent into the receiving streams.

5.4.1 Conveyance System

The DWSD service area includes combined sewer systems as well as separate sewer systems. The City of Detroit, several cities in Wayne County (Dearborn, Inkster and others), and some older communities in Oakland and Macomb counties have combined sewer systems. Some of the separate sewer systems have been classified as "wet" sanitary systems due to significant inflows.

The 1966 DWSD (then, the Detroit Department of Water Service) report titled "Pollution Control Program for the Detroit Regional Watershed" is regarded as the original wastewater master plan for the City of Detroit and surrounding communities. This program was an update to the 1957 Expansion and Improvement Program. The major objectives of the 1966 Pollution Control Program were:

- Systematic and orderly development of a single pollution control system for the Detroit regional watershed
- Construction of an area-wide wastewater interceptor system
- Installation and operation of advanced wastewater treatment facilities
- Further reduction in storm water overflows

- Acceleration of industrial wastewater control

The report considered population and flow projections for Wayne, Oakland, Macomb, St. Clair, Washtenaw and Monroe counties. A regional interceptor system for the Wayne-Oakland-Macomb Area, Monroe-Washtenaw Area, and for the St. Clair Area was envisioned in the report. The City of Detroit's Wastewater Treatment Plant was to treat wastewater from the Wayne-Oakland-Macomb Area interceptors. The Monroe-Washtenaw Area interceptors were to transmit wastewater to a proposed wastewater renovation center in the vicinity of the mouth of the Huron River. The St. Clair Area interceptors were to transmit wastewater to a proposed wastewater renovation center in Cottrelville Township.

The main interceptors within the Wayne-Oakland-Macomb Area were designed for future population projections for the three counties, using a design flow parameter of approximately 0.4 cfs per 1000 capita. For "wet" systems, higher values of 0.5 to 0.6 cfs per 1000 capita were used.

The Greater Detroit Regional Sewer System (GDRSS) model was developed through a cooperative effort between DWSD; the City of Dearborn; and Wayne, Oakland and Macomb counties to predict the hydraulics and flows in the collection and transport system.

The GDRSS model was developed under DWSD Contract CS-1245 under the mandate of the Federal Court (the Honorable Judge Feikens) as part of the NPDES permit settlement negotiations. The GDRSS model has been widely used to estimate flows in the DWSD collection system under dry weather and wet weather scenarios.

5.4.2 Treatment System

The Detroit Wastewater Treatment Plant was first put into operation in 1940. The original plant included Pump Station 1, primary treatment and chlorination, and was designed to serve 2 million customers. With continued population growth and increasing demand for wastewater service in the suburban areas, the Wastewater Treatment Plant underwent a major upgrade in 1960's that included addition of secondary treatment and expansion of the primary treatment capacity.

The primary treatment capacity at the WWTP was designed for wet weather flows. The secondary treatment capacity was designed for dry weather flows. During extreme wet weather events (when the raw wastewater flow exceeded the primary treatment capacity), the transport system was allowed to overflow at outfalls located along both the Detroit and Rouge rivers.

Since Federal and State regulations imposed restrictions on overflows at these outfalls, DWSD initiated a study to minimize combined sewer overflows in the sewer system. In 1994, Pump Station 2 was put into service to increase influent pumping capacity at the Wastewater Treatment Plant.

The same year, DWSD also initiated the "Long Term CSO Control Plan" study.

In addition to developing a long-term CSO plan, the study evaluated individual process capacities and the overall treatment capacity at the wastewater treatment plant. The Study's final report was published in 1996. The study reported the following conclusions:

- Maximum flow capacity of 2,500 mgd in the transport system
- In-system storage capacity of 130 million gallons
- Firm pumping capacity of 1,646 mgd for the two pumping stations at the WWTP
- Primary clarifiers raw water capacity (excluding recycle flow) of 1,520 mgd
- Secondary clarifiers capacity of 930 mgd (including recycle)
- Solids handling capacity of 552 dry tons per day (dtpd)
- Total outfall capacity of 1800 mgd

The study recognized that the primary clarifier capacity was limiting in treating wet weather flows. Hence, two new clarifiers are being built under Contract PC-740 to increase primary treatment capacity by approximately 180 mgd. Other ongoing construction projects include a new chlorination and dechlorination facility, and construction of a second outfall to the Detroit River (DRO2).

Contract PC-744, a program management contract for the WWTP, was initiated in November 2000 to help DWSD in evaluating all needs of the WWTP to ensure that the plant firm capacity is available, among other things. An initial Needs Assessment Study identified all the projects to be accomplished under PC-744 and completed within the next five years. PC-744 will either upgrade or replace equipment so that the plant capacity is not impacted or cut down due to out-of-service equipment. A plant-wide capacity evaluation will be conducted after the completion of existing projects and those projects identified under PC-744.

The annual average flow at the wastewater treatment plant, including dry and wet weather flows, was approximately 724 mgd in 2001. However, flows reach as high as 1,500 mgd during extreme wet weather events.

The DWSD Long Term CSO Plan (DWSD Contract CS-1281) addressed the issue of building CSO retention basins to store wet weather flows in excess of the primary treatment capacity at the Wastewater Treatment Plant. Currently, the City of Detroit has three CSO retention basins recently built and in operation (Hubbell-Southfield, Puritan-Fenkell and Five-Mile). Additional CSO retention basins are either under construction (Conner Creek CSO Pilot Facility, St. Aubin/Leib CSO Pilot Facility) or are being designed.

5.5 Other Policies and Procedures

5.5.1 Engineering Services

The Engineering Services Division provides engineering services to all facilities within DWSD. The services provided can be classified into three broad categories:

- Capital Improvement Program (CIP) development
- Capacity evaluation
- Design and design oversight services

5.5.1.1 CIP Development:

The Wastewater Facility Design group is in charge of identifying CIP projects at the Wastewater Treatment Plant and sewage pumping stations, and for developing contract documents for bidding and executing these projects. The Major Pipeline Design group is in charge of identifying CIP projects in the conveyance system and preparing contract documents. The recently formed CSO Design group is in charge of identifying CIP projects for the collection system to comply with the NPDES permit and all applicable rules and regulations related to CSOs, and to develop contract documents for the identified projects.

The Wastewater Construction group is in charge of scheduling and executing construction projects at the Wastewater Treatment Plant. Construction projects outside the Wastewater Treatment Plant are managed either by the Field Engineering group or the Wastewater Construction group.

Each year, the WWTP, the Water Supply Operations division and the Mechanical Maintenance division generate a list of projects to be included on the CIP list and submit them to the Wastewater Design group. The Wastewater Design group compiles the CIP list for the WWTP and the sewage pumping stations, based on these recommendations. Similar CIP lists are generated by the other Engineering groups, and are forwarded to the General Superintendent of Engineering, and then to the Assistant Director of Engineering Services for their approval. The overall CIP list is submitted by the Assistant Director of Engineering Services to the CIP Executive Committee. The Executive Committee will identify the CIP projects to be initiated that year by assigning a priority level to each project and based on the overall CIP budget.

DWSD initiated the program management contract, PC-744, at the Wastewater Treatment Plant. This was done to execute CIP projects faster than normally done. The General Superintendent of Engineering is the DWSD Project Manager and the Head Engineer of the Wastewater Construction group is the designated DWSD Project Engineer. Detroit Wastewater Partners (DWP), a joint venture company, was awarded the contract. DWP, through the Needs Assessment Study, has identified about 30 to 40 projects to be completed over the next five years.

PC-744 primarily focuses on the upgrade and replacement of equipment at the WWTP and ensures that the WWTP has the required firm capacity. PC-744 also develops operations and maintenance (O&M) manuals and standard operating procedures (SOPs), and provides training to all WWTP operations and maintenance personnel.

Projects under PC-744 have been classified into three categories:

- New projects for which DWP are in charge of the study, design and construction phases.
- Projects for which some of the design work may have been completed under contracts previously initiated by the Wastewater Design group. DWP is in charge of completing the work during the design and construction phases.
- Projects for which the design work has been previously completed. DWP is in charge of the construction phase only.

5.5.1.2 Capacity Evaluation:

Currently, DWSD reviews customer applications for new or expanded service only at the point of connection to the DWSD collection system. The capacity and type of connection are reviewed based on the requested flow. DWSD does not evaluate the design within the customer's service area to avoid liability for any design flaws within the customer service area. However, DWSD will require the customer to conform to DWSD's minimum standards for design and construction.

5.5.1.3 Design and Design Oversight Services:

A guidance manual is being developed for the Engineering Services division. The Engineering Guidance Manual will identify various tasks for engineers and provide step-by-step instructions on how to accomplish these tasks. The Engineering Services division is also developing a "DWSD Standard Specification Set" that will be used for all DWSD projects in the future.

5.5.2 Wastewater Treatment Plant Operation and Maintenance

The Wastewater Treatment division is in charge of all operation and maintenance activities at the wastewater treatment plant and at the CSO retention basins. The Wastewater Treatment Plant staff, the CSO Operations group, and the Industrial Waste Control group are all part of the Wastewater Treatment division.

The Chief Sewage Plant Engineer is in charge of the Wastewater Treatment Plant. The main groups working at the Wastewater Treatment Plant are the operations group, the maintenance group, the plant laboratory, and an engineering staff to assist the Chief Sewage Plant Engineer. All the above staff are located at the Wastewater Treatment Plant. In addition, the Wastewater Construction group (part of the Engineering Services division) is also located at the Wastewater Treatment Plant. The Wastewater Treatment division has set up a workgroup that includes DWSD staff, suburban customer representatives and consultants to review and have input to activities relating to WWTP improvements and a regional operational plan for the wastewater collection system.

Several operations staff at the Wastewater Treatment Plant possess Michigan Class A Sewage Plant Operators certification. The certification is administered through the MDEQ. Currently, there is no additional certification required for CSO operators. The CSO Operations group is currently located at the WWTP, and is responsible for the operation of the three CSO retention basins. As additional CSO retention basins are put into operation, the CSO Operations group is expected to grow in size and may be relocated to a different site in the future.

Sedimentation basins at DWSD's Water Treatment Plants are dewatered once or twice a year to the collection system (with the exception of Lake Huron and Southwest Water Treatment Plants).

The WWTP has had treatment upsets when large amounts of solids have been released into the collection system within a short period of time. The sedimentation basin sludge from the Water Treatment Plants consists mainly of alum floc and settled silt and clay. The predominantly alum sludge does not settle as well as the primary sludge, causing solids carryover in the primary clarifiers at the WWTP.

Studies and design are currently underway for all the DWSD Water Treatment Plants for continuous sludge withdrawal and onsite residuals treatment, thus eliminating solids discharge into the collection system.

5.5.3 Operation and Maintenance of the Conveyance System

Three divisions within DWSD share the operation and maintenance of the conveyance system.

The Wastewater Treatment division is in charge of operation and maintenance of the CSO retention basins. The Water Supply Operations division is in charge of operation of the sewage pumping stations. The Systems Control Center, which is part of the Water Supply Operations division, is in charge of monitoring and controlling flow in the collection system. The Water Supply Operations division also maintains all the non-mechanical portions of the conveyance system. The Facilities Management (Mechanical Maintenance) division is in charge of maintaining the sewage pumping stations.

5.5.4 Industrial Waste Control

The Industrial Waste Control (IWC) division is under the Wastewater Treatment division, and monitors over 12,000 industrial and commercial customers in Wayne, Oakland and Macomb counties. The IWC monitors, issues permits to industrial users, and enforces all the requirements of the Industrial Pretreatment Program (IPP) of the Clean Water Act as stipulated in the NPDES permit for the Detroit Wastewater Treatment Plant.

DWSD industrial customers may range from large industrial facilities to small commercial users discharging wastes stronger than background domestic sewage. Of the 12,000 plus customers that fall under the IPP, about 400 to 500 users are monitored on a regular basis as they are considered "significant" users. IWC group has a staff of approximately 100 people.

Besides the regulatory activity, IWC also conducts a survey of its customers once every three years on a rotational basis in Wayne, Oakland and Macomb counties. It also relies on its customers to update IWC about any changes in usage, flows, or discharge strengths.

All IWC customers pay the wholesale rate that is common to all customers of the DWSD collection system. In addition, IWC customers pay an IWC charge to offset the additional costs of treatment and to support IWC's regulatory activities. Industrial users who discharge compatible pollutants above the domestic sewage background are required to pay an additional surcharge rate as described in the Surcharge Program in the City of Detroit Sewer Ordinance.

The local limits are set by IWC, after review by the MDEQ and approval by the Detroit City Council following the regular regulatory process of public comments and public hearing.

5.5.5 Office of Program Management Assistance

The Office of Program Management Assistance (OPMA), which falls under DWSD Administration, provides support to both the water and wastewater systems.

OPMA maintains all records for DWSD including service contracts. Previously, OPMA was also involved in conducting population projection studies in conjunction with the Southeast Michigan Council of Governments (SEMCOG), but has stopped doing that due to lack of staff. OPMA maintains all the reports sent to regulatory agencies, and disseminates reports within DWSD related to environmental and legislative affairs.

OPMA is also in charge of hazardous waste management throughout all DWSD facilities, and conducts risk management plans and air quality studies for DWSD facilities.

6. Conclusions

DWSD currently has service contracts with 22 different municipal customers (outside the City of Detroit) to provide wastewater service in Wayne, Oakland and Macomb counties. As a contracting policy, DWSD usually enters into service contract agreements only with County or township municipal agencies, and public sewage disposal districts or authorities. However, DWSD does have service contract agreements with a few corporate customers.

The DWSD service policy is rooted in the System Expansion Policy, adopted in 1998. The System Expansion Policy calls for charging capital to customers who wish to either extend or expand their water and wastewater services within their communities.

The philosophy and policy with regards to extending or expanding services can be summarized in two general philosophies – "Commitment To Serve", and "Growth Pays For Growth".

Customer applications for new or expanded services undergo an internal evaluation process. The evaluation process includes a technical feasibility study by the Engineering Services division and a rate evaluation by the Financial Services and Financial Planning divisions. The technical evaluation only includes a capacity and connection-type evaluation at the point of connection to the DWSD collection system. Construction costs for new major infrastructure that may be needed within the customer service area will be borne by the customer and will be paid to DWSD either through an upfront payment, a monthly surcharge rate designed to amortize the cost over a fixed time period, or a combination of the two.

DWSD's Financial Services and Financial Planning divisions are in charge of the rate setting procedures for all DWSD customers. The wholesale rate is common to all the customers and is set on a cost per unit flow basis, and is based on projected total operation and maintenance costs for the primary collection system and the treatment system, and on capital costs incurred on the primary infrastructure.

The wholesale rate is calculated at the beginning of the year by proposing rates to each customer early in the annual cycle, and obtaining customer feedback. The rates are then presented to the City of Detroit Board of Water Commissioners and then to the Detroit City Council for their approvals. In addition to the wholesale rate, customers charge a retail rate to all residents within that customer service area.

DWSD incorporated a "look back" program in 1989, which allows for wholesale rate adjustments at the year-end based on actual flows and expenses incurred during the year.

Detroit's three main interceptors were designed based on future population and flow projections in the tri-county area (Wayne, Oakland and Macomb Counties) in 1966. The wastewater flows were calculated using a design criterion of approximately 0.4 cfs per 1,000 capita for "dry" systems and 0.5 to 0.6 cfs per 1,000 capita for "wet" systems. The Engineering Services division indicated that the transport system has not reached its capacity yet.

The GDRSS model was developed by DWSD in conjunction with Wayne, Oakland and Macomb counties to predict the hydraulics and flows in the collection system. The GDRSS model, developed under the Federal Court mandate as part of the Detroit WWTP NPDES permit settlement negotiations, is very useful in predicting the hydraulic profile at various locations in the collection system at different flows.

The Engineering Services division provides engineering services to both the water and wastewater systems. The services include CIP development, capacity evaluation, and design and design oversight services.

The Wastewater Treatment division is in charge of operation and maintenance of the Detroit WWTP, and operation of the CSO retention basins.

The operation of the collection system, including the sewage pumping stations, is done remotely from the Systems Control Center, which is part of the Water Supply Operations division. The non-mechanical portion of the collection system is maintained by the Water Supply Operations division and the Facility Maintenance division is in charge of maintenance of the sewage pumping stations.

The IWC monitors industrial and commercial customers who discharge wastes stronger than the background domestic sewage, and enforces requirements of the Industrial Pretreatment Program as stipulated in the NPDES permit for the Detroit WWTP.

OPMA, which is part of DWSD administration, maintains records and regulatory reports and disseminates environmental and legislative reports within DWSD. OPMA is also in charge of hazardous wastes management, risk management plans and air quality studies at various DWSD facilities.