Chapter 3: Analytical Methods / Data Sources

3.1 Introduction

This chapter describes the comprehensive approach that was used to assess the current situation and the needs of the Milwaukee Metropolitan Sewerage District (MMSD) treatment system. It also gives an overview of the flow and wasteload development process, which is critical to the treatment system analysis.

3.2 Information Compilation

An extensive collection of information was obtained from all applicable sources. Table 3-1 lists the major sources of information that were referenced, which include:

- Available data
- Available reports
- Interviews of stakeholders (MMSD and United Water Services (UWS))
- Site visits/interviews with operators
- Applicable tools – UWS daily secondary treatment capacity calculation
- Wisconsin Department of Natural Resources (WDNR)
- Applicable standards
- MMSD website (www.mmsd.com)

Information Source	Definition	2020 Use	Acronym
Standards			
Wisconsin Administrative Code NR 110 and 204 Standards	WI state standards for sewerage systems. WI state standards for domestic sewage sludge management.	Evaluate standards compared to existing and future conditions	NR 110 NR 204
MMSD Rules and Regulations	Construction and operation rules and requirements for users of the MMSD system.	Discharge requirements for industrial users and user charge information	MMSD Rules
Title 40, Code of Federal Regulations, Part 503	Requirements for the management of biosolids produced during the treatment of wastewater. The rules encourage the beneficial reuse of biosolids while regulating landfill disposal and incineration.	Classification of biosolids for disposal and review of biosolids management	EPA Part 503 Biosolids Rule
Permits			
Wisconsin Pollutant Discharge Elimination System Permits (treatment and biosolids portion): 2003 (Current) and 1997 permit	Wisconsin regulates the allowable level of pollutants to be discharged into state waterways from wastewater treatment plants.	Document MMSD treatment plant effluent requirements relative to actual effluent water quality data	WPDES Permit
Air Emission Permit and related material: 2004 (Current)	WDNR regulates the allowable air pollutants to be discharged in the state. The JIWWTP and SSWWTP permits were issued in 2004.	Document MMSD emission requirements compared to actual emissions	JIWWTP and SSWWTP WDNR Air Permits
Reports and Manuals			
MMSD Discharge Monitoring Reports	Report issued every month to the WDNR – documents all pollutant discharges as required by the WPDES permit.	Storm event analysis – reported daily flows, influent and effluent water quality	DMR (MMSD)
United Water Services Daily/Weekly Operations Reports	United Water Services daily log: all aspects of treatment at both treatment plants. NOTE: This data is NOT official – DMR data takes precedence when there is a discrepancy.	Unit process evaluation and storm event analysis – reported daily flows, influent and effluent water quality	UWS DWOR
Contract Compliance Office (CCO) Monthly and Annual Reports	MMSD monthly report summarizing monthly issues related to the operation of the system. The UWS Monthly Report is used to develop this report.	Storm event and unit process analyses – issues related to operation of treatment plants	CCO Monthly and Annual Reports

Information Source	Definition	2020 Use	Acronym
United Water Services Monthly Report	United Water Services, the MMSD contracted operator of the MMSD system, monthly report submitted to the CCO.	Storm event and unit process analyses – issues related to operation of treatment plants	UWS Monthly Report
Storm Event Reports: 1999-2004 as available	A report summarizing all aspects of the operation of the system during a storm event utilizing the deep tunnel.	Storm event and unit process analyses – issues related to operation of ISS Pump Station and treatment plants	N/A
MMSD Accounting Records	MMSD annual records used to issue a yearly budgetary report to establish user rates.	Utilize wastewater loading data – document historical MMSD user information (Flow/biochemical oxygen demand/total suspended solids, etc.) compared to design criteria	N/A
Operation and Maintenance Manuals: Jones Island WWTP Operation and Maintenance Manual, 1993 South Shore WWTP Operation and Maintenance Manual, 1986 Inline Storage System Operation and Maintenance Manual: Part 2 Unit Process Operations Vol. 1 Inline Pump Station, 1995	The entire MMSD system has established operation and maintenance guides. Along with the general treatment plant O&M Manuals, each unit process at each plant has its own O&M Manual. Specific unit process O&M Manuals not listed here are referenced when used.	Compare design data to applicable standards to determine current and future capacity needs	• Jones Island O&M Manual • South Shore O&M Manual • ISS Pump Station O&M Manual
MMSD Wastewater System Plan, 1980	MMSD facilities plan completed in 1980	Establish the design flows for the existing treatment plants	1980 MMSD Wastewater System Plan
Water Pollution Abatement Program	Extensive evaluation and improvement program of the entire MMSD system completed between the late 1970s and early 1990s.	Background data	WPAP
MMSD 2010 Facilities Plan	Facilities Plan completed in 1998 to plan for the year 2010	Background data	2010 Facilities Plan

Information Source	Definition	2020 Use	Acronym
MMSD Air Emissions Inventory Summary Report	Report submitted for each treatment plant every year to the WDNR to confirm that air emissions are not exceeding the permitted limitations	Compare to Air Permits to determine if air emissions are meeting permit limits	Air Emissions Inventory Summary Report
Compliance Maintenance Annual Report	Report required to be submitted by all publicly owned treatment works to the WDNR per Chapters NR 208 and NR 210 of the Wisconsin Administrative Code grading treatment plants on a variety of maintenance and compliance criteria	Review of treatment plant scores to determine performance	CMAR
Miscellaneous MMSD Documents and Information			
MMSD/UWS In-Plant Diversion Records	A collection of MMSD and UWS spreadsheets tabulating in-plant diversions – some data are estimated since not all diversion data could be verified.	Analysis of blending events at the treatment plants for flow and water quality	N/A
Correspondence, Reviews, Internal Reports, As-builts	Relevant documents that include information referred to in this Facilities Plan. Documents are referenced when used.	Review past concerns and issues to establish needs of MMSD for current Facilities Plan	N/A
MMSD web site – www.mmsd.com	General information on MMSD and UWS projects, links to MMSD documents, etc.	Review existing and future projects and information on the MMSD and UWS	N/A
Other Available Data	Data not collected into reports already mentioned such as metered flow and process data from treatment plants and ISS Pump Station. Referenced when used.	Used in analysis where information not already provided in other reports	N/A
MMSD Projects			
Central Metropolitan Interceptor Sewer/Harbor Siphon Project	MMSD issued a series of reports by Rust/Harza in 1999-2001 analyzing the MMSD system just upstream of JIWWTP. The key information was the establishment of existing condition capacities of the Harbor Siphons. Specific reports are referenced when used.	Establish the existing and future condition influent flows to JIWWTP	N/A

Information Source	Definition	2020 Use	Acronym
Treatment Plant Wet Weather Project	In 2001, MMSD issued a series of reports by XCG analyzing the capacities and operation of JIWWTP and SSWWTP during wet weather conditions and included recommendations to increase capacities. The recommendations from that analysis were implemented at SSWWTP in 2002 and are still being implemented at JIWWTP.	The Wet Weather Optimization Study was used to establish the existing and future capacities of JIWWTP and SSWWTP unit processes	N/A
Other Documentation			
May 2002 WDNR Stipulation	Court ordered agreement between the WDNR and MMSD that identified projects that have to be implemented by the schedule set in the Stipulation	Identification of committed projects	2002 Stipulation
MMSD 2007 Annual Budget	Annual Budget that sets MMSD expenditures for the following year	Identification of committed and MMSD recommended projects	N/A
Recommended Standards for Wastewater Facilities, a report by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers	Advisory wastewater treatment facility standards established by a consortium of ten states (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania and Wisconsin) and one Canadian Province (Ontario).	Comparison of advisory standards to actual existing and future conditions	10-States Standards
Wet Weather Documentation	Reports and other documents analyzing current technologies that might increase the capacities of the treatment plants	Review current technology to treat high rate wet weather flows as it applies to the MMSD system	N/A
General Reports	Reports that related to the review of the MMSD system and UWS operation for this report. Specific reports are referenced when used.	Reports were used to review the MMSD system and UWS operation	N/A

EPA = Environmental Protection Agency
JIWWTP = Jones Island Wastewater Treatment Plant
MIS = Metropolitan Interceptor Sewer System
POTW = publicly owned treatment works
SSWWTP = South Shore Wastewater Treatment Plant
WDNR = Wisconsin Department of Natural Resource

3.3 Flow and Wasteload Development

3.3.1 Flow Development

The current and future influent wastewater flows delivered to the MMSD treatment plants are critical in predicting capacity requirements at the treatment plants. The flows were developed based on the existing and future hydraulic capacity analysis of the conveyance system, performed as part of the *Conveyance Report* and other projects. The specific flows are discussed in more detail in Chapter 4, *Treatment Evaluation - Existing Condition*, and Chapter 5, *Treatment Evaluation - Future Condition* of this report.

3.3.2 Wasteload Development

The volume and type of wasteloads in the flow delivered to the treatment plants are also critical in predicting capacity requirements at the treatment plants. Existing wasteloads were determined using the values established in the MMSD Accounting Records, Discharge Monitoring Reports (DMRs) and UWS Daily / Weekly Operating Reports (DWORs). The MMSD Accounting Records data were used to determine existing trends in residential, commercial, and industrial wasteloads in the MMSD system. The DMR pollutant data were the official data used to analyze the existing treatment condition of the treatment plants. However, the DMR data were not fully available electronically, so they were only used to analyze water quality issues for identified storm events. The UWS DWOR data were used to analyze the treatment plants on a yearly basis and the individual unit process performance. Future wasteloads were determined by using the expected increase in the average annual flow established in the *Conveyance Report* and then applying residential, commercial, and industrial unit wasteload factors found in the *Cost Recovery Procedures Manual*. The specific wasteloads are discussed in more detail in Chapter 4, *Treatment Evaluation - Existing Condition*, and Chapter 5, *Treatment Evaluation - Future Condition* of this report.