Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Review of Sewerage Studies in Macomb and Oakland Counties

Technical Memorandum
Original Date: August 8, 2003
Revision Date: June 25, 2003
Author: Spalding DeDecker & Associates

Table of Contents

1. Introduction 1
2. Description And Characteristics Of The Area 1
3. Sewer Service Areas 4
4. Sewer Service Boundaries 14
5. Review Of The Existing Reports 18
6. Future Plans 20

Review of Sewerage Studies in Macomb and Oakland Counties

1. Introduction

As a part of the development of Wastewater Master Plan (WWMP) for Detroit Water & Sewerage Department (DWSD), Spalding DeDecker Associates (SDA) collected and reviewed the previous and ongoing studies on planning of wastewater collection and treatment systems of Oakland and Macomb Counties in the current and potential DWSD wastewater service area. The following types of study reports were targeted for collection and review:

1. Wastewater Master Plans
2. Information and/or reports on previous, current and proposed studies related to the planning of wastewater collection and treatment systems.
3. Information and reports on Sanitary Sewer Evaluation Surveys (SSES)
4. Infiltration/Inflow (I/I) study reports
5. Project Performance Certification (PPC) Studies
6. Hydraulic Modeling Investigations
7. Other Related Studies
8. Correspondence by any community (not in the DWSD system) showing interest in joining the DWSD system.

In order to collect these study reports and obtain the latest information on planning and development of the wastewater services, SDA identified officials in charge of sewer/wastewater departments and their Engineers with mailing addresses telephone and fax numbers, and e-mail addresses. An updated list of these mailing addresses is presented in Appendix A.

SDA has communicated with the municipal communities in Oakland and Macomb Counties and their Engineers initially by mailing letters of Dr. Mohammad Gill of DWSD and Dr. S.P. Singh of SDA (Appendix B) with subsequent follow-up by phones and e-mails. The communities and their Engineers were very cooperative in forwarding and/or making available the relevant information to SDA for review. A wide variety of reports and other documents dealing with wastewater services were received and reviewed. Brief review summaries of the reports and documents collected are presented in a subsequent section.

2. Description and Characteristics of the Area

The Oakland and Macomb Counties are located in Southeast Michigan on the north and adjacent to the City of Detroit.

This area is made up of many political entities consisting of a number of village, township, city and county governments. Figures 1 and 2 show the locations of various political divisions of Oakland and Macomb Counties, respectively. Table 1 gives the number of autonomous governmental units in each county.

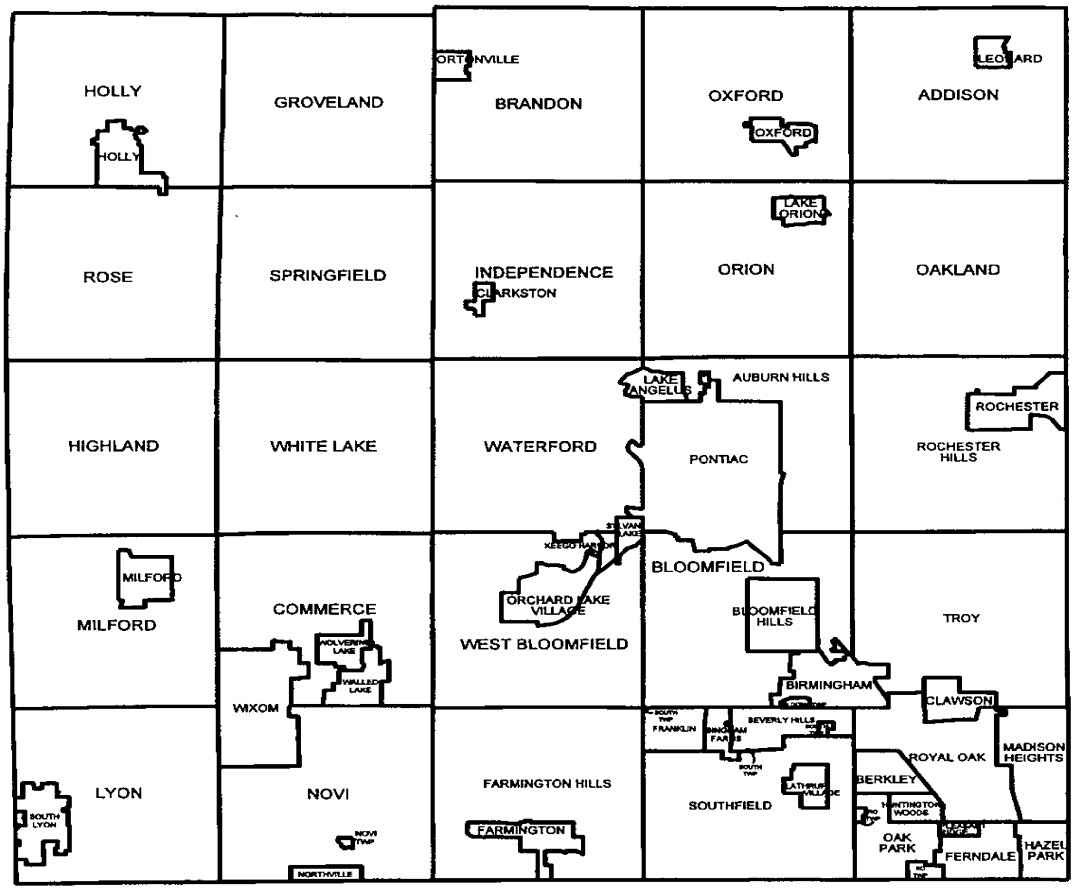


Figure 1: Oakland County



Figure 2: Macomb County

Table 1: Autonomous Governmental Units by Counties

County	Village	Township	City	County	Total
Oakland	10	21	30	1	62
Macomb	3	12	12	1	28

These ninety (90) governmental units in these two counties range from completely rural areas to highly complex urban areas. Many of these units have decided to provide jointly or separately municipal services to their citizens. Where mutual agreements could be reached based on similar needs and requirements, some of the governmental units joined together to provide sewerage services. With the pressure of continued growth in the area there will be an increasing demand for municipal services within these two counties.

3. Sewer Service Areas

SDA conducted telephone interviews with the municipalities and their Engineers to collect the latest information on the sanitary sewage collection and disposal systems. The information on the wastewater services collected from different governmental units and their Engineers is presented in Tables 2 and 3 for Oakland and Macomb Counties, respectively.

The following type of information is presented in Tables 2 and 3:

Community:

It includes the name of the governmental unit i.e., village, city, or township.

Own Sewer System

Whether the community has a sewer system or not.

Own Wastewater Treatment Plant

Whether the community owns a treatment plant or is dependent upon other organization for the treatment of its wastewater.

Wastewater Disposal District / System

Whether the community depends on septic tanks or is a part of a wastewater collection and disposal system.

Managing Authority

Describes the governmental identity that is responsible for managing the wastewater for that community.

Part of DWSD system

Whether the community's wastewater collection and treatment system is part of the DWSD system.

Future Plans

The future plans of the community to join the DWSD system or not.

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
1	Village of Holly		Yes	Yes		Self	No	Unknown	
2	Holly Township		No	No	Septic Tanks	N/A	No	NE corner of the city to be sewered and connected to Grand Blanc System, Genesee County.	
3	Groveland Township		Yes (Pt)	Yes	Septic Tanks (Pt)	OCDC	No	Considering of joining Genesee County wastewater collection and treatment system	
4	Village of Ortonville		No	No	Septic Tanks	N/A	No	Considering of joining Genesee County wastewater collection and treatment system	
5	Charter Township of Brandon		Yes	Yes	Septic Tanks (Pt)	OCDC	No	Considering of joining Genesee County wastewater collection and treatment system	OCDC operates a community treatment plant for a specific development
6	Village of Oxford		Yes	No	C-O	OCDC	Yes	Unknown	
7	Charter Township of Oxford		Yes	No	C-O	OCDC	Yes	Unknown	
8	Addison Township		Yes	Yes	Septic Tanks (Pt)	OCDC	No	Unknown	OCDC operates small treatment plants for individual community
9	Leonard Village							Unknown	
10	Rose Township		No	No	Septic Tanks	N/A	No	Unknown	

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
11	Charter Township of Springfield		Yes	Yes	Septic Tanks (Pt)	OCDC	No	Unknown	OCDC operates a treatment plant for Bavarian Village condominium complex
12	Independence Township		Yes	No	Septic Tanks (Pt) / C-O (Pt)	OCDC	Yes, partially. The township also handles the account of the Village of Clarkston	Unknown	
13	Village of Clarkston		Yes	No	C-O	OCDC	The wastewater is handled by Independence Township	Unknown	
14	Charter Township of Orion		Yes	No	C-O	OCDC	Yes	Unknown	
15	Village of Lake Orion		Yes	No	C-O	OCDC	Yes	Unknown	
16	Charter Township of Oakland		Yes	No	C-O	OCDC	Yes	Unknown	
17	Charter Township of Highland		No	No	Septic Tank	N/A	No	The township is in the process of constructing a 0.3 MGD treatment plant expandable to 2.0 MGD. It is expected to be in operation in 2004.	At this stage, the township is not interested in joining the DWSD system

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
18	Charter Township of White Lake		Yes	Yes	Septic Tank (Pt)/ Commerce Township WWTP (Pt)	OCDC	No	Unknown	The township belongs to Commerce-White Lake sanitary district.
19	Charter Township of Waterford		Yes	No	C-O	OCDC	Yes	Unknown	
20	City of Lake Angelus				C-O	OCDC	Yes	Unknown	
21	City of Pontiac		Yes	Yes		Self		Unknown	
22	City of Auburn Hills				E-F, C-O		Yes	Unknown	
23	City of Sylvan Lake				Pontiac WWTP (Large Part)/ Detroit WWTP (Small Part)		No capacity in Pontiac WWTP to handle wet weather flow. City may consider joining DWSD system for their full requirement.	Unknown	
24	City of Rochester Hills		Yes	No	C-O	OCDC	Yes	Unknown	
25	City of Rochester		Yes	No	C-O	OCDC	Yes	Unknown	The City has abandoned their old treatment plant.

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
26	Charter Township of Milford		No	No	Septic Tanks	N/A	No	Unknown	
27	Village of Milford		Yes	Yes		Self	No	Unknown	
28	Commerce Township		Yes	Yes	C-W, W-N	OCDC	No	Unknown	
29	Village of Wolverine Lake		No	No	Septic Tanks	N/A	No	Unknown	
30	City of Walled Lake		Yes	Yes, jointly with City of Novi	City uses W-N interceptor for sewage transportation	OCDC	No	Unknown	
31	City of Wixom		Yes	Yes		Self through a consulting company.	No	May join the DWSD system in the future	
32	Charter Township of West Bloomfield		Yes	No	Septic Tanks (Pt) / C-O, E-F	OCDC	Yes (Pt)	Unknown	
33	City of Orchard Lake Village		Yes	No	E-F	OCDC	Yes	Unknown	
34	City of Keego Harbor		Yes	No	E-F	OCDC	Yes	Unknown	
35	Bloomfield Township		Yes	No	E-F	OCDC	Yes	Unknown	
36	City of Bloomfield Hills		Yes	No	E-F	OCDC	Yes	Unknown	
37	City of Birmingham		Yes	No	E-F, SOCSDS (12-Town)	OCDC	Yes	Unknown	
38	City of Troy		Yes	No	E-F (Pt) SOCSDS (12-Town) (Pt)	OCDC	Yes	The city has a Master Plan	

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
39	Charter Township of Lyon		Yes	Yes	Partly Septic Tanks and partly sewered.	OCDC	No	Unknown	
40	City of South Lyon		Yes	Yes		Self	No	Unknown	
41	City of Novi		Yes	Partly owns WWTP with Walled Lake	Majority of flow goes to DWSD through H-R interceptor and remaining to Novi-Walled Lake WWTP	OCDC	Yes (Pt)	Unknown	The City is part owner of Walled Lake - Novi WWTP
42	Novi Township		Yes	No	Huron-Rouge Interceptor	OCDC	Yes	Unknown	
43	City of Northville		Yes	No	Huron-Rouge Interceptor	OCDC	Yes	Unknown	
44	City of Farmington Hills		Yes	No	E-F	OCDC	Yes	Unknown	
45	City of Farmington		Yes (Pt)	Yes (Pt)	E-F, own plant (Pt)	OCDC	Yes	Unknown	
46	City of Southfield		Yes	No	E-F (Pt), SOCSDS (12-Town) (Pt)	OCDC	Yes	Unknown	
47	Southfield Township		Yes	No	E-F	OCDC	Yes	Unknown	
48	Village of Franklin		Yes	No	E-F	OCDC	Yes	Unknown	
49	Village of Bingham Farms		Yes	No	E-F	OCDC	Yes	Unknown	

Table 2: Wastewater Services in Oakland County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
50	Village of Beverly Hills		Yes	No	Partly goes to E-F and partly to SOCSDS (12-Town)	OCDC	Yes	Unknown	
51	City of Lathrup Village		Yes	No	E-F (Pt), SOCSDS (12-Town) (Pt)	OCDC	Yes	Unknown	
52	City of Royal Oak		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
53	City of Berkley		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
54	City of Clawson		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
55	City of Ferndale		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
56	City of Hazel Park		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
57	City of Huntington Woods		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
58	City of Madison Heights		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
59	City of Oak Park		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
60	City of Pleasant Ridge		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	
61	Township of Royal Oak		Yes	No	SOCSDS (12-Town)	OCDC	Yes	Unknown	

C-O Clinton-Oakland
E-F Evergreen-Farmington
C-W Commerce-White Lake
W-N Walled Lake-Novi
SOCSDS S. Oakland County Sanitary Sewer District
OCDC OC Drain Commissioner

Table 3: Wastewater Services in Macomb County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
1	Bruce Township		Yes	Yes (Pt)		16% owner of Romeo WWTP	No	Unknown	
2	Village of Romeo		Yes	Yes (Pt)		84% owner of Romeo WWTP	No	Unknown	
3	Armada Township		No	No	Septic Tanks	N/A	No	Unknown	
4	Village of Armada		Yes	Yes		Self	No	Unknown	0.6 MGD plant.
5	Richmond Township		No	No	Septic Tanks	N/A	No	Unknown	
6	City of Richmond		Yes	Yes		Self	No	Unknown	
7	City of Memphis		Yes	Yes		Self	No	Unknown	
8	Washington Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
9	Ray Township			No	Septic Tanks	N/A	No	Unknown	
10	Lenox Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
11	Village of New Haven		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
12	Shelby Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
13	Macomb Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
14	Chesterfield Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
15	City of New Baltimore		Yes	Yes		Self	No	Unknown	
16	City of Utica		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
17	City of Sterling Heights		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
18	Clinton Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	

Table 3: Wastewater Services in Macomb County

	Community	Service Area	Own Sewer System	Own WWTP	Wastewater Disposal System / District	Managing Authority	Part of DWSD System	Future Plans	Remarks
19	City of Mount Clemens		Yes	Yes		Self	No	Unknown	
20	Harrison Township		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	Selfridge National Guards Base is a part of the Harrison Township wastewater disposal system
21	City of Warren		Yes	Yes		Self	No	Unknown	
22	City of Centerline		Yes	No		Self	Yes	Unknown	Connected directly to DWSD system
23	City of Fraser		Yes	No	MCWWDD	MCOPWC	Yes	Unknown	
24	City of Roseville		Yes	No	SMSD	SMSD	Yes	Unknown	
25	City of Saint Clair Shores		Yes	No	SMSD	SMSD	Yes	Unknown	
26	City of Eastpointe		Yes	No	SMSD	SMSD	Yes	Unknown	
27	Lake Township		Yes	No	Through Grosse Pointe Woods, Wayne County		Yes	Unknown	Only 67 people

Remarks
Any special information about the community's wastewater services is presented.

An analysis of Table 2 indicates that there are thirteen (13) wastewater treatment plants (WWTP) in Oakland County owned and operated by different communities and/or the Oakland County Drain commissioner (OCDC). Fourteen communities are fully or partly dependent on septic tanks for their municipal services. There are six major wastewater disposal districts or interceptor systems serving the rest of the county. All these major wastewater interceptor systems discharge to the Detroit Wastewater Treatment Plant through Detroit Water and Sewerage Department (DWSD) collection system.

The analysis of Table 3 indicates that there are eight (8) wastewater treatment plants (WWTP) in Macomb County owned and operated by different communities. Three communities are dependent on septic tanks for their municipal services. There are two wastewater disposal districts or interceptor systems serving the rest of the county. The wastewater interceptor systems discharge to the Detroit Wastewater Treatment Plant through Detroit Water and Sewerage Department (DWSD) collection system.

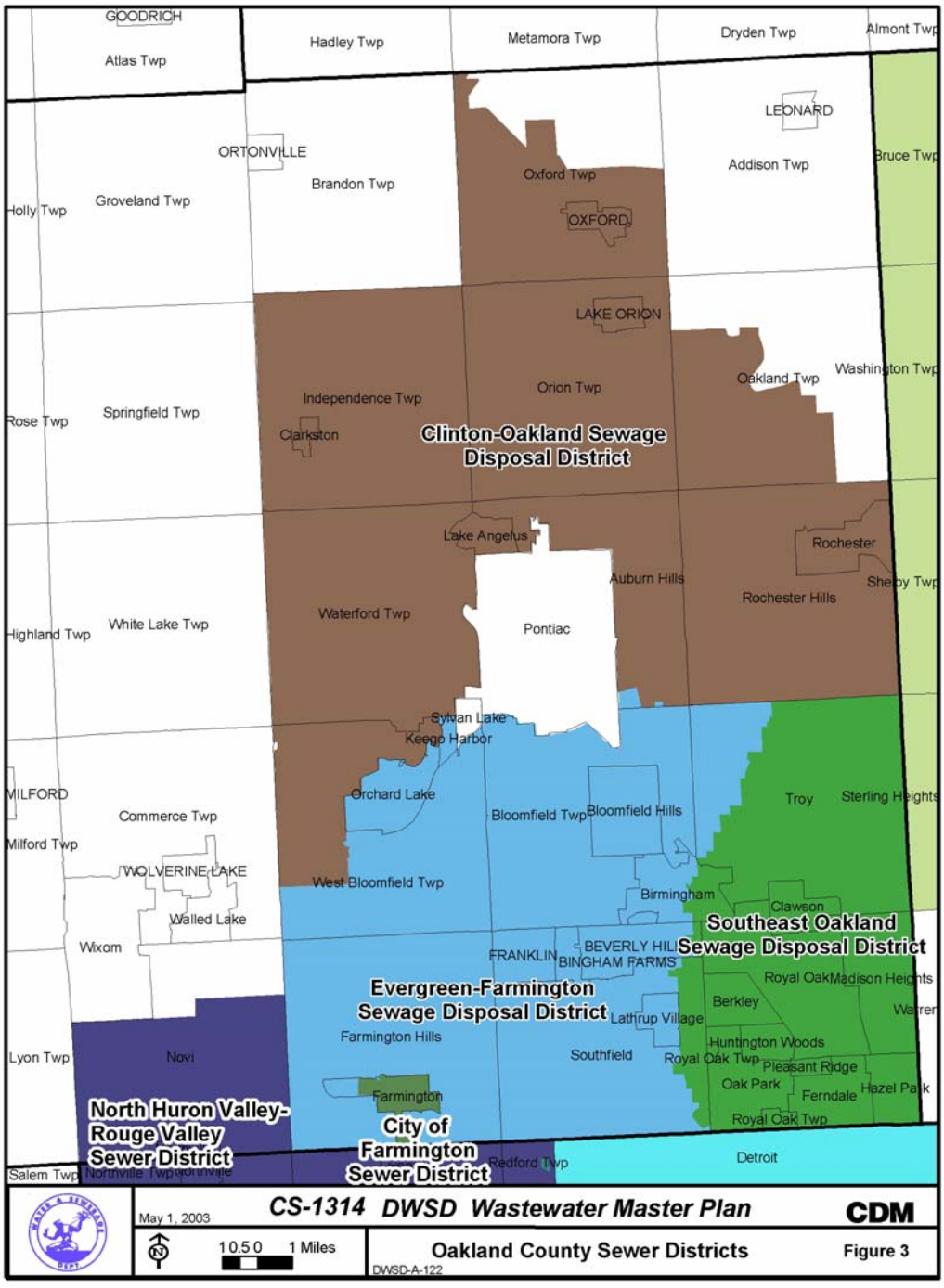
4. Sewer Service Boundaries

The extent of sewer service boundaries is shown on Figures 3 and 4 for Oakland and Macomb Counties, respectively. These sewer service boundaries are marked on the GIS maps prepared by Camp, Dresser & McKee (CDM). Certain areas in these Counties have formed districts for the purpose of collecting and disposing of their wastewater. The district boundaries are also indicated on these figures.

The information about different wastewater disposal districts along with the participating communities is presented in Tables 4 and 5 for Oakland and Macomb Counties, respectively.

The main disposal districts in Oakland County are Clinton-Oakland Sanitary Disposal System (C-O), Southeast Oakland County Sewage Disposal System (SOCSDS) (12-Towns Disposal District is a part of the SOCSDS), Evergreen-Farmington Sanitary Disposal System (E-F), Walled Lake-Novi Sanitary Disposal System (W-N), Commerce-White Lake Sanitary Disposal System (C-W), and Huron-Rouge Sanitary Interceptor (H-R).

The main disposal districts in Macomb County are Macomb County Wastewater Disposal District (MCWWDD), Southeast Macomb Sanitary District (SMSD), and Wayne County Northeast Interceptor District.


GOODRICH
Atlas Twp
Hadley Twp
Metamora Twp
Dryden Twp
Almont Twp
LEONARD
Addison Twp
Bruce Twp
ORTONVILLE
Brandon Twp
Oxford Twp
OXFORD
Holly Twp
Groveland Twp
LAKE ORION
Independence Twp
Orion Twp
Oakland Twp
Washington Twp
Rose Twp
Springfield Twp
Clarkston
Clinton-Oakland Sewage Disposal District
Lake Angelus
Rochester
Auburn Hills
Rochester Hills
Shelby Twp
Waterford Twp
Pontiac
Highland Twp
White Lake Twp
Sylvan Lake
Keego Harbor
MILFORD
Orchard Lake
Bloomfield Twp
Bloomfield Hills
Troy
Sterling Heights
Commerce Twp
Milford Twp
WOLVERINE LAKE
West Bloomfield Twp
Birmingham
Clawson
Walled Lake
Wixom
Southeast Oakland Sewage Disposal District
FRANKLIN
BEVERLY HILLS
BINGHAM FARMS
Royal Oak
Madison Heights
Evergreen-Farmington Sewage Disposal District
Berkley
Warren
Lathrup Village
Farmington Hills
Huntington Woods
Lyon Twp
Novi
Southfield
Royal Oak Twp
Pleasant Ridge
Oak Park
Ferndale
Hazel Park
Farmington
North Huron Valley-Rouge Valley Sewer District
City of Farmington Sewer District
Royal Oak Twp
Salem Twp
Northville Twp
Redford Twp
Detroit
May 1, 2003
CS-1314 DWSD Wastewater Master Plan
CDM
1 0.5 0 1 Miles
Oakland County Sewer Districts
Figure 3
DWSD-A-122

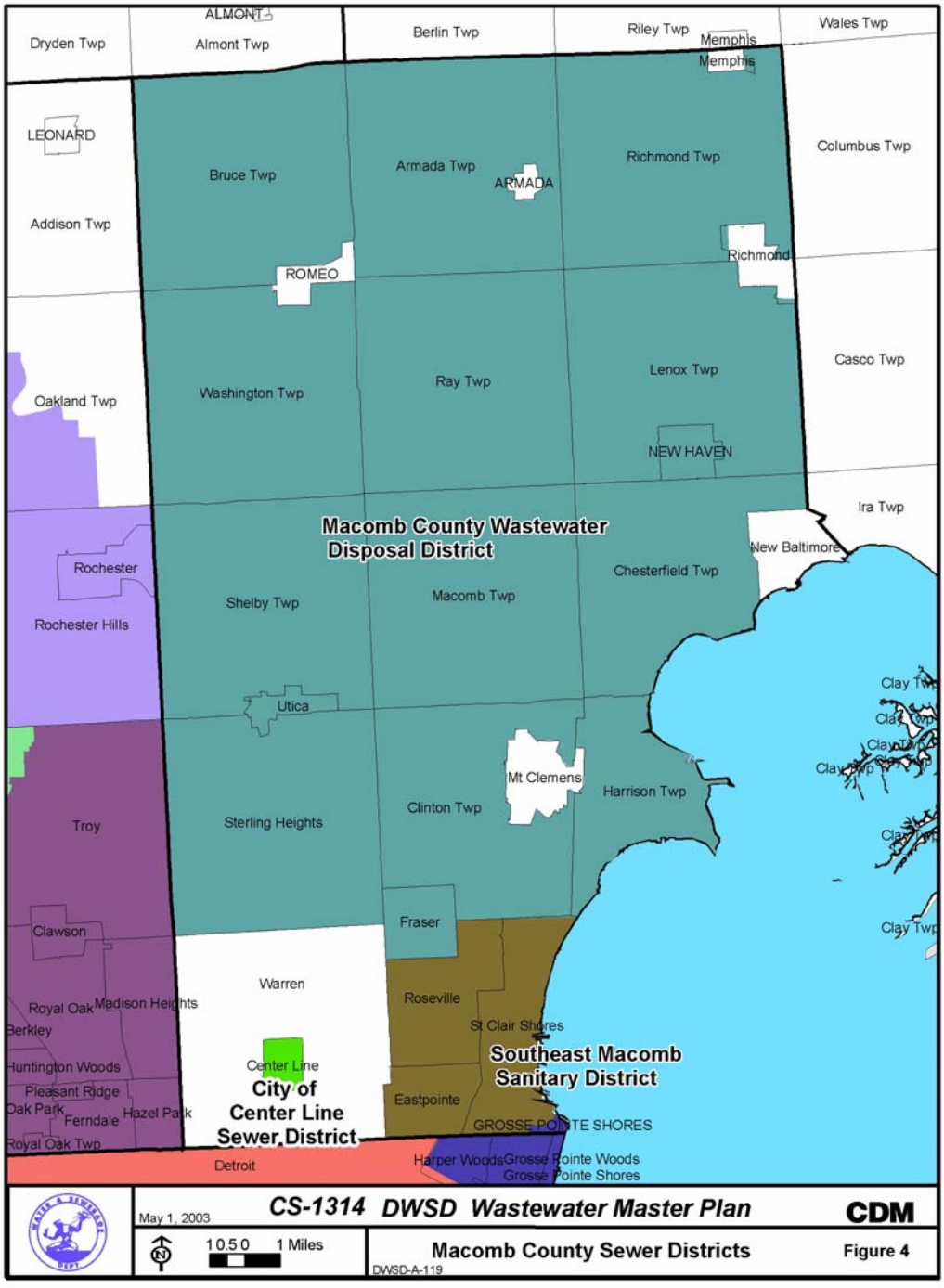

Dryden Twp
ALMONT
Almont Twp
Berlin Twp
Riley Twp
Memphis
Memphis
Wales Twp
LEONARD
Bruce Twp
Armada Twp
ARMADA
Richmond Twp
Columbus Twp
Addison Twp
ROMEO
Richmond
Oakland Twp
Washington Twp
Ray Twp
Lenox Twp
Casco Twp
NEW HAVEN
Ira Twp
Macomb County Wastewater Disposal District
New Baltimore
Rochester
Chesterfield Twp
Shelby Twp
Macomb Twp
Rochester Hills
Utica
Clay Twp
Mt Clemens
Harrison Twp
Troy
Sterling Heights
Clinton Twp
Fraser
Clawson
Warren
Roseville
Royal Oak
Madison Heights
Berkley
St Clair Shores
Southeast Macomb Sanitary District
Huntington Woods
Center Line
City of Center Line Sewer District
Pleasant Ridge
Eastpointe
Oak Park
Ferndale
Hazel Park
GROSSE POINTE SHORES
Royal Oak Twp
Detroit
Harper Woods
Grosse Pointe Woods
Grosse Pointe Shores
May 1, 2003
CS-1314 DWSD Wastewater Master Plan
CDM
1 0.5 0 1 Miles
Macomb County Sewer Districts
Figure 4
DWSD-A-119

Table 4: Wastewater Service Districts in Oakland County

Wastewater Disposal District	Participating Municipalities	Remarks
Clinton-Oakland Sanitary Disposal System (C-O)	Auburn Hills (Pt)	
	Clarkston	
	Indepdence Township	
	Lake Angelus	
	Oakland Township	
	Orion Township	
	Lake Orion Village	
	Oxford Township	
	Oxford Village	
	Rochester	
	Rochester Hills	
	Waterford Township	
	West Bloomfield Township (Pt)	
Southeastern Oakland County Sewage Disposal System (SOCSDS) (12-Towns Drainage District is a part of this system)	Berkley	
	Beverley Hills (Pt)	
	Birmingham (Pt)	
	Clawson	
	Ferndale	
	Hazel Park	
	Huntington Woods	
	Madison Heights	
	Oak Park	
	Pleasant Ridge	
	Royal Oak	
	Southfield (Pt)	
	Troy (Pt)	
Evergreen- Farmington Sanitary Disposal System (E-F)	Auburn Hills (Pt)	
	Birmingham (Pt)	
	Bloomfield Hills	
	Bloomfield Township	
	Farmington	
	Farmingotn Hills	
	Keego Harbor	
	Lathrup Village	
	Orchard Lake Village	
	Southfield (Pt)	
	Southfield Township	
	Beverley Hills Village (Pt)	
	Bingham Farms Village	
	Franklin Village	
	Troy (Pt)	
	West Bloomfield Township (Pt)	
Walled Lake-Novi Sanitary Disposal System (W-N)	Commerce Township (Pt)	
	Novi	
	Walled Lake	
Commerce-White Lake Sanitary Disposal System (C-W)	Commerce Township (Pt)	
	Novi	
	White Lake Township	
Huron-Rouge Sanitary Interceptor (H-R)	Northville (Oakland County Pt)	
	Novi	
	Novi Township	

Table 5: Wastewater Service Districts in Macomb County

Wastewater Disposal District	Participating Municipalities	Remarks
Macomb County Wastewater Disposal District (MCWWDD)	Washington Twonship	
	Lenox Township	
	Village of New Haven	
	Shelby Township	
	Macomb Township	
	Chesterfield Township	
	Utica	
	Sterling Heights	
	Clinton Twonship	
	Harrison Township	
	Fraser	
Southeast Macomb Sanitary District (SMSD)	Roseville	
	Saint Clair Shores	
	Eastpointe	
Wayne County Northeast Interceptor District	Lake Township	Through Grosse Pointe Woods

5. Review of the Existing Reports

SDA collected and reviewed 87 reports and 84 maps, which are listed in Table 6 and 7, respectively. An abstract/ brief summary of these reports is presented in Appendix C in a tabular form. The summary of each report includes the following:

1. Report Name, Description, City/Township/Community/Report/Volume Number & Date.
2. Consultant(s)
3. Background, Purpose and Abstract/ Brief Summary
4. Remarks/ Recommendations/ Conclusions, Relevance to WWMP

The reports collected and reviewed by SDA are of wide variety covering different aspects of sewer system management. These reports included wastewater master plans, flow monitoring, infiltration and inflow studies, sewer system evaluation surveys, relief sewers, sewer separation, basis of design, sewer and manhole inspection, facilities plan, project plans for State Revolving Fund, and sanitary sewer capacity studies, etc.

The wastewater master plans developed by different communities and counties are directly relevant to the development of the DWSD wastewater master plan for the next 50 years.

A Report on Sewage Disposal Problems, Six-County Metropolitan Area, Southeastern Michigan Prepared for the Supervisors, Inter-County Committee by the National

Sanitation Foundation in 1964 is in essence the Wastewater Master Plan developed for six Counties of Southeastern Michigan for 55 years.

The report discussed different treatment facilities that existed at the time of the preparation of the report and what could be required over the next 55 years. Though the report is very old, it is a very comprehensive study of the conditions that existed about 35 years back and presented what should be done for the next 55 years. The other sanitary sewer master plans presented population projections, wastewater capacities, and sewer sizes required to transport wastewater from different communities.

Flow monitoring and infiltration/inflow studies contain very useful data on dry and wet weather flows for different communities. The information presented in these reports can be used for estimation of rainfall dependent infiltration and inflow (RDI/I) parameters for use in the Greater Detroit Regional Sewer System (GDRSS) Model. The data can also be used to forecast the wastewater capacities required for carrying the wet weather flows through the collection system.

Sewer System Evaluation Survey (SSES) and sewer and manhole inspection reports give useful information about the existing conditions of the collection systems where these studies were conducted. This information can be incorporated in the development of the wastewater master plan for DWSD.

Basis of design and project plan reports present important design criteria for the construction of different wastewater collection, treatment, retention, and transport facilities. These reports also include rainfall-inflow data required for sewer separation and relief sewers. Relief sewers are required to convey additional flow generated by rising population in the tributary areas.

These reports are valuable sources of information and their review and understanding can be useful in many ways for developing, organizing, and formatting of the wastewater master plan for DWSD for the next 50 years.

The following procedure is suggested to make the best use of the information presented in these reports:

1. Identify the communities from Tables 2 and 3, and Wastewater Disposal District from Tables 4 and 5.
2. Go to Table 6, and check for the communities or the wastewater disposal district. If the community or wastewater disposal district is listed then check the report title. If the report is of any interest then check the page number.
3. Go to Appendix C, and read the summary of that particular report. If the report seems to be of any interest then go to the actual report and extract the information and use it, where required.

4. Refer to Table 7, column 2 for maps. If the map seems to be of interest, read the map number from column 1 and then go to the actual map to get the desired information.

6. Future Plans

It can be inferred from the discussions, SDA had with the community representatives, that the communities currently having their own wastewater treatment facilities are generally satisfied with their systems and do not intend to join the DWSD system in the future. The communities having no public sewerage system also seem to be satisfied with their existing septic tank systems and are non-committal in making any statement on joining the DWSD system in the future. However, it is our understanding that it would depend upon the political will of any particular community to join the DWSD wastewater collection and treatment system in future. A review of the previous and existing wastewater facilities of different communities suggest that many communities, which had their own treatment plants before are now a part of the DWSD system. It will, therefore, be prudent to analyze the needs of all these communities and include in the development of the wastewater master plan for DWSD.

Table 6: List of Reports Collected and Reviewed

	Type of Report	Jurisdiction/Community	Page
1	Basis of Design Sewer Separation, May 1993.	Bloomfield Hills, Oakland County	C-1
2	Interceptor Relief Study, October 1991.	Clinton-Oakland Sewage Disposal System	C-2
3	Basic Requirement, 1985	Evergreen-Farmington Relief Outlet	C-3
4	North Huron Valley / Rouge Valley Program Engineering Report, May 1985	Evergreen-Farmington Relief Outlet	C-4&5
5	Comprehensive Facilities Plan Vol.1 of 3, October 1982.	Evergreen-Farmington Pollution Control Facilities	C-6
6	Comprehensive Facilities Plan Vol.3 of 3, October 1982.	Evergreen-Farmington Pollution Control Facilities	C-7
7	Sewer Study Acacia Park CSO Area, June 1993.	Village of Beverly Hills, Twelve Towns	C-8
8	Combined Sewer Overflow Abatement Program Birmingham CSO Area, December 1993.	City of Birmingham, Twelve Towns	C-9
9	Sewer System Infrastructure Study, April 1989.	City of Royal Oak, Twelve Towns	C-10
10	Engineering Report, Diversion to Clinton-Oakland SDS, January 1990.	Evergreen-Farmington Sanitary Sewer	C-11
11	Engineering Design Data, Phase VI Sanitary Sewer, February 1990.	Waterford Township, Oakland County	C-12
12	Sewer System Evaluation Survey, May 1989.	Evergreen-Farmington Sewage Disposal System	C-13
13	Amendment to Comprehensive Facilities Plan, October 1985.	Evergreen-Farmington Pollution Control Facilities	C-14
14	Revised Sanitary Sewer Master Plan, May 1997	Commerce Township, Oakland County	C-15
15	Elizabeth Lake Pump Station Testing Report, June 1991.	Clinton-Oakland Sewage Disposal System	C-16
16	Sanitary Sewer Master Plan, July 1990	Commerce Township, Oakland County	C-17&18
17	Sewer System Evaluation Survey (Final Report), June 1989.	Evergreen-Farmington Sewage Disposal System, City of Farmington	C-19&20
18	Michigan Water Pollution Control Revolving Loan Fund Program, June 1990.	City of Farmington	C-21
19	Master Sanitary Sewer Plan (Updated), July 1990.	City of Sterling Heights, Macomb County	C-22
20	Water and Wastewater Distribution System Study, September 1995.	Lenox Township, Macomb County	C-23

Table 6: List of Reports Collected and Reviewed

	Type of Report	Jurisdiction/Community	Page
21	Sanitary Sewer Flow Monitoring Program and System Analysis Study, October 1989.	Village of New Haven, Macomb County	C-24
22	Sewer System Study, July 1989.	City of St. Clair Shores, Macomb County	C-25
23	Sanitary Sewer Capacity Study, Part II, November 1999.	Village of New Haven, Macomb County	C-26
24	System Analysis Report with Operational Information, September 1994.	Clinton-Oakland Sewage Disposal System	C-27&28
25	Sewer System Evaluation Survey Report, May 1989.	City of Lathrup Village, Oakland County	C-29&30
26	Sewer System Evaluation Survey Flow Monitoring Report, September 1981.	Waterford Township, Oakland County	C-31
27	Facilities Plan, 1976.	Pontiac Township Village of Lake Angelus, Oakland County	C-32
28	Independence Township Extension Engineering Report, November 1971.	Independence Township, Clinton-Oakland SDS	C-33
29	Engineering Report for Sanitary Sewer System, August 1975.	Village of Bingham Farms, Oakland County	C-34
30	Engineering Report for 13-Mile Road Arm Extension No. 1, December 1981.	West Bloomfield, Oakland County	C-35
31	Facilities Plan for Wastewater Disposal, July 1978.	Hazel Park, Oakland County	C-36
32	Infiltration and Inflow Study, August 2000.	Clinton Township, Macomb County	C-37
33	Flow Monitoring Study, October 1997, Revised January, 1998.	Clinton Township, Macomb County	C-38
34	Sanitary Trunk Sewer Master Plan, January 1995.	Clinton Township, Macomb County	C-39
35	Basic Facilities Plan Vol. I & II, September 1976.	Village of Holly, Oakland County	C-40
36	Final Plan of Operation Wastewater Treatment Facility, October 1979.	Village of Holly, Oakland County	C-41
37	Sanitary Trunk Sewer System Master Plan, August 1999.	Macomb Township, Macomb County	C-42
38	Sanitary Sewer Interceptor Extension Plan, May 1997.	Macomb County	C-43&44
39	North Arm of Twelve Towns Drain, Project Plan for Relief Sewer, April 1997.	City of Royal Oak, Twelve Towns	C-45
40	Sanitary System Master Plan Update, March 1998.	City of Richmond, Macomb county	C-46

Table 6: List of Reports Collected and Reviewed

	Type of Report	Jurisdiction/Community	Page
41	Sanitary Sewer Evaluation Survey, January 1999.	City of Rochester, Oakland County	C-47
42	Sanitary System Master Plan, August 1999.	Shelby Township, Macomb County	C-48
43	Sanitary Sewer Metering for Southeast Sanitary District, August 1997.	Shelby Township, Macomb County	C-49
44	Overflow Study and Improvement plan (Draft), November 1996.	South Macomb Sanitary District	C-50&51
45	Jefferson Interceptor Inspection from Martin Drain to Marter Rd. Booster Station, October 1996.	South Macomb Sanitary District	C-52
46	Basis of Design for Lake St. Clair Clean Water Initiative (Phase I), February 2000.	South Macomb Sanitary District	C-53
47	Implementation Plan for SMSD Overflow Control Projects, March 1999.	South Macomb Sanitary District	C-54
48	Sanitary Sewer Master Plan, October 1997.	White Lake Township, Oakland County	C-55
49	Design Report, Union Lake Sewer District, Phase 1A, June 1995.	White Lake Township, Oakland County	C-56
50	Sewer System Evaluation Survey, September 2000.	Clinton Township, Macomb County	C-57
51	Sanitary Sewer Flow Monitoring Report, March 1998.	Macomb Township, Macomb County	C-58
52	Manhole Inspection Report of Nine-Mile drain and Martin Drain, 1993.	South Macomb Sanitary District	C-59
53	Master Sewer Plan, July 1990.	City of Sterling Heights, Macomb County	C-60
54	A Report on Sewage Disposal Problems, 1964.	Six County Metropolitan Area Southeastern Michigan	C-61
55	Report on Metropolitan Environmental Study, 1964.	Six County Metropolitan Area Southeastern Michigan	C-62
56	State Revolving Fund Project Plan, December 1999.	South Macomb Sanitary District	C-63
57	Flow Rate Analysis, March 1998.	South Macomb Sanitary District	C-64
58	Technical Report Initial Improvements Projects, Twelve Towns, July 1998.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-65
59	Project Plan, Twelve Towns CSO Control Program, and April 1999.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-66
60	Preliminary Basis of Design Segments 2 and 4, November 1999.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-67

Table 6: List of Reports Collected and Reviewed

	Type of Report	Jurisdiction/Community	Page
61	Basis of Design for Twelve Town Retention Treatment Facility Improvements - Contract 4, November 2000 & April 2001.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-68
62	Final Basis of Design for Madison Heights Drain Disconnection and Combined Sewer Reroute - Contract 1, March 2000.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-69
63	Martin Drain Inspection from Harper Avenue to Jefferson Avenue, October 1997.	South Macomb Sanitary District	C-70
64	Sewer System Evaluation Survey, February 1999.	South Macomb Sanitary District	C-71
65	Flow Monitoring Work Plan, February 2000.	Clinton Township, Macomb County	C-72
66	Beaconsfield Relief Sewer Cleaning Manhole Inspection, February 1999.	South Macomb Sanitary District	C-73
67	Engineering Report, Auburn Hills Extension No. 2, September 1987.	Clinton-Oakland Sewage Disposal System	C-74
68	Engineering Report, Avon Township (Rochester Hills) Extension No. 3, January 1972.	Clinton-Oakland Sewage Disposal System	C-75
69	Engineering Report, Avon Township (Rochester Hills) Extension No. 2, January 1971.	Clinton-Oakland Sewage Disposal System	C-76
70	Engineering Report, Orion Township Extension No. 3, March 1984.	Clinton-Oakland Sewage Disposal System	C-77
71	Facilities Plan, Village of Franklin, January 1989.	Evergreen-Farmington Pollution Control Facilities	C-78
72	Water Distribution System and Sanitary Sewer System Master Plan, Charter Township of Independence, Revised June 1995.	Clinton-Oakland Sewage Disposal System (Part)	C-79
73	Amendment to Facilities Plan for Dry Weather Flow Wastewater Pollution Control, City of Mount Clemens, December 1974.	Owns Wastewater Treatment Plant	C-80
74	Engineer's Report, Oakland-Orion Sewage Disposal System, October 1980.	Clinton-Oakland Sewage Disposal System	C-81
75	Supplemental Report on Sewage Collection and Treatment, Village of Lake Orion, June 1970.	Clinton-Oakland Sewage Disposal System	C-82
76	Paint Creek Interceptor, Oakland Township Extension No. 3	Clinton-Oakland Sewage Disposal System	C-83

Table 6: List of Reports Collected and Reviewed

	Type of Report	Jurisdiction/Community	Page
77	Romeo Arm of Macomb County Sanitary Sewer Interceptor Extension Plan, September 1996.	Macomb County	C-84
78	Sashabaw Creek Interceptor, Orion Township Extension	Clinton-Oakland Sewage Disposal System	C-85
79	Macomb County Wastewater Disposal District (Shelby Section) 21 Mile Road Sanitary Sewer, etc., October 1986.	Macomb County	C-86
80	Fax Transmission from Utica City Attorney to S. Beri of DWSD, January 1997.	Section 35 Utica/Shelby	C-87
81	Engineering Report, Waterford Township Extension Phase IV, March 1977.	Clinton-Oakland Sewage Disposal System	C-88
82	Engineering Report, Waterford Township Extension Stage I, Phase III, April 1973.	Clinton-Oakland Sewage Disposal System	C-89
83	Engineering Report, Waterford Township Extension Stage I, Phase II, February 1973.	Clinton-Oakland Sewage Disposal System	C-90
84	Community Facilities Plan for Waterford Township, November 1976.	Clinton-Oakland Sewage Disposal System	C-91
85	Local Facilities Planning for the City of Farmington Hills, April 1979.	Evergreen-Farmington Pollution Control Facilities	C-92
86	Facilities Plan, Combined Relief Sewer, City of Berkley, May 1976.	Southeastern Oakland County Sewage Disposal System, Oakland County	C-93
87	Facilities Plan Avon (Rochester Hills) Township, December 1976.	Oakland County	C-94

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
1	Existing Sewage Disposal System Village of Clarkston, Oakland County, MI	4-Aug-69	Kieft Engineering, Inc. 5852 S. Main St. Clarkston, MI	Sheet No. 1B. The drawing shows the area served by present Septic Tank System.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
2	System Map Village of Clarkston Sanitary Sewer Oakland County, MI	9 August-71 Revisions	Kieft Engineering, Inc. 5852 S. Main St. Clarkston, MI	Sheet No. 1C. The Revisions were made on original 1969 drawing. The drawing shows Clinton-Oakland Sewage Disposal System Clarkston Extensions.
3	Zoning Map Village of Clarkston, Oakland County, MI	4-Aug-69	Kieft Engineering, Inc. 5852 S. Main St. Clarkston, MI	Sheet No. 1D. The drawing shows the residential, commercial, and manufacturing districts of the village.
4	Design and Flow Map Village of Clarkston Sanitary Sewer Oakland County, MI	11 August-69 Revisions	Kieft Engineering, Inc. 5852 S. Main St. Clarkston, MI	Sheet No. 1E. The drawing provides the design criteria and flow map for Clinton-Oakland Sewage Disposal System Clarkston Extensions.
5	Design Loadings, Sanitary Sewer - Offsite "Deerwood" Subdivision Village of Clarkston, Oakland County, MI	10 July-73.	Kieft Engineering, Inc. 5852 S. Main St. Clarkston, MI	The drawing contains partial mapping and design criteria for the addition of the subdivision. It also includes Oakland County DPW and Village Engineer's approval seals.
6	Plan of Proposed Trunk Sewers of Clinton River Sewage Disposal System Oakland County, MI	December, 1959 Paint Creek Interceptor location revised 25 May-70	Oakland County Department of Public Works, Pontiac, MI	The map shows the system limits, proposed open cut Trunk Sewers, and proposed Tunnel Trunk Sewers along with municipality limits and other information.
7	Plan of Proposed Trunk Sewers of Clinton River Sewage Disposal System Oakland County, MI	December, 1959 Paint Creek Interceptor location revised 25 May-70	Oakland County Department of Public Works, Pontiac, MI	Exhibit "A-1". The map shows the system limits, proposed open cut Trunk Sewers, and proposed Tunnel Trunk Sewers along with municipality limits and other information.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
8	Plan of Proposed Trunk Sewers of Clinton River Sewage Disposal System Oakland County, MI	December, 1959	Oakland County Department of Public Works, Pontiac, MI	Exhibit "C". The map includes area highways and shows the system limits, proposed open cut Trunk Sewers, and proposed Tunnel Trunk Sewers along with municipality limits and other information.
9	Map showing Design Points for Proposed Trunk Sewers of Clinton River Sewage Disposal System Oakland County, MI	November, 1961	Oakland County Department of Public Works, Pontiac, MI	The map shows the system limits, proposed open cut Trunk Sewers, and proposed Tunnel Trunk Sewers along with municipality limits and other information. It also shows the design points for the entire system.
10	Zoning Map of Independence Township, Oakland County, MI	July 29, 1966 June 9, 1971 Revision	Driker Associates, Inc. Birmingham, MI	The drawing contains the land use map of the Township.
11	Map of Sanitary Sewer System - Ultimate Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "E" the map shows the Township sewers, pump stations and the Clinton-Oakdale Sewage Disposal System.
12	Sanitary Sewers Map Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "D" the map shows the Township sewers, pump stations and the Clinton-Oakdale Trunk Sewers.
13	Sanitary Sewers Map Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "I" the maps shows the Township sewers, pump stations, the Clinton-Oakdale Trunk Sewers and contains a table for ultimate design loadings.
14	Pump Station Service Limits Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI (Assumed).	The map shows the limits of service for pump station 29-1
15	Pump Station Service Limits Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI (Assumed).	The map shows the limits of service for pump station 29-2

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
16	Pump Station Service Limits Independence Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI (Assumed).	The map shows the limits of service for pump station 29-3A
17	Clinton-Oakland Sewage Disposal System Oakland Township Extensions Oakland Township, Oakland County, MI	15-Jun-70	Oakland County Department of Public Works, Pontiac, MI	Presented as Exhibit "A", the map shows proposed Paint Creek Interceptor Sewer and its limits, future Township Trunk Sewer and sub-district limits.
18	Sewer District Oakland-Orion Sewage Disposal System Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "A", the map shows the District limits of Oakland and Orion Townships along with sub-district limits including population, flows and load points.
19	Sewer District Oakland-Orion Sewage Disposal System Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "B", the map shows the District limits of Oakland and Orion Townships along with sub-district limits including population, flows and load points. The maps listed, as item 18 and 19 are basically it maps except there are different hands written notes.
20	Master Sewer Plan Orion Township, Extensions No. 1, 2 & 3 Oakland County, MI	August, 1970	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit "A-2", the map shows the District limits of Extensions 1, 2 & 3 in Orion Township.
21	Preliminary Plans- Sanitary Sewer System Orion Township, Oakland County, MI	1966	Johnson & Anderson, Inc. Pontiac, MI	The map shows the existing and projected population in Orion Twp. The map is marked as a Master Copy on 11-16-70
22	Untitled Sewer Map Orion Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map is marked as a Master Copy on 11-16-70

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
23	Sanitary Sewers Map Orion Township, Oakland County, MI	October, 1991 Revision	Oakland County DPW	The map shows sanitary sewer districts such as Paint Creek Interceptor, Oakland- Orion (G. M.), Silver Bell Road P.S., (Addn. To G.M.), and other pump stations.
24	Sanitary Sewers Map Orion Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map shows some sewers with sizes.
25	Sewer District & Design Map Clinton-Oakland Sewage Disposal System Paint Creek Interceptor Orion Township Extension No. 2 Oakland County, MI	March, 1982	Johnson & Anderson, Inc. Pontiac, MI	The map presented as Exhibit "A", shows zoning, service boundaries and other design data.
26	Clinton-Oakland Sewage Disposal System Oxford Township Extensions Oxford Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map shows Paint Creek Interceptor and Index of lateral sewers.
27	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	S.E. Quarter Section 22
28	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	S.W. Quarter Section 26
29	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	S.E. Quarter Section 27
31	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	S.W. Quarter Section 28
32	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	N.W. Quarter Section 28
33	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	N.E. Quarter Section 28

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
34	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	N.E. Quarter Section 29
35	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	S.E. Quarter Section 29
36	Oxford Township Sewer Section Maps Oxford Twp., Oakland County, MI	None	Oakland County Planning Commission	N.W. Quarter Section 35
37	Clinton-Oakland Sewage Disposal System Village of Oxford Oxford Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map shows Index of lateral sewers.
38	Clinton-Oakland Sewage Disposal System Village of Oxford Oxford Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map shows Index of lateral sewers.
39	Clinton-Oakland Sewage Disposal System Village of Oxford Oxford Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	The map shows Index of lateral sewers.
40	Clinton-Oakland Sewage Disposal System Map of Sewer System Service Area Village of Oxford Oxford Township, Oakland County, MI	None	Johnson & Anderson, Inc. Pontiac, MI	Presented as Exhibit-"A", the map provides design calculations.
41	Sanitary Sewers City of Rochester And Suburbs Oakland County, MI	1-12-84 Revision	Frederick H. Gmeiner Grosse Pointe, MI	Partial sanitary sewer map. Sheet No. 10
42	Sanitary Sewers City of Rochester And Suburbs Oakland County, MI	1-12-84 Revision	Frederick H. Gmeiner Grosse Pointe, MI	Partial sanitary sewer map. Sheet No. 11

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
43	Sanitary Sewers City of Rochester And Suburbs Oakland County, MI	1-12-84 Revision	Frederick H. Gmeiner Grosse Pointe, MI	Partial sanitary sewer map. Sheet No. 14
44	Sanitary Sewers City of Rochester And Suburbs Oakland County, MI	1-12-84 Revision	Frederick H. Gmeiner Grosse Pointe, MI	Partial sanitary sewer map. Sheet No. 15
45	Proposed Twelve-Towns Relief Drains Oakland County, MI	July, 1954	Hubbell, Roth & Clarke, Inc. Detroit, MI	The map shows the proposed drains and the existing sewers.
46	City of The Village of Clarkston Oakland County, MI	None	Unknown	The map shows three pump station locations with service boundaries.
47	Clinton-Oakland Sewage Disposal System- Pontiac Twp. (Auburn Hills) Extensions Stage One Contract Oakland County, MI	None	John E. Hiltz & Associates, Inc. Detroit, MI	The drawing shows interceptor sewers, existing sanitary sewers, proposed sanitary sewers and proposed contract limits. The map is labeled as preliminary. It is also marked as superceded on 10-22-70.
48	Pontiac Township Sanitary Sewer Extension No. 2 Auburn Hills, Oakland County, MI	None	Orchard Papke, Hiltz & Mc Climent, Inc., Livonia, MI	The map shows Design Point locations and presents a corresponding Design Data Table.
49	Clinton- Oakland Sewage Disposal System Pontiac Township Extensions Service Area & Design Map	None	John E. Hiltz & Associates, Inc. Detroit, MI	The map shows service area limits, design point numbers and proposed sewers
50	Pontiac Township Sanitary Sewer Extensions Auburn Hills, Oakland County, MI	None	Oakland County Planning Commission	This is part of sanitary sewer section maps representing the Southeast Quarter of Section 11.
51	Pontiac Township Sanitary sewer Extensions Auburn Hills, Oakland. MI	None	Oakland County Planning Commission	This is part of sanitary sewer section maps representing the Northeast Quarter of Section 11.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
52	Pontiac Township Sanitary sewer Extensions Auburn Hills, Oakland. MI	None	Oakland County Planning Commission	This is part of sanitary sewer section maps representing the Southwest Quarter of Section 12.
53	Special Assessment District (S.A.D.) Sanitary Interceptor Sewers City of Rochester (Easterly Annexed Area) Oakland County, MI	June, 1991	Hubbell, Roth, And Clark, Inc. Bloomfield Hills, MI	The drawing shows existing and proposed sanitary interceptor sewers including Oakland- Clinton Contract No. 1 Interceptor. It also includes acreage calculation tables for total District Sanitary Interceptor and Stony Creek Interceptor sub-district.
54	Macomb County 342 Projects Central Macomb Sewer & Water Facilities Chesterfield Township, Macomb County, MI	None	Macomb County Agent	The map is marked as Chesterfield Master and it shows existing and proposed sanitary sewers, pump stations, Detroit Interceptor, lift stations and other utility information, particularly for Chesterfield Township.
55	Sanitary Sewer Master Plan Chesterfield Township, Macomb County, MI	Update- 15 August, 2000	Anderson, Eckstein And Westrick, Inc. Shelby Township, MI	The map shows boundary of service district, pump station locations meter pit location.
56	Sanitary Trunk Sewer System Master Plan Chesterfield Township, Macomb County, MI	December, 1969	Spalding DeDecker Associates, Inc. Rochester Hills, MI	The Master Plan shows Proposed connections to DMWS Interceptor, proposed pumping stations, limits of various service areas, existing and proposed trunk sewers, existing ground elevations, and proposed hydraulic gradient.
57	Sanitary Trunk Sewer System Master Plan Clinton Township, Macomb County, MI PLATE 2	1974 Update- 13 Jan., 1995	Spalding DeDecker Associates, Inc. Rochester Hills, MI	The Master Plan shows Proposed connections to DWSD Interceptor, proposed pumping stations, existing pumping stations, limits of various service areas, existing and proposed trunk sewers, existing force mains, and pump station capacities.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
58	Sanitary Trunk Sewer System Master Plan Clinton Township, Macomb County, MI	April, 1971 Rev. May, 1973	Spalding DeDecker Associates, Inc. Rochester Hills, MI	The Master Plan shows Proposed connections to DMWD Interceptor, proposed pumping stations, existing pumping stations, limits of various service areas, existing and proposed trunk sewers, proposed & existing force mains, existing ground elevations, and proposed hydraulic gradient.
59	Sanitary Sewer District Clinton Township, Macomb County, MI	None	Unknown	The map includes capacity calculations for Interceptor Sewer District Nos. 1 through 5.
60	Sewer Maps for City of East Pointe Macomb county, MI	None	Anderson, Eckstein And Westrick, Inc. (Assumed) Shelby Township, MI	Two pages of maps are for Area Nos. 25-A, 30-D and 30-C.
61	Master Sanitary Sewer & Water Plan City of Fraser, Macomb County, MI	January, 1982	Unknown	This sheet shows Sanitary sewers for the southern part of the City from Thirteen Mile Road to Luxemburg Road.
62	Master Sanitary Sewer & Water Plan City of Fraser, Macomb County, MI	January, 1982	Unknown	This sheet shows Sanitary sewers for the northern part of the City from Luxemburg Road to Fifteen Mile Road.
63	Sanitary Service Districts City of Fraser, Macomb County, MI	None Plot Date 3 Apr. 2001	Anderson, Eckstein And Westrick, Inc. Shelby Township, MI	The map delineates the Garfield Road and Hayes Road service districts.
64	Existing Sanitary Sewer System Charter Township of Harrison Macomb County, MI	29 October, 1999	Anderson, Eckstein And Westrick, Inc. Shelby Township, MI	This map represents an up to-date sewer system of the Township excluding the Selfridge Air National Base. It shows the sanitary sewers with size, meter pit locations, and the boundaries of the system.
65	Sewer System Map Harrison Township, Macomb County, MI	1967	Unknown	The map shows existing and proposed sewers.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
66	Sanitary Trunk Sewer System Township of Lenox, Macomb County, MI	November, 1986	Spalding DeDecker Associates, Inc. Rochester Hills, MI	The map shows proposed connection to DMWD Interceptor, existing and proposed sanitary trunk sewers, and proposed hydraulic gradient.
67	Sanitary Trunk Sewer System Master Plan Township of Macomb, Macomb County, MI PLATE I	February 1988 Study Update- August 1999 Trunkline Update- December 2000	Spalding DeDecker Associates, Inc. Rochester Hills, MI	The map shows existing and proposed sanitary trunk sewers, force mains, limits of service districts and sub-districts, and pump stations. In addition, the drawing shows the connection points to DWSD Interceptor and to the Washington Township, which has a contract for 5.4 cfs from Macomb Township. It also has a Table containing breakdowns of residential and ultimate population equivalent by Township Sections.
68	Sewer Index Map Village of New Haven, Lenox Township Macomb County, MI	None	McNamee, Porter And Seeley Ann Arbor, MI	The map shows the locations of sewers, pumps and diversions.
69	Master Sanitary Sewer Plan Charter Township of Shelby Macomb County, MI	June, 1999	Anderson, Eckstein And Westrick, Inc. Shelby Township, MI	The map includes existing sanitary sewer with size, DWSD Interceptor, existing ground elevation/ Prop. Inverts, proposed flow, proposed combined flow, sanitary sewer service district number, future sanitary sewer with size & slope, proposed sanitary sewer service district line, and proposed sanitary district line.
70	Shelby Township N-S Interceptor Service Areas & Design Criteria Shelby Township, MI	21 August, 1970	Lehner Associates, Inc. Mt. Clemens, MI	The map shows the boundary limits of service area and design criteria.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
71	Long Range Plan For Pollution Control Sanitary Sewer Program Shelby Township, Macomb County, MI	June, 1972 Rev. 1980	Lehner Associates, Inc. Mt. Clemens, MI	The map is labeled as "MASTER- REVISION July, 1973" and shows Interceptor Sewers, laterals and connection points.
72	Long Range Plan For Pollution Control Sanitary Sewer Program Shelby Township, Macomb County, MI	June, 1972 Rev. 1980	Lehner Associates, Inc. Mt. Clemens, MI	The map is labeled as "MASTER- REVISION July, 1973" and shows Interceptor Sewers, laterals and connection points. This drawing is basically same as the one listed above with some differences in some areas such as the Interceptors. Also it is marked as "VOID".
73	Master sanitary Sewer Plan Including Priorities 1 thru 6 City of Sterling Heights, Macomb County, MI	Updated 1990	Hubbell, Roth, And Clark, Inc. Bloomfield Hills, MI	The map shows the existing trunk sewers, existing force mains, pump stations, DMWD Interceptor, and points of connection to DMWD Interceptor.
74	Master Sanitary Sewer Study- Existing Sewers City of Sterling Heights, Macomb County, MI	Updated Aug. 1975- Dec. 1988	Hubbell, Roth, And Clark, Inc. Bloomfield Hills, MI	The map shows limits of district and sub-districts, proposed priority trunk sewers, the existing trunk sewers, existing force mains, pump stations, proposed future sewers, proposed lateral sewers, DMWD Interceptor, and points of connection to DMWD Interceptor.
75	Existing Sanitary Sewer District Washington Township, Macomb County, MI	13 Apr. 2001	Professional Engineering Associates Troy, MI	The map shows the existing central district boundary and the existing sanitary trunk lines.
76	Service Areas For Separate and Combined Sewers In Southeast Macomb County, MI PLATE I	None	Anderson Eckstein And Associates, Inc. Mount Clemens, MI	The map delineates areas serviced by separate sanitary sewers and areas serviced by combined sewers in southeast Macomb County communities.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
77	Storm Drainage Districts In Southeast Macomb County, MI PLATE II	None	Anderson Eckstein And Associates, Inc. Mount Clemens, MI	The map delineates 15 Drainage Districts in southeast Macomb County communities.
78	Sewer System In Southeast Macomb County, MI After Faze Lake Shore Interceptor Construction And I. PLATE III	None	Anderson Eckstein And Associates, Inc. Mount Clemens, MI	The map shows the sewer system including Interceptor Sewers, other sewers, meter chambers and pump stations representing the system after construction of PHASE I in southeast Macomb County communities.
79	Proposed Sewer System (Final Completion) Southeast Macomb County, MI PLATE IV	None	Anderson Eckstein And Associates, Inc. Mount Clemens, MI	The map shows sewer system after completion of Phase I and Phase II in southeast Macomb County communities.
80	Existing Sewer System Southeast Macomb County, MI PLATE V	April, 1971	Anderson Eckstein And Associates, Inc. Mount Clemens, MI	The map shows the existing sewer system in southeast Macomb County communities. It delineates the combined sewer areas and identifies separate sanitary sewers, combined sewers, separate sanitary interceptors and combined main sewers
81	Sewer Map Subdivisions at southwest corner of Ten Mile Road and Vandyke Avenue Centerline, MI	None	Unknown	Shows both sanitary and storm sewers
82	Floods At Mount Clemens USGS Map Prepared As Part of Hydrologic Investigations Mount Clemens, MI	1962	S. W. Witless and D. Ash for USGS	The map provides information on flood heights recorded at various stages, and profiles of Clinton River, North Branch and Middle Branch Clinton River, and Harrington Drain, Macomb County, Michigan. This may be a useful reference material.

Table 7: List of Maps Collected and Reviewed

No.	Map Title/ City/ Township/ Community	Date	Consultant(s)	Remarks/ Summary
83	Lake Shore Interceptor Macomb County, MI	1942	Hubbell, Roth & Clark, Inc. Detroit, MI	The map provides profile for this 5' dia. and 6' dia. Interceptor Sewers from the Wayne County Interceptor to the Martin Drain Regulator Chamber. This could be a good reference material.
84	DWSD System Monitoring & Control Facilities Detroit, MI	1974 & 1975 Last Rev. 1991	Unknown	This map provides a very comprehensive and graphic picture of the DWSD wastewater collection and treatment system. It can be used as an excellent reference tool.

Appendix A

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
1	DWSD Engineering Division International Center Building 400 Monroe Street Suite 700 Detroit, MI 48226	George Haberer Project Manager, Planning Section	Tel:313-964-9871 Fax:313-964-9810 Email:haberer@dwsd.org	Reports and maps on file here are available for making copies.
2	MDEQ S.E. Michigan District Office 38980 Seven Mile Road Livonia, MI 48152	Phil Argiroff Lead Environmental Engineer	734-953-1443 734-953-1467 argirofp@state.mi.us	Documents on file at their office are available for review.
3	Macomb County Public Works Commission 115 S. Groesbeck Hwy. P.O. Box 806 Mount Clemens, MI 48043	Ken Bonin Chief Engineer	810-469-5325 810-469-5933	They have information on various community master plans, reports, maps and county level planning which will be made available.
4	South East Macomb Sanitary District 20001 Pleasant St. Clair Shores, MI 48080	Ted B. Wahby District Chairman	810-777-1284 810-777-2840	Cities of Eastpointe, Roseville and St. Clair Shores belong to this district. The district consulting engineer is: Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307 Contact person: Dave Lakin Tel: 248-844-5400/Fax: 248-844-5404 dlakin@spaldingdedecker.com www.spaldingdedecker.com

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
5	Oakland County Drain Commissioner (OCDC) Building # 95 West One Public Works Drive, Waterford, MI 48328-1907	William E. Klockow Manager, Engineering & Construction Div. ; Douglas A. Buchholz Manager, Operations & Maintenance Div. ; Joseph P. Kozma Chief Engineer ; Byron Hanson System Coordinator	248-858-1094 248-858-1119 248-858-1122 248-858-1066(Fax)	The office of the OCDC is a valuable source for relevant data.The OCDC serves the wastewater needs of the following communities: Addison Township (treatment plant for a specific community development only); City of Bloomfield Hills; Brandon Township (community treatment plant only); Commerce Twp. (both sanitary sewers and treatment plant used jointly with White Lake Twp.); Farmington Hills; Groveland Twp. (community treatment plant only) ; Keego Harbor; Lyon Twp. (both sanitary sewers and treatment plant); City of Novi (both sanitary sewers and treatment plant owned jointly with Walled Lake); Oakland Twp. (both sanitary sewers and treatment plant); City of Orchard Lake Village; Lake Orion Village: Oxford Township; Royal Oak Twp.; Southfield Twp.; Beverly Hills Village; Bingham Farms Village; Franklin Village; Springfield Twp. (sanitary sewers and a treatment plant for Bavarian Village complex only); Walled Lake (both sanitary sewers and treatment plant owned jointly with Novi); and White Lake Twp. (both sanitary sewers and treatment plant).

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
6	City of Auburn Hills Dept. of Public Services 1500 Brown Road Auburn Hills, MI 48326	Ron Melchert, Manager of Utilities	248-391-3777 248-391-4895	The consultant for the city is: Orchard, Hiltz, McCliment, Inc. 34935 Schoolcraft Livonia , MI 48150 Contact Person: Evan Pratt Tel: 734-522-6711/Fax:734-522-6427 E-mail: pratt@ohm-eng.com The city sanitary sewers are connected partly to Evergreen-Farmington Sewage Disposal System (E-F) and partly to Clinton-Oakland Sewage Disposal System (C-O) interceptors.
7	City of Berkley DPW 3238 Bacon Street Berkley, MI 48072	Richard Shepard Director, Public Works	248-546-2430 248-546-2448	They do not have any designated consultant. Some of their current work is being performed by: Ayres, Lewis, Norris & May 3959 Research Park Dr. Ann Arbor, MI. 48108 Contact person: Greg Kacbinsky Tel: 734-761-1010/Fax: 734-761-1200 gkacbinsky@alnm.com The city sanitary sewers use the Southeastern Oakland County Sewage Disposal System (SOC) interceptor.
8	Village of Beverly Hills 18500 W. Thirteen Mile Road Beverly Hills, MI 48025	Renzo Spallasso, Director, DPS	248-646-6404 248-646-3703 renzo@mi.verio. Com	The consultant for the village is : Hubbell, Roth, & Clark, Inc. 555 Hulet Dr. Bloomfield Hills, MI 48302-0360 Tel: 248-338- 9241/Fax: 248-338-2592 bmcfarland@hrc-engr.com The village also uses other consultants. The OCDC manages their sanitary sewer system which uses the E-F and the SOC interceptors.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
9	Village of Bingham Farms 30400 Telegraph Rd. Bingham Farms, MI 48025	Kathryn P. Hagaman, Clerk/ Administrator	248-644-0044 248-644-3254	The OCDC handles their sanitary sewer needs.The consultant for the village is: Anderson, Eckstein, & Westrick, Inc. 51301 Schoenherr, Shelby Twp. MI 48315 Tel: 810-726-1234/Fax: 810-726-8780 aewinc@aewinc.com The sewage flow from the village is connected to the Evergreen-Farmington Sewage Disposal System (E-F) interceptor.
10	City of Birmingham 151 Martin P.O. Box 3001 Birmingham, MI 48012	Dennis Dembiec, Director, DPW	248-644-1800 Ext. 252 248-644-3865 ddembiec.ci.birmingham.mi.us	The city uses Hubbell, Roth & Clark and others as consultants. The Birmingham sewers use the E-F and the SOC interceptors.
11	City of Bloomfield Hills 45 E. Long Lake Road P.O. Box 288 Bloomfield Hills, MI 48304	Charles Harmon, Manager	248-644-1520 248-644-4813	The OCDC maitains their sanitary sewer system.The consultant for the city is: Hubbell, Roth, And Clark, Inc. 555 Hulet Drive Bloomfield Hills, MI 48302-0360 Contact person: Randy Ford Tel:248-338-9241/Fax:248-338-2592 The Bloomfield Hills sanitary sewers use the E-F interceptor.
12	Bloomfield Township 4200 Telegraph Road P.O. Box 489 Bloomfield, MI 48303-0489	Wayne Domine Director, Water And Sewer Department	248-433-7731 248-433-7729	The consultant for the Township is Hubbell, Roth And Clark, Inc. Telephone and address are as above. The Bloomfield Twp. sewers use the E-F interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
13	City of Center Line DPW 6685 E. Ten Mile Road Centerline, MI 48015	Dennis Tenniswood Director, DPW	810-758-8278 810-755-0790	The city contracts directly with DWSD for transporting and treatment of their wastewater. The consultant for the city is Anderson,Eckstein & Westrick, Inc. Contac person: Jim Rabine 51301 Schoenherr Shelby Twp., MI 48315 Tel: 810-726-1234/Fax: 810-726-8780 A master plan preparation is currently in progress by the consultant.
14	City of TheVillage of Clarkston 375 Depot Road Clarkston, MI48346	Artemus Pappas Manager	248-625-1559 248-625-3370	The Oakland County Drain Commissioner is responsible for the wastewater generated from the city which is only 1/2 sq. mi. in size. Independence Twp. maintains and administers their account with the county. Linda Richardson (Tel: 248-625-8222) is the contact person at Independence Township. The City is a part of C-O system
15	City of Clawson 425 N. Main Street Clawson, MI 48017	Louis Vitale City Engineer	248-435-4500 248-435-0515	They do not have any master plan for the sewer system. Only a water system master plan was prepared by Spalding DeDecker Associates. They do not have any consulting engineer on board currently. The City belongs to SOC system
16	Chesterfield Township DPW 50177 N. Gratiot Ave. Chesterfield, MI 48047	Joseph Gayeski DPW Superintendent	810-949-0400 Ext. 3 810-949-4108	The consulting engineers for the Township is Anderson, Eckstein & Westrick, Inc. 51301 Schoenherr Shelby Township, MI 48315 Contact person: Gordy Wilson Tel.:810-726-1234/Fax: 810-726-8780 The Twp. belongs to Macomb County Wastewater Disposal District (MCWWDD).

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
17	Clinton Township 40700 Romeo Plank Road Clinton Township, MI 48038	Rober J. Cannon Township Supervisor	810-286-8000 810-228-1770 www.clintontownship.com	Most of the Twp. flow goes to DWSD system. Only two small portions are connected to Mount Clemens system. The consulting engineers for the Township is: Spalding DeDecker Associates, Inc. Contact person: Dave Lakin 905 South Boulevard E. Rochester Hills, MI 48307 Tel: 248-844-5400 / Fax: 248-844-5404 The Twp. belongs to MCWWDD.
18	Commerce Township 2840 Fisher Ave. Walled Lake, MI 48390	Ken Campbell Building Administrator	248-960-7060 248-624-5384	Commerce Twp. has its own wastewater treatment plant and does not use DWSD system.The OCDC is responsible for maitaining their sanitary sewers and operating the plant. The consultants for the Twp. is: Giffels-Webster Engineers 2871 Bond Street Rochester Hills, MI 48309 Contact Person: Loren Crandell Tel:248-852-3100/Fax:248-852-6372 Commerce Twp. uses both Commerce-White Lake (C-W) and Walled Lake-Novi (W-N) Sewage Disposal Systems.
19	City of Eastpointe DPW 17800 Ten Mile Road Eastpointe, MI 48021	Greg Brown Director, DPW	810-445-5040 810-445-5044	The city of Eastpointe belongs to the South East Macomb Sanitary District (SMSD) along with the cities of Roseville and St. Clair Shores. The consultant for the city is: Anderson, Eckstein & Westrick, Inc. 51301 Schoenherr, Shelby Twp., MI 48315 Contact person: Steve Panvori Tel: 810-726-1234/Fax : 810-726-8780 aewinc@aewinc.com

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
20	City of Farmington DPW 33720 W. Nine Mile Road Farmington, MI 48335	Kevin Gushman Director, DPW	248-473-7250 248-473-7279 kgushman.ci.farmington.mi.us	The city uses Orchard, Hiltz & McCliment, Inc. as their consultants. Contact person: Jeff McIntosh 34935 Schoolcraft Livonia, MI 48150 Tel: 734-522-6711/Fax: 734-522-6427 The city sanitary sewers use the E-F interceptor for western part of the city and the remaining areas of the city flow is pumped and diverted to the DWSD Wastewater Treatment Plant through the City of Detroit sewer system.
21	City of Farmington Hills 31555 Eleven Mile Road Farmington Hills, MI 48336	William Otwell Chief Engineer	248-473-9590 248-474-5925	Oakland County Drain Commissioner takes care of their sanitary sewer collection and treatment needs. The city uses Orchard, Hiltz, & Mcliment, Inc. as their consultant for sewer related assistance and Hubbell, Roth & Clark, Inc. for other problems. The city sanitary sewers use the E-F interceptor.
22	City of Ferndale DPW 521 E. Cambourne Ferndale, MI 48220	Byron Photiades Director, DPW	248-546-2519 248-546-2521 www.ferndale-mi.com	At present they are not using any consultants for sanitary sewers. For water related work Hubbell, Roth, & Clark is assisting them. For road improvements they are using Giffels-Webster Engineers. The city sanitary sewers use the SOC interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
23	Village of Franklin 32325 Franklin Road Franklin, MI 48025	Jane Bais-DiSessa Administrator	248-626-9666 248-626-0538 www.franklin.mi .us	The village currently does not use any city water.They are on well water but recently the village has been sewered. The OCDC was responsible administering the project. Due to the topography, the sewage disposal from homes and businesses has to occur using grinder pumps and force mains. About 80% of the homes are yet to be connected for service. The village uses Hubbell, Roth & Clark and also Giffels-Webster Engineers as consultants. Franklin Village is a part of the E-F system.
24	City of Fraser DPW 31250 Kendall Fraser, MI 48026	Bernard VanFleteren DPW Superintendent	810-293-1977 810-294-8909	The city uses Anderson, Eckstein & Westrick as their consultant. Contact person: Jeff Bednar/Scott Lockwood Tel: 810-726-1234/Fax:810-726-8780 aew@aewinc.com The City belongs to MCWWDD.
25	Harrison Township 38151 Lanse Creuse Harrison Twp., MI 48045	Randy McConnell Director of Engineering & Utilities	810-466-1426 810-465-2618	The consulting engineer for the Township is Anderson, Eckstein & Westrick.. The contact person : Jim Rabine Tel: 810-726-1234/Fax: 810-726-8780, aewinc@aewinc.com Harrison Twp. belongs to MCWWDD and is a part of the Macomb Section of Clinton-Oakland System. .

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
26	City of Hazel Park Water & Sewer Dept. 24211 Couzens Hazel Park, MI 48030	Leonard Solecki Water & Sewer Superintendent	248-542-0340 248-414-5957 www.hazelpark.org	The consulting engineer for the city is Nowak & Fraus 7 S. Perry Street Pontiac, MI 48342 Contact person: Rob Lavoie Tel: 248-332-7931/Fax: 248-332-8257 rlavoie@nowakfraus.net The city sewers use the SOC interceptor.
27	City of Huntington Woods DPW 12795 W. Eleven Mile Road Huntington Woods, MI 48070	Larry Page Director, DPW	248-547-1888 248-414-2060 www.ci.huntington-woods.mi.us	The city retains Nowak & Fraus as their consulting engineer. 1310 N. Stephenson Hwy. Royal Oak, MI 48067 Contact person: Alex Nicolaescu Tel: 248-399-0886/Fax: 248-399-0805 anicolaescu@nowakfraus.com The city sewers use the SOC interceptor.
28	Independence Township DPW 6050Flemings Lake Road Clarkston, MI 48346	Linda Richardson Assistant Director	248-625-8222 248-625-4393 www.to.independence.mi.us	Independence Township also handles the wastewater system of Clarkston. The Township engineer is Hubbell, Roth & Clark, Inc. 555 Hulet Dr. Bloomfield Hills, MI 48302-0360 Contact Person: Randy Ford Tel: 248-338-9241/Fax:248-338-2592 The Twp. uses the C-O interceptor for wastewater disposal.
29	City of Keego Harbor 2025 Beechmont P.O. Box 665 Keego Harbor,MI 48320-0665	Tony Hale Head Engineer, DPW	248-682-0166 248-682-1635 members.aol.com/ keegoharbr	The consultant for the city is Rowe Incorporated 6211 Taylor Dr. Flint, MI 48507 Contact person: Doug Scott Tel: 810-341-7500/Fax: 810-341-7573 dscott@roweincorp.com The OCDC maintains the city sanitary sewer system. Keego Harbor uses the E-F interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
30	Village of Lake Orion 37 E. Flint Lake Orion, MI 48362	JoAnn Van Tassel Manager	248-693-8391 248-693-5874	The consultant for the village is Hubbell, Roth & Clark, Inc. 555 Hulet Dr. Bloomfield Hills, MI 48302-0360 Contact person: Keith McCormack Tel: 248-338-9241/Fax: 248-338-2592 The OCDC maintains their sanitary sewer system. The village sanitary sewers use the C-O interceptor.
31	City of Lathrup Village DPW 19101 W. Twelve Mile Road Lathrup village, MI 48076	Sherri Gadula Administrative Asst.	248-559-0001 248-559-6410	The city uses Giffels-Webster Engineers as their consultant. 2871 Bond Street Rochester Hills, MI 48309 Tel: 248-852-3100/Fax: 248-852-6372 Lathrup village uses the E-F interceptor.
32	Lenox Township 63975 Gratiot Ave. Lenox, MI 48050	John P. Gardner Supervisor	810-727-2085 810-727-3188	The consulting engineer for Township is Spalding DeDecker Associates, Inc. 905 South Blvd. E. Rochester, MI 48307 Contact person: Dave Lakin Tel: 248-844-5400/Fax: 248-844-5404 www.spaldingdedecker.com The Twp. belongs to MCWWDD.
33	Macomb Township DPW 51650 Card Road Macomb, MI 48042	David Koss DPW Superintendent	810-598-0687 810-598-9172	Spalding DeDecker Associates, Inc. is the Township consultant. Macomb Twp. belongs to MCWWDD and a is part of the Macomb Section of Clinton-Oakland System.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
34	City of Madison Heights DPW 801 Ajax Drive Madison Heights, MI 48071	Peter J. Connors Deputy City Engineer	248-589-2294 248-589-2679 www.ci.madison-heights.mi.us	Nowak & Fraus is the engineering consultant for the city. 1310 N. Stephenson Hwy. Royal Oak, MI 48067 Contact person: Alex Nicolaescu Tel: 248-399-0886/Fax: 248-399-0805 anicolaescu@nowakfraus.com The city sanitary sewers use the SOC interceptor.
35	City of Mount Clemens DPW 36570 Jefferson Mount Clemens, MI 48045	Charles Bellmore Superintendent of Utilities	810-469-6889 810-469-7896	Mount Clemens owns and operates its own WWTP which is a tertiary plant having a design capacity of 6 MGD.
36	City of New Baltimore DPW 35319 Cricklewood New Baltimore, MI 48047	Craig Higgins Wastewater Superintendent	810-725-9363 810-725-6927	The city owns and operates its own WWTP which is a secondary treatment plant with a design capacity of 1.75 MGD. The city also does not receive Detroit water. The consultant for the city is Tetra Tech MPS 62529 Main Street Richmond, MI 48062 Contact person: Ken Kingsley Tel: 810-727-0777/Fax: 810-727-7416 ken.kingsley@ttmps.com
37	Village of New Haven 58725 Havenridge New Haven, MI 48048	Brett Harris President	810-749-5301 810-749-9055	The consulting engineer for the village is: Anderson, Eckstein & Westrick, Inc. who has prepared a wastewater master plan for the village. 51301 Schoenherr, Shelby Twp. 48048 Tel: 810-726-1234/Fax:810-726-8780 aewinc@aewinc.com The Village belongs to MCWWDD.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
38	City of Northville DPW 650 Doheny Drive Northville, MI 48167	Paul R. Vertrees Water/Sewer Superintendent	248-349-3271 248-349-4920	The consulting engineer for the city is McNeely & Lincoln Associates, Inc. 37741 Pembroke Livonia, MI 48152 Contact person: Robert Warner Tel:734-432-9777/Fax: 734-432-9786 info@mnline.com The city sanitary sewers discharge to the Huron-Rouge (H-R) interceptor.
39	City of Novi Water & Sewer 26300 Delwal Novi, MI 48375	Bruce Jerome Water & Sewer Superintendent	248-735-5661 248-735-5659 bjerome@ci.novi . mi.us	The city jointly owns Novi/Walled Lake Treatment Plant with Walled Lake. But except 3/4 sq. mi. area the city uses the DWSD system. The consultant for the city is : JCK & Associates, Inc. 45650 Grand River Ave. Novi, MI 48374 Contact person: Dave Potter Tel: 248-348-2680/Fax: 248-348-2777 jckassoc@ismi.net The OCDC maintains and operates their sanitary sewers and the wastewater treatment plant. The city sanitary sewers use the Huron-Rouge (H-R), the C-W, and the W-N interceptors.
40	City of Oak Park 13600 Oak Park Blvd. Oak Park, MI 48237	Steve Chickonoski Director, DPW/ City Engineer	248-691-7497 248-691-7168 www.ci.oak-park.mi.us	The consultant for the city is: Orchard, Hiltz & McCliment, Inc. 34935 Schoolcraft Livonia, MI 48150 Tel: 734-522-6711/Fax: 734-522-6427 The city sanitary sewers use the C-O interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
41	Charter Township of Oakland 4393 Collins Road Rochester, MI 48306	Mary Collins Planning Department	248-651-4440 Ext.221 248-651-7340	The Township engineering consultant is: Land Tech 29000 Inkster Rd., Ste. 120 Southfield, MI 48034 Contact person: Michael Kalinowski Tel: 248-357-7900/Fax: 248-357-3646 mhocking@landtechcivil.com The Twp. does not receive Detroit water. Oakland Twp. has a wastewater treatment plant operated by the OCDC. Their sanitary sewers are also maintained by the OCDC. Part of their flow goes to the DWSD system via the C-O interceptor.
42	City of Orchard Lake Village 3955 Orchard Lake Road Orchard Lake, MI 48323	Gerry McCallum Building Official	248-682-2400 248-682-1308	The wastewater consultant for the city is Spalding DeDecker &Associates, Inc. 905 South Blvd. E. Rochester, MI 48307 Contact person: David Lakin Tel: 248-844-5400/Fax: 248-844-5404 dlakin@spaldingdedecker.com Hubbell, Roth & Clark assists the city for water related projects. The OCDC maintains their sanitary sewer system. The city sanitary sewers use the E-F interceptor.
43	Charter Township of Orion 2525 Joslyn Road Lake Orion, MI 48360	Bill Ireland DPW Superintendent	248-391-0304 248-393-6842	The engineering consultant for the Township is Orchard, Hiltz & McCliment, Inc. 34935 Schoolcraft Livonia, MI 48150 The Twp. sewers use the C-O interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
44	Charter Township of Oxford 18 W. Burdick St. P. O. Box 3 Oxford, MI 48371	William Dunn Supervisor	248-628-9787 248-628-8139 www.oxfordtownship.org	The engineering consultant for the Township is: Rowe Incorporated 6211 Taylor Dr. Flint, MI 48507 contact person: Jim Wilson Tel: 810-341-7500/Fax: 810-341-7573 jwilson@roweincorp.com The OCDC maintains its sanitary sewers. The sanitary sewrs are connected to the C-O interceptor.
45	Village of Oxford 22 W. Burdick P. O. Box 94 Oxford, MI 48371	John Walker DPW Superintendent	248-628-2543 248-628-7030 viloxfd@aol.com	The engineering consultant for the village is: Rowe Incorporated 128 N. Saginaw St. Lapeer, MI 48446 Contact person: Doug Skylis Tel: 810-664-9411/Fax: 810-664-3451 dskylis@roweincorp.com The village sewers are connected to the C-O interceptor.
46	City of Pleasant Ridge 23925 Woodward MI 48069	Larry Garow DPW Superintendent	248-541-2900 248-541-2504	Currently, the city does not have any engineering consultants. The sanitary sewers from the city is connected to the SOC interceptor.
47	City of Pontiac DPW 155 N. Opdyke Pontiac, MI 48342	Eric Nelson Administrator of Utilities	248-857-5695 248-857-5697	The City of Pontiac has its own wastewater collection and treatment systems operated and maintained by the city. The consultant for the city is: Nowak & Fraus 7 S. Perry St. Pontiac, MI 48342 Contact person: Robert Lavoie Tel: 248-332-7931/Fax: 248-332-8257

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
48	City of Rochester DPW 400 Sixth Street Rochester, MI 48307	Dave Kowaleski Astt. Supt. DPW	248-651-5165 248-651-2624	The engineering consultant for city is Hubbell, Roth & Clark, Inc. 555 Hulet Drive Bloomfield Hills, MI 48302 Contact person: Gary Tressel Tel: 248-338-9241/Fax: 248-338-2592 The sanitary sewers are connected to the C-O interceptor.
49	City of Rochester Hills 1000 Rochester Hills Drive Rochester Hills, MI 48309	Paul Davis City Engineer	248-656-4685 248-656-4758 www.rochesterhills.org	The city does not have a consultant at this time. Currently, some sewer expansion designed by HRC is underway. The city sewers are connected to the C-O interceptor.
50	Village of Romeo DPW 70350 Powell Road Armada, MI 48005	Rory Trowsse Water & DPW Supt.	810-752-2684 810-752-2307	The engineer for the city is Hubbell, Roth & Clark, Inc. Contact person: Gary Tressel
51	City of Roseville DPW 29411 Calahan Roseville, MI 48066	Kevin Waleski DPW Superintendent	810-445-5470 810-445-5472	The city is a member of South East Macomb Sanitary District. The consulting engineer for the city is: Anderson, Eckstein, & Westrick, Inc. Contact person: Roy Rose Tel: 810-726-1234/Fax: 810-726-8780
52	City of Royal Oak Engineering Dept. 211 Williams Street Royal Oak, MI 48067	Dick Cole City Engineer	248-546-1000 248-546-1546 www.ci.royal-oak.mi.us	Royal Oak has its own engineering department. Consultants are chosen based on the type of work on an as needed basis. About half of the city has separate sanitary sewers and the remaining area is served by combined sewers. Royal Oak sanitary and combined sewers are connected to the SOC interceptor.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
53	Royal Oak Township DPW 21075 Wyoming Ferndale, MI 48220	Davis Ford Trustee	248-547-9800 Ext. 19 248-547-1415	The Township engineer is Tucker, Young, Jackson, Tull, Inc. 565 E. Larned, Ste. 300 Detroit, MI 48226 Contact person: Alfred McDaniel Tel: 313-963-0612/Fax: 313-963-2156
54	City of St. Clair Shores DPW 19700 Pleasant St. Clair Shores, MI 48081	John Chastine Supervisor, Sewer Dept.	810-445-5363 810-445-4052	The city is a member of South East Macomb Sanitary District. The consulting engineer for the city is Anderson, Eckstein, & Westrick, Inc. Contact person: Roy Rose Tel: 810-726-1234/Fax: 810-726-8780
55	Shelby Township DPW 52700 Van Dyke Shelby Township, MI 48316	Ted Schoenherr Director, DPW	810-731-5990 810-726-7221	The consulting engineer for the Twp. is Anderson, Eckstein, & Westrick, Inc. Contactperson: Lyle Winn Tel: 810-726-1234/Fax: 810-726-8780
56	City of Southfield Engineering 26000 Evergreen Road Southfield, MI 48076	Wayne Bonus Aministrative Engineer	248-354-0810 248-354-2644 I_staton@cityof southfield.com	The city uses Hubbell, Roth & Clark, Inc. as their consultant. Tel: 248-338-9241/Fax: 248-338-2592 For sewage disposal, the city uses both the E-F and the SOC interceptors.
57	Southfield Township 18550 W. Thirteen Mile Rd. Southfield Twp., MI 48025	Raymond E. Mills Supervisor	248-540-3420 248-540-3427	The Twp. has no engineer on board. The sanitary sewers and other utilities for the 8 houses a cemetery and a shopping center belonging to the Township are served by the OCDC alongwith the neighboring villages of Beverly Hills, Bingham Farms and Franklin Village. The sanitary sewers are connected to the E-F interceptors.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
58	City of Sylvan Lake 1820 Inverness Street Sylvan Lake, MI 48320	John Martin Manager	248-682-1440 248-682-7721 www.sylvan lake.org	Only 15 houses and one apartment bldg. in the city is connented to the DWSD system. The rest of the city is connected to the Pontiac system which can not handle the load during heavy rain storm. The city would be interested in joining the DWSD system for their entire need. Tetra Tech MPS has performed some night time flow analysys and manhole inventory for the city.
59	City of Sterling Heights DPW 7200 Eighteen Mile Rd. Sterling Heights, MI 48314	Guy Kebbe Director, DPW	810-446-2440 810-268-7516	The city uses Hubbell, Roth & Clark, for consulting services. Tel: 248-338-9241/Fax: 248-338-2592
60	City of Troy Engineering Dept. 500 Big Beaver Troy, MI 48084	Neal Schroeder City Engineer	248-524-3383 248-524-1838 www.ci.troy.mi. us	The city uses Hubbell, Roth & Clark for their consulting services.They have a master plan prepared by HRC. Tel: 248-338-9241/Fax: 248-338-2592 The city uses the E-F and the SOC interceptors for sewage disposal.
61	City of Utica DPW 7550 Auburn Road Utica, MI 48317	Joseph Francis DPW Superintendent	810-731-6110 810-731-6577	The city uses Hubbell, Roth & Clark as their consultant. Contact person: Mike McDonald Tel: 248-338-9241/Fax: 248-338-2592
62	City of Walled Lake 1499 E. West Maple Walled Lake, MI 48390	Loyd Cureton DPW Director	248-624-4847 248-624-1616 www.walledlake .com	The city jointly owns its treatment plant with Novi and depends 100% on it. Oakland County operates the plant. The city uses Tetra Tech MPS as their consulting engineer. 3131 S. State Street Ann Arbor, MI 48108 Contact person: Mike Harvey Tel:734-665-6000/Fax: 734-665-2570 mike.harvey@ttmps.com The city uses the W-N interceptor for sewage transportation.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
63	City of Warren Engineering Division 12821 Stephens Road Warren, MI 48089	Richard Doherty City Engineer	810-759-9300 810-759-9318	For consulting services, the city uses Anderson, Eckstein & Westrick; Ayres, Lewis, Norris & May; and NTH Consultants, Ltd.
64	Washington Township DPW 11233 Thirty Mile Road Romeo, MI 48095	Steve Hohensee DPW Superintendent	810-752-1052 810-786-0404	The consulting engineer for the Township is: Professional Engineering Associates, Inc. 2430 Rochester Ct., Suite 100 Rochester, MI 48083 Contact person: Wendy Graham Tel: 248-689-9090/Fax: 248-689-1044 peatroy@peainc.com
65	Charter Township of Waterford 5200 Civic Center Drive Waterford, MI 48329	Douglas Bradley Director, Building & Engineering	248-674-6238 248-674-4097 www.twp.waterford.mi.us	According to the engineering department, the Township is already 85% built-up.
66	Charter Township of West Bloomfield 4550 Walnut Lake Road P.O. Box 250130 West Bloomfield, MI 48325-0130	Ken Vogras Director, Water & Sewer Gary Mekjian Township Engineer	248-451-4780 248-624-7435(F) 248-451-4824 248-451-4886(F)	The Township uses Hubbell, Roth & Clark as well as Ayres, Lewis, Norris & May for consulting services. HRC has performed some related studies. They do not have any Master Plan but they have a GIS department. West Bloomfield uses both the E-F and the C-O interceptors for sewage disposal.
67	City of Wixom 49045 W. Pontiac Trail Wixom, MI 48393	Gregory S. McCaffery Director, Public Services	248-624-4557 248-624-0863	The city currently owns and operates its wastewater collection system and treatment plant but may use the DWSD system later. The consultant for the city is: Hubbell, Roth & Clark, Tel: 248-338-9241/Fax: 248-338-2592

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
		Additional Communities outside DWSD system		
68	Addison Township 1440 Rochester Road Leonard, MI 48367	A. Robert Koski Supervisor	248-628-3317 248-628-2207	Addison Township does not have a municipal sanitary sewer system and currently uses individual wells and septic tanks. However, the OCDC operates individual treat plants for specific communities. The Township engineer is : JCK & Associates, Inc. 45650 Grand River Ave. Novi, MI 48374 Contact person: Larry Currin Tel: 248-348-2680/Fax: 248-348-2777
69	Armada Township 23121 East Main Street P.O. Box 578 Armada, MI 48005	Monica Job Supervisor	810-784-5200 810-784-5211 armada-tw@mt.miqvf.org	Armada Twp. has no sewer and is currently on individual well water and septic tanks. The Township engineer is: Anderson, Eckstein & Westrick, Inc. 51301 Schoenherr Shelby Township, MI 48315 Contact person: Lyle Winn Tel: 810-726-1234/Fax: 810-726-8780
70	Village of Armada 74274 Burk Street P.O. Box 903 Armada, MI 48005	Susan Hally Sewer Commissioner	810-784-9151 810-784-9153	The village has its own sanitary sewer system including a treatment plant. Earth Tech is the village engineer and they are also responsible for operating the plant. 14500 Sheldon Road, Suite 160 Plymouth, MI 48170 Tel: 734-416-5678/Fax: 734-416-5698 Contact person: Tim Sikma(at plant) Tel: 810-784-5932

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
71	Charter Township of Brandon 395 Mill Street P.O. Box 429 Ortonville, MI 48462	Pete Auger Manager	248-627-4976 248-627-3719	Brandon Township is currently on individual well water and septic tanks. They are considering to join the Genessee County for sewering part of the Twp.The Township engineer is: Hubbell, Roth & Clark 555 Hulet Dr. Bloomfield Hills, MI 48302 Contact person: Tom Beihl Tel: 248-338-9241/Fax: 248-338-2592
72	Bruce Township 223 East Gates P.O. Box 98 Romeo, MI 48065	Gary C. Schocke Supervisor	810-752-4585 810-752-3870 bruce-twp@mt.miqvf.Org	Bruce Township is currently on individual well water and septic tanks. Only the village of Romeo has sewer and community water. The Township engineer is: Anderson, Eckstein & Westrick. Contact person: Gordon Wilson
73	Township of Groveland 4695 Grange Hall Road Holly, MI 48442	Robert DePalma Supervisor	248-634-4152 248-634-1351	Groveland is currently on individual well water and septic systems. The Township engineers are: Orchard, Hiltz & McCliment 38800 Country Club Dr. Farmington Hills, MI Contact Person: Amy Stickney and Wehner Engineering Tel: 248-634-4088
74	Charter township of Highland 205 North John Street Highland, MI 48357	John P. Stakoe Supervisor	248-887-3791 248-887-1937 jpsec@aol.com	Highland Township is currently on individual well water and septic system. The Township engineer is: Powell & Asociates 110 Audubon Dr. White Lake, MI 48383 Contact person: Michael Powell Tel: 248-889-9669/Fax: 248-889-9779

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
75	Holly Township 102 Civic Drive Holly, MI 48442	Dale A. Smith Supervisor	248-634-9331 248-634-5482 www.hollytwp.com	Holly Township is currently on individual well water and septic system. They are planning for the NE corner of the Twp. to be sewered and connected to the Grand Blanc system. The Township engineer is: Hubbell, Roth & Clark Contact person: Randy Ford
76	Village of Holly 202 South Saginaw Street Holly, MI. 48442	Mark Abeles-allison Village Manager	248-634-9571 248-634-4211 www.vi.holly.mi.us	The village has its own sanitary sewer system including a treatment plant. The village engineer is: Rowe Inc. 6211 Taylor Dr. Flint, MI 48507 Contact person: Jim Wilson Tel: 810-341-7500/Fax: 810-341-7573
77	City of Lake Angelus 45 Gallogly Road Lake Angelus, MI 48326	George Frisch Mayor	248-335-5396 248-335-6570	The Clinton-Oakland system was designed to accommodate wastewater flow from Lake Angelus but no sewer connection has been made as there is no sewer in the city yet.
78	Lake Township 795 Lakeshore Grosse Pointe Shores, MI 48236	Richard F. Fox Supervisor	313-881-6565 313-881-2622	Lake Township has sanitary sewers. It is connected to and handled by the City of Grosse Pointe Shores using DWSD system.
79	Village of Leonard 23 East Elmwood Street P.O. Box 789 Leonard, MI 48367	Eugene A. Mallia, Jr. President	248-628-7380 248-628-8673	The village is on individual well water and septic systems.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
80	Charter Township of Lyon 58000 Grand River Avenue New Hudson, MI 48165	Ms. Marie Sherry Deputy Supervisor	248-437-2240 248-437-2336	Lyon Township is primarily on individual well water and septic system. Howevwer, a portion along Grand River Ave. has been sewered recently. The Township engineer is: Giffels-Webster Engineers Contact person: Dave Carney Tel: 248-852-3100/Fax: 248-852-6372 The OCDC is responsible for the operations & maintenance of the sewers and the treatment plant.
81	City of Memphis 35095 Potter Street P.O. Box 86 Memphis, MI 48041	Burton Dunsmore Supt. DPS	810-392-2220 810-392-3490	Memphis is mostly sewered and has a lagoon system for treatment.
82	Village of Milford 1100 Atlantic Milford, MI 48381	Tom Mackenzie Supt. Wastewater Plant	248-685-8502 248-684-5502 www.milford.lib.mi.us	The village has its own sewer and water systems. It also has a wastewater treatment plant. The engineer for the village is: Wade-Trim 25251 Northline Road Taylor, MI 48180 Contact person: Nick Lomako Tel: 734-947-9700/Fax: 734-947-9727
83	Charter Township of Milford 1100 Atlantic Milford, MI 48381	Don Green Supervisor	248-685-8731 248-685-9236 milfordtownship.com	Milford Township is on individual well water and septic systems. The Township engineer is Hubbell, Roth & Clark. Contact person: John Booth Tel: 248-338-9241/Fax: 248-338-2592
84	Township of Novi P.O. Box 924 Northville, MI 48167	Raymond Schovers Supervisor	248-348-0365	Novi Township consists of 75 acres and 53 homes. They are on individual well water and septic systems.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
85	Village of Ortonville 395 Mill Street P.O. Box 928 Ortonville, MI 48462	Pete Auger Village Manager	248-627-4976 248-627-3719 managerpete@aol.com	Ortonville is currently on individual well water and septic tank systems. However, the village is desirous of having sanitary sewers which may be connected to the Genessee County system located approximately 17 miles away.They are planning to have a vote in the coming spring. The Township engineer is: Rowe Inc. 6211 Taylor Dr. Flint, MI 48507 Contact person: Amy Gilson Tel: 810-341-7500/Fax: 810341-7573
86	Ray Township 64255 Wolcott Ray, MI 48096	Donald Maertens Supervisor	810-749-5171 810-749-6190 raytwp@excite.com	Ray Township is currently on individual well water and septic systems. The Township engineer is: Anderson, Eckstein & Westrick Contact person: Lyle Winn Tel: 810-726-1234/810-726-8780
87	City of Richmond 68225 Main Street P.O. Box 457 Richmond, MI 48062	Paul Fejedelem Director, DPS	810-727-7575 810-727-1815 pfejedel@klondyke.net	The city of Richmond has its own sanitary sewer system and treatment plant. The consulting engineer for the city is: Tetra Tech MPS 67529 Main Street Richmond, MI 48062 Contact person: Ken Kingsley Tel: 810-727-0777/Fax: 810-727-7416 ken.kingsley@ttmps.com
88	Richmond Township 34900 School Section Road Richmond, MI 48062	Keith L. Rengert Supervisor	810-727-8998 810-727-8997 richtown@klondyke.net	Richmond Township is on individual well water and septic systems. The Township engineer is: Anderson, Eckstein & Westrick,Inc. Contact person: Lyle Winn

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
89	Rose Township 204 Franklin Street Holly, MI 48442	Chester W. Koop Supervisor	248-634-6889 248-634-6888	Rose Township is on individual well water and septic tank systems. The engineer for the Township is: Ed Salter 6019 Long Pointe Dr. Davisburg, MI 48350 Tel: 248-625-1317/Fax: 248-625-1317
90	City of South Lyon 335 South Warren South Lyon, MI 48178	Linden Beebe Supt. Water, Wastewater & DPW	248-437-4006 248-486-0449	The city has its own sanitary sewer collection and treatment facilities. They are about to upgrade their treatment plant to accommodate for all the available properties in the city. The consulting engineer for the city is: Hubbell, Roth & Clark 555 Hulet Dr. Bloomfield Hills, MI 48302-0360 Contact person: Keith McCormack Tel: 248-338-9241/Fax: 248-338-2592
91	Charter Township of Springfield 650 Broadway P.O. Box 1038 Davisburg, MI 48350-1038	Collin W. Walls Supervisor	248-634-3111 248-634-2316	Springfield Township is on individual well water and septic systems. The Township engineer is: Orchard, Hiltz & McCliment 34935 Schoolcraft Livonia, MI 48150 Tel: 734-522-6711/Fax: 734-522-6427

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
92	Charter Township of White Lake 7525 Highland Road White Lake, MI 48383	Bonnie L.Elliot Supervisor	248-698-3300 248-698-3996	White Lake Township sanitary sewer system does not use the DWSD facility. It is connected to the adjacent Commerce Township Wastewater Treatment Plant.The OCDC mantains their sanitary sewers and operates the treatment plant. The sewage flow is transported by the C-W interceptor. The consulting engineer for the Township is : Spalding DeDecker Associates, Inc. 905 South Boulevard E. Rochester Hills, MI 48307 Contact person: David Lakin Tel: 248-844-5400/Fax: 248-844-5404 dlakin@spaldingdedecker.com
93	Village of Wolverine Lake 425 Glengary Road Wolverine Lake, MI 48390	Sharon Miller Village Administrator	248-624-1710 248-624-3536 admin@wolverinelake.com	The village is on individual well water and septic systems. The engineer for the village is: Powell & Associates 110 Audubon Dr. White Lake Twp., MI 48383 Contact person: Michael Powell Tel: 248-889-9669/Fax: 248-889-9779
		OTHER SOURCES ----------		
94	Oakland County Planning & Economic Development Commission 1200 N. Telegraph Road Pontiac, MI 48341-0412	Charllotte Burckhardt Principal Planner	248-858-5443 248-975-9555	They have individual Master Plans for various communities as well as composites but not much of wastewater related information.

Detroit Water and Sewerage Department

Wastewater Master Plan - CS 1314

List of Contacts for Oakland & Macomb Counties

	Authority/Community/ Address	Contact Person/ Head Wastewater	Tel./Fax No./ Email	Remarks
95	Macomb County Planning & Economic Development Dept. One South Main, 7th. Floor Mount Clemens, MI 48043	John Crumm Senior Planner	810-469-5285 810-469-6787 john.crumm@co.macomb.mi.us	The planning office does not have much information about wastewater master plans but there may be other useful information.

Appendix B

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
GENERAL ADMINISTRATION

RECEIVED

735 RANDOLPH STREET
DETROIT, MICHIGAN 48226-2830
PHONE 313•224•4800/224-4801
Fax 313•224•6067
WWW.CLDETROTT.MLUS

SDA

December 26, 2000

To: See Distribution

Regarding: WASTEWATER MASTER PLANNING

Dear Community Manager/Agency Representative:

The Detroit Water & Sewerage Department (DWSD) has contracted with Camp Dresser & McKee (CDM) to prepare a long range Wastewater Master Plan (WWMP). The WWMP will include analysis of the needs for wastewater collection to customers and treatment in metropolitan Detroit for the next 50 years.

We are currently in the process of collecting copies of existing reports on wastewater systems and planning that have been prepared by our wholesale customers. We are also collecting copies of existing reports from other communities which border the DWSD service area and customers which might consider seeking wastewater service from DWSD some time in the future. In our endeavor to accomplish this task, we have put together a team of consultants who will perform various tasks under the leadership and guidance of CDM. Therefore, we request you to provide us with copies of the following documents that may have been developed by your organization.

1. Wastewater Master Plans (WWMPs).
2. Information and/or reports on previous, current and proposed studies related to the planning of wastewater collection and treatment systems.
3. Information and reports of Sanitary Sewer Evaluation Systems (SSES) studies
4. Infiltration/Inflow (I/I) study reports.
5. Project Performance Certification (PPC) studies.
6. Hydraulic Modeling Investigations.
7. Other related studies.
8. Correspondences by any community (not in the DWSD system showing interest in joining DWSD system.

Spalding DeDecker Associates, Inc. (SDA) is a member of this study team that has been authorized to contact you and collect copies of the reports, maps and other relevant materials in connection with the above project. We believe and hope that they will receive your full cooperation. Please mail documents to:

Spalding DeDecker Associates, Inc.
905 **South Boulevard E.**
Rochester Hills, MI 48307
Attention: S.P. **Singh, Ph.** D., P.E.
Phone: (248) 844-5400
Fax: (248) 844-5404
E-Mail: **abul@spaldingdedecker.com**

We appreciate your cooperation and assistance in this regard. If there is any cost for photocopying or mailing, please contact Ms. LaJoyce Williams at CDM (313) 963-1313. For any other questions related with the above request, you may contact me at (313) 224-4790.

Sincerely,

Dr. Mohammad Gill, Ph. D., P.E.

MG/JS/mn

January 15, 2001

SPALDING DeDECKER ASSOCIATES, INC.

Engineering & Surveying Excellence
Since 1954

To: See Distribution.

Reference: WASTEWATER MASTER PLANNING
Letter of Dr. Mohammad Gill, Ph.D., P.E. Dated December 26, 2000.

Dear Community Manager / Agency Representative:

The Detroit Water & Sewerage Department (DWSD) has contracted with Camp, Dresser & McKee (CDM) to prepare a long range Wastewater Master Plan (WWMP). The WWMP will include analysis of the needs for wastewater collection and treatment for customers in metropolitan Detroit for the next 50 years. Spalding DeDecker Associates is a member of this study team that has been authorized to contact you and collect copies of the reports, maps and other relevant materials in connection with the above project.

We thank you for all the cooperation you have been extending to us since the beginning of this project. We further request you to contact us for all the information you have at the following address:

S.P. Singh, Ph.D., P.E.
Spalding DeDecker Associates
905 South Boulevard East
Rochester Hills, MI 48307

Telephone: (248) 844 -5400
Fax : (248) 844-5404
Email : ssingh(a),spaldinrdedecker.com

If you have any question regarding policy issues, please contact Dr. Gill at the address given in his letter.

Thank you

Very truly yours,
Spalding DeDecker Associates

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S.P. ingh, Ph.D., P.E.
Senior Project Engineer

Appendix C

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Oakland County CSO Abatement Program Bloomfield Hills CSO Area Control Facilities Basis of Design For Bloomfield Hills Sewer Separation Bloomfield Hills, Michigan May, 1993	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• The Michigan Water Resources Commission authorized the combined sewer overflow from Bloomfield Hills to be discharged under a conditional National Pollutant Discharge Elimination System (NPDES) Draft Permit No. MI 0025461, dated October 12, 1992. The NPDES Permit required that the sewer separation must be under construction by February 1, 1994 and be completed and fully operational by December 31, 1996. The sewer separation would eliminate discharge of untreated CSOs from Outfalls 001 and 002 which was described in Bloomfield Hills Project Plan for CSO Control Facilities. • The Basis of Design Report establishes the design requirements for the CSO Control Facilities. • A Final Engineering Report incorporating comments from various reviewing agencies will follow this report. • The main items of the report are purpose, project description, design criteria and system components.	• The Bloomfield Hills CSO area was divided into districts based on the terrain and existing homes were counted. The equivalent population was calculated using 2.5 people per residence. Based on the Zoning, equivalent population for vacant residential or non-residential were calculated. Design points were assigned at critical locations. The sanitary sewage flow for each point was calculated on the basis of standards adopted for connecting to the City of Detroit System at 0.5 cfs/1000 people. Flows from other areas including the I/I were similarly calculated. • The sanitary sewer system consisting of 8” sewer pipe and 6” house leads will collect wastewater from the CSO Area and transport it to the Evergreen-Farmington SDS located on the northeast corner of the study area. Existing connection to the combined sewer from each lot will be reconnected to the sanitary sewer. The report provides important background information relevant to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Clinton-Oakland SDS Interceptor Relief Study Oakland County Department of Public Works October, 1991	Consoer, Townsend & Associates Minneapolis, MN	• The Clinton-Oakland Sewage Disposal District in Oakland County was formed in 1969 for providing sanitary sewer service within its District boundaries. The Clinton-Oakland Sewage Disposal System (C.O. SDS) encompasses twelve communities that purchased contract capacities and are being presently served with the exception of Lake Angelus City. The flow from C.O. SDS is delivered to the City of Detroit for further transportation and treatment. The flow rate is limited to 0.4 cfs per 1000 equivalent population. • The C.O. SDS pipe network consists of Clinton-Oakland and Paint Creek Interceptor Sewers. The interceptors were constructed and commissioned in 1972. Each community contracted with Oakland County for specified flow rates to the interceptors. The County has a wastewater disposal agreement with Detroit. In 1989 Oakland County authorized this study to determine whether the interceptor system had the capacity needed for the next 30 years.	• The report contains valuable information about the system. It includes background data, population, geographical, precipitation, flows, service area, metering etc. along with recommendations. • The analysis of current and future conditions indicated that by adopting the recommended management system, the anticipated wet weather flow problems may be addressed most economically. This will involve installation of more rain gauges and flow monitors. • A C-O Task Force insuring cooperation between the County and the community members is strongly recommended. • System operation may be improved by Elizabeth Lake pump Station improvements, further mathematical analysis(EXTRAN) of the system, and some service connection modifications. • If wet weather flows can not be managed relief sewers and/or storage will have to be constructed to reduce peak flows. • The C-O SDS will be relevant to WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Basic Requirements Report <u>Evergreen-Farmington Relief Outlet;</u> AuburnHills(p), Beverly Hills(p), Bingham Farms, Birmingham(p), Bloomfield Hills, BloomfieldTwp., Farmington(p), Farmington Hills, Franklin Village, Keego Harbor, Lathrup Village, Orchard Lk.Village, Southfield(p), Sylvan Lake(p), Troy(p),West Bloomfield Twp.(p) 1985 - /+ Report	Detroit Water & Sewerage Department Detroit, MI	The Evergreen-Farmington Sewage Disposal District discharges its flow to Southfield Sewer in Detroit on a temporary basis. Southfield Sewer is unable to handle the entire 170 cfs outlet capacity required by the District on a permanent basis. Southfield Sewer basically takes care of the dry weather flow only. The August 1982 version of the Comprehensive Facilities Plan of the District recommends the construction of a new permanent outlet to meet the service needs. The purpose of this report is to identify the proposed facilities required to provide 170 cfs outlet capacity for the District through existing First-Hamilton Relief Sewer system. The major components of the proposed facilities for the Evergreen-Farmington Relief Outlet includes: 25,200 feet of 8 ft. dia. Interceptor to First-Hamilton Relief Sewer system, a flow metering and control facility to measure and control flow from District sewers to Detroit system, a diversion chamber with control facilities to control sewage flow from First-Hamilton to East Arm , and a regulating device to divert and control flow from First-Hamilton Sewer to Detroit River Interceptor.	The original agreement provided for a temporary connection to Southfield Sewer with a permanent connection to be made to the First-Hamilton Relief Sewer system when available. The report includes a lot of valuable information and evaluation of data, existing conditions and constraints that will affect the proposed project. It contains discussions about prior planning, existing service, service area, population growth projection from 1980 to 2025, capacity requirements, interruptible service requirements, hydraulic constraints, project hydraulics, project components, meters, interceptor, diversion facilities, level sensors, and the estimated project cost for the facility. The report also includes various plans and other drawings pertinent to the project. With a service area of approximately 130 square miles and a projected 2025 population of 286,000 this project will have a vital role in the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
North Huron Valley/ Rouge Valley Program Engineering report- Volume II Evergreen- Farmington Relief Outlet May, 1985	Detroit Water And Sewerage Department Detroit, Michigan	• The Evergreen-Farmington District sewage disposal service was planned jointly by Oakland County and the City of Detroit in the 1950's which resulted in the design and construction of the First-Hamilton Relief Sewer with a capacity of 100 cfs for the District. An interim connection to the Southfield Sewer was made with an original limit of 50 cfs and a revised limit of 110 cfs. Under wet weather conditions and at times when danger of basement flooding existed in Detroit, the flow needed to shut off by the District and diverted to the Rouge River at Eight Mile Road. • During the 1960's and 1970's the National Sanitation Foundation, the MDNR, and the DWSD developed the concept of transporting suburban flow directly to the WWTP via an interceptor. The result was the construction of the East Arm and the proposed construction of the West Arm of the North Interceptor System with the Evergreen-Farmington District flows to be connected to the West Arm. The 1978 DWSD Segmented Facilities Plan recommended that the West Arm should have	• The program called for varying size interceptors in Rouge Valley to Detroit's western interceptors leading to the WWTP, and diversion of the Evergreen-Farmington District's wastewater flows from Detroit's western interceptors to the East Arm of the North Interceptor System leading to the WWTP. • The MDNR approved the plan and certified to EPA with an Environmental Assessment (EA). EPA was also requested to issue a finding of no significant impact (FONSI). In response, EPA through a letter dated September 5, 1984 identified various issues to be addressed before the FONSI could be issued. • The Volume I and Volume II engineering reports address the issues, comments, and questions by EPA in the above letter. • The main issues covered in Volume II are basically as follows: -The Evergreen-Farmington Relief Outlet portion of the program which will be used to divert flow from Detroit's west side interceptors to available capacity in

		capacity to carry retained quantities of CSOs. The EPA did not approve the West Arm for lack of data. In the DWSD Final Facilities Plan of June, 1981 it was determined that the proposed West Arm was not "cost efficient" as part of a CSO control system.. • As a result of cooperative planning efforts by Wayne Co., Oakland Co., and the City of Detroit the North Huron Valley/Rouge Valley program was developed. This program allows the Evergreen-Farmington District flows (currently 110 cfs with a future 170 cfs) to be diverted from the west side interceptor system (Oakwood and Northwest Interceptors) to the east side interceptor system (East Arm and Detroit River Interceptors) thus freeing up capacity for the Rouge Valley District. • The North Huron Valley /Rouge Valley Wastewater Control System Preliminary Engineering Report provided background data for a program for reducing pollution load to the Rouge River at Eight mile Road and along the Middle Branch of Rouge River while at the same time meeting the year 2025 wastewater transportation needs of Rouge Valley and Evergreen-Farmington Districts. The report was submitted to the MDNR and USEPA in June 1984 by Wayne Co. and Plymouth Twp.	Detroit's east side interceptors. -Temporary impact on Detroit River water quality until the construction of Pumping Station No. 2 was completed. -Impact on Rouge River(Main Branch) water quality south of Eight Mile Road. -Impact of the proposed program on Detroit's Interceptor System and the Wastewater Treatment Plant. -Utilization of in-line storage capacities in the existing collection system. • The Volume II report is pertinent to the WWMP since it contains valuable background information about the development of the interceptor system and the correlation between several interceptors.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Evergreen- Farmington Pollution Control Facilities Comprehensive Facilities Plan Oakland County Michigan Volume 1 of 3 Interceptor System Evaluation Final Report October, 1982	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• A draft comprehensive facilities plan for the Evergreen-Farmington Pollution Control Facilities was prepared on October, 1979 and was submitted to the Michigan Department of Natural Resources and to the communities of the District. The plan was subsequently revised and presented in three volumes. • In Volume I, system design flows have been modified and facilities redesigned based on the 1980 SEMCOG population projections for the year 2005. Also revised are the costs of alternative interceptor system projects to reflect 1982 construction prices. In addition , the plans for capacity in the Detroit sewer system have been revised and the summary of infiltration/inflow problems have been updated to reflect findings from the first phase of sewer system evaluation survey. • The District serves a 130 square mile area and the Evergreen and the Farmington are the two major interceptors which serves a network of smaller interceptors and trunk sewers including a combined sewer area of six square mile in the collection system.	• The existing Southfield Sewer did not have adequate capacity to handle the District's future needs. Initially, the plan was to connect EFSDS to the First-Hamilton Relief Sewer when available. It was however, changed to the West Arm of the North Interceptor which was found to be non-implementable. Therefore, for transporting the EFSDS flows, the First-Hamilton Relief Sewer was reconsidered. • It was concluded that the sewage spillage into surface watercourses must be corrected by elimination of excess Infiltration/Inflow, control of CSOs by partial separation and by collection, retention and treatment of CSOs, construction of Interceptor and collector sewers, and additional capacity in the Detroit wastewater transportation system. • It was recommended to accept the County suggested plan, prepare final plans, complete the SSES and rehabilitation program, apply for grant and implement SSES, CSO control & interceptor projects.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Evergreen- Farmington Pollution Control Facilities Comprehensive Facilities Plan Oakland County Michigan Volume 3 of 3 Interceptor System Evaluation Final Report October, 1982	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• A draft comprehensive facilities plan for the Evergreen-Farmington Pollution Control Facilities was prepared on October, 1979 and was submitted to the Michigan Department of Natural Resources and to the communities of the District. The plan was subsequently revised and presented in three volumes. • In Volume III, the infiltration/inflow study was presented. A draft copy of the study was submitted with the October, 1979 facilities plan. Based on the information provided in the I/I study, the EPA funded the first phase of a SSES. The information included in this volume is same as the earlier submittal in 1979. • Excessive infiltration/inflow which was present in the system, is defined as the amount of extraneous flow which is cost effective to remove from the sewer system. This study quantifies the infiltration/inflow on both a system-wide and a sub-district basis and examines optional programs of I/I removal from various sub-districts.	• A large portion of the inflow problem was caused by the influx of ground water entering into the sanitary sewer system through house footing drains connected to the sanitary sewers. In general, removal of these footing drains from the sanitary sewer system is not cost effective. • The total yearly I/I including flows from the combined sewer area is estimated to be as high as 2.5 billion gallons. It constitutes about 25% of the total yearly wastewater flow. At a sustained estimated infiltration /inflow rate of 25 cfs (16.2 MGD) during periods of no rainfall with high ground water conditions, it exceeds the total "allowable infiltration" rate of 3.9 MGD. • In many areas in the District, probably excessive infiltration/inflow exists. Summarized estimates of potential flow reduction and cost savings are included in the report. Approximately 1.75 billion gals. of annual excess flow could be removed from the system through a recommended SSES and rehabilitation program.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Local Sewer Study Acacia Park CSO Area Twelve Towns CSO District Combined Sewer System Village of Beverly Hills, Oakland Co., Michigan Final Report: June1993	Hubbell, Roth & Clark, Inc. P.O. Box 824 555 Hulet Dr. Bloomfield Hills, MI 48303-0824	• The study area sewers are combined sewers and consist of portions from two CSO systems namely, Acacia Park CSO Area and Twelve Towns CSO District. The sewers were 40 to 70 years old at the time of study. Therefore, a sewer system condition evaluation and a hydraulic capacity analysis were performed. • The purpose of the study was to determine its reliability and long term usefulness with regard to conditions and capacities. • The study and report preparation was performed in two phases for field investigation and existing capacity analysis. • In phase one, inspections with condition inventory documentation of manholes were conducted. Physical condition of pipes and structures were collected, and reviewed. • In phase two, hydraulic capacity analysis for sewers in study area was conducted. Many segments lacked in capacity for a 10-yr. Storm. The capacity overload above the existing pipe capacity was in the 3% to 613% range.	• The study area consists of approximately 53,000 linear feet of vitrified clay and concrete combined sewer pipes with non-premium joints and 228 manholes. • Based on the visual inspection 20-25% of the sewer system was found to have structural or functional defects. About 20% of the sewers needed rehabilitation by replacement or relining. Approximately 5% of sewers were structurally in fair/good condition but had functional defects which could be improved by joint grouting and injection of herbicide foam. • The recommended rehabilitation program included: televising the sewers, replacing 23% and relining 17% of the sewers, grouting 430 joints, chemical root control to 860 ft., installing restrictors to 360 catch basins, and reconstructing 17 manholes. • The project is pertinent to DWSD system and is, therefore, important to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Oakland County Combined Sewer Overflow Abatement Program Birmingham CSO Area Birmingham Retention Treatment Basin (RTB) City of Birmingham, Oakland County, Michigan Final Design Report: December, 1993	Hubbell, Roth & Clark, Inc. P.O. Box 824 555 Hulet Dr. Bloomfield Hills, MI 48303-0824	• The NPDES permit dated October 12, 1992 for CSO Discharge issued to the city of Birmingham set deadlines of August 1, 1995 and August 1, 1997 as the starting and completion dates for the RTB. The construction of this RTB would eliminate the untreated combined sewer overflows from Outfall 101. • The purpose of this report was to establish design requirements for the CSO facilities. • The report includes a general project description consisting of the RTB, sewer separation, and collector sewers. The design criterion for flow rates, storage, elevations, rainfall, partial sewer separation and watershed modeling have been provided. Additionally, system components such as RTB, flushing, disinfection, effluent screening, decanting and dewatering, sampling, ventilation and odor control, instrumentation & control, electrical, telemetering, lighting, sanitary and storm sewers and construction procedures have been described. An outline specifications along with drawings are part of the report.	• The CSO control facilities are comprised of a 5.5 million gallon, two cell RTB strategically located in Linden Park adjacent to the Upper Branch Rouge River. • The 11 ft. dia. Collector sewer is connected to the RTB via a rectangular shaft on top of it and a 12 ft.x 12ft. conduit between the shaft and the RTB influent channel. • The pumping station has 3 pumping systems. Pumping is limited to dry weather flow and basin dewatering at a maximum rate of 16 MGD to 42” Evergreen Interceptor sewer with all three pumps running. • Partial sewer separation and sewer separation in some limited areas will be achieved. After completion of separation, sanitary flow to the Evergreen- Farmington system should not exceed 0.5 cfs/1000 people. • The flow from Birmingham is finally entering the DWSD system, and this report is therefore, pertinent to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sewer System Infrastructure Study City of Royal Oak Oakland County Michigan Final Report: April, 1989	McNamee, Porter and Seeley Ann Arbor, Michigan	• The City of Royal Oak undertook a 5-year road improvement program in 1986. This report is the documentation of the sewer system study that was performed to coordinate all underground work which were deemed necessary in conjunction with the paving program. The 1987 draft report was updated in1989 by the consultants. • The major tasks consisted of : - Field/physical investigation and evaluation by visual inspection of sewers and structures. - I/I Analysis including flow monitoring and smoke testing of sanitary sewers. - Analyzing capacity of sanitary sewer system to isolate areas deficient in capacity. • The Royal Oak sewer system was built over a 60 year period. In general, the smaller size pipes are vitrified clay and the larger pipes are concrete. The size ranges from 8 in. to 54 in. The estimated service area is 6790 acres and the collection system consists of approximately 350 miles of sewer. • The estimated budget for sewer improvement was $18,219,000.	• Targeting areas of known and suspected problems,764 manholes were physically inspected including inventory and sewer lamping to determine existing conditions. Recommendations were made to rehabilitate deteriorated manholes, catch basins, and sewer pipes. The inspection revealed numerous cracks and collapses. • Recommendations were made to: - locate cracked and collapsed sewers so that repairs could be made before failure, - conduct internal inspections of all sewers meeting the given criteria including evaluation of tapes to determine specific repair locations, - The Public Service Department to be aware of signs of failure during cleaning operations and routine maintenance work. • 30,000 ft. of sewers were televised mostly in the paving area.and cracks and collapses were located. Generally, VCP sewers were found to be more prone to failure. • Birmingham is a major participant in the DWSD system making this report relevant.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Engineering Report <u>Evergreen-Farmington Sanitary Sewer</u> Diversion To The Clinton-Oakland Sewage Disposal System January, 1990	Orchard, Hiltz & McCliment, Inc. Livonia, Michigan	• This engineering report was prepared for MDEQ. • The City of Auburn Hills and Bloomfield Township were having flooding problems due to infiltration/inflow as well as inadequate capacity in portions of the Evergreen-Farmington SDS (E-F). To alleviate the situation the MDEQ, Oakland County, and the City of Auburn Hills agreed to remove 1.0 cfs of flow from the E-F to be diverted to the Clinton-Oakland SDS (C-O) as a temporary measure until the E-F system rehabilitation could be completed. This decision was taken following the evaluation of the existing flooding conditions at the E-F system, the sewage flow projections in the E-F Facilities Plan and the SSES program. The MDEQ and the consulting engineering firm of Hubbell, Roth & Clark,Inc. performed the evaluation. • This engineering report proposed the construction of 12” and 8” sewers and redistricting sewage flows for some condominiums and apartments from the E-F system to the C-O system.	• In addition to recommendations, the report includes original calculations by HRC, adjusted calculations, calculations for hydraulic grade and sizing of relief sewers, calculations for sanitary flows from a condominium and an apartment complex development for redistricting, and a copy of the agreement by Oakland County for revision of the districts. • Based on engineering investigation of the existing system it was determined that the sanitary relief sewer and the service to the condominium and apartment complexes could be provided by gravity sewers. • It was recommended that the slope of the proposed 8”and 12” sewers be restricted to 0.40% and 0.30% respectively to achieve flow restrictions of 1.0 cfs and to meet certain grade restrictions. • It was also recommended that the system should be constructed as soon as possible so as to provide relief to the E-F SDS and to redistrict flows from the condominium and apartment complexes.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Phase VI Sanitary Sewers Engineering Design Data Report To Accompany Plans And Specifications Waterford Township Oakland County Michigan February, 1990	Johnson & Anderson Drayton Plains, Michigan	• The wastewater collection system in Waterford Township was installed in several phases. This report is for Phase VI. Prior to this, five phases of sanitary sewers were already completed of which Phases IV and V were completed in the late 1970`s under the USEPA Construction Grants Program. • The 201 Facilities Plan for Waterford Township had outlined the basic framework of Phase VI.The purpose of the design report was to further refine the contents of the Facilities Plan. The Phase VI sanitary sewer report was originally prepared by Johnson & Anderson in 1988. • The area covered in this phase lies in the southwest portion of Waterford Township and the service area consists of approximately 800 acres of buildable property bordering White Lake Township on the west, West Bloomfield to the south, Clinton River on the east and Pontiac Lake Road/Elizabeth Lake Road to the north. The elevation of the area ranges between 940 feet and 1100 feet.	• The population statistics from Oakland County Planning Department, Waterford Township and SEMCOG were used to determine a population density of 2.75 persons per dwelling unit. Using the zoning of the area, and the average sewage flow rates, the ultimate “equivalent population” was calculated to be 10,895 persons. It may be noted here that a larger population was projected in the 201 Facilities Plan as well as a 1988 engineering report. Both the reports, however, considered slightly larger service areas. • The sewage flow has been calculated based on 10- State Standard guidelines. • Improvements to Pump Station 32-1 has been recommended which includes replacing the existing two 4-in. pumps with 3- 6 in. pumps with higher motor horse power. A cost estimate is included in the report for recommended improvements. • Since the flow is connected to the C-O interceptor, it is pertinent to WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Oakland County Department of Public Works Evergreen-Farmington Sewage Disposal System Sewer System Evaluation Survey Report Final Report May, 1989	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• An Infiltration/Inflow (I/I) Study was performed as part of the facilities planning for the Evergreen-Farmington Sewage Disposal System in 1978. The first phase of Sewer System Evaluation Survey (SSES) was conducted in 1981 to determine the condition of the sewer system and locate sources of I/I. Potentially excessive I/I areas were isolated by means of flow metering. Based on flow metering data and any known problems about the system's construction and operations, a Phase I (extended) SSES was recommended for the Oakland County Interceptor System in the study area. The Phase I (extended) SSES conducted during 1988-'89 involved the visual inspection of approximately 1,305 manholes. The SSES identified a total of about 4.45 cfs of peak inflow sources. This inflow amount includes inflow removed by SSES Phase I rehabilitation and inflow to be removed by SSES Phase I (extended) rehabilitation. • The main inflow sources included perforated manhole covers, cracked or broken brickwork below castings and shifted manhole castings.	• The Oakland County Drain Commissioner operates the Oakland County Interceptor System. A total of sixteen communities contribute wastewater flow to the Evergreen-Farmington Interceptor System. • This study consists of conducting the SSES in order to verify the results of the I/I and the Phase I SSES Studies The scope also includes providing recommendations for cost-effective sewer system rehabilitation measures. • In the report, recommendations have been made for rehabilitation of identified inflow sources by August 1, 1991. The estimated cost of the Sewer System Rehabilitation was $148,514. • The SSES concluded that the Oakland County Interceptor sewer System was subject to excessive quantities of inflow. Most of the inflow came from defects in the upper portions of the manholes. • The Oakland County Interceptor Sewer is an integral part of the DWSD system. As such, the report is relevant to WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Evergreen-Farmington Pollution Control Facilities Amendment To Comprehensive Facilities Plan Oakland County Drain Commissioner Final Report October, 1985	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• The Evergreen-Farmington District (EFD) is located in the northern part of the Rouge River Basin with an area of 130 square mile. The District outlet is located at Eight Mile Road and Southfield Freeway. Wastewater from the District is transported to the Detroit Wastewater Treatment Plant via Southfield Sewer and Oakwood-Northwest Interceptor. During dry weather conditions, the service remains uninterrupted. However, under certain wet weather conditions overflows to Rouge River at Eight Mile and CSO outlets in Detroit occur when the District's flow exceeds its 110 cfs or outlet to the Detroit system is closed. • A Comprehensive Facilities Plan for the EFD was prepared in October,1982. As a part of a long term strategy for the control of overflows in Rouge River Basin, The MDNR notified the Drain Commissioner and EFD communities to amend the EFD Facilities Plan by Nov.1, 1985 to include an acceptable and cost effective method of eliminating wet weather flow discharges to the Rouge River at Eight Mile. In compliance, the report was amended.	• During the planning period, it became obvious that the existing outlet through the Southfield Sewer lacked the current or future capacity needed by the District. • Three main alternatives to the continued use of the Southfield Sewer were evaluated. The alternatives were: 1) to transport wastewater through a new interceptor to Detroit's First-Hamilton Relief Sewer, or Detroit River Interceptor and/or North Interceptor East Arm; 2) storage of flows exceeding the Southfield Sewer capacity; and 3)construction of a new tertiary wastewater treatment plant to treat the District's flow. • The most cost effective, environmentally sound, and implementable alternative was the construction of the interceptor sewer to First-Hamilton Relief Sewer at an estimated construction of $31,930,000. • The EFD is a very important part of the DWSD system. Therefore the report is relevant to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Master Plan (Update) Commerce Township Oakland County Michigan Revised Report May, 1997	Giffels-Webster Engineers Rochester Hills Michigan	• This report was prepared to update the sanitary sewer master plan prepared by Giffels-Webster Engineers in 1990 which was subsequently revised in 1995. • The Commerce Township sanitary sewer system is designed in such a manner as to require certain improvements as the flow increases. This report includes Tables which provide the necessary tools for monitoring the system so that planned improvements could be made as it becomes necessary. • The projections for population, equivalent residential units and sanitary flow were revised downwards from the 1990 projections to reflect a more realistic growth. This revision corresponds with the maximum flow allowed by the NPDES permit for the Commerce Township Wastewater Treatment Plant. • The Master Plan includes the future sanitary trunk sewers which will provide capacities for White Lake Township and Village of Wolverine Lake. • The report also includes the hydraulic analysis of trunk forcemain sewer system.	• The forcemain trunk sewer system was designed originally for transporting sewage generated from Commerce Township only. White Lake Township and Village of Wolverine Lake were subsequently added to the system as future expansion. As a result, additional sewers would be necessary. These sewers are designated as the Welch Rd. Corridor Sewer and the South Commerce Rd. Sewer in the Master Plan update. • The design analysis of the forcemain system was done using the Cybernet computer model designed for the analysis of looped pressure pipe systems. It was concluded that the hydraulic profile for ultimate development peak flow closely matches the hydraulic profile for ultimate development used in previous designs. Accordingly, the existing pump station should handle the future increased flow. • The Commerce Twp. Sanitary system is out of the DWSD system but due to its location, it is pertinent to theWWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Clinton-Oakland SDS Oakland County Department of Public Works Elizabeth Lake Pump station Testing Report June, 1991	Consoer, Townsend & Associates	• This study of the Elizabeth Lake Pump Station was conducted as a part of Clinton-Oakland 1989 Relief Study which had a goal of establishing the adequacy of the interceptor for the next 30 years. Because of the importance of this pump station as a system component , it was decided to field test the station performance. The testing would include the measurements of flow, level, pressure, and electrical power within the station. Also, flow and/or level monitoring at several interceptor sites were conducted. • The Pump Station, built in 1968 and located in Waterford Township, serves 10,100 sewered acres in West Bloomfield and Waterford Townships. It represents about half of the upstream acres within the District with a tributary population of 80,000. There are about 27,000 feet of Interceptor Sewer upstream from the station. The difference in elevation from the 54" dia RCP influent pipe to the 30" dia force main discharge pipe is about 61 feet. The average dry weather flow is about 9 cfs with a considerable higher wet weather flow.	• The four major goals of the testing were to 1) establish operational characteristics of the pumps and system. 2) verify hydraulic characteristics downstream from the discharge of the force main. 3) obtain measured values for model calibration. 4) determine operational parameters for maximizing system efficiency. • At the time of this report preparation, the County, through an engineering contract, was undertaking a program for the design of various physical improvements at the station since historically, the pump station had been subject to operation problems. • The sizes of he five pumps are 100 Hp, 150 Hp and three 250 Hp. The major factors contributing to the pump operation problems are limited wetwell volume, oversized pumps, excessive equipment maintenance, and downstream flooding. • The pump station is an integral part of the C-O SDS and pertinent to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Charter Township of Commerce Sanitary Sewer Master Plan Commerce Township Oakland County Michigan July 31, 1990	Giffels-Webster Engineers, Inc. Rochester Hills, Michigan	• Commerce Township, located in southwest Oakland County, is a lake oriented and one of the fastest growing communities. It has high density population near the lakes and low density population in between. • Over the years, several plans had been developed to serve the Township with sewers. Before 1985 it was a participant in the Huron River Interceptor (Super Sewer) but the EPA changed the plan by dropping the northern part of the project and directed Commerce Twp. and others to design a sewer system and tie to the Detroit system upon which Commerce Twp. obtained agreements with Wayne County to discharge sewage to the Detroit system. But their grant application was denied by the EPA since the township failed to demonstrate significant existing pollution problems, which was a necessary criteria for the grant. Therefore, Wayne Co. had to drop the plan. In 1985 a committee assigned by the Township became responsible for studying and developing alternate plans for providing sewer services in the Township. They developed several options which included expansion of	• Using the criteria of the NPDES discharge permit allowing the existing 1.0 MGD South Commerce Wastewater Treatment Plant (S.C.W.W.T.P.) to 5.0 MGD capacity as the basis of design, two sanitary sewage collection systems were developed and analyzed. • After reviewing the alternatives with MDNR and other officials, the Township committee recommended that the existing treatment plant should be expanded from 1.0 MGD capacity to 5.0 MGD capacity, and negotiations should be made with Novi and Walled Lake to trade sewer capacity. The sewer capacity trading will be such that a part of southern area in Commerce Township would be served by the Novi – Walled Lake system while an area in the northeast section of Novi would be served by the S.C.W.W.T.P. • Based on the projections of this master plan immediate expansion of the treatment plant is necessary. The 1995 projection of the average daily flows to the plant is 1.6 MGD. The plant expansion needs to be

		neighboring Walled lake-Novi plant to accommodate Commerce Twp., utilization of excess capacities in nearby systems, utilization of small plants and septic systems, a new plant and expansion of the existing 1 MGD plant. The options were also reviewed with the MDNR and other relevant officials. • Giffels-Webster Engineers, Inc. prepared this Master Plan and Report as requested by the Township on January 31,1989. This plan is to be used as a planning tool for the Township Board and its consultants. The primary goals of the plan were to establish a method for wastewater treatment, develop a collection system plan, develop priorities in planning for expansion of the system, and develop a financial analysis including cost estimates and methods of financing. • Master planning of the system revolved around a NPDES permit which allowed the expansion of the existing 1.0 MGD plant to 5.0 MGD.	accomplished in at least two phases. The first expansion should about 2 MGD which will bring the total capacity of the plant to 3 MGD. • Commerce Township is surrounded by communities within the DWSD system. They tried to be a part of the DWSD system but due to problems with the EPA grant eligibility they were forced out. They may be a potential candidate for the future participation in the WWMP.

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Sewer System Evaluation Survey Report Evergreen-Farmington SDS City of Farmington Hills Oakland County Michigan Final Report June, 1989	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• An Infiltration/Inflow (I/I) study was performed as a part of the facilities planning for the Evergreen-Farmington Sewage Disposal System in 1978 the first phase of Sewer System Evaluation Survey (SSES) was conducted in 1981 to determine the condition of the sewer system and locate sources of I/I. Sewage flows from the Farmington hills system were metered at approximately 47 locations to isolate areas of potentially excessive I/I. • Through cost analysis, the report determines that the removal of infiltration would not be cost effective. Therefore, further study of inflow removal needs to be investigated. • Due to the results of phase I SSES and other information about the system's construction and operating problems, a phase I (extended) and SSES Phase II for the City of Farmington Hills study area were recommended. • The City of Farmington Hills SSES Phase I (extended) and SSES Phase II were conducted during the fall of 1988 through winter of 1989. It involved visual inspection of about 2,533	• Based on the findings of the SSES, the City of Farmington Hills sanitary sewer system is subject excessive inflow. A major amount of inflow enters into the system through defective manholes and footing drains during rainstorms. • The established outlet capacity for Farmington Hills as listed in the MDNR Abatement Orders is 46.86 cfs. Using a inflow removal rate of 25.57 cfs the total sewage flow from the City is 47.36 cfs which is very close to the outlet capacity. Metering is required as part the certification program to determine inflow removal success. With proper rehabilitation and certification the City of Farmington Hills should be able to comply with the I/I removal requirements of the MDNR Abatement Orders. • The report documents various other sources of inflow found during the survey along with costs of removal by rehabilitation including sources which were attributable to Phase I manholes and

		manholes, smoke testing of approximately 77,300 feet of sanitary sewers, and inspecting 1,213 houses for private inflow sources. • Inflow sources contributing an estimated 37.64 cfs of peak inflow were identified. 25.57 cfs of this inflow could be removed through rehabilitation. The major sources of inflow were found to be perforated manhole covers, cracked/broken brickwork below manhole castings shifted manhole castings, cross connections, improper downspout extensions etc. • 31% of the total overall City peak inflow can be removed through rehabilitation at a total estimated cost of $6,285,824. • A cost effective comparison of the cost of transporting and treating inflow at the City manholes and sewers in high inflow areas, versus removal by rehabilitation indicated that removal of 8.36 cfs at an estimated rehabilitation cost of $748,331 would be cost effective and grant fundable.	have since been rehabilitated. • The cost effective analysis determined that a sewer rehabilitation expenditure of approximately $1,260,000 to reduce inflow will result in a present worth savings for continued transportation and treatment of approximately $14,321,000 or an annual equivalent savings of $1,555,000 per year. • An update of the sewer system capacity analysis using the SSES indicates the local collection system has no additional deficiencies and the local projects are properly sized. • The report recommends that the City , acting through OCDC, submit a grant request to the MDNR and EPA for implementing the rehabilitation program at a project cost of $748,331. • The report recommends that the City , through, local funding, undertake construction of 46,000 feet of replacement sewer at cost of $5,352,000. • The City should initiate a downspout extension program. • This report is directly relevant to the WWMP because it is a part of Evergreen-Farmington Sewage Disposal System.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Michigan Water Pollution Control Revolving Loan Fund Program Farmington, Michigan Sewer Improvements program City Of Farmington, Michigan Project Plan (Volume I) June, 1990	Black & Veatch Detroit Michigan	• The City of Farmington sewer system consists of approximately 60% separate sanitary sewers and 40% combined sewers. The new NPDES permit requires elimination of all untreated combined sewer overflows through a plan as outlined in the permit. • 48 communities including Farmington make up the Rouge River Basin. The Rouge River has been subjected to a long period of pollution problems mainly due to combined sewer overflow discharges and storm water runoff from these communities. In order to improve the water quality of the river, on October 1, 1985 the Water Resources Commission (WRC) adopted the Rouge River Basin Strategy which was used as a guide for the development of a Remedial Action Plan (RAP). • Farmington has ten (10) permitted overflows on file with MDNR. • This report includes details of the sewer separation and improvement plan including alternatives, cost estimates, evaluations and other required supporting information.	• The MDNR is responsible for carrying out pollution control of the Rouge River. The enforcement tool for point sources of pollution is the NPDES permit program. The new NPDES Permit requires elimination of all CSOs. The City desires to continue with the sewer separation and be relieved of all permit requirements. • The City anticipates little to no growth in the service area. The current approach is to continue discharge wastewater to the City of Detroit and keep within the 6.0 cfs purchase capacity. • The proposed improvements will get rid of all CSOs and will include a new 3.2 million gallon retention basin to replace the existing basin. • New relief sewers will convey the excess wet weather flow that was determined to be not cost effective to remove. • The project areas are tributaries to the Evergreen-Farmington SDS and the Detroit Sewer System and therefore is relevant to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Master Sanitary sewer Plan City of Sterling Heights, Michigan Updated Master Sewer Plan July, 1990	Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan	• The report states that the original Master Sanitary Sewer Plan was first adopted in 1970 and was updated in 1975. Since then, many trunk and branch sewers have been constructed this report anticipates that rest of the areas in the city will be sewered. • This update of the 1975 revision of the Master Sewer Plan reflects the sewer construction which has taken place since then. It includes updating of maps, new set of priorities and cost estimates for new sewers. • The 1975 Master Plan, in addition to establishing design criteria and sewer capacities, included a sewer system that would permit changeover from waste treatment by the City at its own plant to making connections to the DWSD interceptor system for transporting the flow to the DWSD treatment plant. • The city of Sterling heights is served by the connections to DWSD's Oakland-Macomb interceptor System via the Corridor Interceptor, the Oakland Arm and the Romeo Arm. • The city has a contract for providing a minimum of 1.38 million cu.ft./day flow.	• The City of Sterling Heights population grew from 108,999 in 1980 to 130,369 in 1990 with a projected population of 140,000 in the year 2000. This growth trend indicates that the remaining undeveloped areas in the City needs to be adequately sewered in order to get ready to accommodate the projected growth. • Both the Master Plan and the Capital Expenditure Plan for the City recommend a prioritized trunk sanitary sewer construction program with an estimated construction cost of $5,193,000. • The report recommends that the City goes ahead with the completion of the trunk sewer system construction which will be compatible to its future goals and growth. • The report includes an exhibit to show the current sewer system and the system after completion of recommended construction. • Since the City uses the DWSD system for the transportation and treatment of its wastewater, this report with valuable data is pertinent to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Lenox Township Water Distribution System and Wastewater Distribution System Study 1995 Lenox Township Macomb County Michigan Revised Submittal September, 1995	Spalding, DeDecker & Associates, Inc. Rochester Hills Michigan	• The Lenox Township authorized Spalding , DeDecker & Associates, Inc. to conduct a Water Distribution and Wastewater Disposal System Study for the Township on November 7, 1994. The Township was interested to extend water and sewer services along Gratiot corridor north of 30 Mile Road towards 31 Mile Road in order to prevent the annexation of properties by the City of Richmond which has agreed not to pursue annexation for six years while Lenox Township could evaluate if it would be feasible for them to extend utility services to the area themselves. • The objectives of the study includes the evaluation of the expansion of service to the community residents and preserving and expanding the Township's Tax Base. • The study considers population projections to year 2025. Several factors in determining the population density and growth were considered as well. SEMCOG projections were used as a reference point to figure out number of persons per dwelling unit. In order to be consistent with other studies this study uses 3 persons per unit.	• The Gratiot corridor is generally attractive to businesses. Therefore, the study assumes that non residential development will take place faster than residential areas in the Township. The report also assumes that 20% of complete development would be adequate and appropriate for the purpose of serving a population in the utility districts in the year 2025. • Lenox Township is a member of Macomb County Wastewater Disposal District (MCWWDD) run by Macomb County Office of the Public Works Commissioner (MCOPWC) which has adopted the policy of "first come, first serve". • In the Financial Analysis section, the report discusses various ways of funding the construction cost. • The most critical issue for the Twp. is to secure sewer capacity from MCOPWC for sanitary sewer outlet to MCWWDD prior to proceeding further with the project. • Since Lenox Township is a member of MCWWDD, it is pertinent to WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Flow Monitoring Program And System Analysis Study Village of New Haven Macomb County Michigan Final Report October, 1989	McNamee, Porter & Seeley Ann Arbor Michigan	• The Village of New Haven, at the time of this report preparation was treating its wastewater at their own New Haven wastewater treatment plant and discharging effluent into the Salt River. The village entered into a Stipulation and Order with MDNR on October, 1987 requiring the Village to develop a sewer system performance certification program. This final report documents the Village's efforts to meet the requirements. To comply with the order, the Village installed a flow monitoring system to monitor sanitary flows at critical locations within the collection system. • Based on the flow information obtained during the monitoring program, an evaluation of the sewer system has been done in the report. The appendix of the report contains useful data such as rainfall, maximum day, average wet weather and average dry weather flows. • The MDNR's Stipulation and Order limits the maximum daily flows from New Haven to be discharged into the new MCWWDD interceptor at 0.816 cfs based on flows at that time. The limit set by the County is 0.91 cfs.	• Based on the results of the flow monitoring and other factors such as population projection and future growth, the projected flow has been calculated in the report. The report estimates that at the start up of the MCWWDD interceptor, the flow would be 1.238 cfs which is higher than the limit of 0.816 cfs set in the Order and is also higher than the limit of 0.91 cfs set by the County. • The engineer advises the Village to request Macomb County to modify and increase the discharge limit of flow from the Village into the MCWWDD interceptor from 0.91 cfs to 1.927 cfs to include the existing flow of 1.238 cfs and another 0.689 cfs for all the currently proposed residential developments in the Village. • The engineer also recommends that the Village approach the MDNR for increasing the first year maximum day design flow from 0.816 cfs to 1.238 cfs to reflect residential and commercial growth. • The report contains background data considered to be pertinent to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sewer System Study City of St. Clair Shores Macomb County Michigan July, 1989	McNamee, Porter & Seeley Ann Arbor Michigan	• St.Clair Shores sewer system is tributary to the South Macomb Sanitary District (SMSD).In order to rectify severe flooding problem which existed in parts of the system, improvements had been made to the sewer system in the early 1980s. The Gafke /Little Mack area of the City used to be a problem area. A winter storm in February, 1990 created severe basement flooding problems and the City had to activate five overflow pumping stations to bypass flow to Lake St. Clair. The MDNR wants the bypasses to be removed. • This study was initiated for the purpose of investigating and evaluating the sewer system with special emphasis on the existing flooding problem at Gafke Avenue sewer during storm events, to analyze data on conditions observed at the Jefferson Interceptor during that winter storm and to verify how much reduction in the frequency of overflows to Lake St. Clair was experienced as a result of the previous sewer projects undertaken to improve the system. The study then makes recommendations for system improvements including high flow conditions.	• The Northeast Relief Sewer was constructed in 1979 to address the flooding problem at the Gafke/Little Mack area, which improved the situation significantly. But it did not eliminate basement flooding completely. • The study concentrated mostly on the Gafke area flooding situations ,the interceptor system and overflow stations. The major interceptors serving St. Clair Shores are the Martin Combined Sewer and the Jefferson Interceptor. • The study has thoroughly investigated this complex system by analyzing pertinent historical data including information during the February 22, 1990 rain event and other wet weather periods, and results of flow monitoring at key areas. • The study has made several recommendations with cost estimates for the improvement of both the Gafke area sewers as well as the interceptor system. • The study includes many historical data that will be valuable to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Capacity Study Part II For Lombardo Enterprises Proposed Subdivision Development Village of New Haven Macomb County Michigan November 9, 1999	Anderson, Eckstein And Westrick, Inc. Shelby Township Michigan	• .The Village of New Haven used to have its own wastewater collection system and treatment plant which was discharging the effluent to the Salt River. After the construction of the Macomb County Wastewater Disposal District (MCWWDD) interceptor, New Haven decided to close its treatment plant and connect to the interceptor. As required by the MDNR, the Village entered into a Stipulation and Order with MDNR in 1987 for a performance certification program. • Later, the Village's sanitary sewer was allowed to be connected to the interceptor sewer to a maximum stipulated capacity limit. • Since the village has limited interceptor capacity its growth is also limited and needs to be watched. This report is the second part of a sanitary sewer capacity study which was necessary due to the subdivision development project. Part one of the report analyzed the sanitary sewer districts affected by the proposed subdivision. This report deals with the impact of the development on the entire village including the ultimate development.	• The engineer, in preparing this report, used their internal knowledge of currently approved and proposed developments. Aerial photographs and address maps were also used to count vacant lots and existing buildings. • The criteria of 3 persons per household was used for single family residential homes in counting the population. For light industrial or heavy industrial zoned areas, a non-residential density factor of 7 persons per acre or facility was used. • The subdivision has a total of 354 lots. • This report includes a plan of "Village of New Haven Sanitary Sewer Upgrade And Master Plan At Ultimate Development" as Exhibit –B. The proposed ultimate design population as calculated by the engineer is 14,437 and the corresponding design flow at ultimate development is 6.24 cfs which will require a 24" diameter size pipe to discharge into the meter . • This report with the ultimate Master Plan will be useful to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Clinton Oakland S.D.S. System Analysis Report With Operational Information Division of Operations & Maintenance Oakland County, Michigan Volume 1: Report, September, 1994	Consultant: Consoer, Townsend & Associates Minneapolis, MN	• The Clinton-Oakland Sewage Disposal System (SDS) of Oakland County consists of twelve communities namely, Auburn Hills City (AHC), Clarkston Village (CLV), Independence Township (INT), Lake Orion Village (LOV) ,Oakland Township (OAT), Orion Township (ORT), Oxford Township (OXT), Oxford Village (OXV), Rochester Hills City (RHC), Waterford Township(WAT), West Bloomfield Township (WBT), and Lake Angelus City (LAC). • The SDS members own the interceptor sewer which has an estimated replacement cost of $ 60 to $75 million. The purpose of this project was to develop engineering activities and actions needed to improve flow management and extend the useful life of the interceptor system without large capital expenditure while meeting regulatory agency requirements and conveying agreed upon flows from the communities. • The project involved a district member/engineer to work with the county so as to assure continued best use of the interceptor. The goals of the project were to:	• Recommendations/conclusions were made related to metering, pumping, I/I flow isolation, piping and data management/usage. The metering recommendations call for the installation of some new meters between several communities and improvements to a few meters. In the pumping recommendations section discussions have been made regarding the locations, catchment areas, sizes, capacities and many other pertinent aspects for Elizabeth Lake Pump Station (ELPS) which is the largest one in the system as well as the 101 system-wide pump/lift stations. However, no specific recommendation for management of flows has been made. The SDS members and the county may explore further opportunities for better and more efficient flow management efforts. • In the I/I flow isolation portion, reference has been made to chapter 3 of the report, System Analysis where areas with suspected infiltration and inflow has been defined. Based on the analysis, the high I/I

		• Update and expand information about the tributary area and sewer system; • Conduct extensive flow/rainfall monitoring programs; • Summarize activities and recommend actions to improve system management and/or reduce extraneous flows. • The report consists of four chapters which include an executive summary, a system description/information, a system analysis and recommendations. The report also includes 12 appendices which contain the rainfall, flow, tributary area and other information.	basins have been arranged into three priority groups and several activities have been recommended such as further sewer system evaluation survey (SSES) in some areas, using the proposed computer based management system, and to prepare a plan of action describing activities of the county and the SDS members as part of Task-Force activities. The piping (Interceptor) recommendations section describes the system as functioning quite well as a whole. Therefore, no specific recommendations have been made for the interceptor other than continued vigilance. In addition, it recommends that the interceptor level monitor near Galloway Creek be more fully integrated into the OCDC operations. . • The Clinton-Oakland SDS is a major system representing a large infrastructure investment. It serves over 160,000 people and numerous industries covering an area of more than 54,000 acres. It includes over 57 miles of interceptor sewer and 888 miles of community sewers. The growth of this area depends heavily upon this system. Since the flow is transported to and treated at the DWSD facilities its relevance to the DWSD Wastewater Master Plan can hardly be overemphasized.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sewer System Evaluation Survey Report City of Lathrup Village Oakland County Final Report, May, 1989	Giffels-Webster Engineers, Inc. Rochester Hills, MI	• The City of Lathrup Village is almost exclusively residential in character. The I-696 Freeway passes through the city. The city had combined sewer before but prior to this 1989 SSES study the sewer system was separated. Even so, the sanitary sewer system was experiencing flows far exceeding the allowable 275 gpcpd. The north side of I-696 averaged over 3600 gpcpd, and the south side of I-696 averaged in excess of 1900 gpcpd. This excessive flow was caused mostly by the footing drain tile leads from houses connected to the sanitary sewers. Large amounts of storm water run-off were still entering the system through those leads. In addition there were other Infiltration/Inflow entering the system through deteriorated pipes and manhole structures. To rectify the situation, the city commissioned this study and followed up with a repair and rehabilitation program on the basis of the recommendations. • In order to determine the extent and sources of Infiltration/Inflow in the sanitary sewer system, an extensive investigative program was adopted and documented in this report. The	• The report recommends a number of measures to improve the system which includes sewer line rehabilitation, manhole rehabilitation, and miscellaneous non-grant eligible items. The report also includes a correction program which includes relief sewers and a 3.0 mg holding tank. • Relevance to Wastewater Master Plan: Since the City of Lathrup Village sanitary system is a part of overall DWSD treatment system it is considered important for the WWMP.

		methods used were smoke testing, video taping the inside condition of pipes, survey of basement flooding, flow monitoring, ground water monitoring, mapping of sewers, as-built survey of main collectors of the sanitary system, manhole inspection and rainfall simulation using flooding of manholes and sewer lines and dye water testing. The different tests were performed at various phases at different times. The report also contains quantity estimates as well as cost estimates to implement the findings and recommendations	

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sewer System Evaluation Survey Flow Monitoring Report For Area Tributary To Meter No. 5 Huron Gardens Subdivision Waterford Township Oakland County Michigan September, 1981	Johnson & Anderson, Inc. Drayton Plains Michigan	• Flow monitoring in the Huron Gardens subdivision was conducted initially during April-July of 1977 when wastewater flows were recorded in ten locations. A report summarizing the results was prepared. The report identified several sections of sewer lines which needed further investigation by cleaning and television inspection. The report made its recommendations based on the cost effective analyses which showed that all the areas having excessive I/I of 1500 gpimd or more as defined by EPA at the time, were cost effective to clean and televise. Further flow monitoring from the area tributary to meter # 5 was also recommended in that report. • Flow monitoring of this meter # 5 area was conducted by dividing the area into smaller sections and using four extra meters. Data gathered during the monitoring along with an analysis are included in this current report. • Along with the data analysis which indicates that infiltration and inflow exist in the wastewater flow in the area, the report provides cost effective analysis and recommendations.	• The study area population is about 650 people and the sanitary sewers monitored during the program is 10,650 LF of 8" lines including only 350 LF of 10" pipe. • The report has calculated the amount of infiltration in each sub-meter area but the analysis does not include any effort to quantify the inflow. In the analysis more emphasis has been given on identifying the areas having apparent inflow rather than quantification which is quite difficult. • Because of limited availability of funds, 6,400 LF of sewers are identified for cleaning and TV inspection based on data review. The severity of the infiltration problem dictated the sewer line selection process. The eight sections recommended for cleaning and inspection are listed in the report. Further, visual surveys for possible sources of inflow has been recommended. • Waterford Twp. is a part of Cinton-Oakland S.D.S. and the findings may represent typical conditions in the area sewers and could be useful to WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Pontiac Township Village of Lake Angelus Facilities Plan Pontiac Township Village of Lake Angelus Oakland County Michigan Draft Report 1976	Orchard, Papke, Hilz & McCliment, Inc Livonia Michigan.	• The two communities involved in this report – Pontiac Township and Village of lake Angelus are both cities now namely, City of Auburn Hills and the City of Lake Angelus respectively. The report indicates that both the communities are predominantly on septic field disposal systems. A limited area in Pontiac Township have collector sewers. Lake Angelus does not have any collector sewer as yet. Numerous septic fields in the study area are failing causing raw sewage to seep into area drainage ditches, creeks and lakes while pressure for growth in the area is mounting. • The Pontiac Township is approximately 16.96 square mile and Lake Angelus is about 1.50 square mile in area. Pontiac Township owns, operates and maintains about 37 miles of collector sewers up to this time. • The purpose of the facility plan is to develop and evaluate an adequate sewage collection system around Lake Angelus and residential areas of Pontiac Township, choose the best alternative plan and prepare preliminary designs for the selected plan.	• The Pontiac Township sewer system is tributary to a regional trunk sewer under the Clinton-Oakland Sewage Disposal System, which is operated by the Oakland Department of Public Works. Although Lake Angelus does not have any collector sewers and is not within the Clinton-Oakland sewer district, they have access to the trunk sewer by purchasing capacity from Waterford Township which has indicated that capacity is available for the village. • The report has developed and evaluated several alternatives including preliminary cost estimates. • The report has also developed the institutional responsibilities for both the communities along with implementation steps and a schedule for construction drawings and construction. • The plan of the study area if implemented, will use the Clinton-Oakland S.D.S and therefore considered pertinent to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Clinton-Oakland Sewage Disposal System Independence Township Extensions Engineering Report To Accompany Plans & Specifications Independence Township Oakland County Michigan November, 1971	Johnson & Anderson, Inc. Drayton Plains, Michigan	• This report outlines the Clinton-Oakland Sewage Disposal System, Independence Township Extensions and includes construction drawings and specifications. The documents demonstrate the Township's desire to insure continuing development by providing necessary sanitary sewer facilities. The entire Township is (at the time of report writing) served by individual septic tanks and tile fields and are not adequate for handling the growth. The purpose of this report and documents is to abate existing pollution and to provide development of the Township in an orderly fashion. • The proposed extensions provide a sewage outlet for the south half of the Township and the Village of Clarkston. • The extension will serve a total population of 127,413 people from Independence Township, Brandon Township, Springfield Township and Village of Clarkston of which 82,553 are from Independence Township and 1,620 are from Clarkston. The remaining 24,381 people from Independence will be served by future extensions of Clinton-Oakland S.D.S.	• The sanitary sewage from Independence Twp. will be discharged into the Clinton-Oakland interceptor which will outlet into the Oakland-Macomb interceptor for final treatment at the Detroit WWTP. • An intermunicipal contract has been executed between Oakland county, the Village of Clarkston and the Independence Township. Oakland County will carry out the project. • The report recommends that the project be considered for immediate construction. The proposed extensions will provide the most economically feasible means of insuring continued development in the Twp. will abate existing pollution in the lakes and streams in the area. • A sanitary sewer master plan has been included as Exhibit –E the report. • This report provides valuable historical information about sections of the metro Detroit sewer system and is considered important to the WWMP.

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Engineering Report For Sanitary Sewer System Phase II Village of Bingham Farms Oakland County Michigan August, 1975	Giffels-Webster Engineers, Inc. Rochester Hills Michigan	• This engineering report was prepared by GWE for the proposed Evergreen Sewage Disposal System, Bingham Farms Extension No. 2, as per a contract between Oakland County DPW and GWE. It includes information regarding facility sizing, population projections for the district and preliminary cost estimate. • The purpose of this report is to assist designers and reviewers of this project with above mentioned and other information related to engineering, administrative, economic, ecologic and construction aspects. Also it will protect the health and safety of the public by preventing pollution of water and soils through replacement of septic tanks with sewers. • The plan as considered by the engineers is the most practical and economical means of serving all the residents of Bingham Farms with sanitary sewers and to leave an outlet for the Village of Franklin for future use of the northern portion of the Village. • The plan is an extension of the Southfield Rouge Arm of the Evergreen Interceptor which was installed several years ago.	• The Villages of Bingham Farms, Franklin and Beverly Hills broke away from Southfield Township when the City of Southfield was being incorporated. The villages of Bingham Farms and Franklin at the time of this report are the last unsewered in this area of Oakland County. Several studies starting from 1962 were conducted on the sanitary sewer system of Bingham Farms. The latest was in 1972. • Most of the homes in Bingham Farms use septic systems except some subdivision lots and a school which are connected to the Beverly Hills sewer system on a temporary basis. Phase I of the Village sewer system has been completed. • The repot recommends that the project be split into two contracts. The Village should enter into an agreement with the County and construction to start as soon as possible. The project to be funded through the Oakland County DPW and the cost to be shared by the villages based on usage. • The historical data is relevant to WWMP.

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Engineering Report Farmington S.D.S. 13- Mile Road Arm Extension No. 1 West Bloomfield Oakland County Michigan December, 1981	Giffels-Webster Engineers, Inc. Rochester Hills Michigan	• This report was prepared for an extension of the sanitary sewer to the proposed West Bloomfield Fire Station No. 7. The Township requested the Oakland County Drain Commissioner (OCDC) to administer the project. The OCDC has signed a contract for professional services with the consultant for this report. • The report contains information on population projections, forecast of flow, sewer alternatives and recommendations. The approximately 2000 ft. extension along Maple Road is in accordance with the Master Pollution Control Plan for Oakland County. • Upon completion this portion of sewer will become a part of the Farmington District of the Master Plan, 13 Mile Road Arm Extension No. 1. • The service area for the new sewer is 107 acres. It will serve a projected population of 878 persons. The existing 10 inch sewer has an unused capacity of 1.19 cfs whereas the expected peak flow from the service area is 0.54 cfs.	• Based on evaluation of three alternative routes and preliminary cost estimates for sewer construction the report indicates that the construction is feasible. • The consultant recommends that alternate sewer Route C be selected based on ease of construction, least cost, least damage to environment and other favorable factors. • Although 8 inch sewer would be adequate for the current need, the report suggests that 800 ft. of the sewer be increased to 10 inch to allow for unforeseen growth and possible zoning changes. • The report deals with a small area but it is a part of the Farmington District Sewage Disposal System and historical data available in the report may be useful to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Facilities Plan For Wastewater Disposal Hazel Park, Michigan Plan of Study Area Hazel Park Oakland County Michigan Draft Copy July, 1978	Johnson & Anderson, Inc. Drayton Plains Michigan	• The present wastewater system in Hazel Park, a city located at the southeast corner of Oakland County, consists of approximately 39 miles of sanitary, 32 miles of combined and 70 miles of storm sewers. It does not own or operate any treatment system. The wastewater treatment is carried out at the Detroit system through a contract with Oakland County. • All combined sewers discharge to the Twelve Towns Relief Drain which provides relief to combined trunk sewers serving a number of communities in the Southeastern Oakland County Sewage Disposal District (SOCSDD). From Twelve Town wastewater flows to the Southeastern Oakland County Interceptor, then to the Dequindre and finally to the Detroit wastewater system. • The purpose of this study was to determine the extent of pollution caused by the City of Hazel Park collection system. • This study also evaluates the basement flooding and street flooding problems existing in the area.	• The study indicates that no pollution problems (as defined by the U.S. Environmental Protection Agency) are caused by the Hazel Park collection system. However, basement flooding and street flooding with storm and combined wastewater happens quite often. • Another problem detected as a result of the study is the presence of excessive infiltration in the sanitary sewer system. • The study suggests that a Sewer System Evaluation be conducted to further investigate the condition of the collection system which will be grant eligible followed by rehabilitation work of the system which may also be grant eligible. • The information available in this report contains many historical and background data and may be useful to the WWMP.

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Infiltration and Inflow Study For Clinton Township, Macomb County, Michigan ACO-SW00-002 August 1, 2000	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 905 South Boulevard East Rochester Hills, MI 48307	• The I/I study was conducted as per the requirements of Administrative Consent Order (ACO) (ACO-SW00-002). • The following goals were achieved by conducting this study: (i) Identification of the volume and flow rate within the sewer system for dry and wet weathers (ii) Quantification of the volumes being discharged into the storm system during wet weather events. (iii) To estimate the Inflow and Infiltration (I/I) (iv) To conduct cost effective analysis for removal of I/I. .	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Flow Monitoring Study For Clinton Township Sanitary Sewer System Macomb County, Michigan October 29, 1997 Revised January 12, 1998	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 905 South Boulevard East Rochester Hills, MI 48307	• The study was conducted to evaluate the existing condition of the Clinton Township sewage collection system. • The following goals were achieved by conducting this study: (i) Identification of the volume and flow rate within the sewer system for dry and wet weathers (ii) Quantification of the volumes being discharged into the storm system during wet weather events. (iii) To estimate the Inflow and Infiltration (I/I) .	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Charter Township of Clinton Sanitary Trunk Sewer System Master Plan January 13, 1995	Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307	• The Map presented the Wastewater Master Plan for the Charter Township of Clinton • The Township was divided into seven sub-districts. • The Master Plan presented the existing capacity and the proposed ultimate capacity. • The trunk line sanitary sewer pipe sizes for all the districts are shown.	• The majority of the wastewater flow from the Charter Township of Clinton goes to the DWSD collection and treatment system and, therefore, the inclusion of the wastewater master plan of the Township in to the City of Detroit Wastewater Master Plan will be relevant.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Basic Facilities Plan Vol. I & II Village of Holly September, 1976	Capitol Consultants Engineers, Inc. 1627 Lake Lansing Road, Lansing, Michigan 48912	• The Village of Holly has its own treatment facility. • The subject reports present the results of Sewer System Analysis, and Sanitary Sewer Evaluation Survey (SSES). • The reports presented infiltration and inflow (I&I) analysis and the data related to the wastewater collection and treatment system.	• Currently, the Village of Holly has its own treatment facility, and as such it is not a part of the Detroit Water and Sewerage Department (DWSD) collection and treatment system. • The Village intends to join the Genesee County collection system, if it has to, however, it may be appropriate to include the Village of Holly in the City of Detroit, DWSD Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Final Plan of Operation Wastewater treatment Facility Village of Holly October, 1979	Capitol Consultants Engineers, Inc. 1627 Lake Lansing Road, Lansing, Michigan 48912	• The Village of Holly has its own treatment facility. The sludge is sent to Genessee County for incineration. • The report presents a plan of operation for upgrading the existing wastewater treatment facility. • The report presents important data for the water treatment facility.	• Currently, the Village of Holly has its own treatment facility, and as such it is not a part of the Detroit Water and Sewerage Department (DWSD) collection and treatment system. • The Village intends to join the Genesee County collection system, if it has to, however, it may be appropriate to include the Village of Holly in the City of Detroit, DWSD Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Township of Macomb Sanitary Trunk Sewer System Master Plan August 1999	Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307 Macomb Township 19925, 23 Mile Road Macomb, MI 48042	• The report presented the Wastewater Master Plan for the Macomb Township • All the thirty six sections of the Township were analyzed to determine the required trunk line sanitary sewer pipe capacities for the projected population equivalents.	• The Macomb Township discharges its wastewater into the DWSD collection and treatment system. • The Macomb Township Wastewater Master Plan is the most relevant document for development of the City of Detroit Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Macomb County Sanitary Sewer Interceptor Extension Plan May 1997	Anderson, Eckstein, and Westrick, Inc. and METCO Services, Inc. Office of the Macomb County Public Works Commissioner (OMCPWC)	• The primary focus of the study was on Macomb County Wastewater Disposal District (MCWWDD) and the communities not having public wastewater transportation and treatment facilities. • Describes the connections to the DWSD system. • 'Pollution Control Program for the Detroit Regional Watershed' formed the basis of the agreement with DWSD. • DWSD to provide capacity for wastewater disposal to Macomb County. • Rate of discharge was based on 0.4 cfs per 1000 population • 'Basic Requirements Report Oakland Macomb Interceptor System' gives the carrying capacities of the "built-up" and future collection systems. • The report does not include the requirements of these communities: Center Line, Eastpointe, Lake Township, Roseville, St. Clair Shores, and Warren. These communities have alternate arrangements. • Report outlines the future projections of population and wastewater disposal for both	• The MCWWDD discharges its wastewater into the DWSD collection and treatment system. • The report provides a better insight into the wastewater disposal needs of Macomb county and to provide a tool to assist in its management and control and, hence, the MCWWDD Interceptor Extension Plan is the most relevant document for inclusion in the development of the City of D Detroit Wastewater Master Plan.

		Oakland and Macomb Counties. • A summary of Interceptor extensions and the estimated costs are presented in the report. • A project priority ranking system has been developed and presented in the report.	

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North Arm of the Twelve Towns Drain Project Plan for Relief Sewers – Drain Project Plan for Relief Sewers City of Royal Oak April 15, 1997	Hubbell, Roth & Clark, Inc. 555 Hulet Drive, Bloomfield Hills, Michigan	• The area served by North Arm Branch of Twelve Town Drain (i.e., seven communities: Beverly Hills, Birmingham, Clawson, Madison Heights, Royal Oak, Southfield, and Troy) used to experience basement flooding • The Project Plan was based on the City of Royal Oak 'Basement Flooding Mitigation Plan' and presented the analysis for construction of Relief Sewer to alleviate the problem of basement flooding. • The Twelve Towns Relief Drain was constructed in early 1960. • The Project Plan was prepared for SRF funding. • The combined system analysis was conducted by considering the Twelve Towns Relief Drains and the North Arm Branch as one regional system. • The alternatives considered for basement flooding alleviation were the construction of relief sewer and the storage facilities. • The recommended alternative was the construction of relief sewer.	• The Twelve Towns drainage district is a tributary to the Detroit Water and Sewerage Department (DWSD) collection and treatment system and is, therefore, directly impacting the DWSD system and the preparation of the Wastewater Master Plan. • The Project Plan presents the precipitation – runoff analysis and the results of the XP-SWMM hydraulic model. • The proposed relief sewer locations and sizes are also presented in the project Plan.

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City of Richmond Sanitary System Master Plan Update March 1998	Tetra Tech McNamee, Porter & Seeley, Inc. Ann Arbor Detroit	• The City of Richmond has its own Wastewater Treatment Plant that has an annual average dry wastewater flow of approximately 0.58 mgd. The design average daily flow with recycle is 0.90 mgd while the maximum daily dry weather design flow is 1.50 mgd. • The report presents an update to 1996 wastewater master plan.	• The City of Richmond collection system is not a tributary to the DWSD wastewater collection and treatment system, however, the information presented in the report can be useful, if there is a change in the political will of the City to join the DWSD collection system sometimes later in the future.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Evaluation Survey (SSES) for City of Rochester Hills, Oakland County, Michigan Vol. I: report (Draft) January 20, 1999	Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307	• The SSES was conducted as per an agreement with Oakland County Drain Commissioner (OCDC) to (a) perform SSES for districts having flows in excess of 275 GPCPD and (ii) implement a cost-effective rehabilitation. • The following analyses were conducted: (i) physical evaluation (ii) Inflow and Infiltration (I/I) • The rehabilitation, and transport and treatment costs were estimated using MDEQ standards.	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Master Plan For Charter Township of Shelby Department of Public Works Charter Township of Shelby 52700 VanDyke Avenue Shelby Township, MI 48316 August 1999	Anderson, Eckstein & Westrick, Inc. 51301 Schoenherr Shelby Township, MI 48315	• The report presented an updated Sanitary Sewer Master Plan for the Shelby Township • Using the natural features the Township has been divided into 36 sections and three separate sewer districts for development of the Master Plan. • All the 36 sections divided into three sewer districts were analyzed to determine the required trunk line sanitary sewer pipe capacities for the existing/projected population equivalents. • The report presents an excellent map of the Sanitary Sewer Master Plan.	• The Shelby Township discharges its wastewater into the DWSD collection and treatment system through Macomb Township and City of Sterling Heights. • The Shelby Township Sanitary Sewer Master Plan presents the Basis of Design for all three sanitary sewer districts. • The Sanitary Sewer Master Plan is the most relevant document for development of the City of Detroit Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary sewer Metering for Southeast Sanitary Sewer District Charter Township of Shelby 52700 Van Dyke Avenue Shelby Township, MI 48316 August 29, 1997	Anderson, Eckstein & Westrick, Inc. 51301 Schoenherr Shelby Township, MI 48315	• The study was conducted as a consequence of issuing a moratorium for sanitary sewer permits in Macomb, Shelby, and Washington townships by Macomb County Public Works Office (MCPWC). • The study evaluated the affects of wet weather on the sanitary sewer flow in the southeast sanitary district. • The report presents the increase in peak flow in various branches of the southeast sanitary district. • The study recommended the monitoring of illegal storm drains, downspout and sump pump connections. • The study recommended cleaning of the south and west branches on an annual basis until the flow increases in these lines.	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model. • To find out the details of any follow-up studies would also be helpful.

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South Macomb Sanitary District Overflow Study and Improvement Plan (Draft) Prepared for : South Macomb Sanitary District and Macomb County Office of Public Works November 1996	McNamee Porter & Seeley, Inc. And Spalding DeDecker Associates, Inc.	• South Macomb Sanitary District (SMSD) includes the communities of Eastpointe, Roseville, and St. Clair Shores. • The wastewater collection systems serving SMSD are separated and combined systems. • Wastewater from these systems is transported to Wayne County and then to the Detroit Water and Sewerage Department (DWSD) collection system for treatment at the Detroit Wastewater Treatment Plant (WWTP). • The report is a comprehensive study of the SMSD wastewater collection system that recommended the following projects among others: 1. Dry Weather Infiltration/Inflow Removal 2. Nine Mile Drain and Martin Drain Throttling Gates 3. New Control System and Telemeter System 4. Relief Sewer from 9 Mile to Marter Road Booster Station (MRBS) 5. Hoffman P.S. Improvements	• The SMSD discharges its wastewater into Wayne County collection system and then to the DWSD collection and treatment system. • A detailed analysis of the existing and future conditions of the SMSD wastewater collection system would directly impact the DWSD system. • This study is of a great importance to the development of the City of Detroit Wastewater Master Plan.

		6. Relief Sewer from Hoffman P.S. to Bon Brae 7. Martin Drain Outfall Rehabilitation 8. Wet Weather I/I Removal 9. Relief Sewer Hoffman P.S. to North End 10. Eastpointe Separation 11. Roseville Separation	

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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South Macomb Sanitary District Jefferson Interceptor Inspection from The Martin Drain to The Marter Road Booster Station Field Report October 24, 1996	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226	1. The Jefferson Interceptor inspection was conducted to locate and identify hydraulic deficiencies in the sewer system. 2. The Jefferson Interceptor was inspected from Martin Drain to Marter Road Booster Station. 3. The inspection gathered the following data regarding the sewer system: • Manhole condition, features, and tap locations • Sewer pipe sediment depths every 50 feet and at points of rapid change in sediment depth • Lateral sewer tap locations • Information on sediment type • Visible pipe condition • Video tape of the sewer including all taps • Location of significant features • Sampling of the sediment in the pipe at various locations • Sewer sediment lab analysis	• The Jefferson Interceptor inspection report can be useful to understand the condition of the existing sewer system. • The results of the study can be used to develop hydraulic parameters that can later be utilized in the development of the GDRSS model that is to be prepared as a part of the City of Detroit Wastewater Master Plan.

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Basis of Design for Lake St. Clair Clean Water Initiative Phase I SRF No. 5186-01 ACO-SW96-008 February 28, 2000	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 Macomb County Office of Public Works 115 S. Groesback Mt. Clemens, Michigan 48046	• The report presented the basis of design for the following projects that were recommended in the overflow study and improvement plan and agreed upon by MDEQ: 1. Dry Weather Infiltration/Inflow Removal 2. Nine Mile Drain and Martin Drain Throttling Gates 3. New Control System and Telemeter System 4. Relief Sewer from 9 Mile to Marter Road Booster Station (MRBS) 5. Hoffman P.S. Improvements 6. Relief Sewer from Hoffman P.S. to Bon Brae 7. Martin Drain Outfall Rehabilitation 8. Wet Weather I/I Removal 9. Relief Sewer Hoffman P.S. to North End 10. Eastpointe Separation 11. Roseville Separation	• The SMSD discharges its wastewater into Wayne County collection system and then to the DWSD collection and treatment system. • The basis of design presented in the report for the improvement projects is of utmost importance for the DWSD collection system • A detailed analysis of the basis of design is relevant to the development of the City of Detroit Wastewater Master Plan.

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Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Implementation Plan for South Macomb Sanitary District Overflow Control Projects March 5, 1999	Anderson, Eckstein, and Westrick, Inc. Spalding DeDecker Associates, Inc. McNamee Porter & Seeley, Inc. South Macomb Sanitary District and Macomb County Office of Public Works	• The report presented the basis of design for the following projects that were recommended in the overflow study and improvement plan and agreed upon by MDEQ: 1. Dry Weather Infiltration/Inflow Removal 2. Nine Mile Drain and Martin Drain Throttling Gates 3. New Control System and Telemeter System 4. Relief Sewer from 9 Mile to Marter Road Booster Station (MRBS) 5. Hoffman P.S. Improvements 6. Relief Sewer from Hoffman P.S. to Bon Brae 7. Martin Drain Outfall Rehabilitation 8. Wet Weather I/I Removal 9. Relief Sewer Hoffman P.S. to North End 10. Eastpointe Separation 11. Roseville Separation	• The SMSD discharges its wastewater into Wayne County collection system and then to the DWSD collection and treatment system. • The basis of design presented in the report for the improvement projects is of utmost importance for the DWSD collection system • A detailed analysis of the basis of design is relevant to the development of the City of Detroit Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sanitary Sewer Master Plan for White Lake Township Oakland County, Michigan October 13, 1997 Construction Update March 6, 2000	Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307 607 Shelby Suite 400 Detroit, MI 48226	• The report presented the Wastewater Master Plan for the White Lake Township • The Township was divided into twenty two sub districts. • The Master Plan presented the population and sanitary flow projections for all the sub-districts of the Township. • The trunk line sanitary sewer pipe sizes and capacities for the projected population equivalents are presented.	• The White Lake Township sanitary flow goes to Commerce Township wastewater treatment plant, however, the inclusion of the Township in the Wastewater Master Plan will not be inappropriate, if there is a change in the political will to join the DWSD system in future.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Design Report for White Lake Township Union Lake Sewer District Phase 1A Trunk Sewer System Updated June, 1995	Spalding DeDecker Associates, Inc. 905 South Boulevard East Rochester Hills, MI 48307 607 Shelby Suite 400 Detroit, MI 48226	• The report presented the Technical Aspects of the design of the Union Lake Sewer District in White Lake Township, Oakland County. • The design illustrated the current and future needs for the project by examining land use, demographic and economic data, topography, climatology, and existing sewerage facilities in the district. • The design calculations were presented and explained for each phase of the project at the time of the preparation of the report and fifteen and thirty years in the future. .	• The White Lake Township sanitary flow goes to Commerce Township wastewater treatment plant, however, the inclusion of the Township in the Wastewater Master Plan will not be inappropriate, if there is a change in the political will to join the DWSD system in future.

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Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Sewer System Evaluation Survey For Charter Township of Clinton Macomb County, Michigan Consent Order No. ACO-SW00-002 September 1, 2000	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 905 South Boulevard East Rochester Hills, MI 48307	• The SSES was conducted to evaluate the existing condition of the Clinton Township sewage collection system. • The following goals were achieved by conducting this study: (i) Locate and identify the sources of inflow and infiltration within Clinton Township collection and wastewater system (ii) Included in the physical inspection will be manhole inspection, televising sewers, smoke testing, dye testing, and water flood testing to identify the sources of inflow and infiltration. (iii) To estimate the Inflow and Infiltration (I/I) .	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model.

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Sanitary Sewer Flow Monitoring Report for Macomb Township Macomb County, Michigan March 23, 1998	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 905 South Boulevard East Rochester Hills, MI 48307	• The study was conducted to evaluate the existing condition of the Macomb Township sewage collection system. • The following goals were achieved by conducting this study: (i) Identification of the areas of significant inflow and infiltration in the northern part of the township. (ii) To estimate the Inflow and Infiltration (I/I) .	• The subject sewage disposal district is a part of the DWSD collection system and, therefore, an analysis of the results would be appropriate for inclusion in the future Master Plan. • The analysis of the Infiltration/Inflow (I/I) results would be useful in developing the RDII parameters for inclusion in the GDRSS model.

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Manhole Inspection Report of Nine Mile Drain and Martin Drain for South Macomb Sanitary District 20001 Pleasant Drive St. Clair Shores, MI 1993	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226	The Manhole inspection was conducted: • To locate and identify the manhole in need of repair, • Structural damage to drains, and • Volatile waste and possible industrial waste inflow.	• The inspection of existing manholes and interceptors is a task to be undertaken during the development of the Wastewater Master Plan and this report can be useful to understand the condition of the existing manholes. • The results of the study can be used to develop hydraulic parameters that can later be utilized in the development of the GDRSS model that is to be developed as a part of the City of Detroit Wastewater Master Plan.

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Master Sewer Plan For City of Sterling Heights Macomb County, Michigan July 1, 1990	Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The report presented the updated Sewer Master Plan that included updated information concerning population growth, construction priorities, sizing and location of the then existing sewers and priority projects. • The conclusion of the Master Plan was to construct sufficient sanitary sewer to complete its trunk sewer system in order to accommodate expansion and settlement within the city. • The Master Plan presented a Map showing the then existing sewer system along with the updated system how it would be after completion of the recommended improvement projects.	• The City of Sterling Heights discharges its wastewater into the DWSD collection and treatment system through Macomb County Wastewater Disposal District. • The data presented in the report is relevant to the development of the Wastewater Master Plan for the City of Detroit.

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Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
A Report on Sewage Disposal Problems Six-County Metropolitan Area Southeastern Michigan Prepared for the Supervisors Inter-County Committee by the National Sanitation Foundation 1964	Board of Consulting Engineers National Sanitation Foundation Care of Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The report in essence presented the Wastewater Treatment Options (i.e., primary and secondary treatment) for six counties of southeastern Michigan for 55 years. • The report discussed different treatment facilities that existed at the time of the preparation of the report and what could be required over the next 55 years.	• Though the report is very old, however, it is a very comprehensive study of the conditions that existed about 35 years back and presented what should have been done for the next 55 years. • A review and understanding of the report can be helpful in organizing and formatting the report for the City of Detroit Wastewater Master Plan.

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Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
Report on Metropolitan Environmental Study Sewerage and Drainage Problems Administrative Affairs Six-County Metropolitan Area Southeastern Michigan Prepared for the Supervisors Inter-County Committee by the National Sanitation Foundation 1964	Board of Consulting Engineers National Sanitation Foundation Care of Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The report in essence presented the Wastewater Master Plan for six counties of southeastern Michigan for 55 years. • The report presented a comprehensive review of the wastewater collection and treatment facilities that existed at the time of completion of the report. • It presented the proposals for construction of new collection and treatment facilities over the next 55 years.	• Though the report has been very old, however, it has been a very comprehensive study of the conditions that existed about 35 years back and presented what infrastructure would have been required for the next 55 years to meet the demand of new developments in the six counties area. • A review and understanding of the report can be helpful in organizing and formatting the report for the City of Detroit Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
Report Name; Description; City/Township/ Community; Report/Volume Number & Date;	Consultant(s)	Background, Purpose and Abstract/ Brief Summary	Remarks/ Recommendations/ Conclusions; Relevance To WWMP;
State Revolving Fund Project Plan SRF No. 5186 South Macomb Sanitary District December 17, 1999	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI 48226 905 South Boulevard East Rochester Hills, MI 48307	• The Project Plan described the Combined Sewer Overflow (CSO) Control Program to reduce the frequency and volume of, as well as improve the quality of, overflows from the South Macomb Sanitary District to Lake St. Clair. • The Project Plan was prepared following the guidelines for getting financial assistance through State Revolving Fund (SRF) and submitted to the Michigan Department of Environmental Quality (MDEQ).	• The South Macomb Sanitary District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Jefferson Interceptor that is connected to the Wayne County collection system. • The approval of the Project Plan by MDEQ forms the basis of completion of the improvement projects presented in the Overflow Study and Improvement Plan. • The Project Plan for SMSD as approved by the MDEQ is a relevant document to the development of the Wastewater Master Plan for the City of Detroit and should be analyzed for incorporation in to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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1998 Flow Rate Analysis South Macomb Sanitary District Proposed Methodology for Calculation of Milk River System Flow Northeast System March 1998	McNamee, Porter & Seeley, Inc. Ann Arbor, MI	• The objective of the study was to identify an improved methodology for quantifying wet weather flows generated in the Milk River system so that costs can be distributed to the appropriate cost center.	1. The analysis presented in the report identified an alternate method of determining the wet weather flows which includes the impact of small wet weather events, so that wet-weather generated flows could be properly assigned to the Milk River system. 2. A review of the methodology identified in the report may be useful in the development of the Wastewater Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Technical Report Initial Improvements Projects Draft NPDES Settlement Permit Southeastern Oakland County Sewage Disposal System For George W. Kuhn Oakland County Drain Commissioner July 1998	Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The report presented the evaluation of the Retention Treatment Facility that treats and retains combined sewer overflow (CSO) from the Twelve Towns Drainage District of SOCSDS. • The evaluation was conducted to develop alternatives to comply with the requirements of NPDES. • The report recommended nine Initial Improvements Projects and presented the preliminary basis of design for these projects.	• The Twelve Towns Drainage District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Dequindre Interceptor. • The Initial Improvement Projects presented in the report are relevant to the development of the Wastewater Master Plan for the City of Detroit.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Project Plan Twelve Towns CSO Control Program for George W. Kuhn Oakland County Drain Commissioner For City of Berkley City of Birmingham City of Clawson City of Ferndale City of Hazel Park City of Huntington Woods City of Madison Heights City of Oak Parks City of Pleasant Ridge City of Royal Oak City of Southfield City of Troy Township of Royal Oak Village of Beverly Hills April 1999	Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The Project Plan described the Combined Sewer Overflow (CSO) Control Program to reduce the frequency and volume of, as well as improve the quality of, overflows from the Twelve Towns Retention Treatment Facility (RTF) to the Red Run Drain. • The Project Plan was prepared following the guidelines for getting financial assistance through State Revolving Fund (SRF) and submitted to the Michigan Department of Environmental Quality (MDEQ).	• The Twelve Towns Drainage District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Dequindre Interceptor. • The approval of the Project Plan by MDEQ forms the basis of completion of the Initial Improvement Projects presented in the Technical Report. • The Project Plan approved by MDEQ is a relevant document to the development of the Wastewater Master Plan for the City of Detroit and should be analyzed for incorporation in to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Preliminary Basis of Design Segments 2 and 4 George W. Kuhn Drain CSO Control Program George W. Kuhn Oakland County Drain Commissioner For City of Berkley City of Birmingham City of Clawson City of Ferndale City of Hazel Park City of Huntington Woods City of Madison Heights City of Oak Parks City of Pleasant Ridge City of Royal Oak City of Southfield City of Troy Township of Royal Oak Village of Beverly Hills November 1999	Hubbell, Roth & Clark, Inc. 555 Hulet Drive P.O. Box 824 Bloomfield Hills, MI 48303-0824	• The report presented the preliminary Basis of Design for Segments 2 and 4 of George W. Kuhn Drain CSO Control Program. • Segment 2 includes increasing the size of the Retention Treatment Facility, construction of Intermediate Weir Structure and a new pump station. • Segment 4 includes modification to the existing inlet weir.	• The Twelve Towns Drainage District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Dequindre Interceptor. • Though the capacity of the 12-Towns Retention Treatment Facility would not directly effect the downstream conditions of the DWSD collection and treatment system, if no excess wastewater over the contract limit is released in the system, however, an analysis of the system improvements would be appropriate for development of the Wastewater Master Plan of the City of Detroit.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Oakland County Drain Commissioner John P. McCulloch George W. Kuhn Drainage District George W. Kuhn Drain – Contract 4 Retention Treatment Facility Improvements Oakland County, Michigan Basis of Design Report Draft November 2000 Updated April 2001	Tetra Tech MPS Wade-Trim, Inc. Spalding DeDecker Associates, Inc. SOMAT Engineering, Inc.	• The report presented the Basis of Design for Contract 4 (i.e., design and construction of Retention Treatment Basin Improvements) of George W. Kuhn Drain CSO Control Program. • Design of Retention Treatment Basin Improvements included modification to the existing inlet weir, additional storage and disinfection, a new screen system, a dewatering pumping station, and a building to house the screens, chemical feed system, a control room, and a sodium hypochlorite storage.	• The Twelve Towns Drainage District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Dequindre Interceptor. • The construction of Retention Treatment Basin Improvements is a milestone to control the Combined Sewer Overflow from the Twelve Towns Drainage Districts of the Southeast Oakland County Sewage Disposal System. • An analysis of the RTB system improvements and how these improvements would effect the DWSD collection and treatment systems would be an important aspect of CSO control to be included in the Wastewater Master Plan of the City of Detroit

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Final Basis of design Report George W. Kuhn Drain – Contract 1 Madison Heights Drain Disconnection Madison Heights Combined sewer Reroute Oakland County, Michigan March 10, 2000	Glen Yrjanainen, P.E., P.S. Vice President Nowak & Fraus, PLLC 7 South Perry Street Pontiac, MI 48342	• The report presented the final Basis of Design for Contract 1 (i. disconnection of separate storm drain inputs to the southeastern Oakland County sewage Disposal System Retention Treatment Facility located in the City of Madison Heights, with subsequent reconnection to two new parallel storm drains along the route of the RTF, ii. disconnection of 60" and 72" diameter combined sewers from the RTF with subsequent reconnection to the new pump station) • The report presented detailed flow and hydraulic analysis of the sewer systems described above.	• The Twelve Towns Drainage District is a part of the DWSD system. • The wastewater from this drainage district drains into the DWSD collection and treatment system through Dequindre Interceptor and 12 Mile Road sanitary sewer. • The construction of these two improvement projects would help to control the Combined Sewer Overflow from the Twelve Towns Drainage Districts of the Southeast Oakland County Sewage Disposal System. • The flow and hydraulic analysis presented in the report can help to understand how these improvements would effect the DWSD collection and treatment systems and the development of the Wastewater Master Plan of the City of Detroit

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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South Macomb Sanitary District Martin Drain Inspection from Harper Avenue to Jefferson Avenue Field Report OM97-20 October 22, 1997	Spalding DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit MI 48226	• The Martin Drain inspection was performed along Bon Heur Street in the City of St. Clair Shores. The Martin Drain consists of a 6'-6"x 8' double box sewer. In the past pavement collapses and infiltration at taps to the interceptor were noticed. The purpose of the internal physical inspection was to locate and determine the condition of taps; record visible structural defects and identify hydraulic deficiencies in the sewer system. • The limits of the inspection were from Harper Avenue to Jefferson Avenue. • The inspection gathered the following data regarding the sewer system: • Manhole condition features and tap locations. • Interceptor sediment depth and sediment type. • Videotape sewers and taps including locations. • Locations of areas of visible structural concern.	• The Martin Drain is very important since it is the primary flow conduit for the City of Roseville and the Northwest portion of St. Clair Shores. • The report recommends several measures to improve the hydraulic capacity, hydraulic performance and to repair minor structural problems in the Martin Drain. • The data in the report may be useful in the Long Range WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Sewer System Evaluation Survey Report (SSES) For South Macomb Sanitary District Macomb County Michigan Vol. I to IV February, 1999	Anderson, Eckstein, And Westrick, Inc. Shelby Township, MI and McNamee, Porter & Seeley, Inc. Ann Arbor, MI	• The SSES was initiated and authorized by the South Macomb Sanitary District (SMSD) as a result of recommendations in the cost-effective analysis in the 1996 SMSD Overflow Study and Improvement Plan. The SSES was performed during February 1997 to July 1997. • The SMSD is a sewage disposal organization which serves the three member communities of Eastpointe, Roseville and St. Clair Shores. • The purpose of the SSES was to pinpoint locations and quantify the wet weather Infiltration and Inflow (I/I) in St Clair Shores. The other tasks were to identify excessive dry weather infiltration sources in other portions of the SMSD, perform cost-effective evaluation of I/I removal. • The additional goals of the SSES were cost-effectiveness evaluation of I/I removal and to develop recommendations for a rehabilitation program to eliminate excessive I/I. • The major tasks included physical survey of the sewer system, rainfall simulation investigations, flow monitoring, capacity analysis, cost-effectiveness analysis and report.	• The recommendations were to: --Rehabilitate a number of manhole covers, frames and chimneys. --Remove roof leads directly connected to sanitary sewers and reroute and reconnect area drain from sanitary to storm sewer. --Construct a parallel relief sewer along Jefferson Avenue. --Rehabilitate portions of sanitary sewer pipes. ■ The subject sewage disposal district is a part of the DWSD collection and treatment system which makes it pertinent to the future Master Plan.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Flow Monitoring Work Plan For Clinton Township Macomb County, MI Consent Order No. ACO-SW99-018 CL00008 (Draft) February 4, 2000	Spalding, DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI48226 905 South Boulevard East Rochester Hills MI 48307	• Clinton Township has an extensive sanitary sewer system divided into seven districts. The sewage from the Township flows into DWSD,s 15 Mile Road Interceptor and Detroit Wastewater Treatment Plant via Sterling Heights. The area served by the interceptor is designated to have separated sanitary system and no direct storm water sources are to be connected to any lateral or interceptor sewers. • The Clinton River flows through the middle section of Clinton Township and outlets into Lake St. Clair. The river is the receiver for most of the storm drainage outfalls in the area. Lake St. Clair was experiencing pollution problems. • A Consent Order required the Township to eliminate nine (9) sanitary overflow pump stations that was discharging sanitary flows in to the storm system during wet weather events. • The purpose of this report is to provide a work plan to outline the techniques of installing twelve (12) flow monitors on the collection system and to measure the flows from seven (7) pump stations.	• The history of Clinton Township sanitary sewer system was assembled from the previous Infiltration/ Inflow Analysis conducted Spalding DeDecker Associates, Inc. in 1980 and 1997. These studies revealed that excess raw sewage was being discharged to the storm systems. • An inventory of the Township sanitary sewer system was conducted based on the Clinton Township Geographic Information System. • The work plan calls for a total of twelve (12) meters to be installed in the nine pump station districts. The District 2 and 7 are to be subdivided into mini-meter districts based on residential and commercial areas. • Flow monitors are to be installed just downstream of the overflow pumps in the sanitary system. • Clinton Township is in the DWSD service area and the report contains substantial recent data,which may be useful to the WWMP.

DWSD CS-1314 Wastewater Master Plan Oakland & Macomb Counties Abstract/Brief Summary of Reports			
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Beaconsfield Relief Sewer Cleaning Manhole Inspection For South Macomb Sanitary District OM98-016T February 12, 1999	Spalding, DeDecker Associates, Inc. 607 Shelby Suite 400 Detroit, MI48226 905 South Boulevard East Rochester Hills MI 48307	• The Manhole inspection was conducted: • To locate and identify the manhole in need of repair, • Structural damage to drains	• The inspection of existing manholes and interceptors is a task to be undertaken during the development of the Wastewater Master Plan and this report can be useful to understand the condition of the existing manholes. • The results of the study can be used to develop hydraulic parameters that can later be utilized in the development of the GDRSS model that is to be developed as a part of the City of Detroit Wastewater Master Plan.