Chapter 14

SANITARY SEWER

The Sanitary Sewer portion of the Maplewood Comprehensive Plan was previously updated as a component of the overall 2020 and 2030 plans, under separate cover. The 2003 Comprehensive Sanitary Sewer Plan Update (2003 update), was completed to address some inconsistencies in the 2020 Comprehensive Plan. The 2003 update was completed to consider development/ redevelopment that was being planned within the City, and to address sewage flow issues for the Legacy Village development as required by the Alternative Urban Areawide Review (AUAR) for the development. The 2003 update was updated in 2010, like this 2018 Plan update, as part of the City's 2030 Comprehensive Plan.

Overview

This section has been prepared to be consistent with the requirements of the Metropolitan Council's Local Planning Handbook. The Local Planning Handbook describes the content requirements for the sewer element of comprehensive plans. This report serves as both the sewer element of the City's Comprehensive Plan (Tier I) as well as the City's local sewer extension plan (Tier II). The information included in this update allows the Metropolitan Council to plan and manage their regional sewage collection and treatment systems. The current major population characteristics of Maplewood are summarized in **Table 14-1** based upon the current Comprehensive Plan update:

Table 14-1. Maplewood Population Characteristics

Forecast Year	Estimated Population	Estimated Households	Estimated Employment
2010	38,018	14,882	27,635
2020	42,200	17,000	32,700
2030	45,600	18,900	34,800
2040	48,600	20,300	36,600

1. Data from Met Council Community Page for Maplewood

Sanitary Sewer Service Districts

The City is divided into seventy-four (74) separate sewer districts. The district boundaries are identical to the boundaries identified in the 2020 and 2030 Comp Plans. A map illustrating the current sewer district boundaries is shown below as **Figure 14-1**.

Some of the sewer districts discharge Maplewood sewage directly into adjacent communities without any metering of outflow. The Maplewood sanitary sewer system also receives some direct inflow from adjacent communities. The City has agreements with Oakdale (2003) and Little Canada (2008) to accept flow from these cities into Maplewood's sanitary sewer system. In cases where no metering information is available for inflow or outflow, flows are estimated based on land uses in the areas discharging flow. **Figure 14-1** illustrates the locations of inflows from and outflows to the adjacent communities. **Table 14-2** provides a summary of the discharge connections and metering locations for each of the sewer districts. **Table 14-3** provides a summary of the estimated population, households and employment by MCEC Interceptor contribution for the years 2020, 2030 and 2040.

Figure 14-1. City of Maplewood Sanitary Sewer Districts

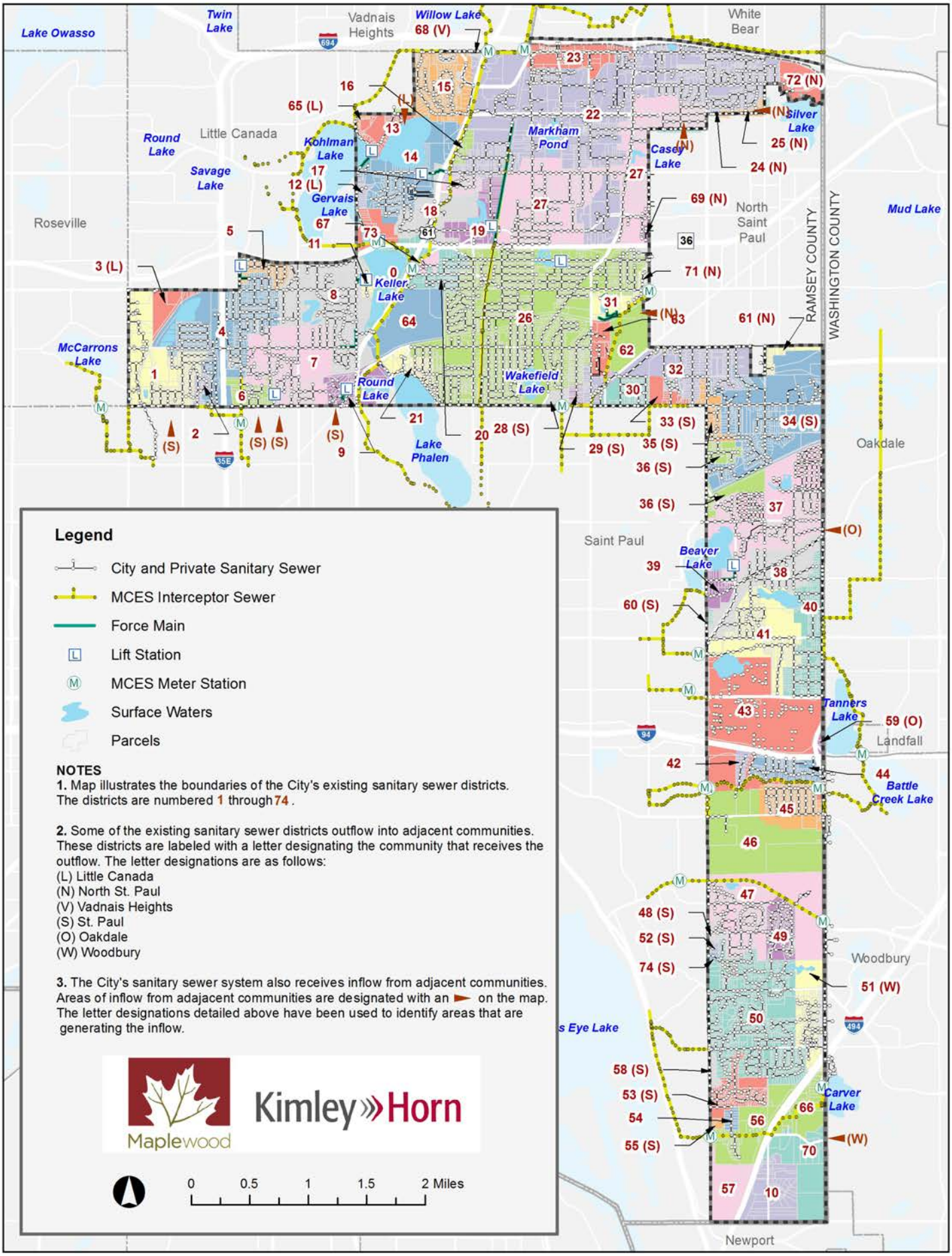


Table 14-2. Sewer Service District Discharge Connections

Sewer District #	Outflow to:	Meter:
3(L), 12(L), 65(L)	Little Canada Sewer	None
5	Maplewood Lift Station 10 to Maplewood Sewer District 4	None
19	Maplewood Lift Station 12 to Maplewood Sewer District 22	#M025A
14	Maplewood Lift Station 14 to Maplewood Sewer District 22	#M025A
13	Maplewood Lift Station 17 to Maplewood Sewer District 14	#M025A
11	Maplewood Lift Station 18 to Maplewood Sewer District 8	None
73	Maplewood Lift Station 20 to MCES Little Canada Interceptor (I-8151)	None
37	Maplewood Lift Station 6 to Maplewood Sewer District 39	#M008
7	Maplewood Lift Station 8 to Maplewood Sewer District 6	#M016
27	Maplewood Sewer District 26	#M011
62	Maplewood Sewer District 32	None
34(S)	Maplewood Sewer District 36	None
57	Maplewood Sewer District 56	None (#M002 not in Service)
42, 43, 44, 45, 46	MCES Battle Creek Interceptor (I-MW-411)	#M005
8, 9, 21, 64	MCES Beltline Interceptor (I-7122)	None
15, 16, 17, 18, 20, 22, 23, 67	MCES Beltline Interceptor (I-7122)	#M025A
10, 54, 56, 66, 70	MCES Carver Lake Interceptor (I-7402)	None (#M002 not in Service)
50	MCES Highwood Interceptor (I-SP-202)	None
39	MCES Interceptor I-8566-371	#M008
38, 41	MCES Interceptor I-SP-211	#M007
30, 32	MCES Interceptor I-SP-215	None
26	MCES Interceptor I-SP-217	#M011
2, 4	MCES Interceptor I-SP-221	None
6	MCES Interceptor I-SP-221	#M016
31, 63	MCES North St. Paul Interceptor (I-MW-413)	None
40	MCES Oakdale Interceptor (I-WO-501) (to be Conveyed to Oakdale)	#M021
1	MCES Trout Brook Interceptor (I-SP-222)	#M015A
47, 49	MCES Woodbury Interceptor (I-MW-410)	#M004
24(N), 25(N), 61(N), 69(N), 71(N), 72(N)	North St. Paul Sewer	None
59(O)	Oakdale Sewer	None
28(S), 29(S), 36(S), 48(S), 52(S), 53(S), 55(S), 58(S), 60(S), 74(S)	St. Paul Sewer	None
33 (S), 35 (S)	St. Paul Sewer (I-SP-214 to be Conveyed to St. Paul)	None
68 (V)	Vadnais Heights Sewer	None
51 (W)	Woodbury Sewer	None

Table 14-3. Projected Population, Households and Employment by MCES Interceptor

MCES Interceptor or Outlflow Location	Estimated Population			Estimated Households			Estimated Employment		
	2020	2030	2040	2020	2030	2040	2020	2030	2040
MCES Battle Creek Interceptor (I-MW-411)	1,720	1,820	3,272	627	680	1,392	9,897	9,734	9,435
MCES Beltline Interceptor (I-7122)	9,192	10,183	12,657	3,971	4,340	5,071	7,622	8,719	9,763
MCES Carver Lake Interceptor (I-7402)	1,613	2,012	1,241	468	916	1,240	36	44	54
MCES Highwood Interceptor (I-SP-202)	2,094	2,078	2,069	1,027	1,123	996	69	80	89
MCES Interceptor I-8566-371	353	361	371	1,356	1,424	1,133	254	293	297
MCES Interceptor I-SP-211	4,494	4,553	5,742	878	915	1,238	5,473	5,369	5,148
MCES Interceptor I-SP-215	1,933	2,244	1,742	754	944	725	718	889	1,063
MCES Interceptor I-SP-217	7,682	8,122	8,159	3,104	3,410	3,476	3,359	4,111	4,882
MCES Interceptor I-SP-221	4,148	4,227	3,937	1,705	1,808	1,513	1,079	1,244	1,405
MCES Little Canada Interceptor (I-8151)	148	158	171	64	68	71	28	33	39
MCES North St. Paul Interceptor (I-MW-413)	68	69	70	17	17	47	300	321	338
MCES Oakdale Interceptor (I-WO-501)	475	477	481	147	154	308	2,291	2,241	2,157
MCES Trout Brook Interceptor (I-SP-222)	372	381	447	262	285	529	450	504	554
MCES Woodbury Interceptor (I-MW-410)	2,193	2,212	1,833	777	782	785	171	193	214
Little Canada Sewer	642	826	960	55	59	89	172	181	189
North St. Paul Sewer	694	1,085	1,602	159	169	169	76	84	92
Oakdale Sewer	86	111	65	5	6	30	353	345	331
St. Paul Sewer	2,718	2,808	2,384	1,256	1,385	1,151	253	283	302
St. Paul Sewer (I-SP-214)	218	233	225	176	214	155	82	112	144
Vadnais Heights Sewer	88	108	119	5	5	5	7	7	7
Woodbury Sewer	1,276	1,531	1,060	183	199	189	13	15	17
TOTALS	**42,206**	**45,600**	**48,607**	**16,998**	**18,902**	**20,312**	**32,702**	**34,801**	**36,519**

Projected Sewage Flows

This update has been prepared considering the City of Maplewood's future land use maps. For the purposes of estimating sewage flows, we have assumed the following:

- The existing land use map illustrates 2018 development within the City. Land currently identified as vacant was assigned a flow representative of the zoning classification for each vacant parcel.
- The future land use map illustrates projected 2040 development within the City

Projected sewage flows have been determined for each of the seventy-four (74) sewer districts in the City. Projected sewage flows are based on the land use specific flows listed in **Table 14-4**.

Table 14-4. Predicted Flows for Existing and Future Land Uses

Existing Land Use	Future Land Use	Units		Predicted Flow Rate	
		Per Parcel	Per Acre	(Gal./Unit/ Day)	(Gal./Acre/ Day)
Single Family Residential	Rural/Low Density Residential	1		275	
	Low Density Residential				
Multi-Family Residential	Medium Density Residential		8	275	2,200
Manufactured Housing Park					
	High Density Residential		12	275	3,300
Planned Unit Development (PUD)	Mixed Use Neighborhood				2,300
	Mixed Use Neighborhood HD				
	Mixed Use Community				
Commercial	Commercial				800
Industrial	Employment				
Public/Institutional	Public/Institutional				
Utility	Utility				0
Open Space	Open Space				
Park	Park				
ROW	ROW				
Water	Water				

Flows for 2018 and 2040 listed in **Table 14-5** are based on the land use categories for existing and future land uses, respectively. Flows for 2030 have been estimated by interpolating the mid-point between the calculated 2018 and 2040 flows. The number of existing subsurface sewage treatment systems (SSTS) in each sewer district that do not have a current sanitary sewer connection available are listed in the second column.

The projected flow rates have been estimated based upon communications with Metropolitan Council Environmental Services (MCES) staff during previous updates. Previous estimates have also considered some calibration of the projected flow rates with actual metering records. The number of units per acre for multiple dwelling residential properties is based on the average density of each category consistent with the City's land use plan. The estimated flow rate for mixed use and PUD properties of 2,300 gallons/acre/day has been estimated assuming a mix of high density residential use and commercial use.

For districts having SSTS systems with no connection currently available, flow have been adjusted to recognize no flow from these parcels. Flows from SSTS parcels having a connection available are included in **Table 14-5**. Future flows will be evaluated with the CIP projects in **Table 14-6.**

Table 14-5. Estimated Flow by District and Year

Sewer District	SSTS No Connection Available	Average Daily Flow (Gallons/Day)		
		2018	2030	2040
1		171,289	223,659	276,030
2		13,968	13,968	13,968
3 (L)		30,352	30,352	30,352
4		227,635	234,170	240,705
5		24,200	24,200	24,200
6		33,408	36,794	40,180
7		182,156	184,575	186,993
8		153,494	159,326	165,159
9		58,153	73,615	89,077
10	41	1,100	1,100	1,100
11		4,400	4,400	4,400
12 (L)		5,500	5,500	5,500
13		14,025	14,025	14,025
14		88,473	99,041	109,609
15		111,910	120,147	128,384
16		11,644	11,681	11,718
17		26,735	24,074	21,413
18		72,381	85,316	98,250
19		31,690	52,479	73,267
20		43,059	53,410	63,761
21		45,590	51,144	56,698
22	4	750,829	902,493	1,054,993
23		150,719	176,483	202,247
24 (N)		1,375	1,375	1,375
25 (N)		9,075	9,075	9,075
26		742,604	793,113	843,623
27	1	297,256	319,760	342,265
28 (N)		9,928	9,928	9,928
29 (N)		10,175	10,383	10,592
30		42,881	55,595	68,309

Sewer District	SSTS No Connection Available	Average Daily Flow (Gallons/Day)		
		2018	2030	2040
31		37,621	37,621	37,621
32		155,229	198,214	241,198
33 (S)		23,685	28,790	33,895
34 (S)		249,373	259,630	269,887
35 (S)		24,473	30,402	36,330
36 (S)		43,616	84,695	125,774
37	1	437,384	459,156	480,928
38		112,768	120,581	128,394
39		26,300	29,356	32,411
40	2	83,238	88,970	98,752
41		128,502	134,645	140,788
42		4,950	4,950	4,950
43		302,835	303,121	303,406
44		40,520	46,601	52,681
45		74,396	78,254	82,112
46		62,173	62,173	62,173
47		249,010	287,017	325,024
48 (S)		10,732	10,775	10,818
49		65,194	83,125	101,057
50	1	247,286	250,521	253,755
51 (W)	12	57,464	83,208	108,951
52 (S)		1,925	1,925	1,925
53 (S)		46,829	46,829	46,829
54		5,225	5,225	5,225
55 (S)		1,650	1,650	1,650
56	2	14,300	14,300	14,300
57		0	0	0
58 (S)		2,475	2,475	2,475
59 (O)		3,216	6,231	9,246
60 (S)		2,750	2,655	2,561
61 (N)		8,250	8,250	8,250
62		275	275	275
63		34,917	34,917	34,917
64		0	0	0
65 (L)		1,925	1,925	1,925
66	7	5,499	5,499	5,499
67		10,925	20,394	29,863
68 (V)		2,267	2,267	2,267
69 (N)		3,472	3,472	3,472
70	12	1,925	90,150	178,375
71 (N)		5,225	5,225	5,225
72 (N)		0	0	0
73		2,475	2,475	2,475
74 (S)		2,475	2,475	2,475
0		62	62	62
Totals		**5,960,812**	**6,721,660**	**7,487,394**

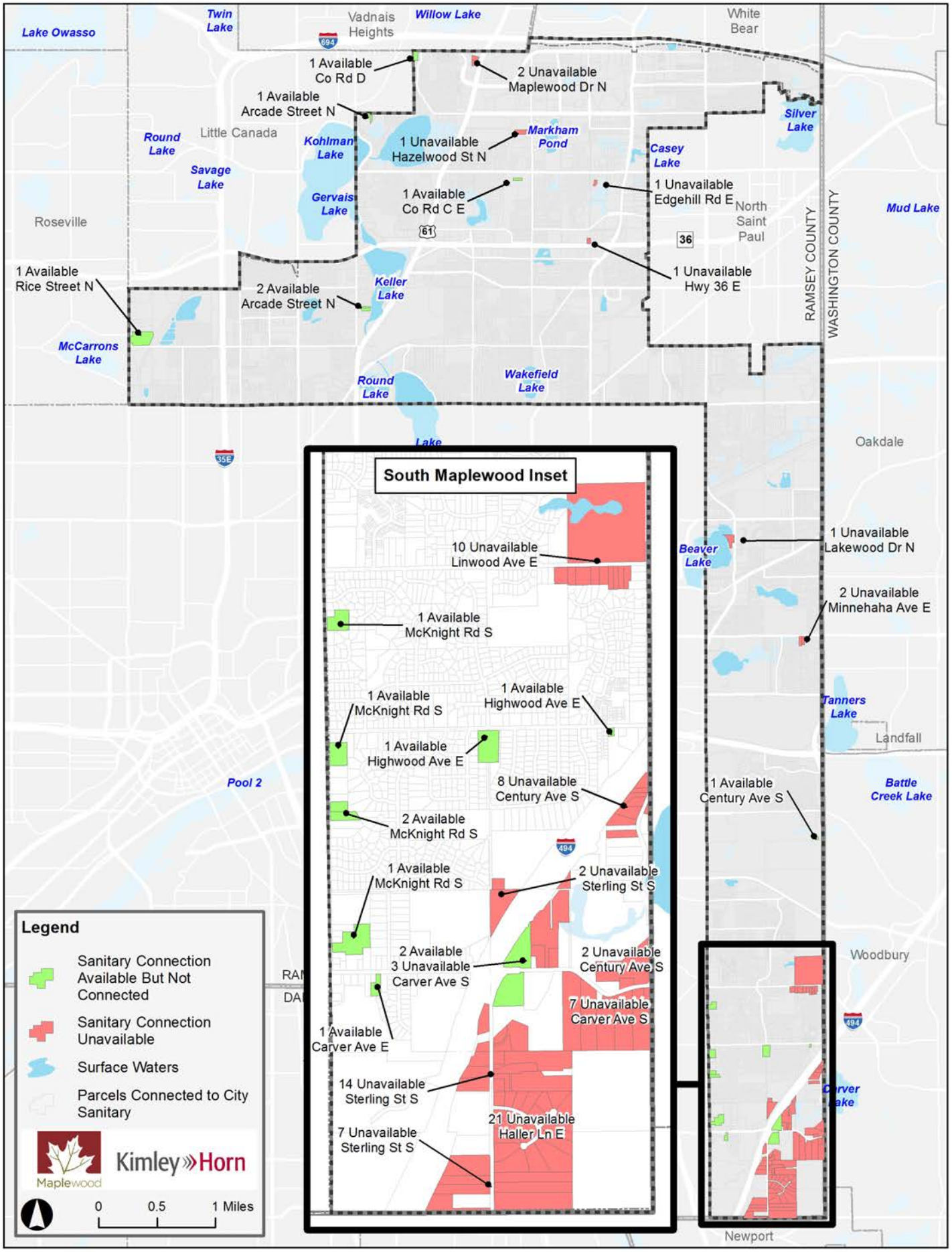
Subsurface Sewage Treatment Systems (SSTS)

There are approximately 100 subsurface sewage treatment systems (SSTS) in the City of Maplewood as of 2018. The City previously had 135 SSTS in 2003, 112 in 2010 and 102 in 2016. The vast-majority of these systems are located south of Linwood Avenue as shown in **Figure 14-2**. The City's goal is to phase out the use of SSTS within Maplewood as practical and feasible. Additional information on the SSTS in the southern portion of Maplewood south is provided in the South Maplewood Sewer Study, prepared by SEH, Inc. dated May 19, 2003. **Figure 14-2** identifies which current SSTS locations have a potential connection to the sanitary sewer system available.

Each year, the City prepares an Annual SSTS Report summarizing the status of the SSTS sites. This report states which sites have sewer available and which sites are required to connect to the City sewer. SSTS owners are required to have their system inspected every 3 years and complete any required maintenance. The owner must submit the required MPCA Septic Tank Maintenance Reporting Form to the City. On January 28, 2002, the City of Maplewood approved City Ordinance Section 9-950 regulating the location, design, installation, use and maintenance of SSTS within Maplewood. The ordinance became effective on June 1, 2002. The City's current SSTS Ordinance is found in Chapter 40, Article II, Division 5.

There are no public or privately owned Community Wastewater Treatment Systems in operation within the City.

Figure 14-2. Subsurface Sewage Treatment Systems in Maplewood



Infiltration/Inflow

In 1998, the City of Maplewood initiated a program to identify and address infiltration and inflow (I & I) issues in the City's sanitary sewer system. This program includes a quarterly review of flow reports to identify critical I & I areas. The City has been making annual investments to address I & I problems, including sewer main lining, sealing manholes, and the replacement of sections of sanitary sewer main.

According to the 2011-2015 US Census, 5,889 (37.6%) of the total 15,663 housing units in Maplewood at that time were built prior to 1970. The City has not specifically targeted pre-1970 housing areas but recognizes that this can be an important factor in contributing to infiltration and inflow. A majority of the I & I program has been focused on the portion of Maplewood north of Minnehaha Avenue, where much of the pre-1970's housing stock is located.

Based on a review of monthly flow data obtained from MCES billing meters in Maplewood, the City has completed an assessment of the measured or estimated clearwater flows in the system. **Table 14-6** shows the estimated percent I&I of the average daily flows and the peak monthly flows for the years 2010-2017. The average annual I&I of only 11% suggest the City does not have a significant I&I concern. Even the maximum value of 45% in 2014 of peak monthly flows equated to only about 107 gpd per person, which is below the EPA guidance of 120 gpd per person as the screening level for excessive infiltration.

Table 14-6. Calculated Percent I&I Years 2010-2017

Year	2010	2011	2012	2013	2014	2015	2016	2017	8-Year Averages
Average Daily Flow (Mgpd)	2.48	2.76	2.47	2.77	2.85	2.47	2.61	2.81	**2.65**
Year I&I	4%	21%	8%	9%	17%	9%	11%	9%	**11%**
Peak Monthly Flow (Mgpd)	2.75	3.37	2.82	3.33	4.31	2.68	2.93	3.27	**3.18**
Peak I&I	13%	35%	20%	24%	45%	16%	21%	22%	**25%**

The City's I & I program initially focused on addressing illegal sump pump connections under an annual program that started in 2004. Currently, the City funds annual sewer main lining program that is linked to its annual street reconstruction program. The City lines sanitary sewer mains that have been identified as contributing to I & I and also offers landowners the opportunity to have the system in their area televised at no cost. If improvements or repairs are needed, the City covers the cost of improvements within the right-of-way (ROW) and the landowner is responsible for the cost of improvements outside the ROW. A summary of the recently completed and planned sewer lining projects is provided below. The method used to line pipes is a cured in place pipe (CIPP) liner.

Completed Projects

- **2014** - 4,109 feet of 8-inch CIPP
- **2015** - 2,772 feet of 8-inch CIPP
- **2016** - 5,552 feet of 8-inch CIPP
- **2017** - 2,809 feet of 8-inch CIPP

Planned Projects

- **2018** - 2,942 feet of 8-inch CIPP
- **2019** - 3,405 feet of 8-inch CIPP
- **2020** - 3,357 feet of 8-inch CIPP
- **2021** - 3,446 feet of 8-inch CIPP

City code, Division 4 - "Discharges Into Sewer System", prohibits discharges of certain hazardous and harmful waters, wastes and substances into the sanitary sewer system. Section 40-133 prohibits clear water discharges from foundation drains, sump pumps and other clear water drainage sources and prohibits property owners from making or maintaining a connection between any conductor used to carry clear water drainage to the municipal sanitary sewer system, including sump pump discharges.

Actions/Capital Improvement Plan

A number of trunk sanitary sewer improvements have been identified that should be considered as a part of the City's future Capital Improvement Plan (CIP) to meet future needs of growth areas, address public health issues or to eliminate the need for existing lift stations. A summary of these improvements and a proposed schedule for their completion is provided in **Table 14-7** below and the location of these potential improvements is illustrated in **Figure 14-3**. The schedule for a number of these improvements will be directly related to development activity in the area. Prior to capital improvements in the districts listed in **Table 14-7**, and in preparation for development and redevelopment in areas of change discussed in the Land Use chapter of this plan, the City will complete more detailed analyses of the sanitary sewer system in those areas and will provide Met Council an opportunity to review these studies prior to final approvals of the proposed project.. The City will initiate improvements in specific areas noted only in response to development activity or to protect public health.

Table 14-7. Capital Improvement Plan

Sewer District	Date	Description
7	TBD	Construction of gravity sewer connection to eliminate Lift Station #8.
10	Development or Public Health Driven	Construction of sewer extension and two lift stations along Sterling Street to connect to MCES Carver Lake Interceptor.
19	TBD	Construction of gravity sewer connection to MCES Beltline Interceptor to eliminate Lift Station #12.
51	Development or Public Health Driven	Construction of sewer extensions along Linwood Avenue and Highwood Avenue west of Century Avenue to connect to existing City sanitary sewer.
56	Development or Public Health Driven	Construction of sewer extension along Henry Lane and Sterling Street to connect to MCES Carver Lake Interceptor.
66	Development or Public Health Driven	Construction of sewer extension along Century Avenue south of I-494 to connect to MCES Carver Lake Interceptor.
70	Development or Public Health Driven	Construction of sewer extension along Carver Avenue to connect to MCES Carver Lake Interceptor.

Figure 14-3. Capital Improvement Plan