ENGINEERING ENTERPRISES, INC.

Draft Report

Wastewater System Master Plan

Village of Sugar Grove
April 2024

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WASTEWATER SYSTEM MASTER PLAN UPDATE

Village of Sugar Grove

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Abbreviations and Acronyms

ADD	AVERAGE DAY DEMAND
AWWA	AMERICAN WATER WORKS ASSOCIATION
CF	CUBIC FEET
CMAP	CHICAGO METROPOLITAN AGENCY FOR PLANNING
CMAP PLAN	2050: NORTHEASTERN ILLINOIS REGIONAL WATER SUPPLY/DEMAND PLAN
FMWRD	FOX METRO WATER RECLAMATION DISTRICT
FT	FOOT
GAL	GALLON(S)
GIS	GEOGRAPHICAL INFORMATION SYSTEM
GPCPD	GALLONS PER CAPITA PER DAY
IEPA	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
I/I	INFILTRATION AND INFLOW
IN	INCH(ES)
MDD	MAXIMUM DAY DEMAND
MGAL	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MSL	MEAN SEA LEVEL
PE	POPULATION EQUIVALENT
VILLAGE	VILLAGE OF SUGAR GROVE
WM	WATER MAIN
WWTF	WASTEWATER TREATMENT FACILITY

Executive Summary

The Village of Sugar Grove is a growing community that is strategically located in Kane County along US-47, just south of I-88, approximately 45 miles southwest of Chicago. The Village experienced a fair amount of growth through the 1990s and into the 2000s, and the Village installed sewers and lift stations to accommodate the expansion during this timeframe. While the Village's growth rate has slowed in subsequent decades, there is potential for an increased level of growth in the near future.

Furthermore, wastewater service is a critical need for any future development, and the Village had the foresight to make the wastewater system a priority in its planning efforts. This study aimed to compile critical information regarding its existing infrastructure while also opening communications with Fox Metro Water Reclamation District to determine capacity restrictions to the downstream. FMRWD, as a result of this coordination, engaged consultants in its own analysis of the Village's downstream wastewater system capacity. A summary of the critical findings/recommendations of this study are made:

1. The Village should engage in regular meetings and/or communications with FMWRD to discuss potential upcoming developments as well as any on-going maintenance items that might affect the Village. It is our understanding that Public Works has regularly scheduled meetings currently.

2. From a FMWRD perspective, the most significant restriction to future development is the Sugar Grove Pump Station which is owned, operated, and maintained by FMWRD. Upon an additional 3,600 population equivalent (PE) being added to the system, an additional pump at Sugar Grove Pump Station will be required, and it requires a minimum of two (2) years of planning. The timing of this pump should be an on-going discussion at the regular meetings with FMWRD.

3. Local planning areas beyond the FMWRD interceptor sewers need to be evaluated on a case-by-case basis for future developments to with the following goals and understanding:

    a. Minimizing and eliminating existing and proposed lift stations.

    b. Any development that occurs in the Sugar Grove West Service Area is taking capacity away from the Sugar Grove East Service Area which will trigger the need for an additional pump at the Sugar Grove Pump Station as well as take away capacity from the interceptor that runs through Settlers Ridge. It will be a policy decision as to where or if development will occur in the Sugar Grove West Service Area.

4. The Village has established a foundation for its Wastewater Collection and Conveyance System in GIS. As additional or better information is obtained, we recommend the Village update the GIS maps routinely. We also recommend setting up processes for revisions to be in GIS accordingly.

1 Introduction

1.1 Purpose

The Village of Sugar Grove is a growing community that is strategically located in Kane County along US-47, just south of I-88, approximately 45 miles southwest of Chicago. The Village experienced a fair amount of growth through the 1990s and into the 2000s, and the sanitary collection system was expanded to accommodate the expansion during this timeframe. While the Village's growth rate has slowed in subsequent decades, there is potential for an increased level of growth in the near future.

Various developers have expressed interest in developing in the Sugar Grove area, and wastewater service is a key component to success of such future development. The last study completed for the Village regarding its wastewater system was prepared in the 1990's when the Village was annexed to Fox Metro Water Reclamation District (FMWRD). Therefore, the Village contracted with Engineering Enterprises, Inc. to perform the following:

- Compile and review historical and current information regarding its wastewater collection system,
- Convert the Village's collection system into a Geographical Information System (GIS) platform,
- Evaluate tributary areas of the lift stations,
- Better understand the Village's wastewater collection system capacity and associated limitations,
- Coordinate with Fox Metro Water Reclamation Water Reclamation District regarding downstream capacity limitations, and
- Make recommendations on future wastewater collection system planning.

Ultimately, the intent of this document is to compile the historical wastewater information, convert it to GIS, coordinate with Fox Metro Water Reclamation District (FMWRD) on any potential restrictions, and make recommendations for future sanitary collection system planning for future developments.

1.2 Wastewater System Planning Components

Several parameters need to be considered when analyzing the Village's Wastewater System. Some of the parameters included in this study are as follows: the capacity of the Village's collection system, lift station limitations, FMWRD's collection system, and FMWRD's treatment capacity.

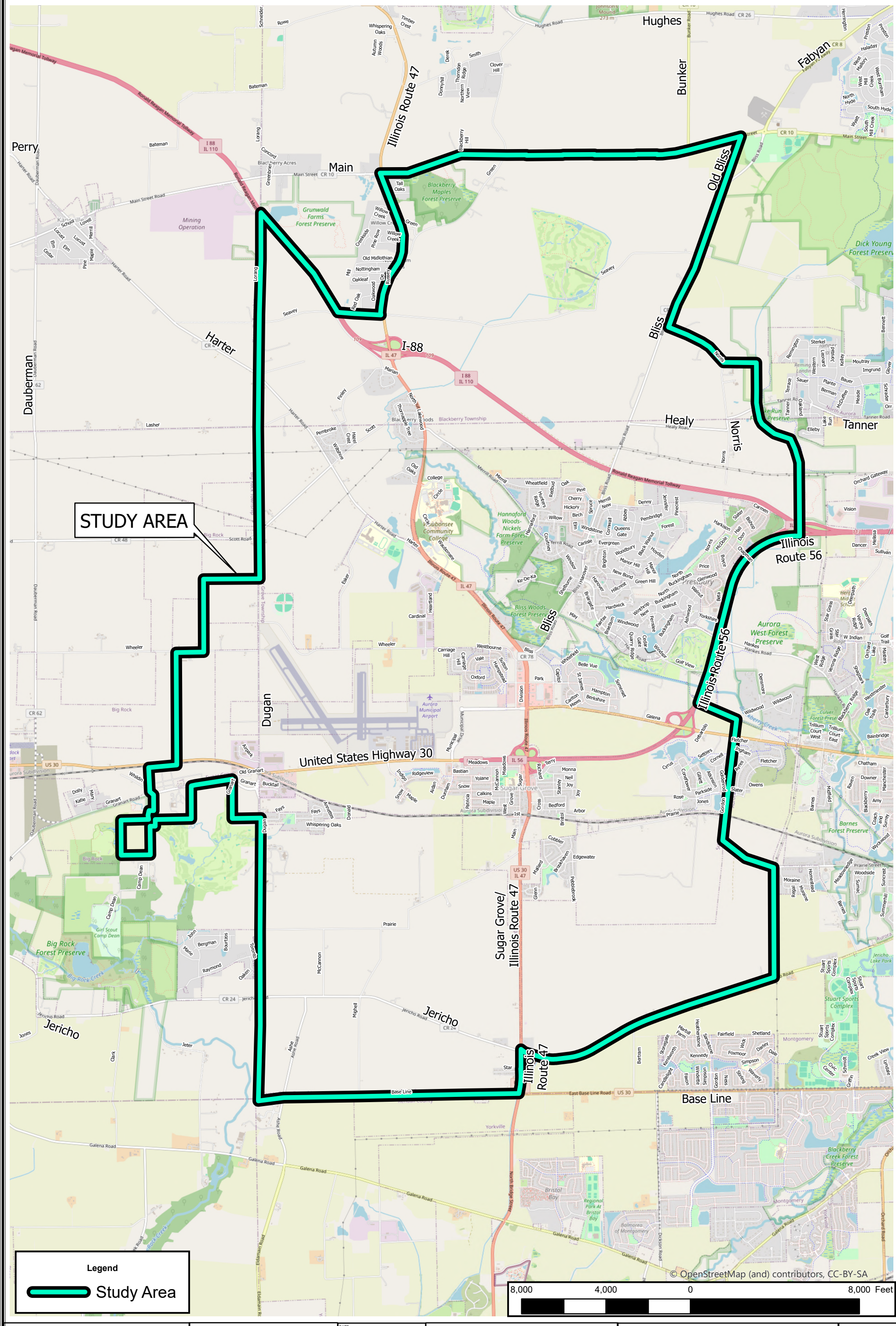
Included in this report are tables, worksheets, and exhibits to document the limitations within the Village and FMWRD's systems.

1.3 Study Area

The study area generally aligns with the planning area defined in Figure 21 of the 2023 Comprehensive Plan adopted by the Village Board on June 6, 2023 (Ordinance 2023-0606A) as shown in Exhibit 1-1.

This planning area is bound by the boundary agreement lines on the east, west, and south with the adjacent communities of the Village of Montgomery, United City of Yorkville, Village of North Aurora, City of Aurora, City of Batavia, Village of Kaneville, Village of Plano, and Village of Big Rock. The northern limit of the study area is delineated by Main Street. These boundaries are all identified on Exhibit 1-2. The existing Facility Planning Areas (FPAs) in the region are also identified on this exhibit. The FPAS are being shown merely as a reference point for the Village because historically questions have arisen about these boundaries. We researched the FPA boundary lines with Chicago Metropolitan Agency for Planning (CMAP) and integrated them into the Village's GIS database for reference; however, in practicality, FPAs no longer govern what areas a wastewater system can or cannot service. As of 2010, "*the Illinois EPA no longer denies State construction permits based solely on an inconsistency with an FPA boundary and it no longer maintains maps of the FPA boundaries.*"[1]

[1] Illinois Environmental Protection Agency, https://epa.illinois.gov/topics/water-quality/watershed-management/facility-planning.html



Engineering Enterprises, Inc. 52 Wheeler Road Sugar Grove, Illinois 60554 (630) 466-6700 www.eeiweb.com	**VILLAGE OF SUGAR GROVE** 160 Municipal Drive Sugar Grove, IL 60554	DATE: APRIL 2024 PROJECT NO.: SG2109 BY: MJT PATH: H:\GIS\PUBLIC\SUGARGROVE\2021\SG2109 FILE: SG2109_ Exhibit 1-1 Study Area	**WASTEWATER SYSTEM MASTER PLAN**	**EXHIBIT 1-1 STUDY AREA** NORTH

Sugar Grove Boundary
Elburn FPA
Fox Metro WRD FPA
Yorkville-Bristol FPA

Sugar Grove Boundary Agreements

Aurora Boundary
Batavia Boundary
Big Rock Boundary
Kaneville Boundary
Montgomery Boundary
North Aurora Boundary
Plano Boundary
Yorkville Boundary

Illinois Route 38
Lincoln Highway
IL 38
Meredith
Virgil Township
Kaneville Township
Elburn Forest Preserve
Main
Illinois Route 47
Keslinger
CR 41
CR 62
CR 16
CR 26
CR 10
CR 4
CR 48
IL 47
I 88
IL 110
Ronald Reagan Memorial Tollway
Hughes Mound
273 m
Fabyan
Fabyan Parkway
Mill Creek Forest Preserve
Blackberry Township
Schneider
Rowe
Kenmar
Spring Valley
Whispering Oaks
Timber Crest
Bateman
Perry
Kaneville
Mining Operation
Grunwald Farms Forest Preserve
Blackberry Maples Forest Preserve
Dick Young Forest Preserve
Dauberman
Harter
Seavey
Lorang
Concord
Greenbrier
Old Bliss
North Aurora Boundary
Batavia Boundary
Aurora Boundary
Bliss
Kaneville Boundary
Big Rock Township
Sugar Grove
Healy
Tanner
Norris
Aurora
Illinois Route 56
Scott
Big Rock Boundary
Big Rock
Galena
Maddock Airport
United States Highway 30
Dugan
Illinois Route 56
Rhodes
Granart
Big Rock Forest Preserve
Jericho
Sugar Grove/ Illinois Route 47
Montgomery Boundary
Montgomery
Orchard
Yorkville Boundary
Plano Boundary
Galena
Rock Township
Kendall County
Yorkville-Bristol FPA
Base Line
Fox Metro WRD FPA

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WASTEWATER SYSTEM MASTER PLAN
VILLAGE OF SUGAR GROVE
KANE COUNTY, ILLINOIS

EXHIBIT 1-2
VILLAGE OF SUGAR GROVE
BOUNDARY AGREEMENTS AND FPAS MAP

NORTH

1.4 Population

Wastewater and subsequent wastewater system needs are largely dependent on population. Reviewing historical trends and then projecting population is a critical component of the Wastewater System Master Plan. The next few subsections outline the historical population trends and the projected population for the study.

1.4.1 Historical Population

The Village of Sugar Grove was incorporated in July 1957 with an approximate population of 200 people. Table 1-1 below provides the Village's population figures provided by the United States Census from 1980 to 2020. The Village of Sugar Grove experienced its highest recent decade of growth from 2000 to 2010, growing from 3,909 persons in 2000 to 8,997 in 2010. Its growth rate was steady after that, and based on the estimates, the total residential population served by the Village's Water Works System, including Prestbury, is 9,888.

Table 1-1. Historical Population (1980 – 2020)

Year	Sugar Grove Population	Prestbury Population	Total Population	Annual Incremental %Change
1980	1,366		1,366	
1990	2,005		2,005	3.91%
2000	3,909	1,682	5,591	10.80%
2005	7,958	2,061	10,019	12.37%
2010	8,997	1,722	10,719	0.80%
2012	9,132	1,722	10,854	0.63%
2016	9,546	1,657	11,203	0.79%
2017	9,786	1,657	11,443	2.14%
2018	9,703	1,657	11,360	-0.73%
2019	9,800	1,657	11,457	0.85%
2020	9,888	1,657	11,545	0.77%

1.4.2 Projected Population

Forecasting future population patterns in a geographic location can be very complex. Economic conditions, social perspectives, governmental influences, environmental factors, and many other circumstances can disrupt population dynamics. An example of a situation that altered the Village's potential population growth pattern occurred in 2000s. With the rapid growth trends of the 2000s and sizable amount of available land remaining to develop within the planning boundary, the Village was preparing for a continued population increase. In 2003, CMAP estimated that the population of the Village would grow to 62,742 by 2030. However, with the subsequent downturn in the economy in the mid-2000s, the rate of population growth slowed down significantly. However, reasonable population projections should be made utilizing the most current, best available sources of information in order to establish a baseline for determining future Wastewater System needs. The projected population trends are summarized in Table No. 1-2 and graphed with the historical trends in Figure 1-2.

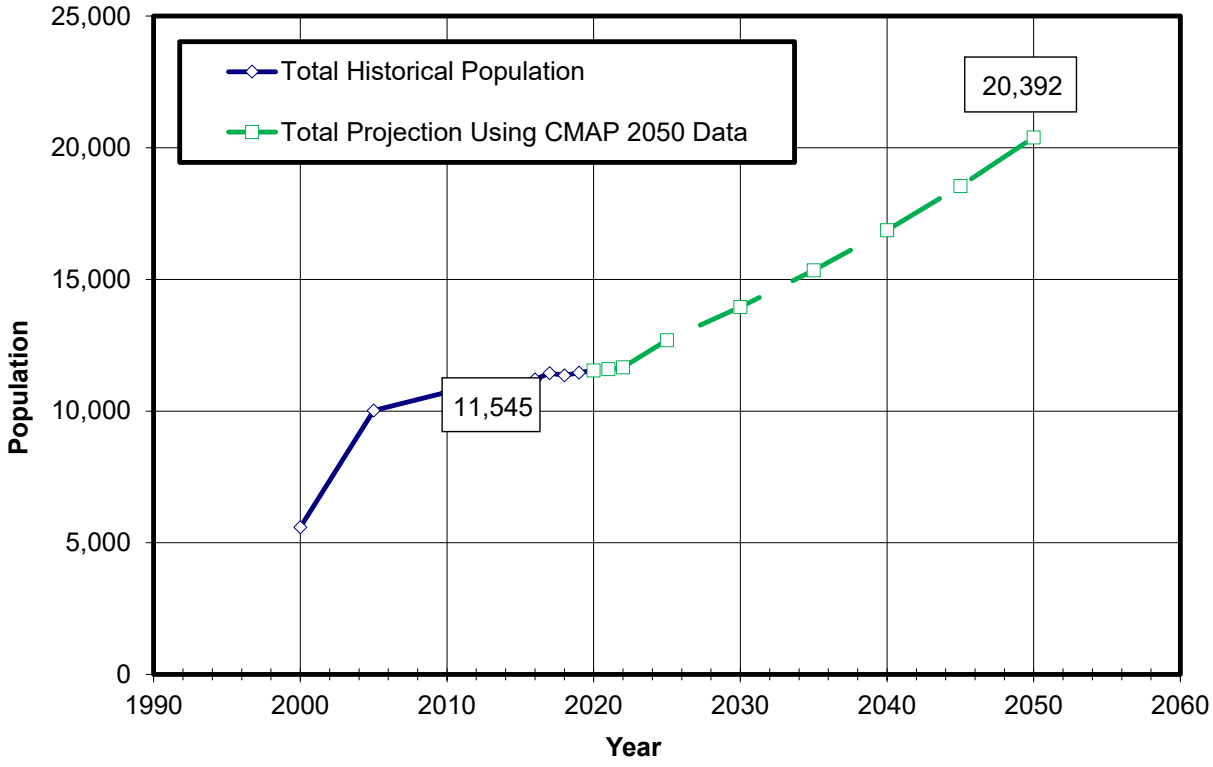
Table 1-2. Projected Population

Year	Sugar Grove Population	Prestbury Population	Total Population	Annual Incremental %Change
2020	9,888	1,657	11,545	
2025	10,431	1,657	12,088	0.92%
2030	11,727	1,657	13,384	2.06%
2035	13,184	1,657	14,841	2.09%
2040	14,822	1,657	16,479	2.12%
2045	16,664	1,657	18,321	2.14%
2050*	18,735	1,657	20,392	2.16%

Notes:

* CMAP 2050 Population Projection.

Figure 1-2. Historical and Projected Population



The Village anticipates an additional 8,847 people by year 2050. The study area can support a significantly higher population at full build-out, and so it is important to anticipate the most likely locations that development will occur in the coming years.

2 Existing Wastewater System

The Village of Sugar Grove incorporated in 1957 and encompassed approximately 350 acres at that time. The sewage was originally tributary via gravity to the Prestbury WWTF. As the Village expanded, the Prestbury WWTF needed to be expanded. Therefore, in 1987, the Village purchased the Prestbury WWTF and expanded it to a capacity of 0.85 MGD in 1987. As part of the Village amending its Facilities Plan in 1993, comments were received by FMWRD indicating that the Village should initiate and infiltration and inflow (I/I) study along with conducting a study to determine the feasibility of the Village connecting to FMWRD's conveyance and treatment system. Subsequently, in 1994, the Village contracted with Walter E. Deuchler Associates, Inc. to develop a Wastewater Comprehensive Master Plan to identify excessive infiltration and inflow (I/I) entering the collection system along with sewer and treatment plant capacity limitations. At the time of this study, significant I/I was identified and the wastewater treatment plant was operating hydraulically at or beyond its capacity and significant. Furthermore, significant growth was anticipated within Sugar Grove's Facilities Planning Area. As a result of this study, the Village began negotiations to obtain a "temporary" connection to FMWRD which ultimately led to the Village deciding to permanently connect to FMWRD.

2.1 Sanitary Collection and Conveyance System

Currently, the Village of Sugar Grove's Sanitary Collection and Conveyance System consists of a wastewater conveyance system (sanitary sewers less than 15" in diameter, force main, lift stations) which is then tributary to FMWRD's conveyance system (sanitary sewers greater than or equal to 15" in diameter, force main, and lift stations) and ultimately the FMWRD's wastewater treatment plant (WWTP). Exhibit No. 2-1 provides an overview of the Village's existing sanitary sewer collection system and includes pipe diameters for currently GIS-identified pipes.

2.1.1 Village-Owned Collection and Conveyance System

The Village of Sugar Grove sanitary sewer collection and conveyance system includes sanitary sewers less than 15" in diameter and utilizes six (6) lift stations along with force main to convey wastewater where an unimpeded gravity flow, cost-effective route to one of the WWTPs was not an option. These six (6) lift stations do not include the Patricia Lane Lift Station that was removed as part of the Prairie Glen Subdivision improvements. The collection system service areas, including the areas tributary to each lift station, are depicted in Exhibit No. 2-2. As part of this study, site visits were made to all lift station to gather data and to get a better understanding of the condition of the lift stations. A summary of each of the lift stations is included in Table No. 2-1. All the lift stations are in generally good condition. The lift stations are maintained and rehabilitated as necessary. All the lift stations have onsite backup natural gas or diesel generators.

All sanitary waste within the Village is ultimately tributary to the FMWRD lift station located south of Blackberry Creek across from Bliss Creek Golf Course before it heads through additional

Legend

- SANITARY LIFT STATIONS
- 4" FORCE MAIN
- 6" FORCE MAIN
- 8" FORCE MAIN
- 10" FORCE MAIN
- 12" FORCE MAIN
- UNKOWN SANITARY SEWER
- 6" SANITARY SEWER
- 8" SANITARY SEWER
- 10" SANITARY SEWER
- 12" SANITARY SEWER
- 14" SANITARY SEWER
- 15" SANITARY SEWER
- 16" SANITARY SEWER
- 18" SANITARY SEWER
- 20" SANITARY SEWER
- 24" SANITARY SEWER
- 30" SANITARY SEWER
- 36" SANITARY SEWER

LIFT STATION NO.4 - WINDSTONE

LIFT STATION NO.8 - WALNUT WOODS

LIFT STATION NO.5 - STRAFFORD WOODS

LIFT STATION NO.6 - WHEELER ROAD

SUGAR GROVE LIFT STATION (OWNED AND MAINTAINED BY FMWRD)

LIFT STATION NO.9 - PRAIRIE GLEN

LIFT STATION NO.7 - MALLARD POINT

I-88

Illinois Route 47

Sugar Grove/ Illinois Route 47

Illinois Route 56

United States Highway 30

Bliss

Healy

Tanner

Norris

Jericho

Jericho

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WASTEWATER SYSTEM MASTER PLAN	VILLAGE OF SUGAR GROVE KANE COUNTY, ILLINOIS
EXHIBIT 2-1	**WASTEWATER COLLECTION AND CONVEYANCE SYSTEM MAP**

NORTH

Legend

- SANITARY LIFT STATIONS
- 4" FORCE MAIN
- 6" FORCE MAIN
- 8" FORCE MAIN
- 10" FORCE MAIN
- 12" FORCE MAIN
- UNKOWN SANITARY SEWER
- 6" SANITARY SEWER
- 8" SANITARY SEWER
- 10" SANITARY SEWER
- 12" SANITARY SEWER
- 14" SANITARY SEWER
- 15" SANITARY SEWER
- 16" SANITARY SEWER
- 18" SANITARY SEWER
- 20" SANITARY SEWER
- 24" SANITARY SEWER
- 30" SANITARY SEWER
- 36" SANITARY SEWER

STRAFFORD WOODS LIFT STATION TRIBUTARY AREA

WINDSTONE LIFT STATION TRIBUTARY AREA

WALNUT WOODS LIFT STATION TRIBUTARY AREA

LIFT STATION NO.4 - WINDSTONE

LIFT STATION NO.8 - WALNUT WOODS

LIFT STATION NO.5 - STRAFFORD WOODS

No. 4 Windstone Constructed-1990

No. 8 Walnut Woods Constructed-2002

No. 5 Strafford Woods Constructed-1989

WHEELER ROAD LIFT STATION TRIBUTARY AREA

No. 6 Wheeler Road Constructed-1991

LIFT STATION NO.6 - WHEELER ROAD

Blackberry Creek (Maintained By FMWRD) Constructed-

SUGAR GROVE LIFT STATION (OWNED AND MAINTAINED BY FMWRD)

No. 9 Prairie Glen Constructed-2007

LIFT STATION NO.9 - PRAIRIE GLEN

PRAIRIE GLEN LIFT STATION TRIBUTARY AREA

No. 7 Mallard Point Constructed-1993

MALLARD POINT LIFT STATION TRIBUTARY AREA

LIFT STATION NO.7 - MALLARD POINT

Illinois Route 47

Sugar Grove/ Illinois Route 47

Illinois Route 56

I-88

United States Highway 30

Jericho

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WASTEWATER SYSTEM MASTER PLAN
VILLAGE OF SUGAR GROVE
KANE COUNTY, ILLINOIS

EXHIBIT 2-2
LIFT STATION TRIBUTARY AREAS AND SANITARY SEWER SYSTEM

NORTH

TABLE NO. 2-1: LIFT STATION OVERVIEW

Village of Sugar Grove, IL

Lift Station Name	Connected To SCADA	Candidate For Rehab	Ground Elevation (ft)	Bottom Elevation (ft)	Force Main Size (in)	Force Main Length (Approx.) (ft)	Gravity Sewer Inv. (ft)	Gravity Sewer (in)	Year Constructed	Building	Generator Type	Bypass Capability	Pump Number	Pump Type	Pump Vendor	HP	TDH (ft)	Pump Rating (gpm)	Maintenance
#4 - Windstone	Yes	No	697.5	688.5	8"	1,307	688.73	10"	1990	Yes	Kohler 80 kW Diesel	Yes	1	Submersible	ABS/Sulzer	17.5	69	465	1999 - pumps replaced 2003 - pressure inducer installed
													2	Submersible	ABS/Sulzer	18	69	465	
#5 - Strafford Woods	Yes	No	717.0	689.1	4"	859	696.30	10"	1989	Yes	Kohler 20 kW Diesel	Yes	1	Submersible	ABS/Sulzer	5	37	120	Siding/Roofing rehab completed approx. 2013
													2	Submersible	ABS/Sulzer	5	37	120	
#6 - Wheeler Road	Yes	No	697.5	683.84	6"	871	696.92	14"	1991	No	25 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	3.75	25	180	2018 - complete overhaul of pipe/valves, pumps, and generator
													2	Submersible	ABS/Sulzer	3.75	25	180	
#7 - Mallard Point	Yes	No	678.9	655.8	10"	820	663.7	12"	1993	No	80 kW Kohler Diesel (80ROZJ)	Yes	1	Submersible	ABS/Sulzer	30	57	850	
													2	Submersible	ABS/Sulzer	30	57	850	
#8 - Walnut Woods	Yes	No	707.9	668.9	6"	1,800	674.36	12"	2002	No	45 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	12	48.5	267	Village washes down wet well at each LS 2-3 times per year on average
													2	Submersible	ABS/Sulzer	12	48.5	267	
#9 - Prairie Glen	Yes	No	700.0	668.0	12"	5,798	675.7	14"	2007	Yes	125 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	22.4	66	953	Brick LS Building; Building Maintenance handled as part of annual O&M when/as required (for each LS)
													2	Submersible	ABS/Sulzer	22.4	66	953	

FMWRD interceptor sewers and discharges into the FMWRD Wastewater Treatment Facility on Route 31 in Oswego.

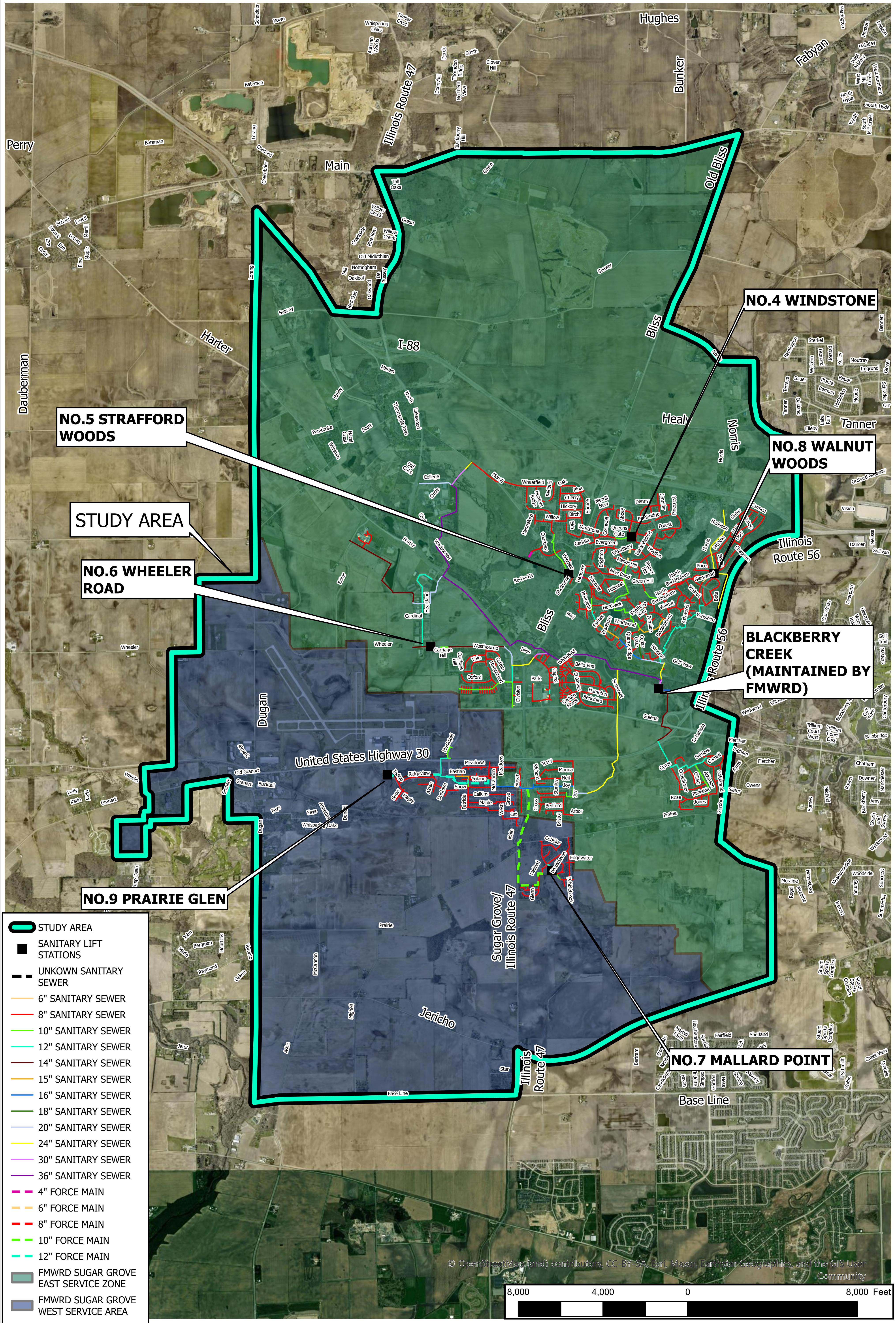
2.1.2 FMWRD System and Sugar Grove Service Areas

FMWRD performs master planning for its full service area to better understand the needs of the various communities and to identify major intercept routes and sizes as well as any necessary lift stations. For the Sugar Grove, FMWRD has established two (2) service areas: Sugar Grove West Service Area and Sugar Grove East Service Area. These service areas are depicted on Exhibits 2-3 and 2-4.

Per Exhibit 2-4 that was prepared by and provided to the Village by FMWRD, the Sugar Grove West Service Area is anticipated to be serviced by a future interceptor along Dugan Road which heads south to approximately Jericho Road and then heads east to a future FMWRD regional lift station just east of IL-47, ultimately continuing to flow east and south to the FMWRD Wastewater Treatment Facility on Route 31 in Oswego. The Sugar Grove East Service Area is generally tributary to FMWRD's North Aurora Interceptor (refer to Appendix A, page 2).

Given the significant investment that is required to construct the interceptor sewer along Dugan Road and then to the east and south for the Sugar Grove West Service Area, the Village currently utilizes lift stations to pump wastewater flow that exists in the Sugar Grove West Service Area over to the Sugar Grove East Service Area. The Prairie Glen Lift Station services the downtown area and Prairie Glen Subdivision while Mallard Point Lift Station service Mallard Point and Rolling Oaks Subdivisions.

Furthermore, it should be noted that to obtain service from FMWRD, the owner of the property must work through the annexation process with FMWRD and then pay both Annexation and Infrastructure fees that currently range from $7,045 to $9,085 per acre. Figure 2-1 is an excerpt from the FMWRD Annexation Boundaries and Sewer System Map that outlines the current annexation boundaries of FMWRD. All areas in orange on the map are annexed to FMWRD.



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WASTEWATER SYSTEM MASTER PLAN

EXHIBIT 2-3
FMWD - SUGAR GROVE SERVICE AREAS

NORTH

EXHIBIT 2-4: FMWRD SUGAR GROVE SERVICE AREAS

(Prepared and Provided by FMWRD)

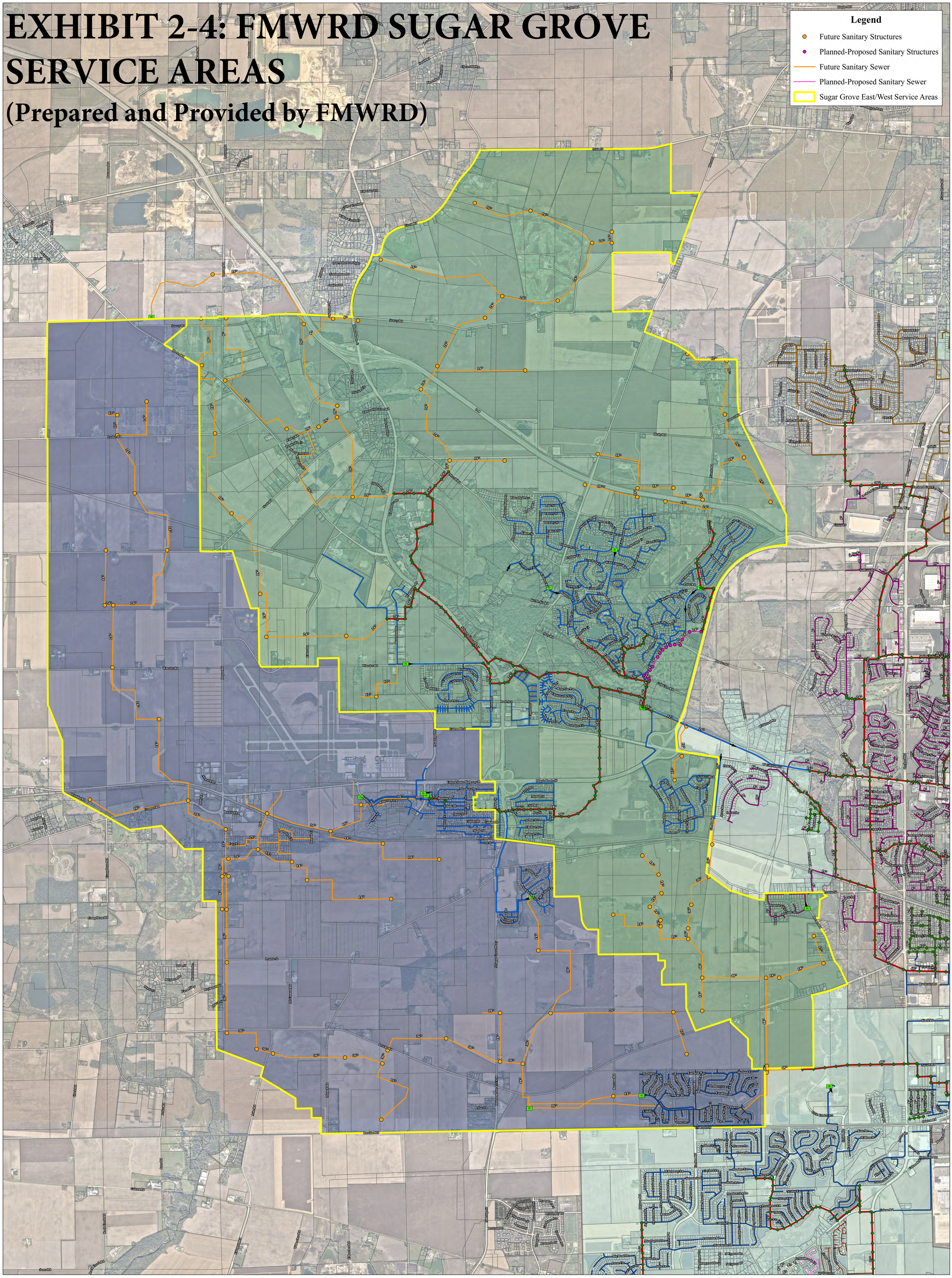
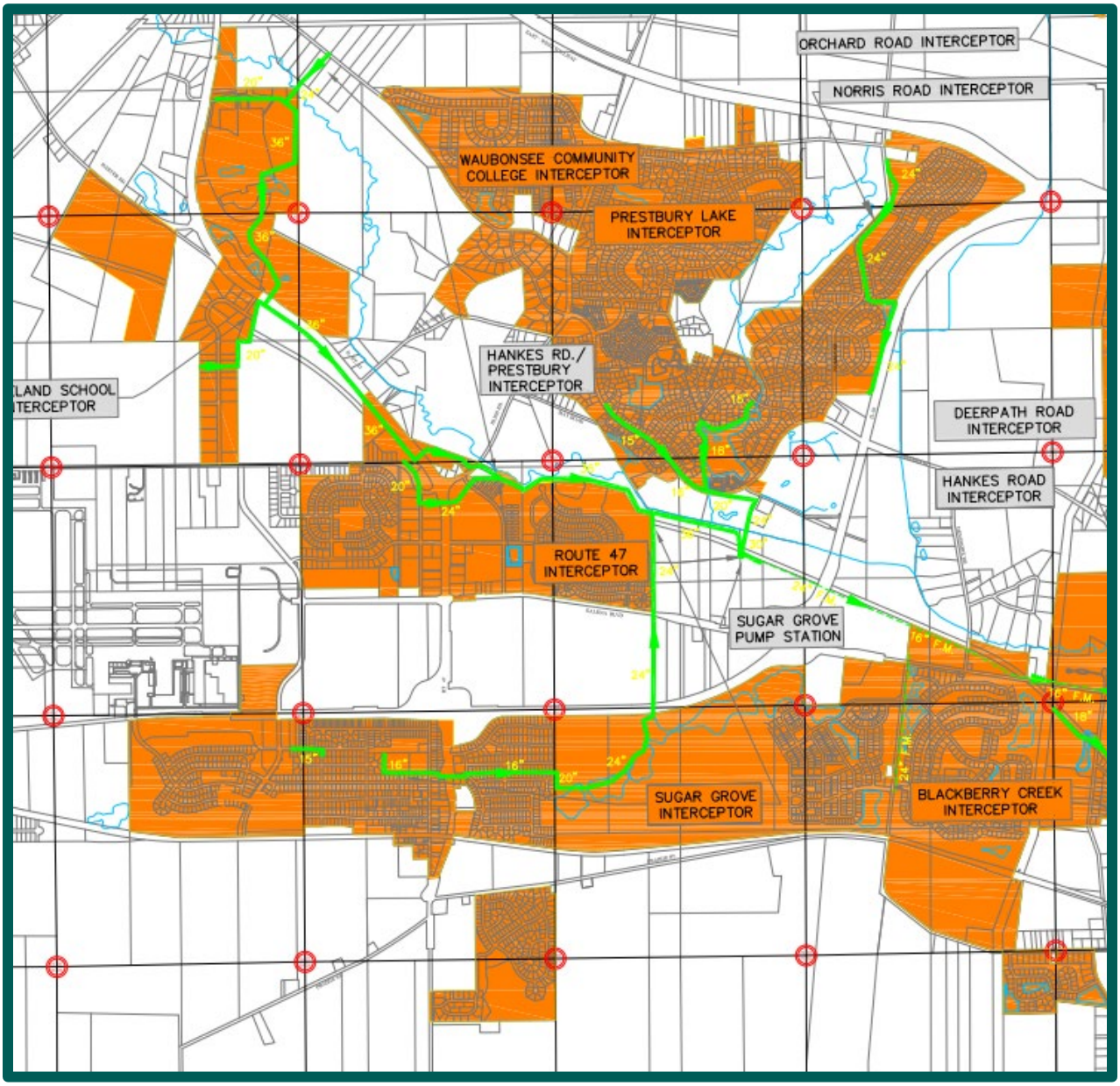


Figure 2-1. FMWRD Annexation Boundaries and Sewer System Map



Source: https://www.foxmetro.org/wp-content/uploads/2019/05/BoundaryMap-2019-05.pdf

Note: All areas in orange on the map are annexed to FMWRD.

2.2 GIS Conversion and Available Information

Prior to this study, the Village maintained the wastewater collection and conveyance map information in paper and computer aided design (CAD) formats. As part of this project, the Village's wastewater collection and conveyance system was converted into GIS. The existing CAD-based sanitary system atlas map was utilized as the base information for the conversion. Then subdivision plans, engineering drawings, and utility locate mark-ups were compiled to review and adjust the locations accordingly. Various meetings with Village staff were had to refine the information as well. The 1996 Wastewater Collection Treatment Plan Analysis and Recommendations was also reviewed to obtain any additional insights. Then, Kane County GIS base map information was also utilized. A major advantage of converting the maps to GIS is that additional "smart" information can be associated with the pipes shown on the map such as installation year, pipe material, pictures, etc. Therefore, as part of this project, some additional information beyond pipe diameter was gathered and added to the newly developed GIS database. As a result, the following exhibits were prepared to illustrate some of the information that was gathered:

- Exhibit 2-5. Sanitary Sewer System by Installation Decade
- Exhibit 2-6. Sanitary Sewer System by Material Type
- Exhibit 2-7. Overall Basin Summary
- Exhibit 2-8. Subdivision Map

The information on these maps are based on the best information available at this time given the resources mentioned in this section. For pipe installation decade, the subdivision map (Exhibit 2-8) was prepared in GIS to better understand the approximate age of the improvements based on plats and engineering plans as well as to help determine the material type. Once a baseline of best assumptions was determined for age and material type, then the information was reviewed by Village staff who have decades of experience with the Village. Village staff were able to integrate their institutional knowledge. The Overall Basin Map (Exhibit 2-7) was developed for potential future flow monitoring and Sanitary Sewer Evaluation Survey work. As the sanitary sewer system ages, infiltration and inflow (I/I) can increase. This map assists in breaking the system into manageable areas to study and possibly attack if that begins to occur.

Legend

- Sanitary Lift Station
- Sanitary Sewer

Force Main Year Install
- Unknown
- 1980-1989
- 1990-1999
- 2000-2009

Sewer Year Install
- 1970-1979
- 1980-1989
- 1990-1999
- 2000-2009
- 2010-2019
- Unknown

LIFT STATION NO.4 - WINDSTONE

LIFT STATION NO.8 - WALNUT WOODS

LIFT STATION NO.5 - STRAFFORD WOODS

No. 4 Windstone Constructed-1990

No. 8 Walnut Woods Constructed-2002

No. 5 Strafford Woods Constructed-1989

No. 6 Wheeler Road Constructed-1991

LIFT STATION NO.6 - WHEELER ROAD

Blackberry Creek (Maintained By FMWRD) Constructed-

SUGAR GROVE LIFT STATION (OWNED AND MAINTAINED BY FMWRD)

No. 9 Prairie Glen Constructed-2007

LIFT STATION NO.9 - PRAIRIE GLEN

No. 7 Mallard Point Constructed-1993

LIFT STATION NO.7 - MALLARD POINT

Illinois Route 47

Sugar Grove/ Illinois Route 47

Illinois Route 56

United States Highway 30

I-88

Bliss

Healy

Tanner

Norris

Jericho

NOTE: MATERIAL TYPE WAS DETERMINED BY BEST AVAILABLE INFO.

Engineering Enterprises, Inc.
52 Wheeler Road
Sugar Grove, Illinois 60554
(630) 466-6700
www.eeiweb.com

VILLAGE OF SUGAR GROVE
160 Municipal Drive
Sugar Grove, IL 60554

NO.	DATE	REVISIONS
1		
2		
3		
4		

DATE: APRIL 2024
PROJECT NO.: SG2108
BY: MJT
PATH:
FILE:

WASTEWATER SYSTEM MASTER PLAN
VILLAGE OF SUGAR GROVE
KANE COUNTY, ILLINOIS

EXHIBIT 2-5
SANITARY SEWER SYSTEM BY INSTALLATION DECADE

NORTH

Legend

- Sanitary Lift Stations
- Sanitary Manholes

Force Main Material

- Unknown Force Main
- PVC

Sanitary Sewer Material

- Unknown
- DIP
- PVC
- RCSP
- VCP

LIFT STATION NO.4 - WINDSTONE

LIFT STATION NO.8 - WALNUT WOODS

LIFT STATION NO.5 - STRAFFORD WOODS

No. 4 Windstone Constructed-1990

No. 8 Walnut Woods Constructed-2002

No. 5 Strafford Woods Constructed-1989

No. 6 Wheeler Road Constructed-1991

LIFT STATION NO.6 - WHEELER ROAD

Blackberry Creek (Maintained By FMWRD) Constructed-

SUGAR GROVE LIFT STATION (OWNED AND MAINTAINED BY FMWRD)

No. 9 Prairie Glen Constructed-2007

LIFT STATION NO.9 - PRAIRIE GLEN

No. 7 Mallard Point Constructed-1993

LIFT STATION NO.7 - MALLARD POINT

Illinois Route 47

Sugar Grove/ Illinois Route 47

Illinois Route 56

I-88

Bliss

Healy

Tanner

Norris

Harter

United States Highway 30

Jericho

NOTE: MATERIAL TYPE WAS DETERMINED BY BEST AVAILABLE INFO.

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VILLAGE OF SUGAR GROVE
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PATH:
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WASTEWATER SYSTEM MASTER PLAN
VILLAGE OF SUGAR GROVE
KANE COUNTY, ILLINOIS

EXHIBIT 2-6
SANITARY SEWER SYSTEM BY MATERIAL TYPE

NORTH

Legend

- SANITARY LIFT STATIONS
- 4" FORCE MAIN
- 6" FORCE MAIN
- 8" FORCE MAIN
- 10" FORCE MAIN
- 12" FORCE MAIN
- UNKOWN SANITARY SEWER
- 6" SANITARY SEWER
- 8" SANITARY SEWER
- 10" SANITARY SEWER
- 12" SANITARY SEWER
- 14" SANITARY SEWER
- 15" SANITARY SEWER
- 16" SANITARY SEWER
- 18" SANITARY SEWER
- 20" SANITARY SEWER
- 24" SANITARY SEWER
- 30" SANITARY SEWER
- 36" SANITARY SEWER

Basin S
Sanitary Sewer Total = 13,225 LF

Basin R
Sanitary Sewer Total = 10,528 LF

Basin Q
Sanitary Sewer Total = 15,626 LF
Force Main Total = 854 LF

LIFT STATION NO.4 - WINDSTONE

Basin V
Sanitary Sewer Total = 19,250 LF

Basin U
Sanitary Sewer Total = 15,382 LF
Force Main Total = 1,342 LF

Basin Z
Sanitary Sewer Total = 13,566 LF

LIFT STATION NO.8 - WALNUT WOODS

Basin T
Sanitary Sewer Total = 15,385 LF

LIFT STATION NO.5 - STRAFFORD WOODS

Basin V
Sanitary Sewer Total = 19,250 LF

Basin W
Sanitary Sewer Total = 10,005 LF

Basin J
Sanitary Sewer Total = 11,177 LF

Basin O
Sanitary Sewer Total = 7,805 LF

Basin N
Sanitary Sewer Total = 9,859 LF
Force Main Total = 854 LF

Basin Y
Sanitary Sewer Total = 5,924 LF

Basin X
Sanitary Sewer Total = 15,392 LF

LIFT STATION NO.6 - WHEELER ROAD

Basin M
Sanitary Sewer Total = 8,565 LF

Basin H
Sanitary Sewer Total = 8,341 LF

Basin L
Sanitary Sewer Total = 10,870 LF

SUGAR GROVE LIFT STATION (OWNED AND MAINTAINED BY FMWRD)

Basin K
Sanitary Sewer Total = 8,864 LF

Basin N
Sanitary Sewer Total = 9,859 LF
Force Main Total = 854 LF

Basin F
Sanitary Sewer Total = 12,684 LF

LIFT STATION NO.9 - PRAIRIE GLEN

Basin A
Sanitary Sewer Total = 12,554 LF
Force Main Total = 3,354 LF10,902 LF

Basin D
Sanitary Sewer Total = 14,987 LF
Force Main Total = 1,240 LFF

Basin B
Sanitary Sewer Total = 12,709 LF
Force Main Total = 3,445 LF

Basin G
Sanitary Sewer Total = 9,123 LF

Basin C
Sanitary Sewer Total = 10,902 LF

LIFT STATION NO.7 - MALLARD

Basin E
Sanitary Sewer Total = 13,295 LF
Force Main Total= 5,725 LF

I-88
Illinois Rd
Sugar Grove/ Illinois Route 47
United States Highway 30
Healy
Norris
Jericho

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DATE: APRIL 2024
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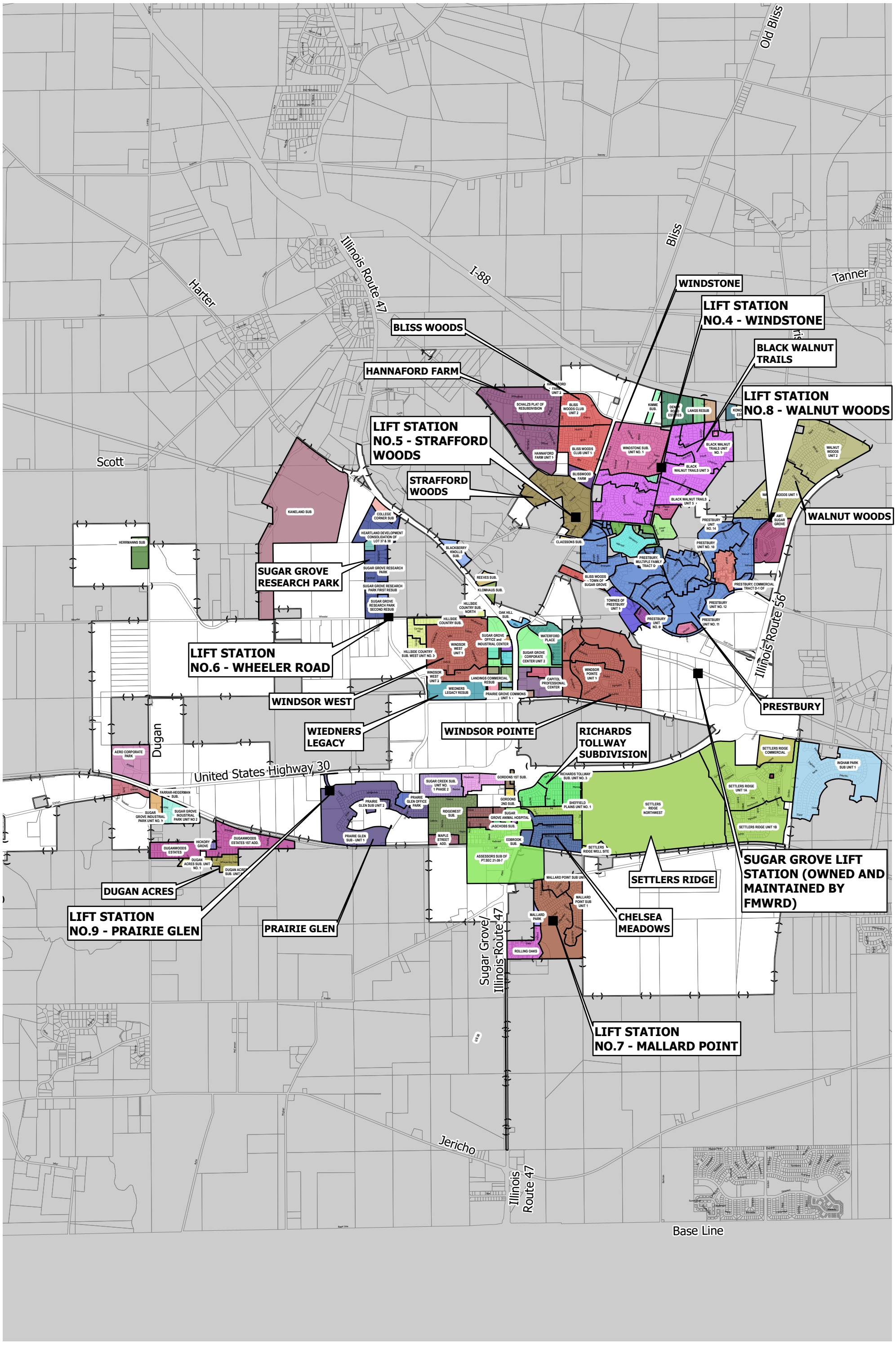
PATH:
FILE:

WASTEWATER SYSTEM MASTER PLAN
VILLAGE OF SUGAR GROVE
KANE COUNTY, ILLINOIS

EXHIBIT 2-7
OVERALL BASIN SUMMARY

NORTH



Engineering Enterprises, Inc. 52 Wheeler Road Sugar Grove, Illinois 60554 (630) 466-6700 www.eeiweb.com	**VILLAGE OF SUGAR GROVE** 160 Municipal Drive Sugar Grove, IL 60554	**WASTEWATER SYSTEM MASTER PLAN** VILLAGE OF SUGAR GROVE KANE COUNTY, ILLINOIS
NO. / DATE / REVISIONS 1 2 3 4	DATE: APRIL 2024 PROJECT NO.: SG2169 BY: MJT PATH: FILE:	**EXHIBIT 2-8** **SUBDIVISION MAP**

NORTH

3 FMWRD Coordination and Capacity Analysis

Given the Village's wastewater flows ultimately drain to FMWRD owned interceptor sewers, regional lift stations, and Wastewater Treatment Facility (WWTF), it is essential for the Village to understand any limitations/restrictions or triggers for significant downstream improvements. In 2021, Engineering Enterprises, Inc. engaged FMWRD in discussions regarding anticipated downstream limitations and restrictions. Subsequently, FMWRD hired Fehr Graham Engineering Environmental to place flow monitors at critical points within the Sugar Grove interceptor sewers to perform capacity analysis. Due to the optimal seasonal timing for flow monitoring, the draft report was not issued until November 28, 2022. At that time, FMWRD had several questions regarding the report and believed additional analysis was warranted. Subsequently, FMWRD contracted with Strand Associates, Inc.® to perform the additional analysis. This capacity analysis (*Report for Fox Metro Water Reclamation District, Illinois, Village of Sugar Grove Service Area Planning* prepared by Strand Associates, Inc.® and dated 3/24/23) is included in Appendix A.

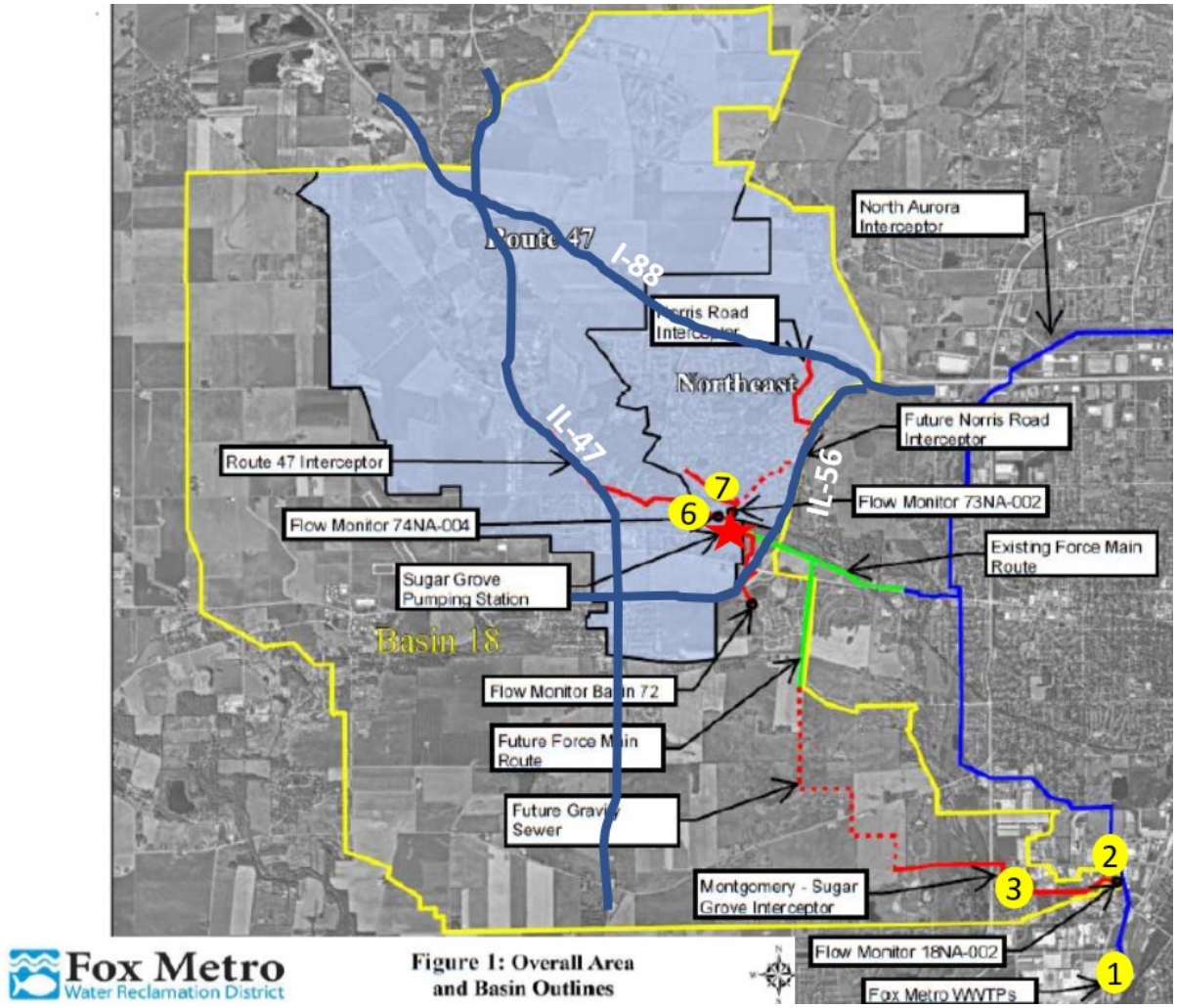
To summarize the analysis, seven (7) critical points were reviewed with FMWRD's collection and conveyance system for Sugar Grove which include the following:

1. Wastewater Treatment Facility
2. North Aurora Interceptor
3. Montgomery-Sugar Grove Interceptor
4. Sugar Grove Pumping Station
5. Force Main – Sugar Grove Pumping Station
6. Route 47 Interceptor
7. Norris Road Interceptor

Figure 3-1 shows the locations of these critical points. (This figure is an excerpt from Strand's report with some additional labeling added by EEI for clarity.)

We will defer the details of the analysis to the report in Appendix A; however, the most significant capacity limitation is at the Sugar Grove Pump Station. This is the lift station located along the south side of Blackberry Creek, just west of the Galena Road exit of IL-56. Under current conditions that includes a total Sugar Grove and Prestbury population of 11,666 residents, the Sugar Grove Pump Station can support an additional 3,600 population equivalent (PE). However, the pump station was designed with adequate space to install an additional population 10,300 PE which equates to a total additional population of 13,900 PE (3,600 PE +10,300 PE). Due to planning, permitting, and lead times of equipment, such an improvement will require notification and coordination with FMWRD a minimum of two (2) years prior to when it is needed. Beyond the additional pump, FMWRD has long-term planning that includes an expanded replacement pump station that will service up to an additional 29,000 PE for a total additional 42,900 PE (13,900 PE

Figure 3-1. Overall Area and Basin Outlines (FMWRD Capacity Analysis)



Source: *Report for Fox Metro Water Reclamation District, Illinois, Village of Sugar Grove Service Area Planning* prepared by Strand Associates, Inc.® and dated 3/24/23

Legend:

1. Wastewater Treatment Facility
2. North Aurora Interceptor
3. Montgomery-Sugar Grove Interceptor
4. Sugar Grove Pumping Station ★
5. Force Main – Sugar Grove Pumping Station ★
6. Route 47 Interceptor
7. Norris Road Interceptor

+ 29,000 PE). Several years of planning will be required to plan, fund, and complete this project.

A second major capacity limitation noted in the report is at the FMWRD WWTF which will also need to be expanded beyond an additional 27,700 PE. However, this additional population is for FMWRD's full service area, not just the Sugar Grove Service Area.

Based on the CMAP 2050 projections, the Village anticipates an additional approximately 8,850 people by 2050. This additional population will require the additional pump to be installed at the Sugar Grove Pump Station during this period, and it is unknown whether the WWTF will need to be expanded as the projected population for the full service area for FMWRD On-going communication between the Village and FMWRD is necessary to continue to understand how this capacity changes over time such that the expansion can be planned and constructed in time for any projected development within the Village.

Furthermore, based on discussions with FMWRD staff, all improvements to this lift station and FMWRD interceptors are intended to be funded through the infrastructure/connection fees collected by FMWRD whether it is providing an additional pump at the Sugar Grove Pump Station or completely replacing the Sugar Grove Pump Station. However, considerable coordination with FMWRD will be required by the Village to develop creative funding mechanisms when the amount of development does not support the costs associated with major projects in a timely manner. These major projects may include projects such as the Sugar Grove Pump Station Replacement or the future Montgomery-Sugar Grove Interceptor and associated pump station.

4 Findings and Recommendations

Through this study and coordination with FMWRD, an understanding of capacity restrictions downstream of the Village system was obtained. Furthermore, the Village has invested in its future by laying an electronic storage foundation for future operation and maintenance of the Village's collection and conveyance system. Subsequently, the following findings/ recommendations shall be noted:

1. We recommend the Village engage in regular meetings and/or communications with FMWRD to discuss potential upcoming developments as well as any on-going maintenance items that might affect the Village. It is our understanding that Public Works has regularly scheduled meetings currently.

2. From a FMWRD perspective, the most significant restriction to future development is the Sugar Grove Pump Station which is owned, operated, and maintained by FMWRD. Upon an additional 3,600 PE being added to the system, an additional pump at Sugar Grove Pump Station will be required, and it requires a minimum of two (2) years of planning. The timing of this pump should be an on-going discussion at the regular meetings with FMWRD.

3. This plan only outlines the major interceptor sewers provided by FMWRD. Please note that the smaller, local planning areas need to be evaluated on a case-by-case basis to evaluate the following:

a. Minimizing and eliminating existing and proposed lift stations.

b. Understanding that any development that occurs in the Sugar Grove West Service Area is taking capacity away from the Sugar Grove East Area which will trigger the need for an additional pump at the Sugar Grove Pump Station as well as take away capacity from the interceptor that runs through Settlers Ridge. Any potential development occurring in the Sugar Grove West Service Area will be a policy decision as to whether or not the Village wants to utilize the capacity in the Sugar Grove Service East Area for such development.

4. The Village has established a foundation for its Wastewater Collection and Conveyance System in GIS. As additional or better information is obtained, we recommend the Village update the GIS maps routinely. We also recommend setting up processes for revisions to be in GIS accordingly.

This Wastewater System Master Plan offers a foundation for planning efforts in regard to the wastewater infrastructure. We recommend the Village continue to build a strong, collaborative relationship with FMWRD and continue to monitor and be aware of capacity restrictions as development occurs.

APPENDIX A

Report for

Fox Metro Water Reclamation District, Illinois

Village of Sugar Grove Service Area Planning

Prepared by:

STRAND ASSOCIATES, INC.®
IDFPR No. 184-001273
1170 South Houbolt Road
Joliet, IL 60431
www.strand.com

March 2023

STRAND ASSOCIATES®
Excellence in Engineering
Since 1946

TABLE OF CONTENTS

The Fox Metro Water Reclamation District (District) provides wastewater conveyance and treatment services to the City of Aurora, Boulder Hill, portions of the Cities of Batavia and Yorkville, and the Villages of Montgomery, North Aurora, Oswego, and Sugar Grove. The District was approached by the Village of Sugar Grove (Village) inquiring about the amount of Village growth the District's infrastructure can accommodate in both the near and long term. In response to this inquiry, the District retained the services of another consultant to perform an analysis of District infrastructure and provide guidance to the Village, which was summarized in a memorandum dated November 28, 2022 (2022 Memo).

Subsequently, the District requested Strand Associates, Inc.® (Strand) perform a secondary review of the 2022 Memo. During Strand's review, inaccuracies were identified, and potentially impacted infrastructure was omitted from the analysis. As a result, the District requested Strand perform an independent analysis of the Sugar Grove Service Area. The remainder of this brief report provides a summary of the results of this analysis.

The following methodology was used as part of the analysis:

1. Spare capacity of interceptor sewers was calculated assuming 80 percent full pipe flow during peak flow conditions, which is appropriate for a planning-level analysis.

2. Theoretical peaking factors were used to estimate future peak flows using the following equation, which can be found in Appendix D of Part 370 of Title 35 of the Illinois Administrative Code (IAC), where P is future population in thousands:

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

INTRODUCTION

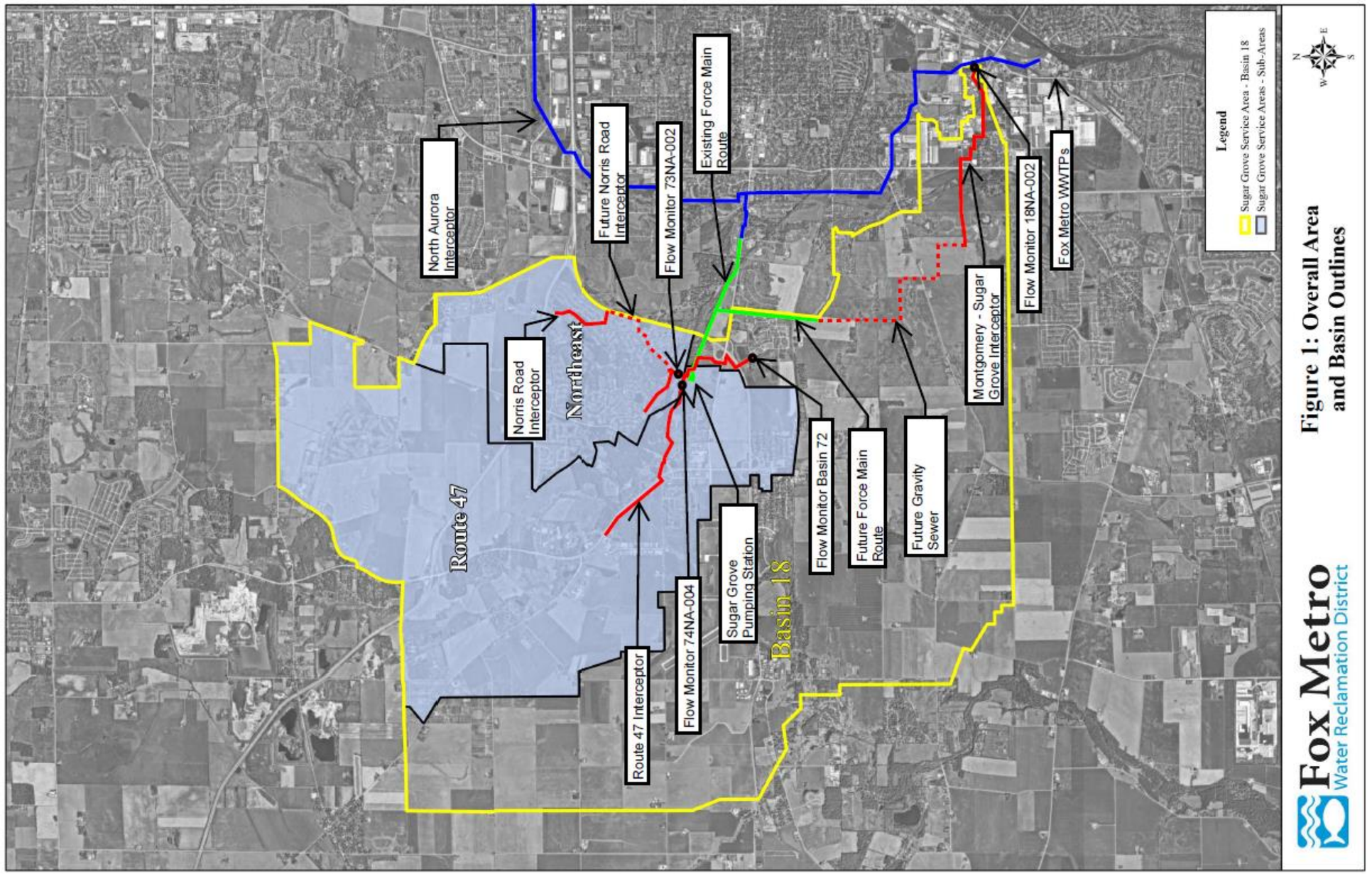
Growth in the Village is anticipated to impact the following District infrastructure:

1. Wastewater treatment plant (WWTP)
2. North Aurora Interceptor
3. Montgomery–Sugar Grove Interceptor
4. Sugar Grove Pumping Station and Force Main
5. Route 47 Interceptor
6. Norris Road Interceptor

The Village is located within the District's Basin 18, which is shown in Figure 1. The basin boundaries represent the planned ultimate build out of the Sugar Grove Service Area. According to the 2022 Memo, there is approximately 19,600 acres of developable land, as shown in Figure 2. Figures 1 and 2 were included in the 2022 Memo and are being repurposed for this report.

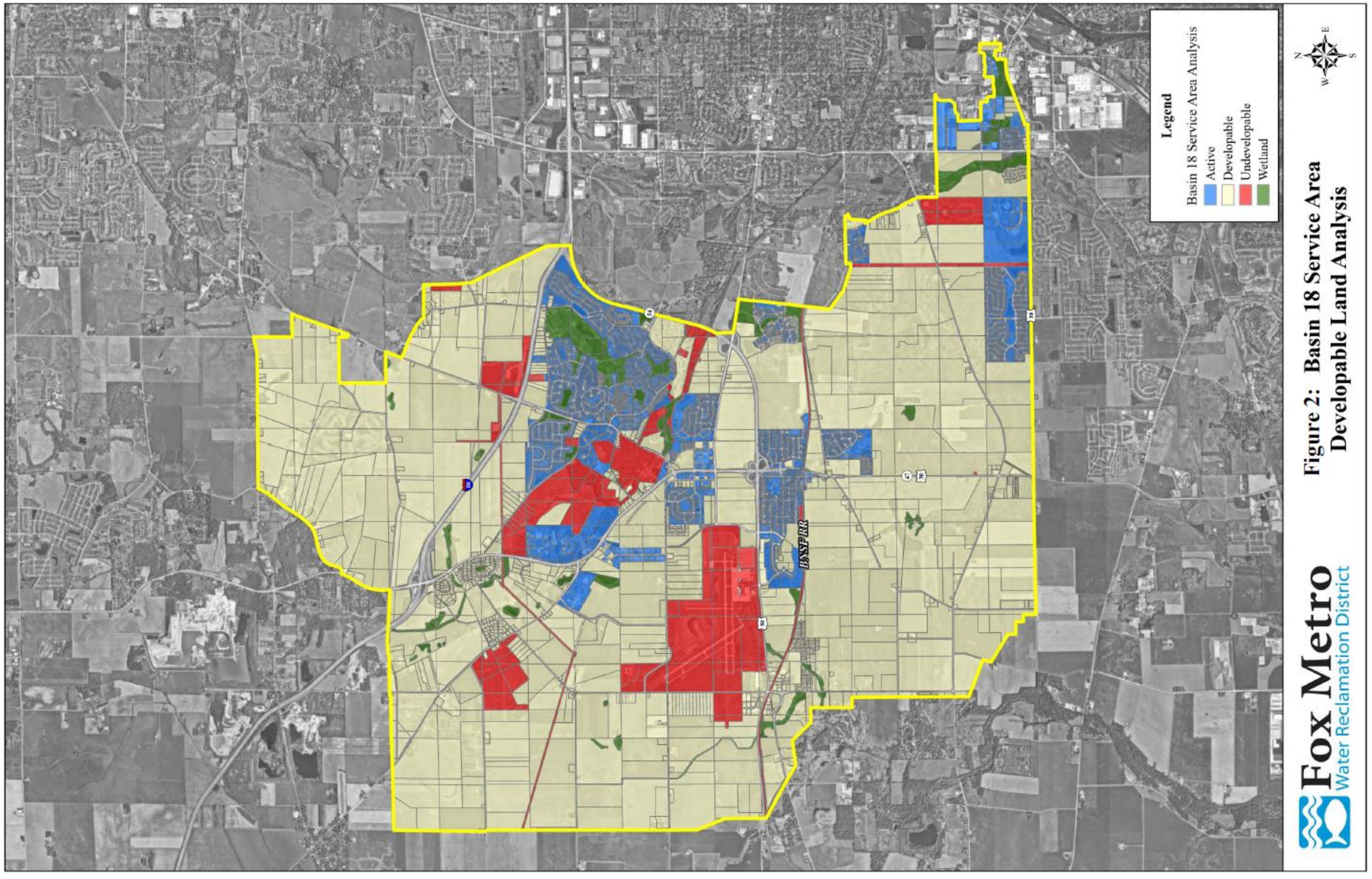
The extents of Basin 18 are well beyond the current Village and District limits. As a result, any development beyond the existing limits of the Village and District would need to be annexed into the District to be served.

Figure 1 Overall Area and Basin Outlines



Source: Fox Metro Water Reclamation District

Figure 2 Basin 18 Service Area Development Land Analysis



Source: Fox Metro Water Reclamation District

Two subareas are highlighted in Figure 1 as well. The Route 47 Subarea represents the areas tributary to the Route 47 Interceptor. The Northeast Subarea represents the areas tributary to the Norris Road Interceptor. The amount of developable land in the Route 47 and Northeast Subbasins is 7,000 and 1,100 acres, respectively, according to the 2022 Memo. Both subareas are also tributary to the Sugar Grove Pumping Station. This is discussed in more detail later in this report.

EXISTING VILLAGE FLOWS

Four flow monitors were installed from early August 2022 to late September 2022 to quantify existing flows within the Village. Figures 3 and 4 show the locations where the flow monitors were installed. Table 1 summarizes each flow monitoring location and its service area.

Flow Monitor	Pipe Size (inches)	Service Area	Notes
73NA-002	24	Northeast Subarea	Tributary to the Sugar Grove Pumping Station, which discharges to the North Aurora Interceptor.
74NA-004	36	Route 47 Subarea and remaining portions of the Village limits along Route 47	Tributary to the Sugar Grove Pumping Station, which discharges to the North Aurora Interceptor.
Basin 72	12	Settler's Ridge Subdivision	Tributary to the Sugar Grove Pumping Station, which discharges to the North Aurora Interceptor.
18NA-002	48	Basin 18	Gravity discharges to the North Aurora Interceptor downstream of the current Sugar Grove Pumping Station Force Main.

Table 1 Village Flow Monitoring Locations

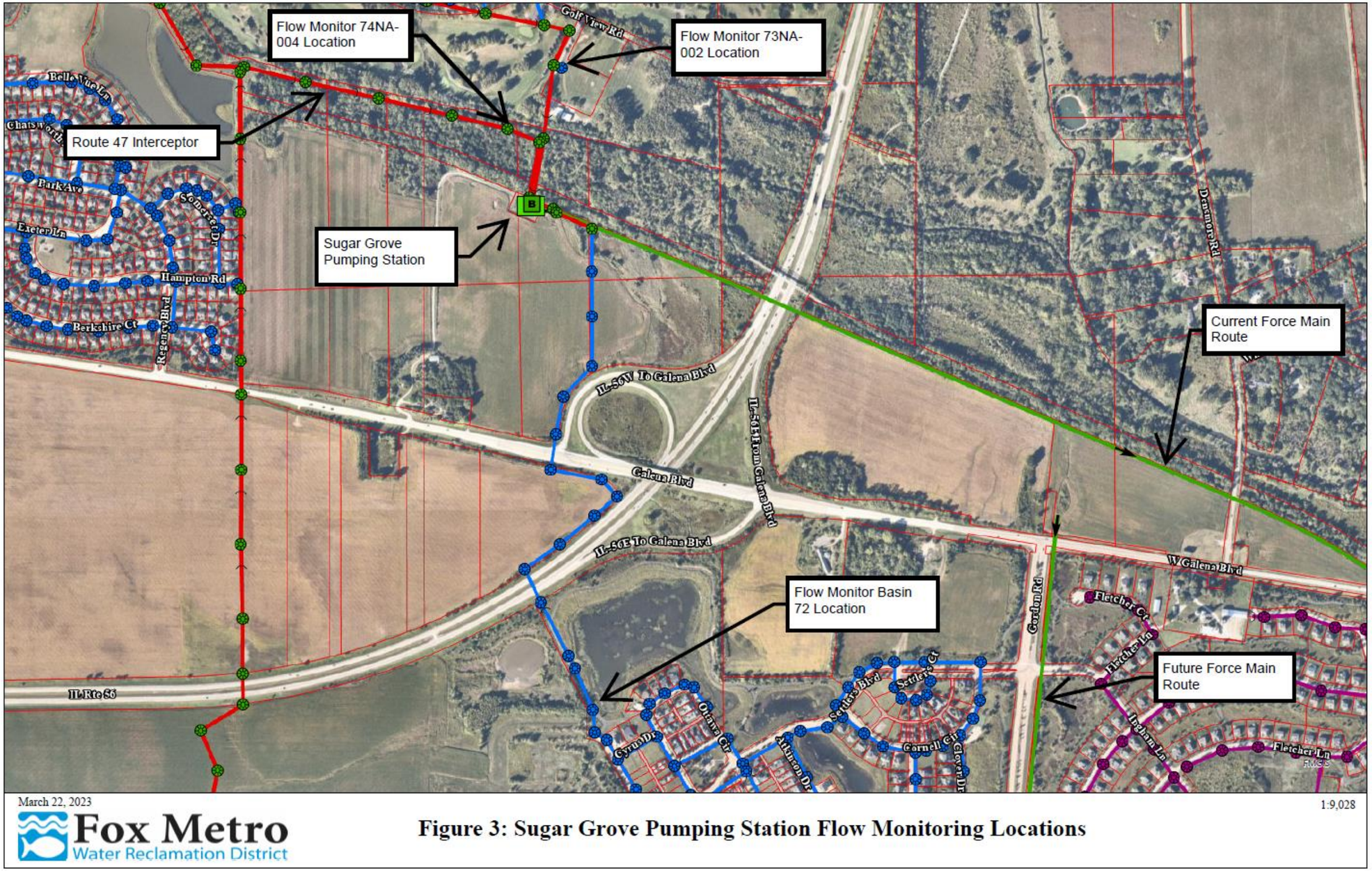
A summary of the flow metering data is provided in Table 2.

Flow Monitor	Average Flow Rate (gpm)	Peak Flow Rate (gpm)	Peak Flow Rate (MGD)
73NA-002	400	2,153	3.10
74NA-004	252	525	0.76
Basin 72	26	237	0.34
18NA-002	97	195	0.28
Totals	**775**	**3,110**	**4.48**

Notes:
gpm=gallons per minute
MGD=million gallons per day

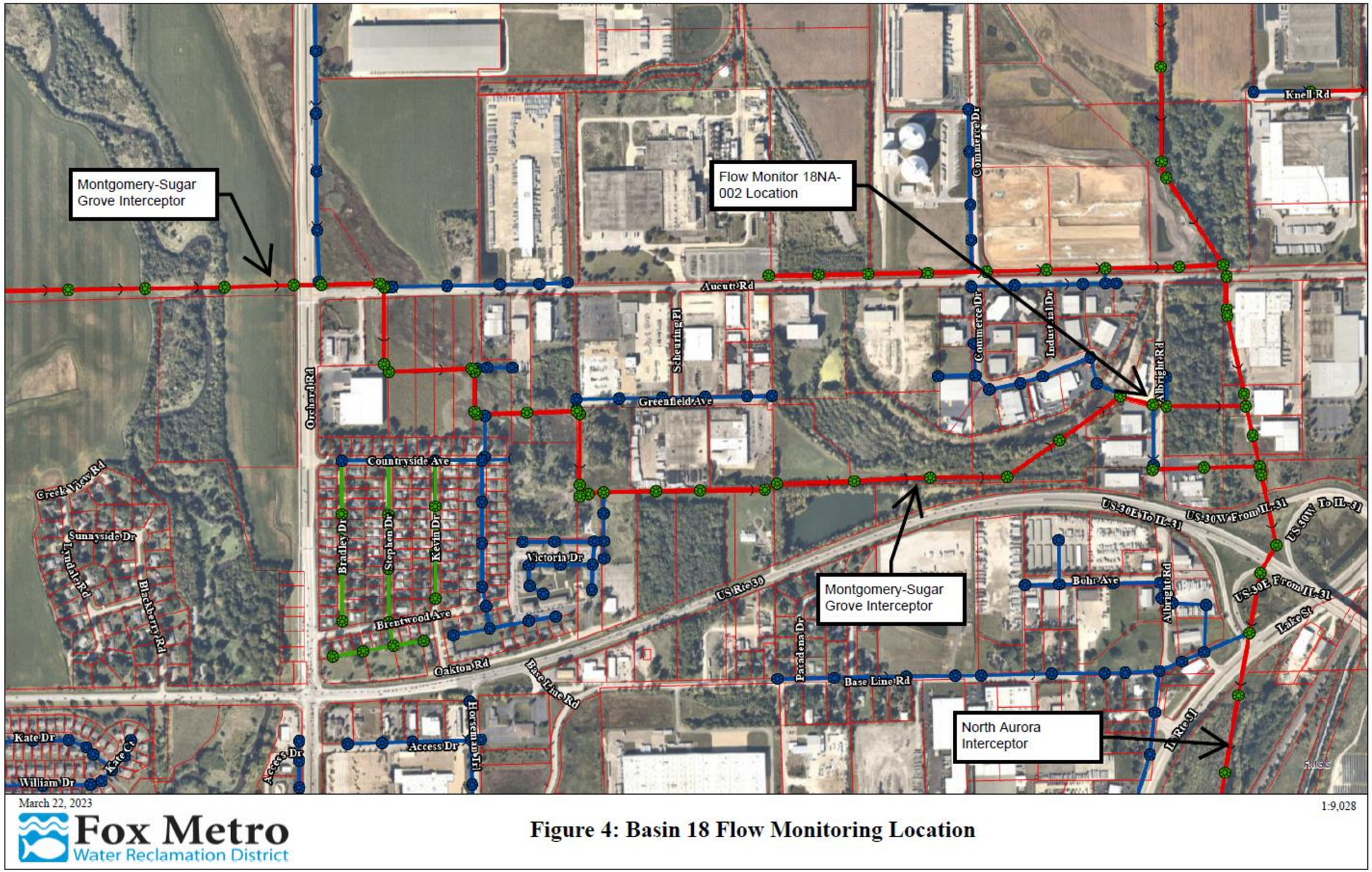
Table 2 Existing Village Flow Rates

Figure 3 Sugar Grove Pumping Station Flow Monitoring Locations



Source: Fox Metro Water Reclamation District

Figure 4 Basin 18 Flow Monitoring Location



Source: Fox Metro Water Reclamation District

The flow monitoring period was mostly dry. However, the peak flow rates in Table 2 represents a significant wet weather event that occurred toward the end of August resulting in a wet weather response and an increase in flows. The cumulative flows from these four flow monitors represents the total existing flow from the Village. Comparing total peak flow and dividing by total average flow indicates the Village has an existing peaking factor of approximately four.

CAPACITY ANALYSIS

A cursory review of the available hydraulic capacity associated with each piece of previously discussed District infrastructure is discussed further in the following. These analyses were based on readily available data consisting of existing flow metering data and data summarized in the District's draft *Master Plan Update* from 2020. These analyses are intended to only be planning level and, as a result, additional investigations and more detailed reviews may be appropriate as development projects become known.

A. WWTP

The District owns and operates one regional treatment facility consisting of two treatment trains, the North WWTP and the South WWTP. The rated hydraulic capacity of each WWTP is listed in Table 3.

Wastewater Flow	North WWTP	South WWTP
DAF (MGD)	36	6
DMF (MGD)	85	12
PHF (MGD)	139	12

Notes:
DAF=Design Average Flow
DMF=Design Maximum Flow
PHF=Peak Hourly Flow

Table 3 WWTP Rated Capacities

Table 4 summarizes existing flows at each WWTP as of 2018, according to the draft 2022 *Master Plan Update* provided by the District.

Flow	North WWTP	South WWTP	Total
Annual Average (MGD)	34.16	2.33	36.49

Table 4 WWTP Current Flow Rates

It is important to note the following:

1. The most readily available flow data is through 2018. More recent data should be used if a more detailed analysis is required to assess impacts associated with a specific development project.

2. Only flow is being analyzed for the purposes of this analysis. Current and future loadings should also be evaluated during a more detailed review of the available capacity at the WWTPs to accommodate specific development projects.

3. There are five interceptors conveying flows to the North WWTP, including the North Aurora Interceptor serving the Village, the Original Combined Sewer Interceptor, the Boulder Hill Interceptor, the Caterpillar Interceptor, and the Waubonsie Interceptor. A sixth interceptor, the Oswego Interceptor, conveys flow to the South WWTP. There is a diversion structure on the Waubonsie Interceptor that allows a portion of its flow to be redirected and treated at the South WWTP. As a result, the District is able to maximize flow to the South WWTP to free up capacity at the North WWTP.

Based on the information summarized previously, there appears to be approximately 5.51 MGD of combined available capacity at the North and South WWTPs to accommodate growth from all the communities served by the District. The District is in the early stages of planning for the next phase of the South WWTP expansion, which would double its DAF capacity from 6 to 12 MGD. This expansion will likely be needed regardless of future growth in the Village. For the purposes of this analysis, it is assumed enough flow can be diverted from the Waubonsie Interceptor to the South WWTP to free up capacity at the North WWTP to accommodate growth in the Village. This increases the available combined capacity at the District's North and South WWTPs to 11.51 MGD.

Table 5 summarizes the existing estimated population served by each of the interceptors tributary to the District's WWTPs. Table 5 also shows the projected 2050 service population used to determine the anticipated population increase within the District's service area. This information comes from the draft 2020 *Master Plan Update* and is based on Chicago Metropolitan Agency for Planning's (CMAP) population projections. It should be noted the Caterpillar Interceptor is dedicated to the original Caterpillar property located west of the District's WWTPs. As a result, current flows in this interceptor are industrial in nature related to the operation of the facility (rather than residential like most flow at the District's WWTPs). However, there has been an increase in interest in the Caterpillar property and the areas immediately surrounding it for potential redevelopment. Initial discussions suggest flows tributary to the Caterpillar Interceptor will increase by approximately 750,000 gallons per day (gpd), as indicated in Table 5.

Interceptor Service Area	2020 CMAP Population	2050 Projected Population	Anticipated Population Increase	Tributary WWTP	Anticipated Additional Average Daily Flow (MGD)
North Aurora Interceptor	69,348	111,088	41,740	North	4.17
Boulder Hill Interceptor	2,928	3,197	269	North	0.03
Caterpillar Interceptor	N/A	N/A	N/A	North	0.75
Original Combined Interceptor	102,102	120,572	18,470	North	1.85
Waubonsie Interceptor	106,846	134,552	27,706	Both	2.77
Oswego Interceptor	38,467	66,514	28,047	South	2.80
Total	**319,691**	**435,923**	**116,232**		**12.37**

Table 5 2050 Projected Population and Annual Average Flow Rates

To determine how the anticipated population increase affects the District's available WWTP capacity, Illinois Environmental Protection Agency (IEPA) design requirements were applied for determination of future flows. These design requirements indicate average flow shall be based on 100 gallons per capita per day. The resulting anticipated average daily flow to each of the District's interceptors and the anticipated increase to the WWTPs is approximately 12.37 MGD by 2050. This suggests the WWTPs will be above their combined capacities by 2050 and could require an additional expansion.

The Village, as well as portions of the Villages of North Aurora and Montgomery and the City of Aurora, are located within the North Aurora Interceptor Service Area. As shown in Table 5, there is approximately 4.17 MGD of capacity available to accommodate growth in the North Aurora Interceptor Service Area. It appears most of the open space available for development in the North Aurora Interceptor Service Area surrounds the Village. As a result, it is possible that a majority of the 4.17 MGD of available capacity would be available to accommodate growth in the Village. However, some capacity should be reserved for growth in the Villages of North Aurora and Montgomery. It appears that population growth in the City of Aurora will not impact the North Aurora Interceptor based on current land available for development.

Table 6 summarizes the anticipated growth in the Villages of North Aurora and Montgomery based on CMAP's population projections as well as the anticipated additional average daily flow associated with that growth.

Community	2020 CMAP Population	2050 Anticipated Population	Population Increase	Anticipated Additional Average Daily Flow (MGD)
North Aurora	18,261	23,795	5,534	0.55
Montgomery	20,262	28,409	8,147	0.81
Total	**38,523**	**52,204**	**13,681**	**1.36**

Table 6 2050 Projected Population and Annual Average Flow Rates–Villages of North Aurora and Montgomery

The District is in the process of negotiating an annexation agreement to accept wastewater flows from Mooseheart Child City and School (Mooseheart). Based on existing flow metering data, the average daily flow from Mooseheart is approximately 40,000 gpd, which will also take up part of the available capacity in the North Aurora Interceptor Service Area.

Based on IEPA design requirements, the projected population for the Villages of Montgomery and North Aurora, and Mooseheart suggests approximately 1.40 MGD of capacity will be required to serve those communities. This leaves 2.77 MGD of capacity available in the North Aurora Interceptor Service area for growth in the Village.

An additional phased expansion at the South WWTP assumes doubling the DAF capacity further from 12 to 24 MGD. If growth throughout the service area accelerates beyond the CMAP projections, it could require this additional expansion at the WWTP. If that were to occur, additional capacity could be available to accommodate growth in the Village. However, for the purposes of this analysis, it is assumed only 2.77 MGD of capacity is available unless otherwise noted. This is equivalent to approximately 27,700 population equivalents (PE) using IEPA design standards.

B. North Aurora Interceptor

Flows from the Village are eventually conveyed by the North Aurora Interceptor to the North WWTP. Available capacity in the North Aurora Interceptor is based on wet weather flows rather than annual average flows as described in the previous WWTP analysis. As a result, the peak hydraulic capacity of the interceptor must be compared with theoretical future wet weather flows.

The North Aurora Interceptor is 60 inches in diameter as it enters the WWTP campus. It expands to a 72-inch-diameter at the connection point with the Caterpillar Interceptor on-site. For the purposes of this evaluation, the peak capacity of the interceptor can be calculated based on the following assumptions:

1. Using the Manning's Equation and a Manning's "n" value of 0.013.

2. Using a weighted average of the theoretical interceptor capacity between Manhole 20NA-010 (located on the north side of Route 31) and Manhole 20NA-002 (located on-site) based on "as-built" drawings from the original construction.

3. Assuming 80 percent full pipe flow to be conservative.

A summary of the calculated full flow capacity of each pipe segment is summarized in Table 7. The average is weighted based on the length of each segment. A weighted average is being used because the diameter and the slope of the interceptor change along the route. Additionally, a certain level of surcharge in an interceptor is acceptable, and as such, the weighted average of capacity is a better indicator of overall performance rather than using the lowest capacity portion of the sewer.

Upstream Manhole	Downstream Manhole	Pipe Diameter (inches)	Slope	Length (feet)	Calculated Full Pipe Capacity (MGD)	80 Percent Full Flow Capacity (MGD)
20NA-010	20NA-009	66	0.25%	448	117.2	93.8
20NA-009	20NA-008	66	0.25%	500	117.2	93.8
20NA-008	20NA-007	66	0.25%	500	117.2	93.8
20NA-007	20NA-006	54	0.85%	145	126.6	101.3
20NA-006	20NA-005	60	0.50%	58	128.6	102.9
20NA-005	20NA-004	60	0.50%	396	128.6	102.9
20NA-004	20NA-003	60	0.50%	68	128.6	102.9
20NA-003	20NA-002	60	0.50%	325	128.6	102.9
				Weighted Average	**121.7**	**97.4**

Table 7 North Aurora Interceptor Calculated Capacity

Strand performed an analysis of the existing flows on the North Aurora Interceptor as part of the Bar Screen Replacement Preliminary Design project in 2022. A regression analysis of approximately 10 years' worth of flow monitoring data was used to project peak hourly flow (PHF) rates at different recurrence intervals. A summary of the results is provided in Table 8.

Interceptor	3-Month Recurrence Interval Estimated PHF (MGD)	1-Year Recurrence Interval Estimated PHF (MGD)	5-Year Recurrence Interval Estimated PHF (MGD)
North Aurora Interceptor	40.6	55.2	72.1

Table 8 North Aurora Interceptor Estimated Current Peak Flows

Based on a weighted average interceptor capacity of 97.4 MGD and the results in Table 8, the North Aurora Interceptor has 25.3 MGD of capacity available to accommodate future growth during a 5-year recurrence interval event. It should be noted, there are two ongoing projects, which will be tributary to the North Aurora Interceptor and will reduce the available capacity.

The first is the Mooseheart agreement previously discussed. While the DAFs are only anticipated to be 40,000 gpd, the anticipated peak wet weather flow could be as high as 1.2 MGD based on preliminary discussions between the District and Mooseheart.

The second is the North Aurora Pumping Station project, which is nearing completion. The new pumping station is replacing the original North Aurora Pumping Station, which has a firm capacity of approximately 19.9 MGD. The new pumping station will be equipped with four pumps on variable frequency drives and

have a firm capacity of 32 MGD. However, modeling of the collection system tributary to the North Aurora Pumping Station suggests the sewers only have enough capacity to convey a maximum of 25.6 MGD to the new pumping station. This could be increased to 27 MGD with some improvements, which would increase flows to the North Aurora Interceptor by 7.1 MGD.

The available capacity in the North Aurora Interceptor is reduced to approximately 17 MGD to accommodate future growth within its service area after accounting for future wet weather flows from Mooseheart and the new North Aurora Pumping Station.

Theoretical peaking factors are used to predict future wet weather flows from potential new development as previously mentioned. A typical peaking factor for a separate sanitary sewer system is between two and four. A theoretical peaking factor and the resultant annual average flow and population can be calculated iteratively using the previous peaking factor equation.

The available wet weather capacity in the North Aurora Interceptor equates to an annual average flow of 6.47 MGD (future growth of 64,700 PE and peaking factor of 2.16). Based on the population projections discussed previously, this would mean approximately 5.07 MGD of capacity would be available to accommodate growth in the Village, which is equivalent to approximately 50,700 PE.

C. Montgomery–Sugar Grove Interceptor

The Montgomery–Sugar Grove Interceptor was constructed in two phases, with the first phase being constructed in 2004 and the second phase being constructed in 2013. The western most end of the interceptor is located just west of Stuarts Sports Complex, on the north side of Route 30. It generally runs east until it connects to the North Aurora Interceptor just south of the intersection of Abigail Road and Aucutt Road in the Village of Montgomery. The interceptor was sized to accommodate existing and future growth associated with Basin 18, the extents of which are shown in Figure 1.

A summary of the calculated capacity of the Montgomery–Sugar Grove Interceptor is provided in Table 9 using the same assumptions stated previously for the North Aurora Interceptor.

Downstream Manhole (18NA)	Upstream Manhole (18NA)	Pipe Diameter (inches)	Slope	Length (feet)	Theoretical Full Pipe Capacity (MGD)	80 Percent Full Flow Capacity (MGD)
1	2	48	0.215%	539	46.5	37.2
2	3	48	0.280%	90	53.1	42.5
3	4	48	0.440%	229	66.5	53.2
4	5	48	0.180%	507	42.5	34.0
5	6	48	0.220%	431	47.0	37.6
6	7	48	0.220%	522	47.0	37.6
7	8	48	0.170%	514	41.3	33.1
8	9	48	0.230%	524	48.1	38.5
9	10	48	0.210%	40	46.0	36.8
10	11	48	0.210%	440	46.0	36.8
11	12	48	0.140%	295	37.5	30.0
12	13	48	0.210%	356	46.0	36.8
13	14	48	0.320%	103	56.7	45.4
14	15	48	0.250%	85	50.1	40.1
15	16	48	0.150%	447	38.8	31.1
16	17	48	0.460%	28	68.0	54.4
17	18	48	0.120%	335	34.7	27.8
18	19	48	0.340%	345	58.5	46.8
19	20	48	0.470%	21	68.7	55.0
20	21	48	0.080%	265	28.4	22.7
21	22	48	1.210%	33	110.3	88.2
22	23	48	0.160%	558	40.1	32.1
23	24	48	0.310%	64	55.8	44.7
24	25	48	0.180%	515	42.5	34.0
25	26	48	0.500%	38	70.9	56.7
26	27	48	0.130%	396	36.2	28.9
27	28	48	0.280%	186	53.1	42.5
28	29	48	0.190%	467	43.7	35.0
				Weighted Average	**45.8**	**36.6**

Table 9 Montgomery–Sugar Grove Interceptor Calculated Capacity

Because all flows from the Village are intended to eventually be conveyed to the Montgomery–Sugar Grove Interceptor, the existing total peak flow from the Village of 4.48 MGD summarized in Table 2 can be used to calculate available capacity for future growth.

There is an existing development located along Route 30 that is currently pumped by a temporary pumping station elsewhere but is intended to eventually be rerouted to the Montgomery–Sugar Grove Interceptor. As a result, the flows from this development are not currently accounted for in the flow monitoring data summarized previously. To account for these eventual future flows, average flows from the development can be estimated using parcel counts and assigning a number of PE per parcel. There are 900 parcels in the development. Assuming 3.5 PE per parcel and 100 gpd per PE equates to an estimated average flow of 0.32 MGD. The Kaneland McDole Elementary School is also located within this development. Current enrollment of Kaneland McDole Elementary School is approximately 430 students and 60 staff members. Appendix A of Part 370 of the IAC provides guidelines for calculating

average flows from schools at 25 gpd per occupant. This equates to an additional 12,250 gpd (0.0123 MGD) of flow to be accounted for.

The wet weather peaking factor for this development is calculated at 3.40 using the previous peaking factor equation. The resulting estimated wet weather flow from this development is 1.13 MGD.

This suggests the Montgomery–Sugar Grove Interceptor has approximately 30.99 MGD (36.6 - [4.48 +1.13]) of available capacity to accommodate development across all of Basin 18, which is significantly higher than the available capacity within the North Aurora Interceptor and the WWTP. This further suggests the Montgomery–Sugar Grove Interceptor is oversized.

D. Sugar Grove Pumping Station

Currently, all flows within the Village limits are conveyed via gravity to the Sugar Grove Pumping Station, located near Route 56 and Galena Boulevard. The pumping station conveys flow east via a force main along the Virgil L. Gilman Trail before discharging to a gravity sewer near the intersection of Galena Boulevard. and Barnes Road. The force main from the Sugar Grove Pumping Station is intended to pump flow south to the Montgomery–Sugar Grove Interceptor in the future as the Village grows.

The Sugar Grove Pumping Station is a submersible station equipped with three pumps constructed in 1998. Each pump is rated at 1,875 gpm at a total dynamic head of 84 feet. The firm capacity of the station with two pumps running is approximately 5.40 MGD. There is space available for a fourth pump to be installed, which would increase the firm capacity to 8.10 MGD assuming the fourth pump is identical to the first three.

Flow is pumped into a common 24-inch-diameter force main before leaving the station. As previously mentioned, the force main currently discharges to a gravity sewer near the intersection of Barnes Road and Galena Blvd. However, the force main is intended to be rerouted in the future such that it eventually will discharge to the Montgomery–Sugar Grove Interceptor.

Flow is conveyed to the Sugar Grove Pumping Station via three gravity sewers, all of which were monitored during the flow monitoring period previously summarized. The cumulative peak wet weather flow measured by the flow monitors upstream of the pumping station was 4.20 MGD. This suggests the existing station has approximately 1.20 MGD of capacity available to accommodate future growth. If a fourth pump is added, a total of 3.90 MGD of peak flow capacity would become available. Using a similar iterative process described previously results in a peaking factor of 3.37 and 2.81 in the three- and four-pump scenarios, respectively. This equates to an average flow of 1.39 MGD or approximately 13,900 PE if a fourth pump were to be added. Any growth beyond 13,000 PE may require a substantial expansion or replacement of the pumping station.

The existing and future 24-inch-diameter force mains can convey a peak flow of approximately 14.20 MGD, assuming a peak velocity in the force main of 7 feet per second. If the station were to be expanded to a firm capacity of 14.20 MGD, 10.00 MGD of peak flow capacity would become available. This would be equivalent to approximately 42,900 PE after iteratively calculating a peaking factor of 2.33.

E. Route 47 Interceptor

The Route 47 Interceptor is generally 36 inches in diameter (there are portions of the interceptor near the pumping station that are 30-inch-diameter at steeper slopes) and was constructed in 1999. The extent of the interceptor is from the Sugar Grove Pumping Station at the downstream end to just east of the intersection of Capitol Drive and Bliss Road at the connection to the Blackberry Interceptor.

The Route 47 Interceptor was extended in 2005 along Route 47 north to the Waubonsee Community College campus and through campus to Merrill Road. A summary of the theoretical capacity of the Route 47 Interceptor is provided in Table 10 using the same assumptions already stated for previous interceptor capacity analyses.

Downstream Manhole (74NA)	Upstream Manhole (74NA)	Pipe Diameter (inches)	Slope	Length (feet)	Theoretical Full Pipe Capacity (MGD)	80 Percent Full Flow Capacity (MGD)
Pumping Station	1	30	0.74%	35	24.6	19.7
1	2	30	0.66%	381	23.3	18.6
2	3	36	0.17%	232	19.2	15.4
3	4	36	0.12%	390	16.1	12.9
4	5	36	0.11%	506	15.4	12.4
5	6	36	0.18%	506	19.8	15.8
6	7	36	0.09%	428	14.0	11.2
7	8	36	0.19%	323	20.3	16.2
8	9	36	0.12%	489	16.1	12.9
9	10	36	0.11%	455	15.4	12.4
10	11	36	0.12%	470	16.1	12.9
11	12	36	0.14%	451	17.4	13.9
12	13	36	0.10%	491	14.7	11.8
13	14	36	0.10%	445	14.7	11.8
14	15	36	0.08%	614	13.2	10.5
				Weighted Average	**16.6**	**13.2**

Table 10 Route 47 Interceptor Calculated Capacity

Subtracting the peak flows captured by Flow Monitor 74NA-004 suggests there is approximately 12.40 MGD of peak flow capacity available in the Route 47 Interceptor. This is equivalent to approximately 55,900 PE when iteratively calculating a peaking factor of 2.22.

F. Norris Road Interceptor

The Norris Road Interceptor is a 24-inch-diameter gravity sewer that extends from a temporary pumping station at the south end of the Walnut Woods Subdivision to the north along Norris Road to the corner of Norris Road and Denny Road. There are plans in the future to extend the interceptor south along Illinois Route 56, through a portion of the Bliss Creek Golf Course, along Hankes Road, and eventually discharge into one of the existing sewers directly tributary to the Sugar Grove Pumping Station. The interceptor is intended to provide service to the Northeast Subarea identified in Figure 1.

A summary of the theoretical capacity of the Norris Road Interceptor is provided in Table 11 using the same assumptions as previous interceptor capacity analyses.

Downstream Manhole (73NA)	Upstream Manhole (73NA)	Pipe Diameter (inches)	Slope	Length (feet)	Theoretical Full Pipe Capacity (MGD)	80 Percent Full Flow Capacity (MGD)
29	30	24	0.11%	456	5.2	4.2
30	31	24	0.07%	111	4.2	3.3
31	32	24	0.08%	426	4.5	3.6
32	33	24	0.08%	476	4.5	3.6
33	34	24	0.16%	238	6.3	5.1
34	35	24	0.08%	177	4.5	3.6
35	36	24	0.08%	415	4.5	3.6
36	37	24	0.14%	414	5.9	4.7
37	38	24	0.29%	174	8.5	6.8
38	39	24	0.08%	410	4.5	3.6
39	40	24	0.10%	357	5.0	4.0
40	41	24	0.08%	247	4.5	3.6
				Weighted Average	**5.0**	**4.0**

Table 11 Norris Road Interceptor Calculated Capacity

The Walnut Woods Subdivision contributes the only existing flows to the Norris Road Interceptor. The existing flow from Walnut Woods is estimated to be 90,000 gpd based on a parcel count of 257, assuming 3.5 PE per acre and 100 gpd per PE. The peak flow from Walnut Woods is estimated to be 345,000 gpd based on a calculated peaking factor of 3.83. This leaves approximately 3.66 MGD of capacity available to accommodate growth in the Norris Road Interceptor service area. Iteratively calculating a peaking factor of 2.85 yields an average flow of 1.28 MGD, which is equivalent to approximately 12,800 PE.

G. Summary of Results

Planning level capacity analyses of several pieces of infrastructure were estimated to identify the limiting factors, which could impact growth potential in the Village. The results of the capacity analyses are summarized in Table 12.

Infrastructure ID	Peak Flow Capacity Available (MGD)	Average Flow Capacity Available for the Village (MGD)	Future PE
WWTP		2.77	27,700
North Aurora Interceptor	17	5.07	50,700
Sugar Grove–Montgomery Interceptor	31.12	17.10	170,100
Existing Sugar Grove Pumping Station (three pumps installed)	1.20	0.36	3,600
Existing Sugar Grove Pumping Station (four pumps installed)	3.90	1.39	13,900
Sugar Grove Pumping Station Force Main	10.00	4.29	42,900
Route 47 Interceptor	12.40	5.59	55,900
Norris Road Interceptor	3.66	1.28	12,800

Table 12 Infrastructure Growth Potential

CONCLUSIONS

The following conclusions can be derived from the previous information:

1. The analysis summarized in the 2022 Memo focused solely on the available capacity in the Montgomery–Sugar Grove, Route 47, and Norris Road Interceptors. The available capacity at the District's WWTP, the North Aurora Interceptor, and Sugar Grove Pumping Station were not considered in the evaluation. As a result, the recommendations of the 2022 Memo overestimate the growth potential for the Village.

2. The amount of growth available in the Village is dependent upon on which pieces of infrastructure are upgraded and where growth occurs. The existing Sugar Grove Pumping Station, with three pumps installed, is the current limiting factor for growth potential in the Route 47 and Northeast Subareas. Without any improvements, the pumping station limits the growth potential in the Route 47 and Northeast Subareas to approximately 3,600 PE.

   The existing station capacity can be increased relatively easily by adding a fourth pump. However, it would still be the limiting factor for future growth in the Route 47 and Northeast Subareas.

   The limiting factor for growth in Basin 18 overall is the available capacity at the District's WWTPs. When the South WWTP is expanded to a DAF of 12 MGD, it appears there would be adequate capacity to allow additional growth of approximately 27,700 PE throughout

the entirety of Basin 18. This number could change depending on how the other communities and areas served by the District grow. Any additional growth beyond 27,700 PE may require an additional expansion at the South WWTP, doubling the DAF to 24 MGD. If this occurs, there would adequate capacity for additional growth in the Village. Several scenarios, along with the resulting growth potential, are summarized in Tables 13 through 16.

a. Scenario 1–All Infrastructure Stays at Current Capacity and South WWTP Expanded to a DAF of 12 MGD

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Route 47 and Northeast	Sugar Grove Pumping Station	3,600	8,100	0.44
Remainder of Basin 18	WWTP Capacity	24,100	11,500	2.1
	Totals	**27,700**	**19,600**	**1.41**

Table 13 Scenario 1 Growth Potential

b. Scenario 2–Fourth Pump Added at Sugar Grove Pumping Station and South WWTP Expanded to a DAF of 12 MGD

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Route 47 and Northeast	Sugar Grove Pumping Station	13,900	8,100	1.72
Remainder of Basin 18	WWTP Capacity	13,800	11,500	1.2
	Totals	**27,700**	**19,600**	**1.41**

Table 14 Scenario 2 Growth Potential

c. Scenario 3–Sugar Grove Pumping Station Expanded to Maximize Force Main Capacity and South WWTP Expanded to a DAF of 12 MGD

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Route 47 and Northeast	WWTP	27,700	8,100	3.42
Remainder of Basin 18	WWTP Capacity	0	11,500	0.00
	Totals	**27,700**	**19,600**	**1.41**

Table 15 Scenario 3 Growth Potential

d. Scenario 4–Sugar Grove Pumping Station Expanded to Maximize Force Main Capacity and South WWTP Expanded to a DAF of 24 MGD

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Route 47 and Northeast	Sugar Grove Pumping Station Force Main	42,900	8,100	5.30
Remainder of Basin 18	North Aurora Interceptor	7,800	11,500	0.68
Totals		**50,700**	**19,600**	**2.59**

Table 16 Scenario 4 Growth Potential

3. Growth in the Northeast Subarea will have an impact on the growth potential of the Route 47 Subarea and vice versa. This is due to the available capacity of the Sugar Grove Pumping Station. Tables 17 and 18 demonstrate the impact of maximizing growth in the Route 47 Subarea and Northeast Subarea, respectively, assuming the Sugar Grove Pumping Station is expanded to maximize the capacity of the force main.

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Route 47	Sugar Grove Pumping Station	42,900	7,000	6.13
Northeast	Sugar Grove Pumping Station	0	1,100	0
Totals		**42,900**	**8,100**	**5.30**

Table 17 Maximizing Route 47 Subarea Growth Potential

Subarea(s)	Limiting Infrastructure	Available Growth (PE)	Developable Land (acres)	Growth Density (PE/acre)
Northeast	Norris Road Interceptor	12,800	1,100	11.64
Route 47	Sugar Grove Pumping Station	30,100	7,000	4.30
Totals		**42,900**	**8,100**	**5.30**

Table 18 Maximizing Northeast Subarea Growth Potential

4. The previous analysis focuses on wastewater-related infrastructure only. History suggests growth can often be limited by potable water availability and conveyance more than wastewater conveyance and treatment capacity. Any growth plan developed by the Village should factor in the availability and conveyance of potable water, which was beyond the scope of this assessment.

APPENDIX B

Wastewater Collection System Interim Update Village Board

June 7, 2022

Michele L. Piotrowski, PE, MBA, LEED AP
Senior Project Manager / Principal

1

Agenda

1. Goals
2. Historical Information
3. Lift Station Inventory
4. GIS Conversion
5. Next Steps

2

GOALS

3

GOALS

- GATHER HISTORICAL INFORMATION
- CONVERT COLLECTION SYSTEM INTO GIS
- EVALUATE TRIBUTARY AREAS OF LIFT STATIONS
- BETTER UNDERSTAND POTENTIAL COLLECTION SYSTEM CAPACITY/ LIMITATIONS
- COORDINATION/ ON-GOING COMMUNICATION WITH FMWRD
- RECOMMENDATIONS

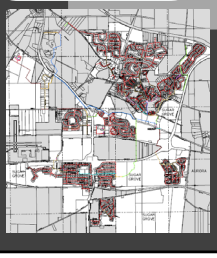
4

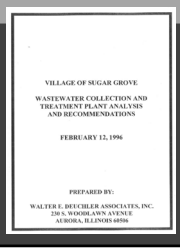
HISTORICAL INFORMATION

5

GATHERING HISTORIC INFORMATION

- Sewer Collection Maps in CAD, Subdivision Engineering Plans, and Utility Locate Mark-ups
- 1996 Wastewater Collection and Treatment Plant Analysis and Recommendations
- Kane County GIS and Recorders Office Info + CMAP FPA Info
- Site Visits to Lift Stations
- Staff Knowledge and Experience



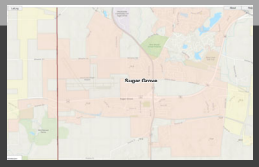

VILLAGE OF SUGAR GROVE

WASTEWATER COLLECTION AND TREATMENT PLANT ANALYSIS AND RECOMMENDATIONS

FEBRUARY 12, 1996

PREPARED BY:

WALTER E. DEUCHLER ASSOCIATES, INC.
230 S. WOODLAWN AVENUE
AURORA, ILLINOIS 60506

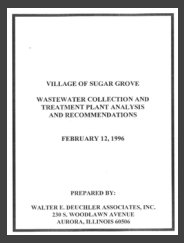


6

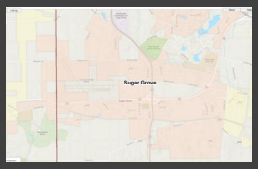
GATHERING HISTORIC INFORMATION

Sewer Collection Maps in CAD, Subdivision Engineering Plans, and Utility Locate Mark-ups

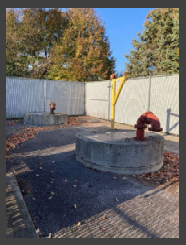
1996 Wastewater Collection and Treatment Plant Analysis and Recommendations



Kane County GIS and Recorders Office Info + CMAP FPA Info



Site Visits to Lift Stations



Staff Knowledge and Experience

7

LIFT STATION INVENTORY

8

LIFT STATION INVENTORY

LOCATIONS

- CAD Map
- Subdivision Engineering Plans

INFORMATION

- Subdivision Engineering Plans
- Site Visits
- Discussions with Staff

RECOMMENDATIONS

- TBD – Final Presentation

9

LIFT STATIONS

SIX (6) ACTIVE LIFT STATIONS

BUILT BETWEEN 1989 - 2007

3 EXTERIOR STRUCTURES / 3 INTERIOR STRUCTURES

GENERATOR TYPE

ELEVATIONS

FORCE MAIN SIZE

PUMP TYPES AND RATINGS

CONDITION

10

LIFT STATIONS

Lift Station Name	Connected To SCADA	Candidate For Rehab	Ground Elevation (ft)	Bottom Elevation (ft)	Force Main Size (in)	Force Main Length (ft)	Gravity Sewer Inv. (ft)	Gravity Sewer (in)	Year Constructed	Building	Generator Type	Bypass Capability	Pump Number	Pump Type	Pump Vendor	HP	TDH (ft)	Pump Rating (gpm)	Maintenance
#4 - Windstone	Yes	?	697.5?	688.5	8"	1,307	688.73	10"	1990	Yes	Kohler 80 kW Diesel	UN	1	Submersible	ABS	17.5	69	465	1999 - pumps replaced 2003 - pressure inducer installed
													2	Submersible	ABS	18	69	465	
#5 - Strafford Woods	Yes	?	717.00	689.10	4"	859	696.30	10"	1989	Yes	Kohler 20 kW Diesel	Yes	1	Submersible	Metropolitan ?	5	37	120	
													2	Submersible	Metropolitan ?	5	37	120	
#6 - Wheeler Road	Yes	No	697.50	683.84	6"	871	696.92	14"	1991	No	25 kW Kohler Natural Gas	Yes	1	Submersible	Sulzer	3.75	25	180	2018 - complete overhaul of pipe/valves, pumps, and generator
													2	Submersible	Sulzer	3.75	25	180	
#7 - Mallard Point	Yes		678.9	655.8	10"	820	663.7	12"	1993	No	80? kW Kohler Diesel (80ROZJ)	Yes	1	Submersible	Sulzer		57	850?	Need better photo of Sulzer sticker inside cabinet; does generator have rating on it?
													2	Submersible	Sulzer		57	850?	
#8 - Walnut Woods	Yes		707.9	668.9	6"	1,800	674.36	12"	2002	No	45 kW Kohler Natural Gas	Yes	1	Submersible	Sulzer ABS	12	48.5	267	
													2	Submersible	Sulzer ABS	12	48.5	267	
#9 - Prairie Glen	Yes		700.00	668.00	12"	5,798	675.7	14"	2007	Yes	125 kW Kohler Natural Gas	Yes	1	Submersible	Sulzer ABS	22.4	66	953	
													2	Submersible	Sulzer ABS	22.4	66	953	

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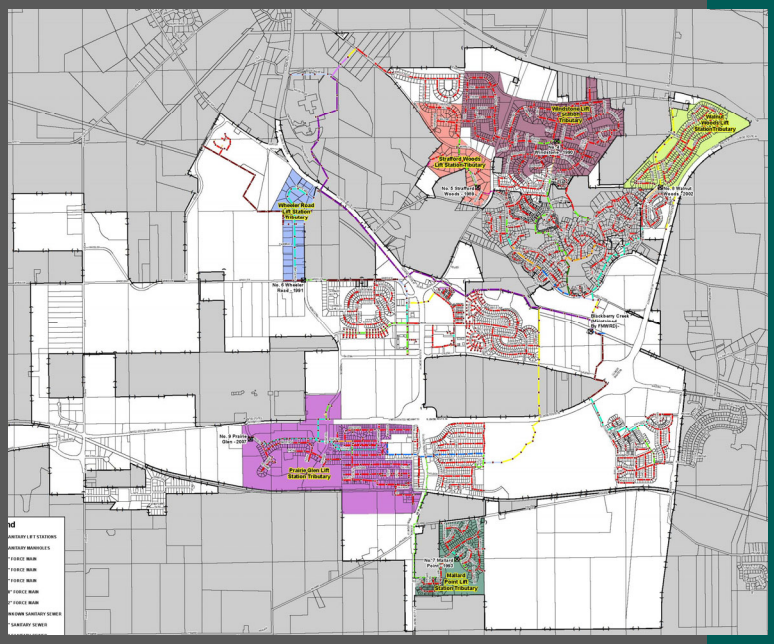


LIFT STATION TRIBUTARY MAP

12

GIS CONVERSION

13

GIS CONVERSION

LOCATIONS

- CAD to GIS Conversion
- Utility locate maps
- Nearmap aerials

INFORMATION

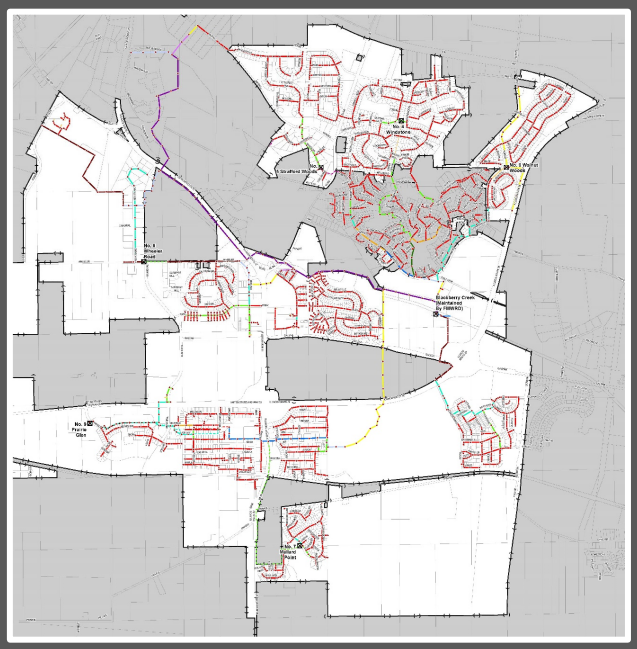
- Installation Year
- Material

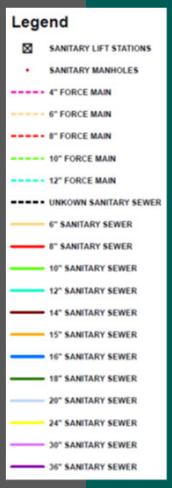
EXHIBITS

- Pipe by size
- Utility atlas map for locating
- Pipe by age
- Pipe by material
- Lift Station Tributary Areas
- Planning Areas

14

Sanitary Collection System By Size





Sanitary Sewer Main Diameter	Length (mi)
Unknown	0.1
6"	0.3
8"	43.8
10"	3.3
12"	3.2
14"	2.8
15"	0.7
16"	1.2
18"	0.3
20"	1.3
24"	2.8
30"	0.5
36"	3.4
Subtotal	63.8
4" Force Main	0.2
6" Force Main	0.3
8" Force Main	0.3
10" Force Main	1.5
12" Force Main	1.0
Force Main Subtotal	**3.2**
Total	**67.0**

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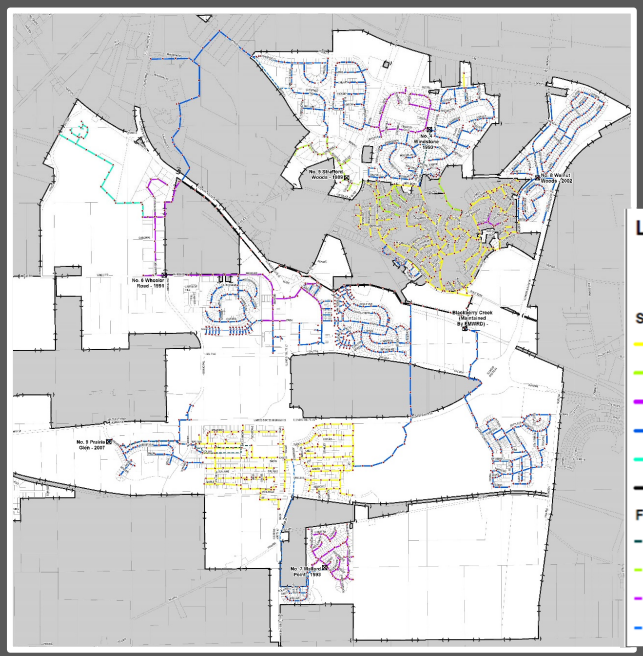
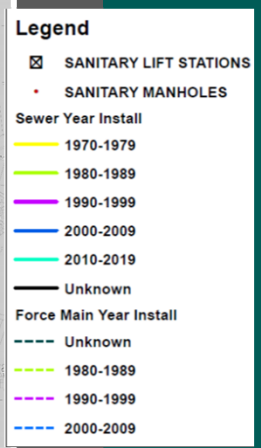
Sanitary Collection System By Installation Year





Sanitary Sewer Main Install Year (By Decade)	Length (mi)
Unknown	2.8
1970-1979	17.2
1980-1989	1.9
1990-1999	6.9
2000-2009	33.6
2010-2019	1.4
Subtotal	**63.8**
Unknown Force Main	1.6
1980-1989 Force Main	0.2
1990-1999 Force Main	0.2
2000-2009 Force Main	1.3
Force Main Subtotal	**3.2**
Total	**67.0**

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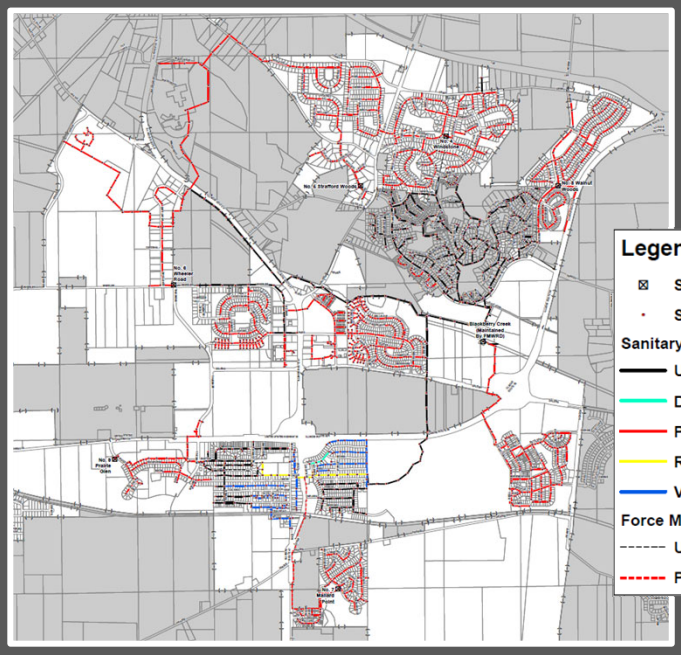
Sanitary Collection System By Material



Sanitary Sewer Main Material Type	Length (mi)
Unknown	20.3
DIP	0.2
PVC	39.5
RCSP	0.8
VCP	3.0
Subtotal	**63.8**
Unknown Force Main	1.3
PVC Force Main	2.0
Force Main Subtotal	**3.2**
Total	**67.0**

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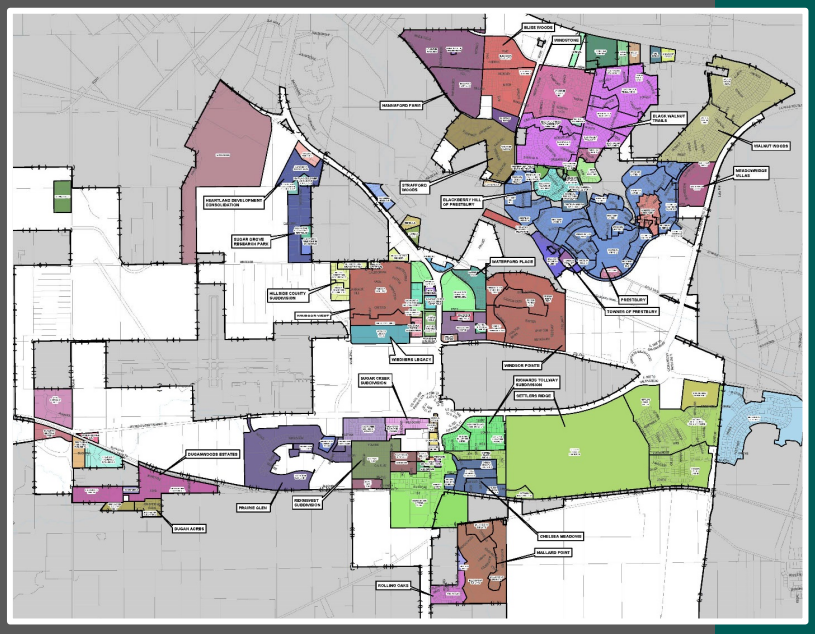
SUBDIVISIONS



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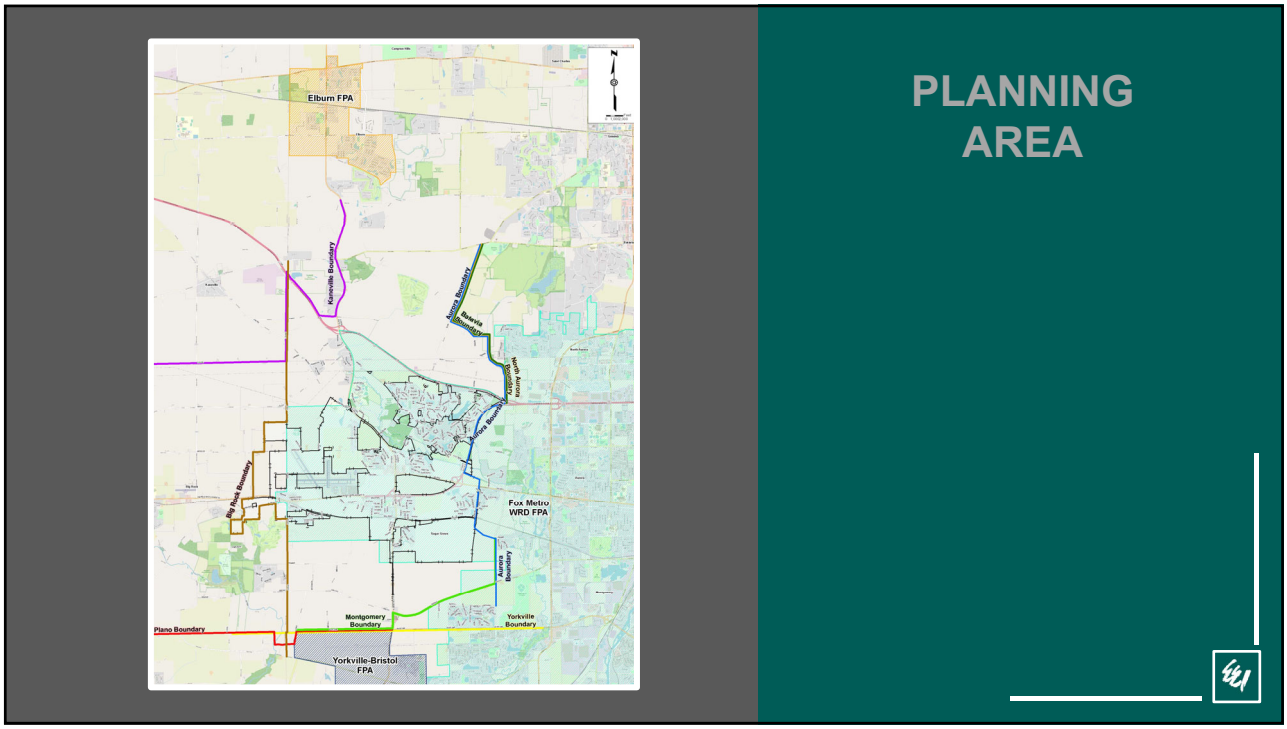
Elburn FPA
Kaneville Boundary
Batavia Boundary
Aurora Boundary
Big Rock Boundary
Fox Metro WRD FPA
Montgomery Boundary
Yorkville Boundary
Plano Boundary
Yorkville-Bristol FPA
PLANNING AREA

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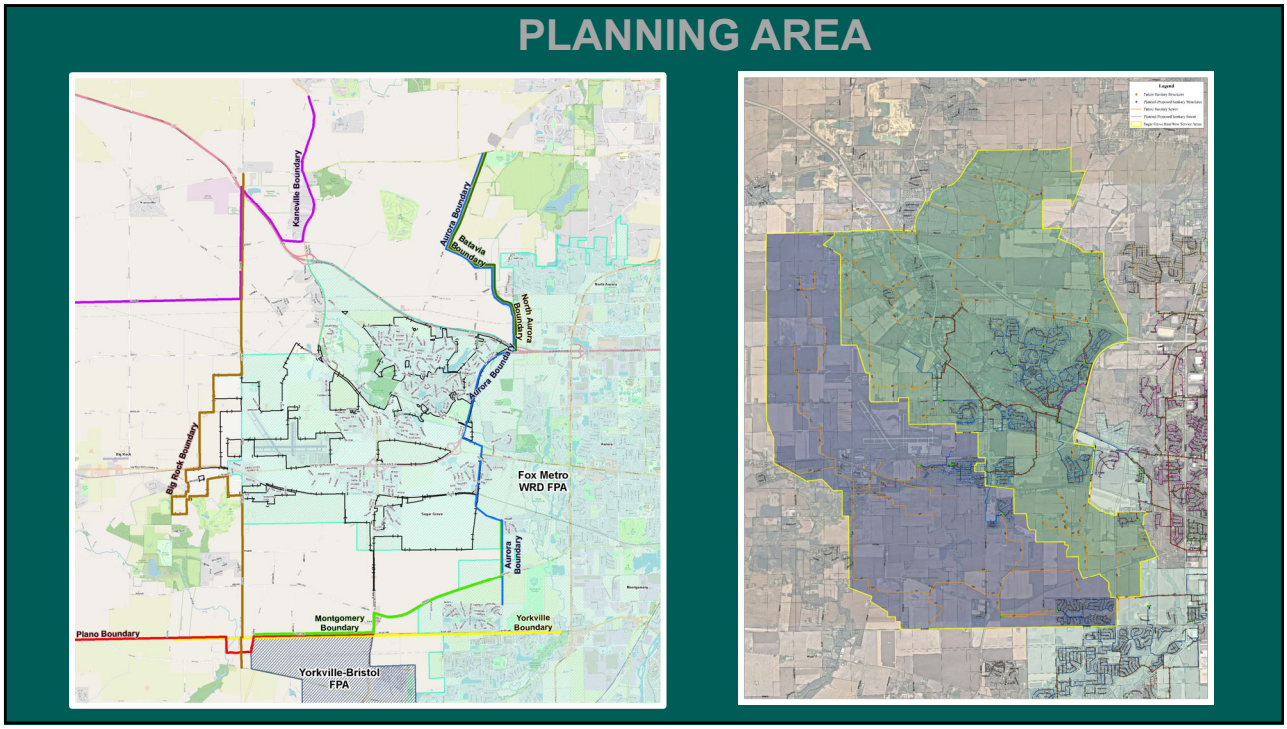
PLANNING AREA
Kaneville Boundary
Batavia Boundary
Aurora Boundary
Big Rock Boundary
Fox Metro WRD FPA
Montgomery Boundary
Yorkville Boundary
Plano Boundary
Yorkville-Bristol FPA

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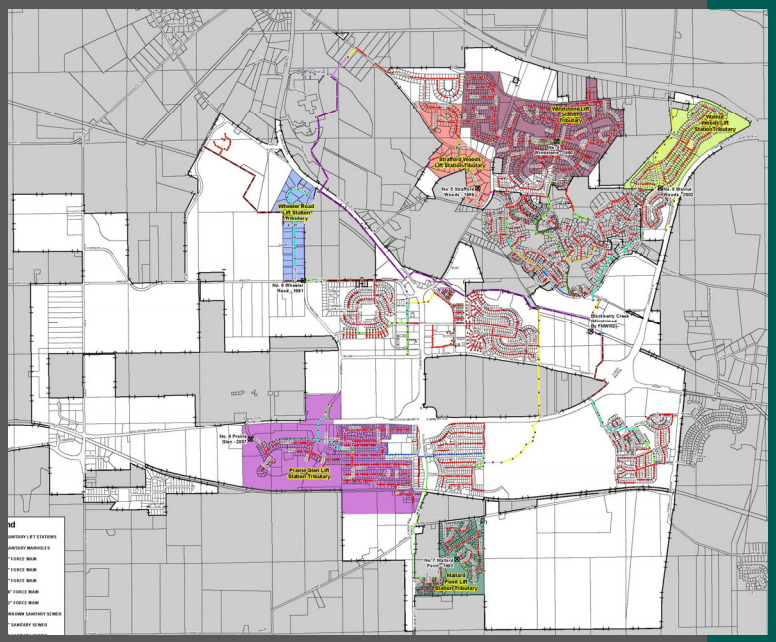

LIFT STATION TRIBUTARY MAP

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NEXT STEPS

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NEXT STEPS

- Continued Coordination with FMWRD
- Lift Station CIP
- Additional QC/QA by Staff
- Identifying / Outlining Capacity Challenges for Future Development

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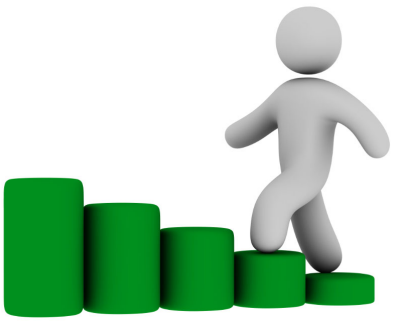
NEXT STEPS

- Prepare Recommendations
- Prepare Report/Final Presentation
- Provide Electronic Documents to Village Staff



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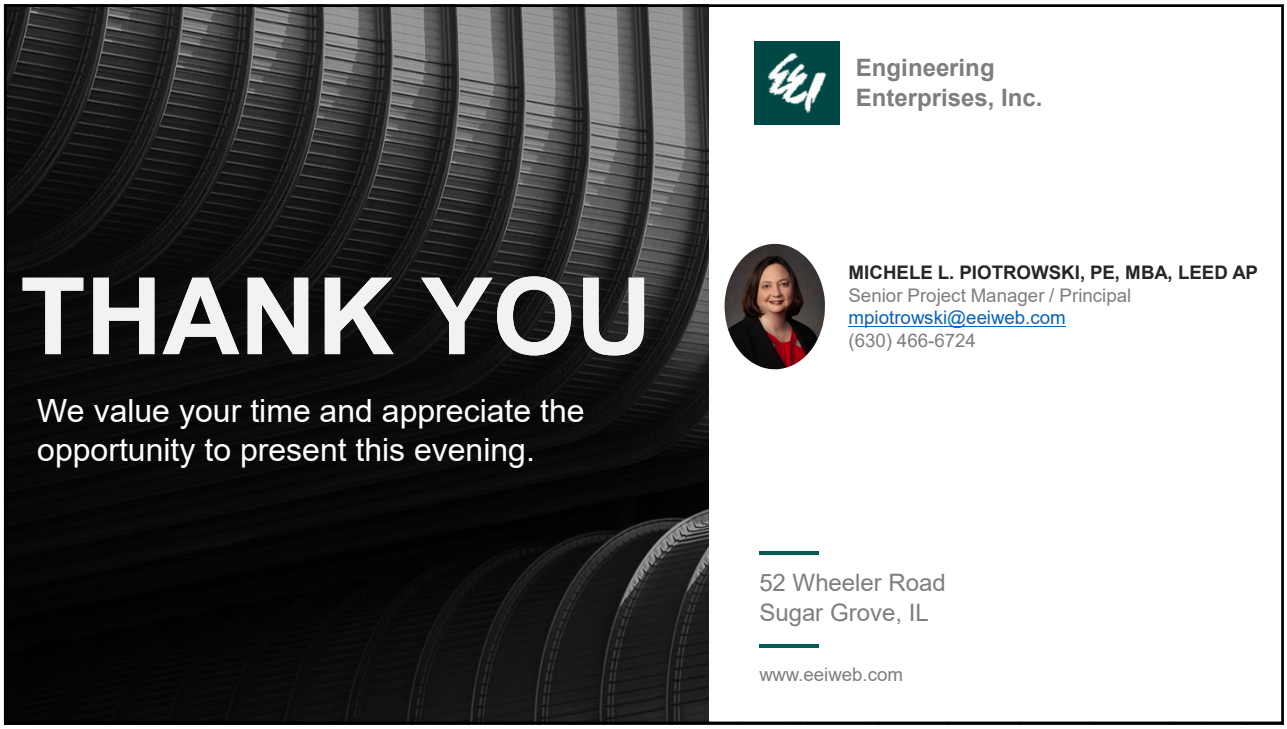
Questions or Comments?

25


THANK YOU
We value your time and appreciate the opportunity to present this evening.
Engineering Enterprises, Inc.
MICHELE L. PIOTROWSKI, PE, MBA, LEED AP
Senior Project Manager / Principal
mpiotrowski@eeiweb.com
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APPENDIX C

Wastewater Collection System Final Presentation Village Board

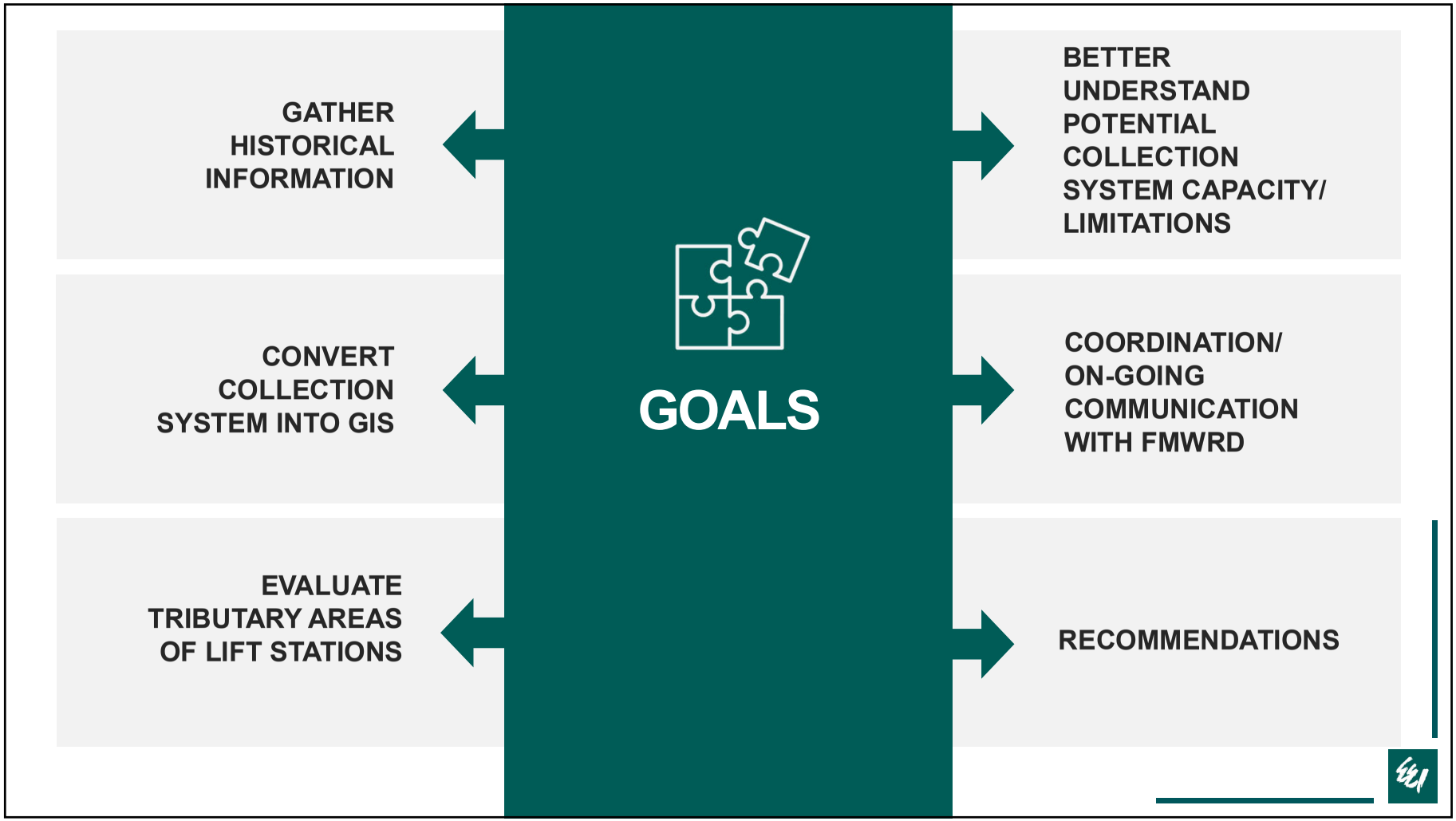
June 6, 2023

Michele L. Piotrowski, PE, MBA, LEED AP
Senior Project Manager / Principal

Agenda

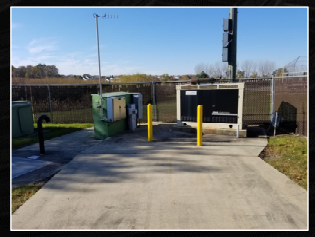
1. Goals
2. Lift Station Inventory & CIP
3. Fox Metro Water Reclamation District Coordination & Collection System Capacity
4. Next Steps

GOALS


GATHER HISTORICAL INFORMATION
CONVERT COLLECTION SYSTEM INTO GIS
EVALUATE TRIBUTARY AREAS OF LIFT STATIONS
GOALS
BETTER UNDERSTAND POTENTIAL COLLECTION SYSTEM CAPACITY/ LIMITATIONS
COORDINATION/ ON-GOING COMMUNICATION WITH FMWRD
RECOMMENDATIONS

LIFT STATION INVENTORY & CIP



LIFT STATIONS

SIX (6) ACTIVE LIFT STATIONS

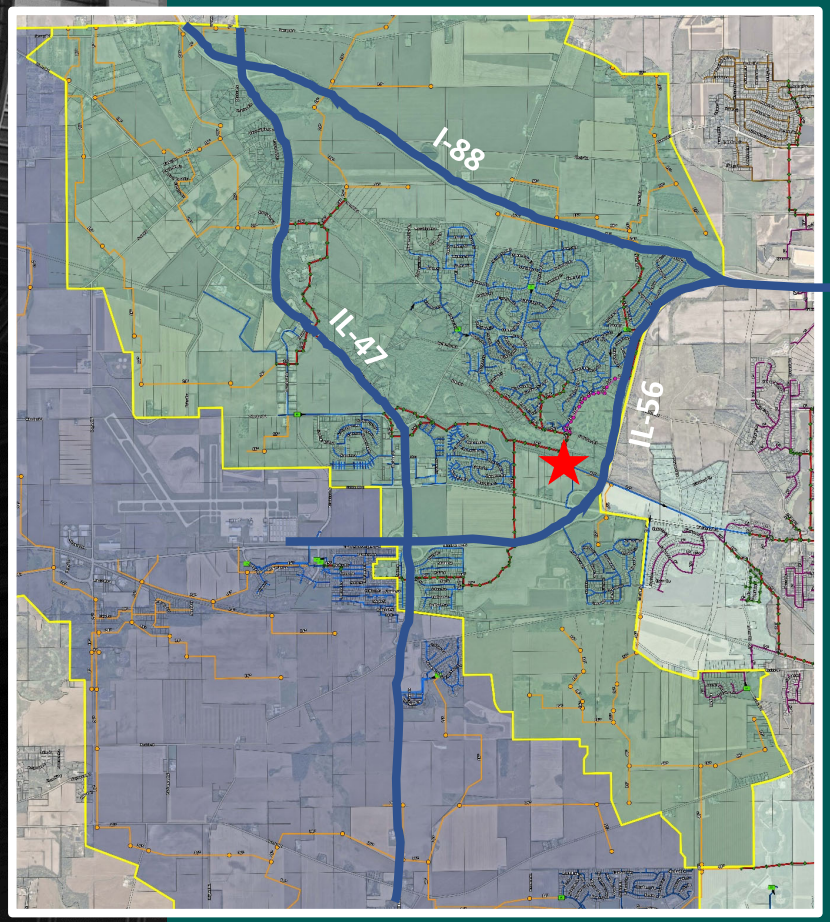
- BUILT BETWEEN 1989 - 2007
- 3 EXTERIOR STRUCTURES / 3 INTERIOR STRUCTURES
- GENERATOR TYPE
- ELEVATIONS
- FORCE MAIN SIZE
- PUMP TYPES AND RATINGS
- CONDITION

LIFT STATIONS

Lift Station Name	Connected To SCADA	Candidate For Rehab	Ground Elevation (ft)	Bottom Elevation (ft)	Force Main Size (in)	Force Main Length (Approx.) (ft)	Gravity Sewer Inv. (ft)	Gravity Sewer (in)	Year Constructed	Building	Generator Type	Bypass Capability	Pump Number	Pump Type	Pump Vendor	HP	TDH (ft)	Pump Rating (gpm)	Maintenance
#4 - Windstone	Yes	No	697.5	688.5	8"	1,307	688.73	10"	1990	Yes	Kohler 80 kW Diesel	Yes	1	Submersible	ABS/Sulzer	17.5	69	465	1999 - pumps replaced 2003 - pressure inducer installed
													2	Submersible	ABS/Sulzer	18	69	465	
#5 - Strafford Woods	Yes	No	717.0	689.1	4"	859	696.30	10"	1989	Yes	Kohler 20 kW Diesel	Yes	1	Submersible	ABS/Sulzer	5	37	120	Siding/Roofing rehab completed approx. 2013
													2	Submersible	ABS/Sulzer	5	37	120	
#6 - Wheeler Road	Yes	No	697.5	683.84	6"	871	696.92	14"	1991	No	25 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	3.75	25	180	2018 - complete overhaul of pipe/valves, pumps, and generator
													2	Submersible	ABS/Sulzer	3.75	25	180	
#7 - Mallard Point	Yes	No	678.9	655.8	10"	820	663.7	12"	1993	No	80 kW Kohler Diesel (80ROZJ)	Yes	1	Submersible	ABS/Sulzer	30	57	850	
													2	Submersible	ABS/Sulzer	30	57	850	
#8 - Walnut Woods	Yes	No	707.9	668.9	6"	1,800	674.36	12"	2002	No	45 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	12	48.5	267	Village washes down wet well at each LS 2-3 times per year on average
													2	Submersible	ABS/Sulzer	12	48.5	267	
#9 - Prairie Glen	Yes	No	700.0	668.0	12"	5,798	675.7	14"	2007	Yes	125 kW Kohler Natural Gas	Yes	1	Submersible	ABS/Sulzer	22.4	66	953	Brick LS Building; Building Maintenance handled as part of annual O&M when/as required (for each LS)
													2	Submersible	ABS/Sulzer	22.4	66	953	

FOX METRO WATER RECLAMATION DISTRICT (FMWRD) COORDINATION

FMWRD SERVICE AREAS



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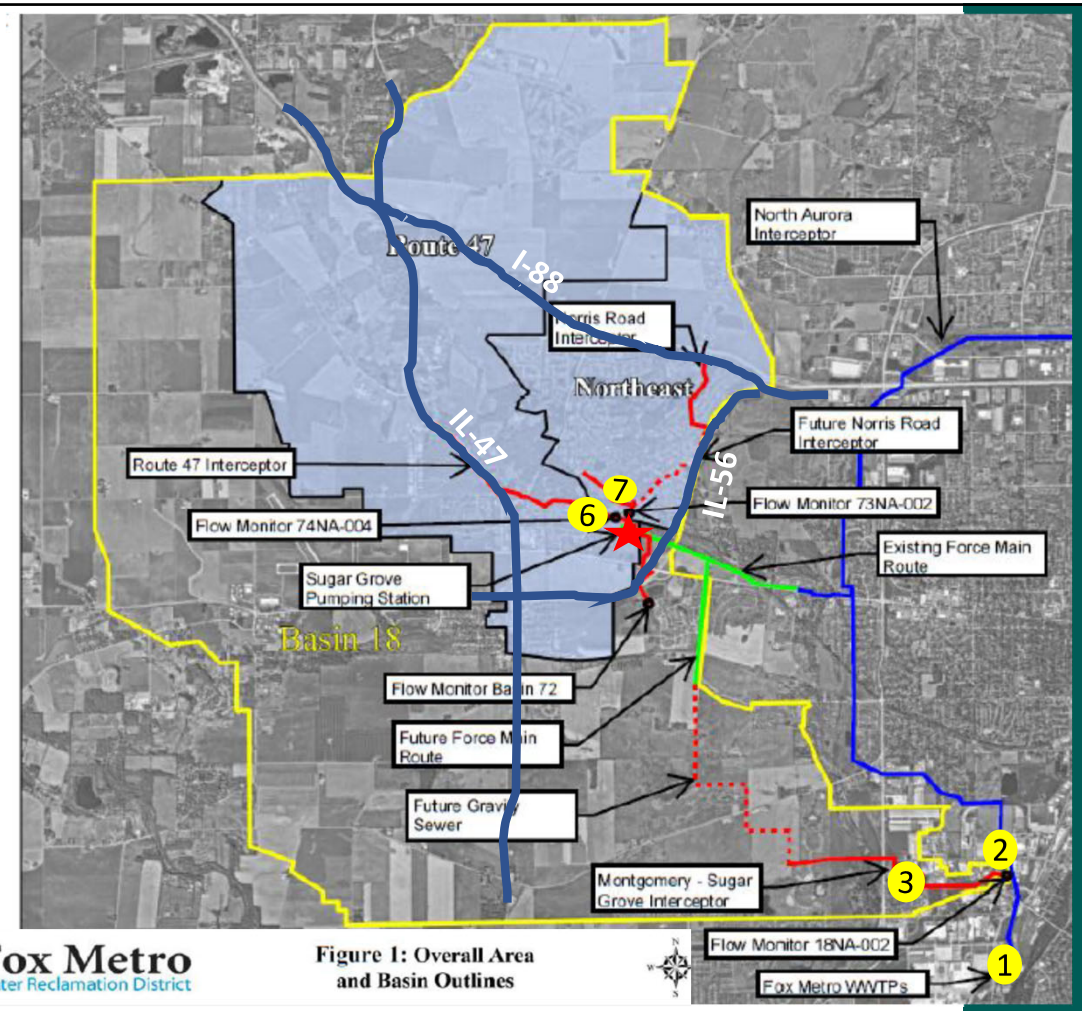


Figure 1: Overall Area and Basin Outlines

FMWRD Capacity Analysis

1. Wastewater Treatment Plant
2. North Aurora Interceptor
3. Montgomery-Sugar Grove Interceptor
4. ★ Sugar Grove Pumping Station
5. ★ Force Main – Sugar Grove Pumping Station
6. Route 47 Interceptor
7. Norris Road Interceptor

Capacity Limitations – Sugar Grove Pump Station

Existing Population: 11,666
(Including Prestbury)

Existing Conditions (No improvements):

Additional 3,600 PE

Add Pump:

Additional 10,300 PE (Total of 13,900 Additional from Existing)

(Minimum 2 years of planning needed)

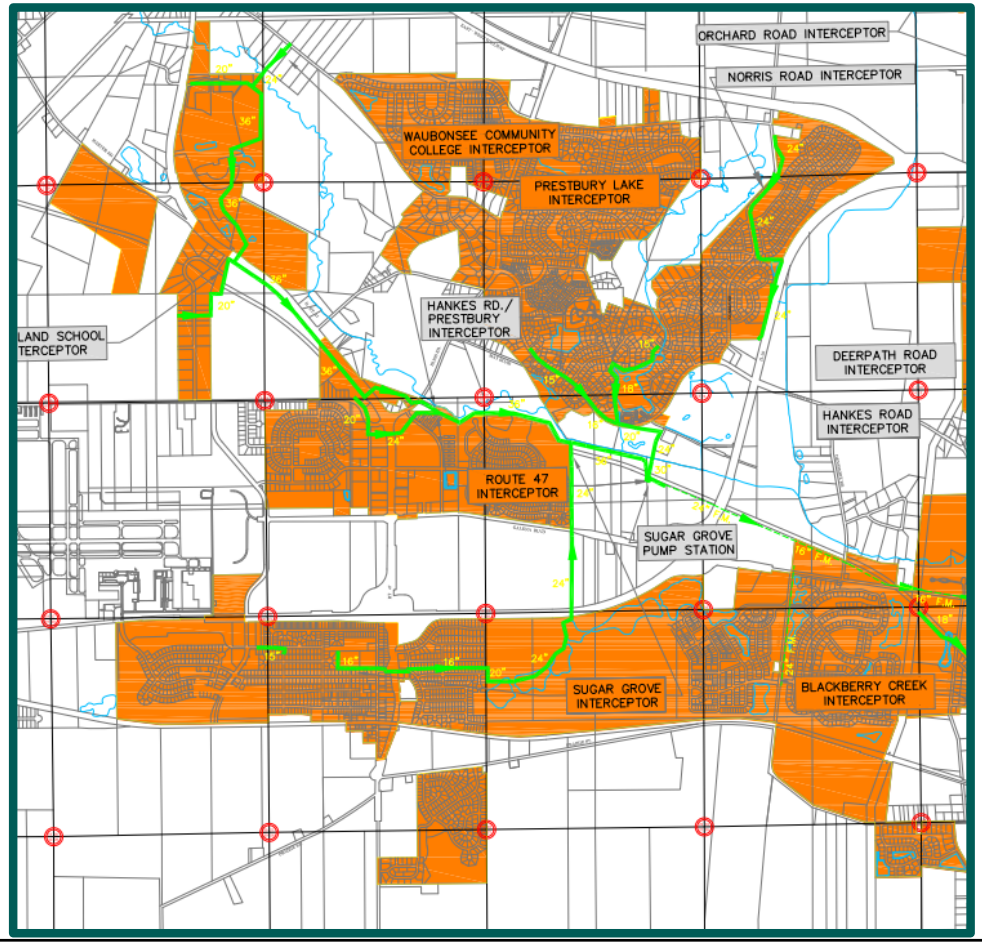
Pump Station Replacement:

Additional 29,000 PE (Total of 42,900 Additional from Existing)*

Several years of planning/funding needed)

* WWTP capacity will also need to be expanded beyond additional 27,700 PE

FMWRD Boundary Map



All areas in orange are annexed to FMWRD

To annex into FMWRD, the owner needs to:

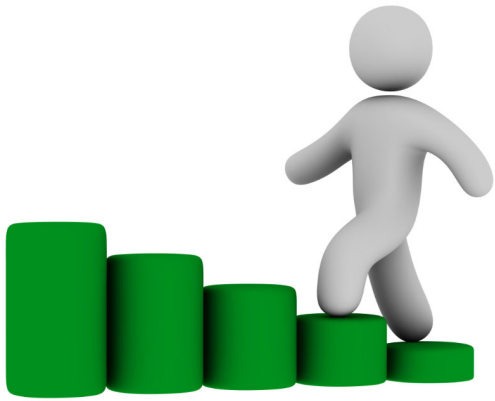
1) Work through the annexation process with FMWRD

2) Pay Annexation and Infrastructure Fees ranging from $7,045 to $9,085 per acre

NEXT STEPS

NEXT STEPS

- On-going Coordination with FMWRD
- Determine GIS Approach
- Complete Summary Report




Questions or
Comments?

THANK YOU

We value your time and appreciate the opportunity to present this evening.

Engineering Enterprises, Inc.

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