City of Escanaba
Wastewater System Improvements

Michigan Clean Water State Revolving Fund Project Plan (2023)
Volume 1 – Report Body (FINAL)

22-0290

April 26, 2023

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1211 Ludington Street
Escanaba, MI 49829

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LIST OF ABBREVIATIONS

Abbreviation	Description		Abbreviation	Description
AC	Acre		O&M	Operation and Maintenance
AMP	Asset Management Plan		OMB	US Office Of Management And Budget
ASCE	American Society of Civil Engineers		PAC	Powdered Activated Carbon
AWWA	American Waterworks Association		PACL	Polyaluminum hydroxychloride
BOD	Biological Oxygen Demand		PFAS	Per- and polyfluoroalkyl substances
BRF	Business Risk Factor		POF	Probability of Failure
CAS or CI	Cast Iron Pipe		POSA	Plan of Study Area
CFM	Cubic Feet per Minute		POTW	Publically Owned Treatment Works
CFS	Cubic Feet Per Second		PPB	Parts per Billion
CI	Chlorine		PPD	Pounds Per Day
CIP	Capital Improvement Plan		PPM	Parts Per Million
CT	Contact Time		PRV	Pressure Reducing Valve
CUPPAD	Central U.P. Planning and Devel. Reg. Commission		PS	Pump Station
DBP	Disinfection Byproduct		PSI	Pounds Per Square Inch
DI or DIP	Ductile Iron Pipe		PVC	Polyvinyl Chloride (Pipe)
DO	Dissolved Oxygen		RRI	Repair, Replacement, and Improvements (Fund)
DWAM	Drinking Water Asset Management		RUS	Rural Utility Service (USDA RD)
DWSRF	Michigan Drinking Water State Revolving Fund		SAN	Sanitary Sewer
EDU	Equivalent Dwelling Unit		SAW	Michigan Stormwater, Asset Management, And Wastewater funding
EGLE	Mich. Dept. of Environment, Great Lakes, & Energy		SCADA	Supervisory Control And Data Acquisition
ENR	Engineering News-Record		SCFM	Standard Cubic Feet per Minute
EPA	US Environmental Protection Agency		SF	Square Foot
EPDM	Ethylene Propylene Diene Terpolymer		TSS	Total Suspended Solids
EUPPDR	Eastern U.P. Planning and Devel. Reg. Commission		STO	Storm Sewer
FPS	Feet per Second		SRF	Michigan State Revolving Loan Fund
FSP	Fiscal Sustainability Plan		SWD	Side Wall Depth
GAC	Granular Activated Carbon		TDH	Total Dynamic Head
GPCD	Gallons Per Capita Per Day		TRS	Trihalomethane Removal System
GPD	Gallons Per Day		TTHM	Total Trihalomethane
GPD/IN-MI	Gallons Per Day Per Inch Diameter Mile		TWST	Treated Water Storage Tanks
GPM	Gallons Per Minute		USACE	US Army Corps Of Engineers
HP	Horsepower		USDA RD	US Dept. Of Agriculture - Rural Development
HVAC	Heating, Ventilation, and Air Conditioning (System)		UV	Ultra Violet
ITA	Intent to Apply		VFD	Variable Frequency Drive
MDNR	Michigan Department of Natural Resources		WERF	Water Environment Research Foundation

Abbreviation	Description		Abbreviation	Description
MG	Million Gallons		WM	Watermain
MGD	Million Gallons Per Day		WPA	Works Progress Administration (early public works construction program)
MG/L	Milligrams Per Liter		WRC	Michigan Water Resources Commission
MH	Access Manhole		WS	Water Service
ML	Milliliter		WTP	Water Treatment Plant
MPN	Most Probable Number		WUPPDR	Western U.P. Planning and Devel. Reg. Commission
NEMA	National Electrical Manufacturers Association		WV	Water Valve
NEPA	National Environmental Policy Act		WWTF	Wastewater Treatment Facility
NH_3-N	Ammonia Nitrogen		WWTP	Wastewater Treatment Plant
NPDES	National Pollutant Discharge Elimination System			
NPV	Net Present Value			
NRWA	National Rural Water Association			

SUMMARY

Project Background

This study (Project Plan) was authorized by the City of Escanaba via execution of a letter proposal. The purpose of the Project Plan is to evaluate needs and recommend alternatives for improvements to the City's wastewater system.

Summary of Project Need

The ultimate goal of wastewater treatment is to protect the quality of the waters of the State and protect the health of the public. Reliable operation of the wastewater collection system within the City's utility system directly impacts the health and safety of the City's citizens and visitors. Deficient sewers can contaminate ground and surface waters, and diminish the wastewater treatment plant's ability to adequately treat wastewater.

Analysis of Alternatives

This Project Plan focuses on collection system (sewer main and lift station) improvements. The improvements are additive of each other. However, the improvements are separated into two categories for alternative analysis as summarized below:

A. Collection System Improvements

Alternative A1: No Action

No implementation of a corrective measures project at this time while attempting to correct deficiencies in the system over time as maintenance budgets will allow.

Alternative A2: Sewer Main Replacement

Replacement and upgrading where required of sanitary sewers prioritized as to condition via SAW Asset Management Plan findings, City records, and personnel knowledge. This alternative includes emphasis on lines which coincide with aging or deficient water and sewer lines to allow combining projects and maximizing use of project funding for construction while minimizing environmental effects and disruption to the area citizens. Sanitary sewers to be replaced vary in size from 8 to 24-inch. This alternative includes over 13,000 ft of pipe with the most severe ratings. The project will address sewer main backups/SSOs in the project location.

B. Lift Station Improvements

Alternative B1: No Action

The Ludington Street pump station is beyond its useful life and is need of upgrades. Sand Point and 5th Street Lift Stations are also aging. No Action would put the City at risk for backups, by-passes, and SSOs in a large City sewer district.

Alternative B2: Relocate Lift Station to Water Treatment Plant Area (Three Submersible Pumps)

This alternative would replace two lift stations and require only one lift station for future O&M and capital costs. If the downtown area of the City is to remain viable, then secure and reliable wastewater collection must be provided. Continued viability of the City's south side neighborhoods is also critical to the historic nature and culture of the City.

Alternative B3: Rebuild Lift Station(s) Near Existing Location (Three Dry Pit Pumps)

This Alternative would only improve one of the lift stations, Ludington Street, while the other two stations continue degradation. City would have increased O&M costs to continue maintaining three lift stations, opposed to one.

Selected Alternative

The selected alternatives are Alternative A2: Sewer Main Replacement and Alternative B2: Relocation of Lift Station(s) to Water Treatment Plant Area. These two alternatives have the most resilient and cost effective option for addressing issues within the collection system that include structural, reliability, and hydraulic deficiencies within the system. Project priorities were established using the City's current Asset Management and Capital Improvement Plan. This Project will coincide with the 2023 DWSRF Project Plan funding; where overlap of water main and lead impacted water services with sewer improvements are present, best practices will be used to minimize construction costs.

Environmental Evaluation

The anticipated environmental impacts resulting from implementation of the selected alternative are relatively minor. There is no increase in the extent of the water system, and no major changes in terms of residuals or other material effects. Full detail may be found under the section labeled "Environmental Evaluation".

Mitigation Measures

Where adverse impacts due to installation of the recommended improvements cannot be avoided, mitigation measures will be implemented. Costs for mitigation measures were considered and included where applicable in project opinions of

probable cost and will be included in construction contract documents. A full discussion of mitigation measures can be found in detail in section “Mitigation Measures”.

Public Participation

A public meeting for this CWSRF Project Plan took place on April 6, 2023. Copies of public hearing advertising and minutes are included in Appendix E of the adopted final version of this Project Plan.

PROJECT BACKGROUND

This study (Project Plan) was authorized by the City of Escanaba, Michigan, on November 2, 2022. The purpose of the Project Plan is to evaluate needs and recommend alternatives for improvements to the Escanaba Wastewater System.

The City of Escanaba is the responsible governing entity for the municipal WWTP and collection system serving the City. The system components are owned by the City. The City operates and maintains the WWTP, which is located west of the highway (M-35) along Willow Creek Road in the City.

Delineation of Study Area

The study area includes the entire sanitary sewer service district served by the WWTP. The sanitary sewer service district is located in the southern portion of Delta County at the center of Michigan's Upper Peninsula. The existing sanitary sewer service includes the entire City: 12.9 square miles in land area; 979.5 people per square mile; and in 38N Township, and 23W Range, Section 1. The WWTP is located in the N ½ of the NW ¼ of Section 1, Township 38N, and Range 23W. The WWTP effluent discharge is to the Little Bay de Noc. A location map is provided as Figure 1. A service area and USGS topographic map are provided as Figure 2.

Figure 1. Project Location

Miles
0 0.2 0.4 0.8 1.2 1.6

N

Wells Township

Escanaba

Escanaba River

Bay Coll...

Portage Creek

Delta County Airport

Legend

- Project Location
- Potential Service Area
- Service Area
- City of Escanaba

FIGURE 2: STUDY & SERVICE AREAS

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

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PROJECT: 220290
DELTA COUNTY, MICHIGAN

FIGURE 2. STUDY AND SERVICE AREA

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Environmental Setting

Supplemental information on the environmental setting is contained in Appendix C.

Cultural Resources

The proposed construction will be within previously disturbed areas. It is expected that there will be no long term impact to cultural resources.

The Natural Environment

Air Quality

Project area air quality can be described as good to excellent. There are no large industrial facilities which can adversely affect air quality. Limited population also means limited transportation system initiated air quality impacts.

Wetlands

There are scattered pockets of wetlands within the Service Area.

Coastal Zones

The Service Area is along the shores of Little Bay de Noc, upstream of Lake Michigan. No significant adverse impact to the managed coastal zone are anticipated. Entire project routes will be reviewed by EGLE as part of the permitting process.

Floodplains

Localized floodplains exist along the shore of Little Bay de Noc. The floodplains are generally not developed.

Natural or Wild and Scenic Rivers

There are no designated natural or wild and scenic rivers in the project area; the White Fish River is the closest to the Service Area.

Major Surface Waters

Little Bay de Noc, along with Big Bay de Noc to the east, is located in the most northwestern portion of Lake Michigan, in Green Bay. Escanaba is located on the western shore. The rivers or streams within the City are Portage

and Willow Creeks, which flow from the northwest portion of the City southeast into Lake Michigan at Portage Point. Each of these rivers contribute to the ecological diversity and abundant wildlife supported by the Little Bay de Noc region. Little Bay de Noc is one of the top walleye sport fisheries in the world, along with the nearby Big Bay de Noc. Water temperatures, depth, spawning habitat, and forage facilitate an ecosystem that supports the growth of large walleye populations, and other Great Lakes fish species. Combined with all of the tributaries, Little Bay de Noc provides Escanaba residents with a unique fresh water resource that is strongly appreciated by the community as well as visitors. Preservation of and access to this hydrological resource is a community concern and should be a major consideration for future planning. The WWTP discharges to Little Bay de Noc. The discharge location is 45° 43' 14" N Latitude and 87° 04' 07" W Longitude. At this time, no portion of effluent is diverted for agricultural, industrial, or public water supply uses.

Climate

Escanaba has a humid continental climate, described as an area with large seasonal temperature swings, warm and humid summers and cold to frigid winters with precipitation occurring somewhat regularly throughout the year. The climate in and around the City of Escanaba is heavily influenced by the proximity of Lake Michigan and Lake Superior. Escanaba is situated in a region with long, cold winters and relatively cool summers. The lakes help to keep summer temperatures cool and winter temperatures warmer than inland areas. The proximity of the lakes also creates lake effect snow, although not as much as the northern part of the region. The lake effect snow results from cool air masses moving over the relatively warm waters of the lakes. When these air masses reach the cooler land areas, the moisture picked up from the lake is deposited as snow. The average annual temperature is 42°F. The average high and low temperatures range from a high of 25°F and 7°F in January, to 76°F and 57°F in July. The City receives approximately 28.51 inches of rain per year, with the wettest month in September and the driest month in February.

Recreational Facilities

Several City parks, non-motorized trails and marina are situated within the City of Escanaba. The nearest recreational complex and golf course are approximately 0.75 miles east of the WWTP and will have no negative impacts on the recreational use of these sites. Refer to Figure 3 on the following page.

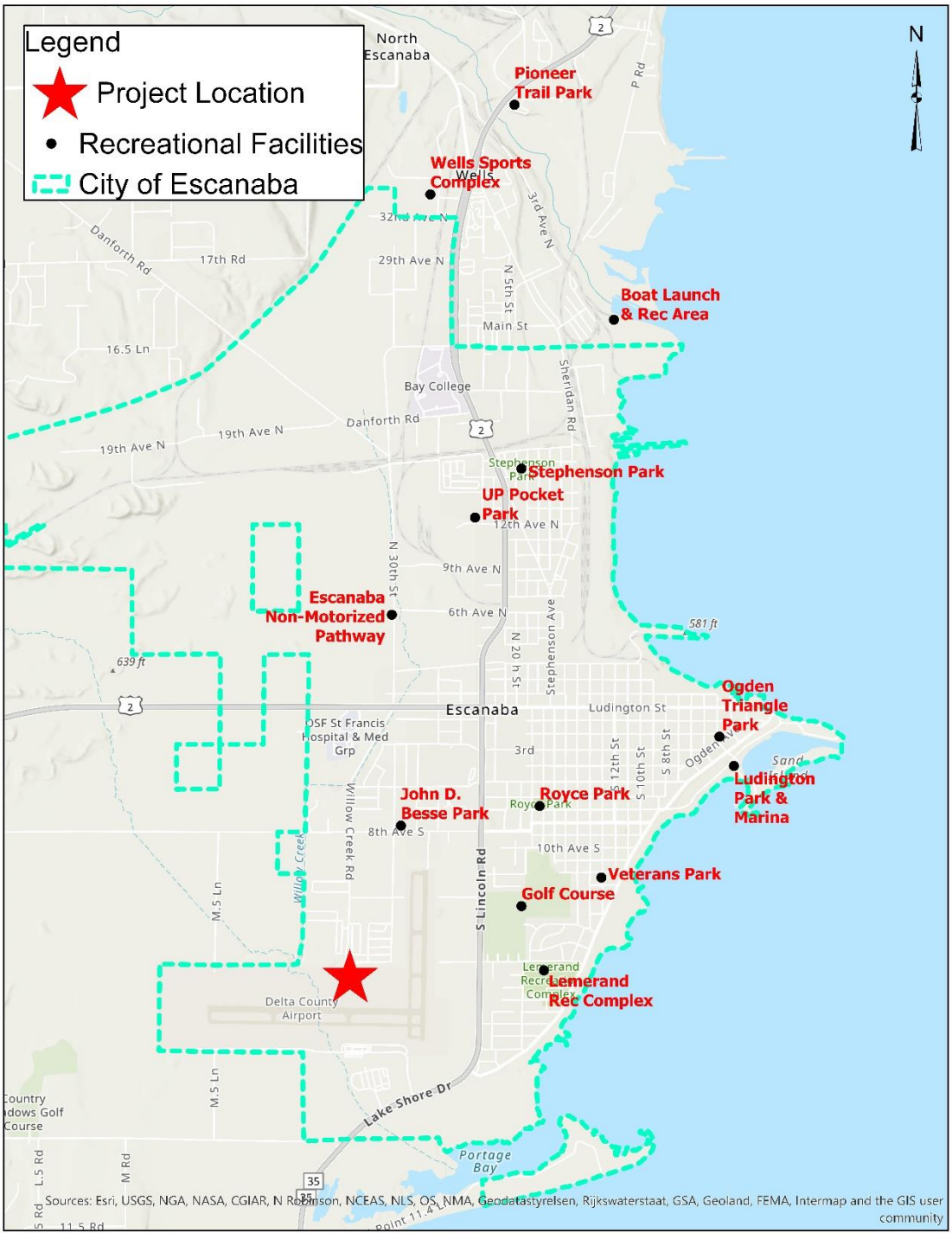


Figure 3. Recreation Facilities in Service Area

Topography

As with the rest of the Upper Peninsula, Escanaba was shaped by glacial activity and the Great Lakes. Escanaba is located in a gently sloping region on the ancient lakebed of Lake Michigan. Escanaba drains toward Lake Michigan and is situated in a low-lying area with minor elevation change. Further north and west, elevation begins to rise and greater slopes begin to occur. Overall, Escanaba contains few areas with steep slopes, and has a gentle elevation increase moving toward the inland regions. Refer to Figure 2 for a topographic map of the area.

Geology

The bedrock surface of Delta County is formed by Paleozoic rocks of Ordovician and Silurian age. A glacial drift of varying thickness was deposited on the bedrock during the Pleistocene era. Many of the physical features of the County were formed during this era. Rocks from this era include limestone, dolomite, shale, sandstone, and gypsum deposited by shallow seas. In the northeastern part of the County, glacial deposits form areas of higher elevation. The Escanaba area was once covered by an early glacial lake, as seen from the plains, beaches, and dunes of the area. The period of glaciation was followed by a period of erosion. The uplift of land after the last ice age formed the present shoreline of the area.

There are several alvar landscapes within Delta County and Escanaba that were formed during the late Ordovician and early Silurian periods when Michigan was covered in inland seas. Limestone was formed into flat, horizontal layers of rock, which can be seen very clearly on the banks of the Escanaba River where the soil has eroded to expose the bare rock. This type of landscape has thin to no soil and, as a result, sparse grassland vegetation. Often flooded in the spring, and affected by drought in the summer, alvars support a distinctive group of prairie-like plants. This stressed habitat supports a community of rare plants and animals, including species more commonly found on prairie grassland. Lichens and mosses are common while trees and shrubs are absent or severely stunted.

Soils

USDA Natural Resource Conservation Service (NRCS) published their Soil Survey of Delta County. General soil classifications and estimated percentage of the service over which they survey show their dominance can be found in Appendix C.

Agricultural Resources

Nearest farm or farmland is approximately three miles from the vicinity of the Service.

Fauna and Flora

The Service Area is residential and commercial in nature with private lawn areas and parking lots or driveways.

Airways and Airports

The Delta County Airport is less than a half-mile (2,000 feet) south of the Escanaba WWTP. Minimal impact on airways and airport however, crane location during construction will meet FAA guidelines and a Tall Structures Permit will be required if appropriate.

Land Use

Delta County has approximately 1,173 square miles of area, 211 miles of Great Lakes shoreline, 514 miles of rivers/streams, nearly 6,000 acres of inland lakes and ponds, and nearly 310,000 acres of public recreation land. The vast majority of the land areas in Delta County are forested. Land use in the study area is a mixture of residential, commercial, industrial, open space district, civic/institutional, and transportation. The land use map for the City is located on Figure 4.

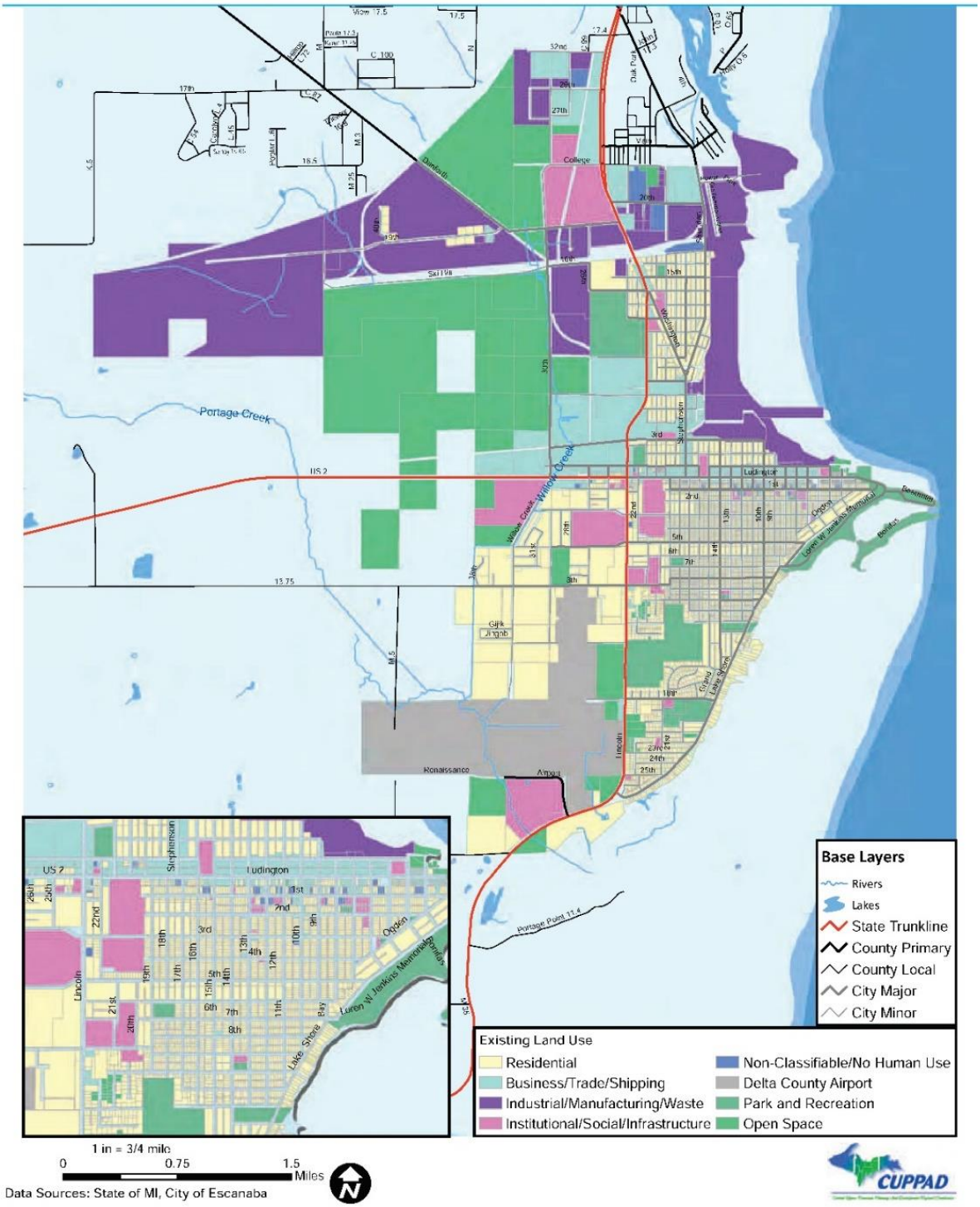


Figure 4. Land Use

Population Projections

The City of Escanaba and surrounding areas have experienced population loss in past decades. Table 1 reports census numbers in the prior four decades and forecasts a population stabilization in the near future. The wastewater service area has potential for a slight population increase if future development in Wells Township pushes a need for municipal type wastewater service.

Table 1. Population Projections

Entity (a)	1980	1990	2000	2010	2020	2030	2040
City of Escanaba	14,830	13,705	13,119	12,616	12,450	12,450	12,450
Delta County	38,947	37,780	38,520	37,069	36,903	36,903	36,903
Wells Township	5,181	5,159	5,044	5,115	5,160	5,160	5,160

(a) 1960 to 2020 based on published US Census figures
2020 to 2040 assumes population stabilizing as economy stabilizes after nationwide recession

Economic Characteristics

The City of Escanaba is the County's seat of government. The extensive lakeshore includes a commercial port facility, modern marina, and large public park areas. Trunklines US-2/41 and M-35 converge in the City. The Canadian National and Escanaba and Lake Superior railroads provide service within and through the City. The area's major employers and their approximate number of employees is listed in Table 2. Major Employers of Project AreaTable 2 on the following page.

Table 2. Major Employers of Project Area

Employer	Number of Employees
Hannahville	1,084
Verso Corporation	1,000
OSF St. Francis Hospital	603
Escanaba Schools	434
EMP	400
Walmart	400
Bay Collage	275
Bishop Noa	150
Elmers	150
City of Escanaba	110
Andex	85

Existing Facilities

The City of Escanaba owns and operates its wastewater system. The City provides water and wastewater service to residential and commercial customers within the City and an immediately adjacent portion of Wells Township. Escanaba began providing municipal sewer service to its residents around 1890 with the first iteration of the WWTP constructed in 1932.

Wastewater Collection system

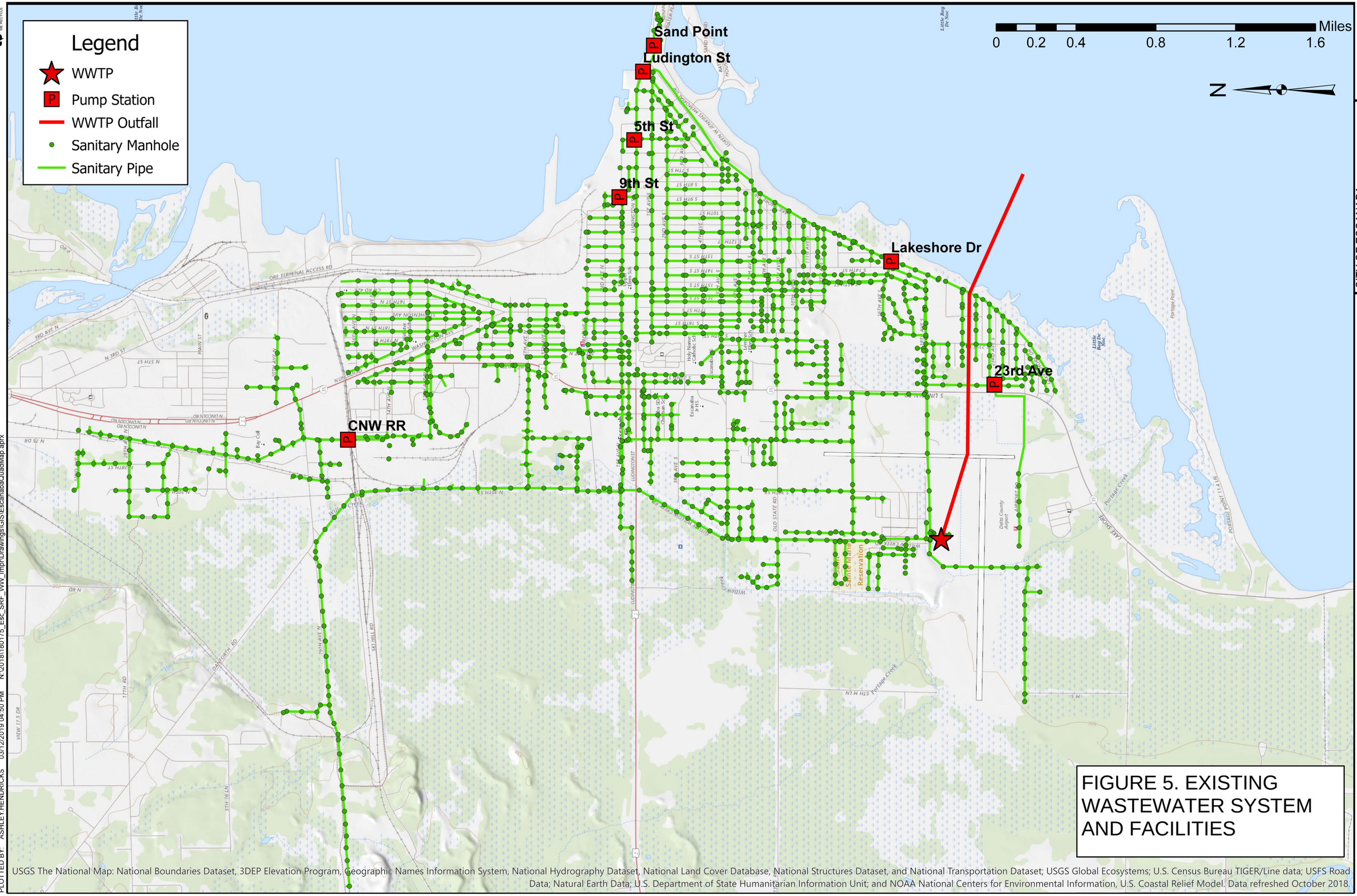
Escanaba's wastewater collection system consists of approximately 72 miles of 6 to 36-inch collector and interceptor sewers along with seven pump stations serving over 8,200 acres of residential, commercial, and light manufacturing customers. Most of the collector sewers are located on developed City street or alley rights-of-way with interceptor sewers more typically cross-country.

The downtown business area and surrounding residential areas have sewers aged 75 to 100+ years old totaling approximately half of the collection system. Other older residential areas are 50 to 75 years old totaling approximately a quarter of the system.

Collection system makeup is summarized in Table 3 on the following page and a map of the system in Figure 5.

Table 3. Collection System Description

GRAVITY SEWER						
Size (in.)	Length (ft)	Inch-Miles		Size (in.)	Length (ft)	Inch-Miles
48	244	2		12	36,535	83
36	7,925	54		10	32,815	62
30	12,187	69		8	244,073	370
27	2,914	15		Total Mains	388,453	838
24	7,464	34				
21	8,395	33				
18	23,409	80		4 to 6 Svc (a)	17,000	16
15	12,492	36		4 to 6 Svc (b)	183,000	173
(a) = connected to structures, (b) = est. connected to sewers *(a) + (b) = (5,700 customers @ 35 ft each)*						
FORCE MAIN						
Size (in.)	Length (ft)		Size (in.)	Length (ft)		
16	4,278		6	937		
			1.5 to 3	4,633		
			1.5 to 3	4,633		
PUMP STATIONS						
No / Asset ID	Name	Location		Pumps		
PS001/PLUD	Ludington St.	Ludington St at Lakeshore Dr		1,100 gpm	1,100 gpm	2,000 gpm
PS002/PLSD	Lakeshore Dr.	Lakeshore Dr at 16th Ave So		400 gpm	400 gpm	
PS003/P9TH	N. 9th St	No 9th St at 1st Ave No		95 gpm	95 gpm	
PS004/PCNW	CNW RR	RR at 26th St & Danforth Rd		750 gpm	1,500 gpm	
PS005/P23RD	23rd Ave S.	23rd Ave So at So Lincoln Rd		150 gpm	350 gpm	350 gpm
PS006/PSP	Sand Point	Sand Point at Water Plant Rd		300 gpm	300 gpm	
PS007/P5TH	N. 5th St.	No 5th St at Ludington St		95 gpm	95 gpm	



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DELTA COUNTY, MICHIGAN

FIGURE 5. EXISTING WASTEWATER SYSTEM AND FACILITIES

Ludington Street Lift Station

The Ludington Street Pump Station is located on the east end of Ludington Street (Escanaba's primary downtown business area street) near the shore of Little Bay de Noc and across the street from the City's Municipal Dock (see Figure 5). The station serves a mix of residential and commercial customers in and around the City's core business district. The service area also includes much of the City's older south side neighborhoods. The tributary area can be seen in the flow monitoring maps prepared for the SSES report (Figure 3 in Appendix D.3.).

Constructed in 1931 and 1932, the station has had major rehab work in 1959 and 1991. The station now serves approximately 440 acres including a mix of residential and other (commercial, government, education, religious) users. The Ludington Station itself is a 25 by 21 ft brick over concrete building. A 19 by 8 ft wet well is located along the west side of the building along with a manually cleaned bar screen area. Pump controls are located on the first floor which is open with balcony to the pump floor below.

The pump floor has three horizontally mounted, dry pit type, end suction sewage pumps (ITT A-C) rated at 1100, 1100, and 2000 gpm. Drawdown testing done in 2017 as part of the City's SAW funded Asset Management Program confirmed the approximate output. Firm pumping capacity (largest pump out of service) is approximately 1,500 gpm.

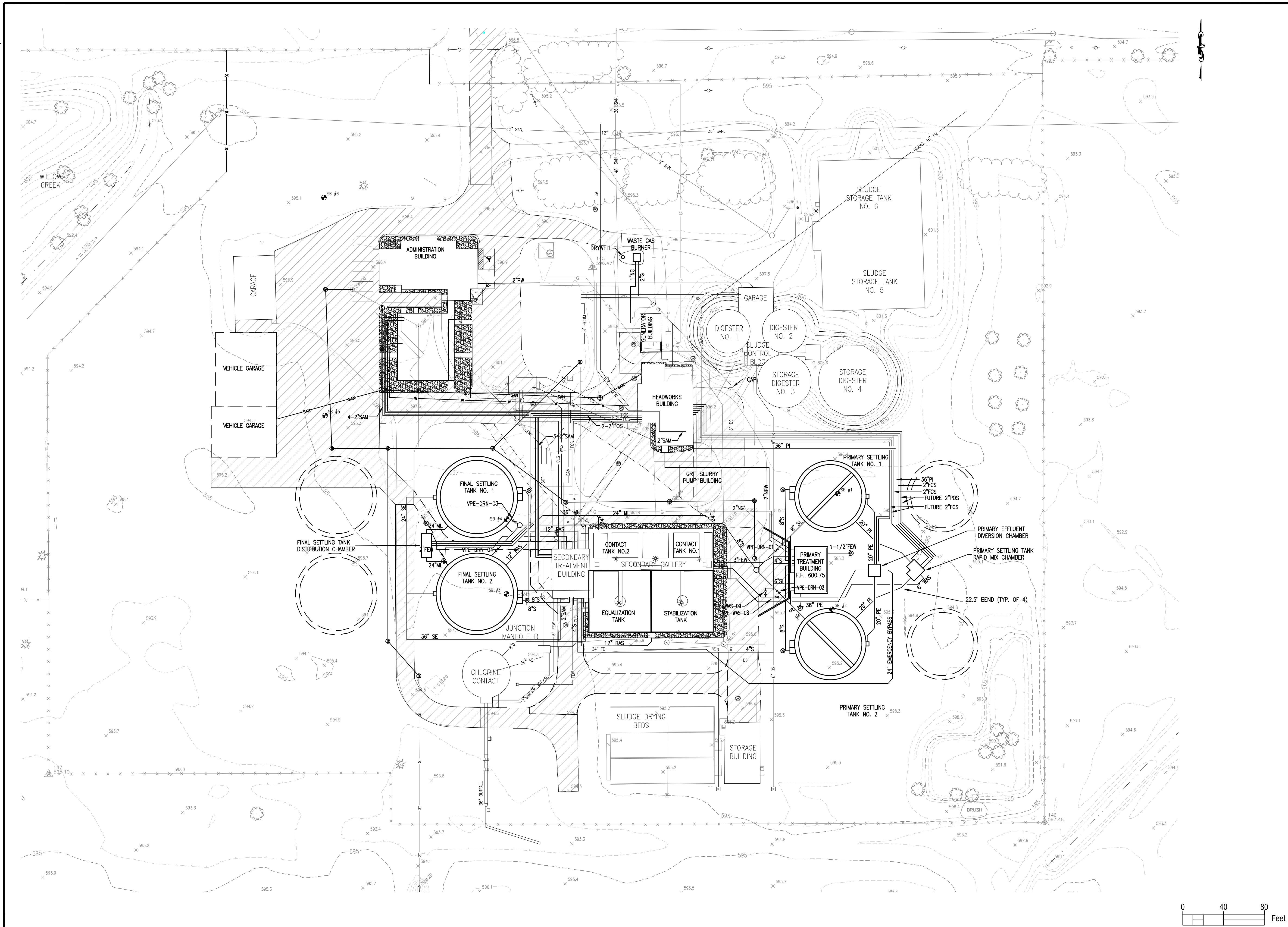
An on-site emergency generator is housed on the east side of the pump station building. The station discharges to a 16-inch ductile/cast iron force main primarily following Lakeshore Drive south to 7th Ave S then one to one and a half blocks west to discharge to a gravity sewer manhole at 7th Ave S and S 10th St. Lakeshore Drive is the easterly boundary of the City's expansive lakeside Ludington Park.

Wastewater Treatment Plant

The WWTP is a 2.2 MGD conventional activated sludge facility including influent screening and flow measurement, aerated grit removal, primary settling, chlorine disinfection, and anaerobic digestion for biosolids stabilization. The WWTP processes are summarized in Table 4. The WWTP site is shown In Figure 6. Wastewater Treatment Plant Site.

Table 4. Wastewater Treatment Plant Description

Design Loading Criteria:	
Design Average Annual Flow Loading	2.2 MGD
Organic Loading (BOD_5)	153 mg/L or 2,807 lb/day
Solids loading (TSS)	170 mg/L or 3,119 lb/day
Phosphorous	3.8 mg/L or 73 lb/day
Unit Process Descriptions:	
Screening	Automatic fine screening with washer compactor; Two screens: ¼ -inch fine screen and 1-inch bar screen, 10.0 MGD capacity at 30 percent blinding, mechanical horizontal rotary screw type compactor with constant bagging system
Raw Sewage Pumping	Four dry pit submersible pumps with 2,100 gpm at 50 ft TDH, firm system capacity of raw sewage pumping is 9.0 MGD
Grit Removal	Vortex grit, with inclined screw dewatering with 10.0 MGD peak capacity or 3.5 min detention at 2.2 MGD
Primary Settling Tanks	Two circular tanks (62 ft inside diameter by 14 ft SWD) Detention time at design average flow of 2.2 MGD is 6.9 hrs Overflow rate of 1,200 gal/ft^2/day at design peak flow BOD_5 reduction of 50 percent and TSS reduction of 80% with chemical addition
Primary Equalization	354,000-gallon rectangular concrete equalization basin and vertical mixer aerator that provides redundant CSAS tank or automated drain control valve directs excess flow back to process
Secondary Treatment	Contact stabilization activated sludge tank with vertical aerator mixer and selector tank: stabilization tank is 308,000 gal with a detention time of 6.4 hrs at 50% RAS and selector tank is 51,000 gal with a detention time of 22 mins at design average annual flow
Contact Tanks and Aeration	BOD_5 loading of 29.1 lb/1000 ft^3 and firm aeration capacity of 2,400 scfm; four existing fine bubble aeration diffuser grids within each contact tank
Final Clarifiers	Two circular tanks with 72 ft diameter by 14 ft SWD Surface overflow rate of 890 gal/ft^2/day at peak flow Weir overflow rate of 16,026 gal/ft/day at peak flow
Chlorine Contact Tank	Existing tank provides 27 min detention time at 7.25 MGD
Digesters (Sludge Storage)	Existing concrete tankage receives scum and sludge from both primary and secondary treatment. New waste gas burner, with auto pilot ignition system
Outfall	12,800 ft of 24, 30, and 36-inch pipe with a theoretical capacity of 5.5 to 6.0 MGD



CITY OF ESCANABA, MICHIGAN
WASTEWATER TREATMENT PLANT
IMPROVEMENTS
DELTA COUNTY, MICHIGAN

FIGURE 6. WASTEWATER TREATMENT PLANT SITE

REVISIONS

REV	DESCRIPTION	DATE

PROJ. #: 180175

DATE: 02-16-2023

SHEET

C-103

AS CONSTRUCTED

Fiscal Sustainability Plan (FSP)

Through historic established practices and programming developed via the State SAW funded asset management planning, the City has addressed asset inventory, asset evaluation, water/energy conservation, and asset maintenance/funding. Detailed information can be found in Appendix D.

Need for the Project

Orders or Enforcement Actions

The City is currently (Spring of 2023) in the process of working with EGLE and are negotiating a draft ACO.

Water Quality Problems

The ultimate goal of wastewater treatment is to protect the quality of the waters of State and protect the health of the public. Reliable operation of the wastewater collection system within the City's utility systems directly impacts the health and safety of the City's citizens and visitors. Deficient sewers can contaminate ground and surface waters and contribute to the wastewater treatment facility's ability to adequately treat wastewater. There are no known combined sewers in the Escanaba system and the location of the last known collection system overflow was closed in 1992 (near Ludington Street Pump Station).

The WWTP has received notices of water quality violations of percentage removal for TSS and CBOD5 associated with wet weather events (see Appendix B for list). This project aims to reduce I/I in the collection system that should address the alleged water quality violations and minimize the impact of future wet weather events.

There is a list of sewer backups in the service district provided in Appendix B from the last ten years' service calls. These are backups not only in the project locations, but upstream of the project locations. The project will implement improvements that are expected to minimize backups and reduce the I/I that can affect backups.

Projected Needs for the Next 20 Years

The Capital Improvement Plan for the City (developed as part of the SAW Project) currently includes wastewater projects allocated over ten year periods. Service area population has been stable for some time. Increased treatment capacity is not a current goal of this Project Plan or any subsequent project. Projected needs concentrated more on the system's reliability and replacement/enhancement of existing treatment systems to protect what is there now. Further information can be found in Appendix D.

If the downtown area of the City is to remain viable, then secure and reliable wastewater collection must be provided with improvements to the Ludington Street Lift Station. Continued viability of the City's south side neighborhoods is also critical to the historic nature and culture of the City. The tributary area is not expected to expand geographically over the 20 year planning period. However, infill is expected in the form of re-occupying or fully occupying business district buildings and potentially replacing unused structures with hotel or other commercial uses (such as the former county jail and chamber of commerce buildings). "Projected needs" in the form of recommended firm capacity for the Ludington Street Pump Station is based on 2017 to 18 flow monitoring and 25-year, 24-hour peak flow model development. Allowance is made for fill-out of the business district as noted above.

Future Environment without the Proposed Project

The primary purpose of this project is to ensure the system is equipped to handle capacity for its existing and projected flow rates and to continue to comply with its NPDES discharge permit requirements. The goal is to protect surface and ground water quality and public health. Ability to reliably meet these goals moving forward would be adversely affected without the project. The project will improve the system's reliability and efficiency.

Continued utilization and livelihood of the downtown business district and adjacent residential neighborhoods is dependent on reliable operation of the Ludington Street Pump Station. Reliable operation includes security as well as capacity with uninterrupted operation. The downstream (East) end of the Ludington Street Pump Station Tributary Area is adjacent to the shores of Little Bay de Noc making uninterrupted operation of the pump station critical to preventing any adverse impacts to the Bay.

ANALYSIS OF ALTERNATIVES

The City of Escanaba has invested in regular maintenance, asset management, and capital improvements planning for their WWTP and collection system. This Project Plan examines several alternatives for development in the next five to twenty years.

Potential Alternatives

No Action

The No Action alternative, although saving a large initial capital investment, would result in several and continuing adverse impacts on the City's wastewater system and its customers. Those impacts include, but may not necessarily be limited to, the following:

- Continued risk of system failure
- Continued decrease in the reliability of waste treatment and increased risk to water quality of the Great Lakes
- Continued and accelerated degradation of the system along with increased maintenance costs.
- Continued use of excess energy
- Continued I/I leading to sewer main backups and capacity issues

Optimum Performance of Existing Facilities

Optimizing of the existing system alone, without capital improvements, will not incorporate improved technologies; will not fully restore the service life to facilities and system; will not take advantage of improvements to reduce energy use; and will fail to improve the sustainability of the system. The principal alternative described below can be considered an extension of this concept, but one that requires significant capital improvements.

Water and Energy Efficiency

Selected equipment shall have greater energy efficiency verses original components (primarily through more efficient motors).

Regional Alternatives

The Escanaba WWTP currently serves the City limits of Escanaba and a small portion of Wells Township adjacent to the north limits. There have recently been discussions to potentially collect wastewater from a slightly larger portion of Wells Township. The nearest collection system not currently treated at Escanaba is the City of Gladstone. This is seven miles away with one large river crossing and entire City of Escanaba to transverse. On several occasions over the last 25 years,

the feasibility of conveying Gladstone sewage to Escanaba has been discussed to the level of Manager. At this time, it is not considered feasible for Gladstone to convey sewage to Escanaba and for Escanaba to plan to accept sewage in the future. The City believes the existing regional service district can be somewhat expanded, but no neighboring facility can accept the large flow from Escanaba. Rendering this alternative not a feasible choice.

Principal Alternatives

A. Collection System Improvements

Alternative A1: No Action

No implementation of a corrective measures project at this time while attempting to correct deficiencies in the system over time as maintenance budgets will allow. No Action will result in continued I/I leading to sewer main backups and capacity issues.

Alternative A2: Sewer Main Replacement

Replacement and upgrading where required of sanitary sewers over 70 years old prioritized as to condition via SAW findings, City records, and personnel knowledge. This alternative includes emphasis on routes which coincide with aging or deficient water and sewer lines to allow combining projects and maximizing use of project funding for construction while minimizing environmental effects and disruption to the area citizens. Sanitary sewers to be replaced vary in size from 8 to 24-inch. This alternative includes 13,000 ft of pipe with the most severe NASSCO quick ratings.

B. Lift Station Improvements

Alternative B1: No Action

The Ludington Street Lift Station is beyond its useful life and is need of upgrades. No Action would put the City at risk for backups and SSOs in a large City sewer district.

Alternative B2: Relocate Lift Station to Water Treatment Plant Area (Three Submersible Pumps)

This alternative would replace two lift stations and require only one lift station for future O&M and capital costs. If the downtown area of the City is to remain viable, then secure and reliable wastewater collection must be provided. Continued viability of the City's south side neighborhoods is also critical to the historic nature and culture of the City.

Alternative B3: Rebuild Lift Station(s) Near Existing Location (Three Dry Pit Pumps)

This Alternative would only improve one of the lift stations, Ludington Street, while the other two stations continue degradation (Sand Point and 5th St Lift Stations). City would have increased O&M costs to continue maintaining three lift stations, opposed to one.

ANALYSIS PRINCIPAL ALTERNATIVES

The Monetary Evaluation

A construction cost estimate of the selected alternatives is provided in Table 5. The construction costs used in these analyses are based on previous work done in the City and neighboring communities. Costs have been adjusted based on ENR index and typical engineering and administrative fee rates. Detailed costs, sewer lengths/sizes, and number of manholes can be found in Appendix A. A map with location of the improvements is shown on the following page in Figure 7 and Figure 8. Priority 2 construction costs are considered as "wish list items" if budget allows from more areas of sewer improvements to be included into the project. If more information about the sewer main dictates an alternative rehabilitation method, these changes will be made during the design phase.

Table 5. Construction Cost Estimate

Label	Location	Rehabilitation	Cost
Priority 1			
	Manholes (75)	Lining	$300,000
	Manholes (25)	Replacement	$475,000
L1	Ludington Street (9th St to Water Plant)	Replacement	$9,968,000
WPLS	Water Plant Lift Station	Replacement	$2,375,000
CNLS	CN Lift Station By-Pass Upgrades	Upgrade	$50,000
A3	Alley East of S 16th St (4th to 6th Ave S)	Lining	$103,800
A4	Alley East of S 9th St (5th to 6th Ave S)	Lining	$55,600
A5	6th Ave S (S 21st to 19th St)	Replacement	$379,100
A6	Alley East of S 14th St (6th to 7th Ave S)	Pipe Bursting	$589,300
A8	Alley East of Lincoln Rd (S 12th to 13th St)	Lining	$53,800
A9	Alley East of S 16th St (10th to 12th Ave S)	Lining	$71,700
A10	Alley South of Ludington St (S 25th St to Walgreens)	Replacement	$278,700
Priority 1 - Construction Subtotal			*$14,700,000*
Priority 1			
L2	Ludington Street (19th to 9th St)	Replacement	$12,584,000
A1	Alley East of Lincoln Rd (1st to 2nd Ave N)	Lining	$45,400
A2	Elementary School Play Ground	Lining	$33,200
A7	Easement West of Lincoln Rd (9th to 14th Ave S)	Lining	$208,700
O1	New WWTP Outfall	Replacement	$13,753,000
Priority 2 - Construction Subtotal			*$12,872,000*

Construction costs for Ludington Street (L1 and L2) include costs to remove roof drains previously connected to the sanitary sewer and reconnect the roof drain leads into the storm sewer. As part of this new construction, the storm sewer will need to be repaired and costs are included in the totals listed in the table above.

Legend

- PumpStations
- Sanitary Manhole
- Priority 1
- Priority 2
- Sanitary Pipe
- Railroad

Feet
0 500 1,000 2,000 3,000 4,000

FIGURE 7: PROPOSED PROJECT LOCATIONS

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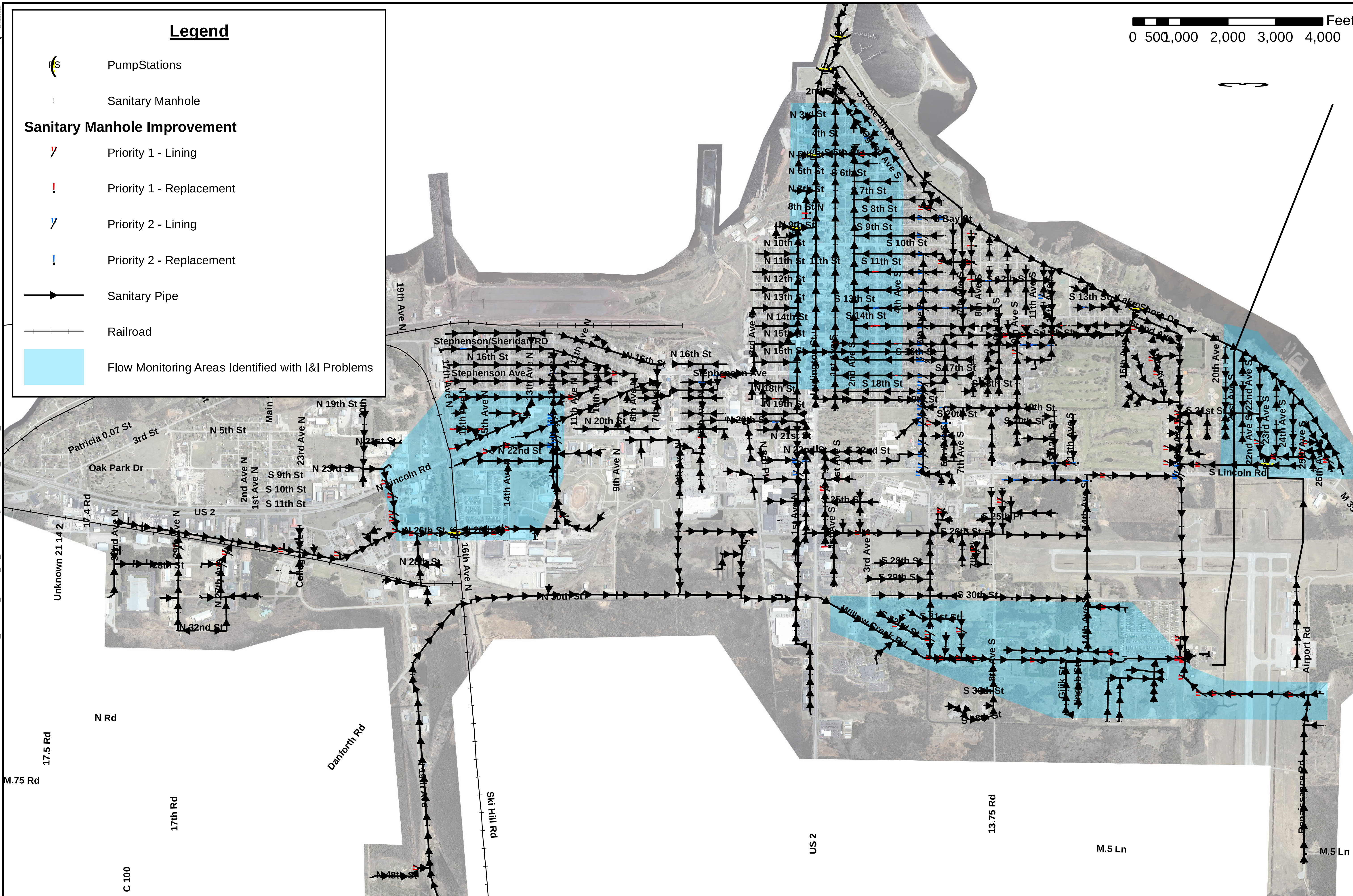

FIGURE 8: PROPOSED MANHOLE IMPROVEMENT LOCATIONS

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PROJECT: 22-0290
DELTA COUNTY, MICHIGAN

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The 30-year present worth analyses is also included in Table 6 and Table 7 below. Because the City is a disadvantaged community, they are eligible for a 30-year loan/bond term. The bond schedule, operating expense, and salvage values can be found in Appendix A. O&M impacts were assumed to effect plant operations only for this analysis. The anticipated savings in operating expenses is represented in Appendix A as negative "O&M impacts." Likewise, the "No Action" alternatives indicates escalating expenses as utility rates increase and energy efficiency decreases.

Table 6. Present Worth Analysis – Alternative A: Collection System Improvements

Item	Description	Alternative A1: No Action	Alternative A2: Sewer Main Replacement
1	Construction Costs	$0	$14,700,000
2	Engineering, Legal, Administration, Planning, and Contingencies	$0	$3,937,500
3	Total Capital Cost	$0	$16,022,500
4	Change in Annual O&M Costs	$0	-$10,000
5	Present Worth of O&M Costs	$0	-$312,000
6	Salvage Value	$0	$4,806,750
7	Present Worth of Salvage Value	$0	$5,182,000
8	Total Present Worth	$0	$11,152,500

Table 7. Present Worth Analysis – Alternative B: Lift Station Improvements

Item	Description	Alternative B1: No Action	Alternative B2: Relocate (Submersible)	Alternative B3: Rebuild (Dry Pit)
1	Construction Costs	$0	$2,375,000	$2,425,000
2	Engineering, Legal, Administration, Planning, and Contingencies	$0	$736,250	$751,750
3	Total Capital Cost	$0	$3,111,250	$3,176,750
4	Change in Annual O&M Costs	$0	-$1,200	-$400
5	Present Worth of O&M Costs	$0	-$23,021	-$7,674
6	Salvage Value	$0	$1,279,000	$1,358,500
7	Present Worth of Salvage Value	$0	$1,180,854	$1,254,254
8	Total Present Worth	$0	$1,809,229	$1,810,576

Table row description for Table 6 and Table 7:

1. Construction costs developed by AMP and detailed in Appendix A.
2. Project support fees based on a percentage of construction costs. Table 12 further breaks this total cost down for the Action Alternatives.
3. Capital costs are sum of 1 and 2.

4. O&M costs are based on the full budget, adding or subtracting impacts throughout the system.
5. Present value of O&M costs for 20 years at -0.25% (per 2023 USDA/SRF guidance).
6. Land considered permanent, 50-year life for piping and valves, 30-year life for lining of pipes, 50-year life for structures, 20-year life for repairs, and 20-year life for equipment (pumps).
7. Present worth of line 6 at -0.25% interest for 20 years.
8. Total of items 3 and 5 minus 7.

Partitioning of the Project

The long-term needs of the collection system are discussed in this report and in SAW. The City intends to partition the total collection system needs into numerous construction phases over the next several decades to enable improvements to within the limited financing capability of the service district. The 20-year improvement plan is outlined in the AMP and Appendix D.

The Environmental Evaluation

The City has considered the impact of these recommended improvements. The areas most affected have already been impacted by the original construction of the facilities. The necessary disruption caused by construction must be performed with conservation in mind. EGLE has not classified the project as either equivalency or non-equivalency; a preliminary environmental review has been completed. Please refer to Appendix C for more detail. A summary of the environmental review is presented in Table 8.

Table 8. Environmental Evaluation – Alternative A: Collection System Improvements

Category	Alternative A1: No Action	Alternative A2: Sewer Main Replacement
Cultural Resources:		
- Historical/Archaeological	1	1
Natural Environmental:		
- Climate	0	0
- Air Quality	0	1
- Wetlands	0	0
- Coastal Zones	1	1
- Floodplains	0	0
- Natural Wild and Scenic Rivers	0	0
- Surface Waters	2	0
- Topography	0	0
- Geology	0	0
- Soils	1	1
- Agricultural Resources	0	0
- Sensitive Habitats	0	0
- Threatened or Endangered Species	0	0
- Unique Features	0	0
Total (lower is less impact)	5	4

Major environmental impacts expected to result from the Ludington Street Pump Station alternatives will be very similar. Both will require deep excavation in sandy soils (sheeting and dewatering), traffic disruption, and visual distraction during construction. These are typical construction problems for this area of the City and although expensive to address, quality contractors will be able to mitigate the impacts and eventually completely restore the affected areas. A full environmental analysis is provided in Table 9 below.

Table 9. Environmental Evaluation – Alternative B: Lift Station Improvements

Category	Alternative B1: No Action	Alternative B2: Relocate (Submersible)	Alternative B3: Rebuild (Dry Pit)
Cultural Resources:			
- Historical/Archaeological	1	1	1
Natural Environmental:			
- Climate	0	0	0
- Air Quality	0	0	1
- Wetlands	0	0	0
- Coastal Zones	0	0	1
- Floodplains	1	1	1
- Natural Wild and Scenic Rivers	0	0	0
- Surface Waters	1	1	1
- Topography	0	0	0
- Geology	0	0	0
- Soils	1	1	0
- Agricultural Resources	0	0	0
- Sensitive Habitats	0	0	0
- Threatened or Endangered Species	0	0	0
- Unique Features	0	0	0
Total (lower is less impact)	4	4	5

Implementability and Public Participation

The City has completed large construction projects over the past several decades. All are openly discussed at public Council meetings, including with cost impacts. The Project Plan was advertised and displayed for citizen review for one month prior to a formal Public Meeting. The City contracted with an engineering design consultant (C2AE) for assistance in the planning process and utilized quality based selection for their design consultant as required by the CWSRF. They will also contract a bond counsel for assistance in arranging project funding.

Implementing either Ludington Street Pump Station alternative will be a high profile, high visibility venture requiring keeping the public appraised throughout the process of planning and construction. Addressing the aging pump station has been included in the project planning process at open City Council meetings along with budget impacts. The construction contract documents will also require the contractor (with City and Engineer) to hold public informational meetings before and during construction.

Technical Considerations

Infiltration and Inflow (I/I) Removal and Sewer System Evaluation Survey (SSES)

Areas of I/I concern in the service area has been investigated extensively over the past ten years. Flow monitoring was performed in 2017 and 2018. Smoke testing and roof drains investigation was performed in 2015 and 2018. These results are summarized in the following reports (see report excerpts in Appendix D):

2018 City of Escanaba SAW Study Summary
2018 City of Escanaba Infiltration and Inflow (I/I) Study
2019 City of Escanaba Sewer System Evaluation Study (SSES)
2019 City of Escanaba Wastewater System Model Summary
2019 City of Escanaba SRF Project Plan

Flow responses to high groundwater periods and rain/snowmelt events indicated potential inflow and/or infiltration in these areas. I/I in the system is resulting in capacity issues. Sewer separation experience in other UP communities has shown that I/I removal via a public infrastructure project can likely be successful in removing less than 50% and closer to 30% of the I/I when it is predominantly caused by infiltration and rain enhanced infiltration such as in Escanaba.

I/I removal estimates and related costs target the older, deeper portions of the collection system where 2017 and 2018 flow monitoring along with pump station pumping rate reviews indicate I/I potential problem areas are concentrated. Investigations included both areas called out for sewer main replacement in this Plan and the Ludington Street Lift Station tributary area. Figure 9 below highlights the I/I problem areas in the system.

Ludington Street was investigated in 2005 and 2018 for roof drain connections into the sanitary sewer. Potentially over six acres of roof areas are connected into the sanitary sewer. This project will aim to eliminate these connections during construction.

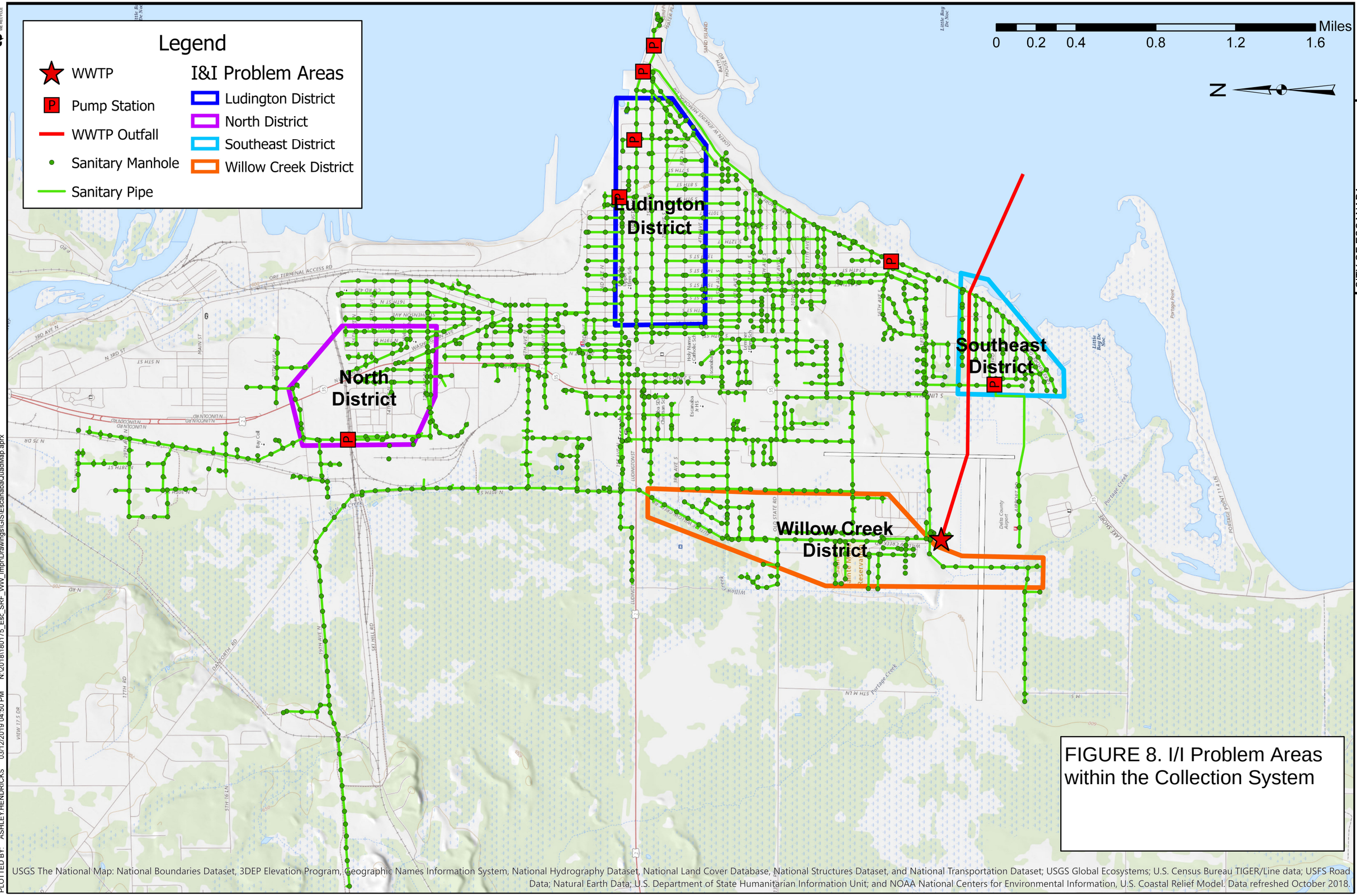

FIGURE 8. I/I Problem Areas within the Collection System

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

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FIGURE 9. I/I Problem Areas within the Collection System

Other project areas not in the likely I/I suspected areas, but are presumed to address I/I issues because they have cracks, holes, large joint offsets, and roots and sand infiltration. During times of high groundwater, these pipes are highly susceptible to infiltration. Manholes are also included by observation of I/I during SAW investigations. Table 10 below summarizes the issues in each of the project locations (manhole problems are summarized in the Appendix B).

Table 10. Project Location Deficiency Descriptions

Label	Location	Recorded Issues
L1 & L2	Ludington Street (9th St to Water Plant)	Four backups in past 10 years; 27 service calls in past 10 years; High probability of failure; I/I priority area from SSES; Installed in 1800s
A1	Alley East of Lincoln Rd (1st to 2nd Ave N)	Cracking; Holes; I/I observed; Connections at PVC-concrete are failing; High probability of failure
A2	Elementary School Play Ground	Root infiltration; Holes; Joint Offsets; Cracking; Deformation; High probability of failure
A3	Alley East of S 16th St (4th to 6th Ave S)	Joint offsets; Cracking; Holes; Sand infiltration; Cannot cctv entire pipe; High probability of failure; Installed in 1800s
A4	Alley East of S 9th St (5th to 6th Ave S)	Sand infiltration; High probability of failure; Installed in 1800s
A5	6th Ave S (S 21st to 19th St)	Hole in pipe; Sand infiltration; Pipe sagging; High probability of failure; One service call in past 10 years
A6	Alley East of S 14th St (6th to 7th Ave S)	Root & sand infiltration; Holes; Cracking; Cannot cctv entire pipe; High probability of failure; 10 service calls in past 10 years
A7	Easement West of Lincoln Rd (9th to 14th Ave S)	High probability of failure
A8	Alley East of Lincoln Rd (S 12th to 13th St)	Cracking; Joint offsets; Cannot cctv entire pipe; High probability of failure
A9	Alley East of S 16th St (10th to 12th Ave S)	Cracking; Root & sand infiltration; High probability of failure; 3 service calls in past 10 years
A10	Alley South of Ludington St (S 25th St to Walgreens)	Sand infiltration; Cannot cctv entire run pipe; Failing wye;
O1	New WWTP Outfall	Causing hydraulic and bottleneck issues at WWTP; No access points; Cannot cctv

Structural Integrity

After reviewing sanitary sewer televising, flow monitoring, and manhole inspections done as part of the City's SAW project, it has been concluded that there are sections of sewer that require replacement. Appendix B and D provides data collected under the SAW Program and during City investigations. The program has identified overall condition rating (or Probability of Failure) for sewer manholes, pump stations, and WWTP assets. The condition rating can be assumed as a major contributing factor to structural integrity. Figure 10 below provides the business risk of the system. Business risk is a parameter for categorizing replacement, factoring in structural integrity, of the system's assets where a higher value (maximum value of 25) indicates an asset needing replacement prioritized over assets with a lower business risk. Further structural deficiencies have been summarized above in Table 10.

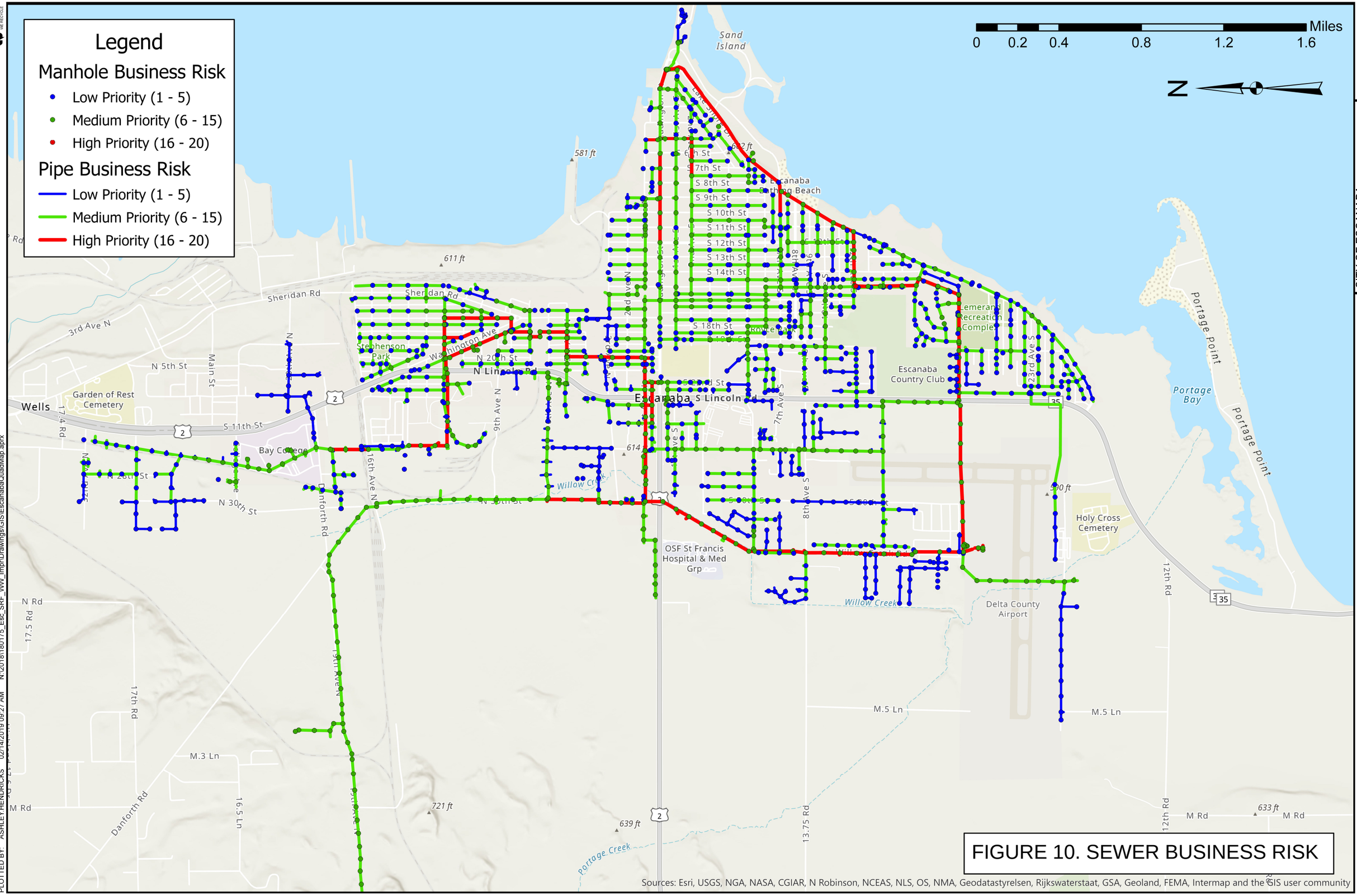

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FIGURE 10. BUSINESS RISK OF THE COLLECTION SYSTEM

FIGURE 10. SEWER BUSINESS RISK

Sludge and Residuals

The proposed improvements will not affect quality of sludge or residuals.

Industrial Pretreatment

It is not expected that the improvements recommended under the alternatives will have a positive or negative impact on industrial pretreatment issues.

Growth Capacity

It is not anticipated that there will be a need for significant growth capacity in the 20-year future planning period. Significant capacity needs that surface as a result of given development moving forward would be addressed as part of that development.

Potential (probable) development of the old county jail site into a hotel/commercial establishment must also be considered in establishing the recommended capacity for the pump station. Current preliminary planning for this report has used 2,000 gpm as a design firm capacity for the pump station to be refined once design is underway (and jail site plans are finalized).

Areas Currently Without Sewers

Developed areas within the project area are all currently served.

Alternative Sites and Routings

All improvements under the principal alternatives are contained on the existing site. Considerations for Alternative siting and routing are minimal due to the extensive infrastructure already in place.

Combined Sewer Overflows (CSO)

There are no known combined sewer overflows associated with the City. A list of sewer backups is provided in Appendix D.

Contamination at the Project Site

There are no known contamination sites within the project area.

Green Project Reserve

The proposed project does not include green infrastructure, water, nor energy improvements. However, high efficiency, energy saving pump motors will be specified where applicable.

SELECTED ALTERNATIVE

The Alternative A2: Sewer Main Replacement and Alternative B2: Relocate Lift Station are the selected alternative because it provides the most cost effective option to provide improvements to structural deficiencies within the system. Project priorities are prioritized based on importance established using SAW findings (i.e. televising reports, manhole inspections, etc.); priorities may change depending on funding levels and award from the water and wastewater projects.

Relevant Design Parameters

Sewer replacement or rehabilitation would conform to current EGLE and American Water Works Association (AWWA), and "Ten State" standards. Environmental issues that arise during design would be addressed via EGLE and local and county permitting processes. Wastewater collection deficiencies to be corrected are prioritized based on results of the SAW program and City personnel knowledge of problem areas, existing pipe age and material, and ability to combine work with water system deficiencies to cost effectively deal with both.

Ludington Pump Station relevant design parameters include an estimated 1,700 to 2,000 gpm firm capacity, self-cleaning bar screen for pump protection, on-site emergency power, high water protection, security, provision for emergency pumping, plus reliable access to pumps, controls, and electrical for maintenance. Firm capacity is that estimated to meet 20+ year planning needs with ability to increase capacity if need-be.

Project Maps

Below is a list of the maps presented in this report:

- Figure 2. Study and Service Area
- Figure 5. Existing Wastewater System and Facilities
- Figure 6. Wastewater Treatment Plant Site
- Figure 7. Proposed Project Locations
- Figure 8. Proposed Manhole Improvement Locations
- Figure 9. I/I Problem Areas within the Collection System
- Figure 10. Business Risk of the Collection System

Controlling Factors

Planning and design will be in accordance with applicable industry standards including:

- EGLE and USACE Permitting Requirements

- OSHA and MiOSHA Requirements
- SHPO and THPO Requirements
- EGLE and Ten States Standards
- Regional Utility Standards

Special Assessment District Projects

A special assessment district is not planned nor applicable to this project.

Sensitive Features

Work will take place on previously disturbed areas within right-of-ways and on existing treatment facility grounds. Both areas will be isolated from any potential sensitive environmental locations. It will be necessary to protect the waters of the Great Lakes during construction.

Schedule for Design and Construction

The schedule for design and construction is presented in Table 11 below.

Table 11. Project Schedule

Item	Target
CWSRF Application Submittal	Spring 2023
CWSRF Acceptance	Summer 2023
Funding Commitment	Summer 2023
Start Design	Fall 2023
Land & Easements Acquisition	N/A
Permits	Winter 2024
Advertise for Bids	Winter 2024
Funding Closing	Spring 2024
Contract Award	Spring 2024
Construction	Spring 2024
Substantial Completion	Fall 2026
Final Completion & Initiation of Operation	Fall 2026

Cost Summary

A brief summary of planning, design, and construction costs is included below in Table 12.

Table 12. Project Cost Summary

Item	Est. Total
Construction	$14,700,000
Administration, Legal, Bonding, Permits, & Miscellaneous	$189,000
Planning (excluded from engineering total)	$54,000
Design	$735,000
Bidding	$45,000
General Engineering During Construction	$324,000
Post Construction Services	$52,000
Resident Project Representative	$809,000
Additional Services – Design Related	$136,000
Additional Services – Construction Related	$230,000
Engineering Total	$2,385,000
Contingencies	$1,764,000
Total Project Cost	$19,038,000

Authority to Implement the Selected Alternative

The City is incorporated as a Home Rule City in the State of Michigan. The City has successfully implemented wastewater system improvements projects over the past 50 years. The City has shown it has the legal, institutional, technical, financial, and managerial resources to accomplish implementation of the recommended alternatives.

User Costs

Table 13 demonstrates the impact on user rates that may be possible with a project of this size. This breakdown assumes a 30-year debt service on the bond at an interest rate of 1.875% (2023 interest rate). O&M is expected to decrease, but will be maintained at existing rate for conservative budgeting.

Table 13. User Costs

Description	Value
CWSRF Loan Amount	$19,038,000
Anticipated Interest Rate	1.875%
Term	30 years
Annual Debt Service	$835,505
Monthly Debt Service	$69,625
Estimated System EDUs	7,146
User Rate Impact / EDU / Month	$9.74

Overburdened Community

A "Overburdened Community Status Determination Worksheet" is included with the final Project Plan submittal (see Appendix B). According to guidelines, the City does qualify as a significantly overburdened community considering their current and projected debt service, median household income, and user rates.

Useful Life

Remaining Useful Life of all wastewater assets is available in the SAW Asset Management Plan (see Appendix D). For new capital improvements including those under the proposed SRF project the total useful lives are as listed below based on methodology for salvage value computation.

- Building: 50 years
- Underground facilities including piping and foundations: 50 years (100 years expected based on performance of existing systems).
- Short-lived equipment: 20 years (30 to 40 years expected based on performance of existing equipment).

ENVIRONMENTAL EVALUATION

Summary

EGLE has not classified the project as equivalency or non-equivalency; a cursory environmental review has been performed and the findings are included within Appendix C until equivalency status has been determined. Below summarizes the environmental review findings.

Analysis of Impacts

Direct Impacts

Construction Impacts

Construction activity impacts will be short term as previously noted and are not expected to be unusual for underground utility or building construction. Implementing the improvements will reduce overall system operation and maintenance efforts due to replacement of outdated equipment and installation of newer, more reliable equipment.

Operational Impacts

No changes in odors, noise, traffic, or accident/spill potential are expected from the selected alternative. Updating systems to more reliable and efficient operation helps to minimize adverse operational impacts. Implementing the improvements will reduce overall system operation and maintenance efforts due to replacement of outdated assets and installation of newer, more reliable system.

Social Impacts

The project segments will create short term economic benefits in areas of construction employment and materials supply. No relocation of residents or businesses is expected to result from the project. Long term human, social, and economic impacts will be positive through increased efficiency and reliability in area infrastructure. Construction is not anticipated to have any adverse effect on historical, archaeological, geological, or recreational areas.

Indirect Impacts

Land Development

The project will occur on previously disturbed areas or rights-of-way and should not induce changes in rate, density, or type of land development nor associated transportation routes.

Land Use

The project is not expected to change current land use patterns.

Air and Water Quality

Air and water quality changes stemming from primary and secondary development are expected to be temporary and minor to non-existent.

Secondary Growth

Secondary growth is also not expected other than that of any well run and maintained utility system.

Cultural Impacts

Impacts generated by the recommended improvements on cultural, human, social, and economic resources can only be considered beneficial in the long term. Continued efficient and reliable operation of the area's utility system(s) contributes to a stable infrastructure promoting public health and safety.

Aesthetics

The projects will produce no overall permanent damage to existing area aesthetics.

Resource Consumption

No additional or increased resource consumption will occur due to these projects other than the construction related issues previously noted.

Cumulative Impacts

No additional development incentive is expected to be created other than what occurs by default with improvements to a utility system.

MITIGATION MEASURES

General

Where adverse impacts due to installation of the recommended improvements cannot be avoided, mitigation measures will be implemented. Costs for mitigation measures were considered and included where applicable in project opinions of probable cost. Mitigation measures needed during construction will be included in construction contract documents.

Short-Term Construction Related Mitigation

Traffic

Any traffic disruptions that occur (such as equipment deliveries or construction-related traffic) will be organized and controlled to minimize disruption of local, transient, and emergency traffic. All needed barriers and signing or flagging will be in conformance with applicable Authority, County, and MDOT standards.

Safety

All work shall comply with Federal, State, and local laws governing activities, safeguards, devices and protective equipment. Minimum requirements are defined by the U.S. Department of Labor and the Michigan Occupational Safety and Health Act.

Dust and Noise

Construction dust and noise will be required to be kept to a minimum via the construction contract documents. Use of water or other suppressants will be used to control fugitive dust and prevent violation of Rule 901.

Erosion

A Soil Erosion and Sedimentation Control permits will be required for the project. Site specific mitigation measures will be addressed during design and included in the construction contract documents. For this project, there is very little anticipated site disturbance.

Restoration

Damaged curbing, driveway, and sidewalk surfaces will be restored to equal or better condition in accordance with best modern practices. Undeveloped areas will be restored with topsoil, fertilizer, mulch and seed or sod as needed in a timely manner. All disturbed site soil will be restored with topsoil, seed, fertilizer, and mulch. When final restoration will not occur with 14 days of disturbance, temporary seed and mulch will be required.

Utilities

Disruption of utilities during construction will be kept to the minimum necessary to allow new installations. Repairs will be made in a timely manner. Careful sequencing with Owner is required in construction contract to avoid interruptions to the treatment process. No untreated or partially treated discharge of effluent to Little Bay De Noc will be allowed.

Valuable Features

Implementation of the selected alternatives is not expected to significantly impact more extensive or valuable existing features such as mature vegetation.

Mitigation of Long-Term Impacts

General Construction

It is not anticipated that there will be any long term impacts from the general construction activities.

Siting

Work will be confined to existing developed areas and in existing rights-of-ways.

Operational Impacts

Long term operational issues will not be adversely changed by the projects; rather, operations should be enhanced through new more reliable equipment installations.

Mitigation of Indirect Impacts

Master Plan and Zoning

Long range planning by the City identified the project segments evaluated in this report and all take place within existing disturbed or developed areas and rights-of-ways and will have no effect on planning and zoning in the community.

Ordinances

Local ordinances are in place regarding minimum building construction and operation standards and site erosion control. Wetlands, floodplains, and other sensitive habitats are protected by State laws and permitting procedures.

Staging of Construction

Staging will not be necessary.

Construction Problems

Construction problems anticipated include groundwater control and potentially areas of inferior structural/pipe bedding and backfill soil material. These are normal occurrences with construction in the area and prior planning/design will create a situation where these problems will pose no significant difficulties for qualified contractors.

PUBLIC PARTICIPATION

The City's wastewater system needs and generic potential fixes have been openly noted at several City Council meetings over the past decade. The Council has held several open council meetings over the past years where there were discussions and approved studies both at the WWTP and regarding the collection system. The previous project plan for WWTP improvements were discussed on June 6, 2019.

Public Meeting

An initial public meeting on the information presented in this report was held on April 6, 2023. A written transcript is included in Appendix E.

Public Meeting Advertisement

An advertisement was placed in The Daily Press 16 days prior to the Public Meeting on March 20, 2023. Simultaneously to the advertisement publication, copies of the Project Plan were made available to the public at City Hall and on the City's website. Appendix E includes the advertisement copies.

Public Meeting Summary

A full transcript of the public meeting is available in Appendix E. Comments are summarized in Appendix E with a full transcript. No written comments were received prior to the Public Meeting.

Adoption of the Project Plan

Agency and/or Owner preliminary review comments were incorporated into the final version of this Project Plan. The plan was adopted by the City on April 6, 2023.