



City of South Haven Capital Improvement Plan

March 20, 2017



INTRODUCTION

The City completed a systematic analysis of its utility system to address issues within the collection system that lead to elevated wet weather flows and utilize system capacity that could otherwise be available for growth. It was funded through an S2 Grant from the Michigan Department of Environmental Quality (MDEQ) and submitted to MDEQ for State Revolving Loan Funding (SRF). In 2016, the City also completed an Asset Management Report for the Wastewater Treatment Plant (WWTP) and Lift Stations which outlined necessary improvements to meet permit and demand requirements. The information collected through these studies was used by the City of South Haven to develop a Capital Improvement Plan to guide infrastructure spending.

The purpose of this Capital Improvement Plan (CIP) is to provide an overview of the cost effective projects previously identified in those studies mentioned above for approval by the City Council. The following projects were selected following comprehensive research, mapping, metering, monitoring, modeling, testing, and inspection of the existing infrastructure are facilities. A cost benefit analysis was developed for each project to ensure the each provided a positive impact relative to the investment.

Structurally Deficient Pipe Projects

- Dyckman Avenue Reconstruction (Phase I) – Construction of new sanitary sewers to replace structurally deficient, collapsed sewers and defective manholes on Dyckman Avenue between Park Avenue and the Bridge over the Black River. This project also involves reconstruction of Storm Sewer on Dyckman Avenue between Black River Street and the Outfall at the Black River to eliminate cross connections discovered during smoke testing.
Status: Complete
- Kalamazoo Street Reconstruction: Phase I&II – Reconstruction of sanitary sewers and manholes on Kalamazoo Street from a point 650 feet south of Aylworth Avenue to Cable Avenue to address qualifying structural, alignment and observed infiltration defects.
Status: In Progress
- Black River Street Reconstruction: Phase II – Reconstruction of sanitary sewer to address defects that prevent replacement or maintenance of pipes. This work involves rerouting of the existing sewer from beneath privately-owned structures to an accessible location within an easement or right-of-way.
Status: In Progress- Construction Fall 2017

- North Shore Drive Reconstruction: Phase II – Replacement of existing sanitary sewers and manholes to address structural defects in pipe and manholes, address ingress of roadbed material/undermining of roadway, and debris intrusion.

Status: In Progress

- Abell Avenue Reconstruction: Phase III – Reconstruction of sanitary sewers and manholes on Abell Avenue from Indiana Avenue to Kalamazoo Street in order to address qualifying structural defects identified during internal inspection.

Status: In Design

- Edgell Street Rehabilitation (East): Phase III – Rehabilitation of pipe and manholes on Edgell Street from Kalamazoo Street to Manhole 409 west of Center Street to address collapsed and broken pipe. The nature of these defects is such that in-place rehabilitation techniques are suitable to address the issues identified in the inspection.

Status: In design

Lyon Street Reconstruction: Phase III – Replacement of existing sanitary sewers and manholes on Lyon Street mid-block between Indiana Avenue and Kalamazoo Street. This section of sewers exhibits structural defects that qualify for SRF participation and warrant reconstruction based on technical feasibility.

Status: In design

- Indiana Avenue Reconstruction (North): Phase IV – Reconstruction of sewers on Indiana Avenue, South Haven Street, Monroe Street, and Clinton Street where structural defects, broken and collapsed pipe, and underground voids were visible during internal inspection.

- **Status: In design**

- Center Street Reconstruction: Phase IV – Reconstruction of sanitary sewers and manholes on Center Street between Aylworth Avenue and Abell Street to address qualifying structural and alignment defects.

Status: In design

Inflow and Infiltration Elimination Projects

- Peterson Ravine Manhole Rehabilitation: Phase I – Correct defects and deficiencies at manholes in the Peterson Ravine Interceptor. This project involved raising castings, waterproofing chimneys, and addressing leaks/cleanout defects in the manholes located within the Peterson Ravine between Clinton Street and Aylworth Avenue.

Status: Complete

- Center Street Sewer Separation: Phase IV – Reconstruction of sanitary and storm sewers on Center Street between the Peterson Ravine crossing and Lyon street to eliminate cross connections.

Status: In design

- Indiana Avenue Sewer Rehabilitation (South): Phase IV – CIPP rehabilitation of sanitary sewers on South Indiana Avenue and adjacent streets where infiltration issues are present and CEA demonstrates the financial viability of removal.

Status: In planning

- Indiana Avenue and Edgell Street Sewer Rehabilitation: Phase IV – CIPP rehabilitation of two segments of sanitary sewer that demonstrated significant infiltration issues.

Status: In planning

- Commercial and Residential Roof Drain Removal – Removal of interconnected commercial and residential roof drains is suggested as an enforcement issue to eliminate these illicit connections. The locations identified during smoke testing, have the appropriate storm sewers available and can be addressed by the property owner at no cost to the city.

- **Status: In planning**

Lift Station Projects

- Indian Grove Lift Station Reconstruction and Force Main Replacement (Phase I) – Reconstruction of lift station Superstructure to address failing condition of walls, roof and the insufficient capacity of the existing pumps. Replacement of force main at creek crossing to eliminate SSOs, extension to Monroe Boulevard, and replace lift station pumps, plumbing, equipment and controls to address runtime issues and allow monitoring of lift station performance. Associated Monroe Boulevard Reconstruction Project, though not eligible for SRF funding, has been is also shown in the monetary evaluation to demonstrate overall project cost.

Status: In progress

- Main Lift Station Consolidation (Phase I) – Replacement of Main Lift Station to upgrade capacity for design storm event and consolidate Main and Wells Lift Stations into one facility. Capacity improvements will eliminate SSO events due to undersized pumps in existing station.

- **Status: In progress**

Wastewater Treatment Plant Projects

- WWTP Biosolids Storage – This project will construct a new Biosolids Storage Tank and associated pumps and piping required to operate the tank. The amount of biosolids storage is currently no adequate and does not meet the State of Michigan standard of 180 days for systems utilizing agricultural land application. The plant currently has only approximately 90 days of storage. This creates operational problems for the plant as the private biosolids hauler often has difficulty in hauling the biosolids at this frequency due to land availability in the area and seasonal weather conditions which prevent land application on farmland. When the biosolids storage is full, the WWTP does not have available capacity to accept new waste without the possibility failing to meet permit limits. Providing additional storage would help prevent the situation which occurred in July 2016 and allow for future growth and industrial discharges to the WWTP. It is proposed to provide a new storage tank with a 650,000 gallon capacity and associated pumps and piping required.

Status: In design

- WWTP Aeration Blowers – This project will replace two of the existing aeration blowers and add a dissolved oxygen based control system. The existing blowers are not able to provide enough oxygen in the summer months and due to the lack of controls, they provide too much oxygen in the winter months. Blower and dissolved oxygen probe technologies have provided for increased efficiency and more sophisticated yet easy-to-maintain control systems over the last ten years. Operating new and more efficient blowers with an automatic control system will likely save the City at least \$20,000-\$30,000 in electrical power cost per year (based on \$0.10/KWH) and will also allow for the plant to automatically ramp up the air supply when businesses, like the proposed brewery, discharge oxygen-demanding waste to the plant. In addition, the Return Activate Sludge (RAS) Pumps and Waste Activated Sludge (WAS) Pumps and controls should be replaced to provide better control of the biological treatment system.

Status: In design

- WWTP Screen Chamber: Phase II – This project, closely related to the consolidation of the Main and Wells Lift Station, consists of new screening coarse and fine screening for the WWTP. Replacement of the existing damaged and maintenance intensive screening equipment will be integrated before and after the new Main Lift Station. Screening will be installed before and after flow is handled by the new lift station. Coarse screening will be placed ahead of the lift

station pumps to protect the impellers from wear and tear associated with pumping this debris as well as improving reliability and reducing operational costs associated with pulling and cleaning the pumps. Following the pumping, fine screening will be conducted at the surface in order to remove smaller items from the waste stream.

Status: In progress

- Settling Tanks & Equipment Replacement: Phase III – This project includes construction of at least two settling tanks to increase the hydraulic capacity of this system to a point that it is able to adequately treat the projected hydraulic loading. The additional settling tanks will be fed by an influent splitter capable of distributing flow to existing and new settling tanks. In addition to the added capacity, the 50-year-old sludge collection equipment (in poor condition) will be replaced with modern equipment for improved performance and efficiency as well as reduced maintenance. A cleaning system will also be installed to reduce or prevent algae accumulation on the effluent weirs.

Status: In design

- Chemical Feed, Mechanical Thickening, and Administration: Phase III

Chemical Feed Revisions: The South Haven WWTP currently utilizes a gas chlorination system utilizing 150 pound cylinders. As part of this project, the existing gas chlorination system will be modified to utilize liquid sodium hypochlorite with the addition of new bulk storage tanks and feed equipment.

Mechanical Thickening: The current solids handling process consists of gravity thickening, followed by anaerobic digestion, followed by storage and land application. While the performance of the solids handling process has been adequate, the thickening of solids is less than what is produced from similar WWTP resulting in higher disposal costs and the amount of sludge storage is not adequate. This project will include installing a mechanical thickener and converting the existing digester into storage tanks.

Administration Building: The lab/administration building is poorly insulated, is in need of major repair and there is not adequate space in the lab or office areas. This project will include constructing a new lab/administration building.

Status: In planning

- Aeration Tanks, Chlorine Tank and Site Improvements: Phase IV –

Aeration Tanks: The WWTP currently has two aeration tanks. While these tanks are adequate to treat average flows, during higher flow periods or when one is shut down for maintenance, the aeration tanks can be hydraulically and organically overloaded. This project will include constructing a new aeration tank to increase the treatment capacity of the WWTP.

Chlorine Tank Improvements: The existing chlorine tank was originally created by modifying the Imhoff tanks from the original WWTP constructed in 1933. This project will include cutting off the top portion of the tank and other improvements to make access and maintenance within the tank easier.

Site Improvements: This project will include improving the site security with a new security gate and fence, repaving the existing driveway, replacing sidewalks and improving the aesthetics of the site with new landscape planting and berms.

Status: In design

SCHEDULE FOR DESIGN AND CONSTRUCTION

The proposed projects have been broken down into a segmented plan with phases selected in order to meet project goals (addressing the most critical areas first) while coordinating with currently scheduled improvements to other infrastructure. The proposed phasing takes into account the results of the Collection System Evaluation (Project Plan) and WWTP Evaluation and Facilities Master Plan.

The following schedule establishes a logical approach and timeframe to design and construct the selected alternatives.

Table 1: Anticipated Project Construction Schedule

Project Area	'14-'15	'15-'16	'16-'17	'17-'18	'18-'19	'19-'20	'20-'21	'21-'22	'22-'23	'23-'24	'24-'25	'25-'26
Dyckman Avenue Reconstruction	X											
Peterson Ravine Manhole Rehabilitation		X										
Kalamazoo Street Phase III & Cartwright Avenue		X										
Kalamazoo Street Reconstruction - Phase IV			X									
Monroe Blvd Reconstruction Project			X	X								
Indian Grove Force Main Replacement			X	X								
Indian Grove Building and Controls			X	X								
Option A: Main Pump Station Consolidation			X	X								
WWTP Screen Chamber			X	X								
Black River Street Reconstruction			X	X								
North Shore Drive Reconstruction			X	X								
Abell Avenue Reconstruction						X						
Edgell Rehabilitation (East)							X					
Lyon Street Reconstruction								X				
WWTP Biosolids Storage				X	X							
WWTP Aeration Blowers				X	X							
Indiana Avenue Reconstruction (North)												X
Indiana Ave. Rehabilitation (South)												X
Indiana and Edgell Rehabilitation												X
Center Street Reconstruction												X
Center Street Sewer Separation												X
WWTP Settling Tanks & Equipment Replacement									X			
WWTP Chemical Feed, Mech. Thickening, & Admin. Building									X			
WWTP Aeration Tanks, Chlorine Tank, & Site Improvements												X

COST SUMMARY

The estimated costs of the proposed project plan are summarized in **Table 2** below.

Table 2: Proposed Project Costs

Phase I Projects and Costs (COMPLETE)

Project Area	Construction Cost Estimate	Engineering		SRF Project Cost Estimate	City Funded Work	Total Project Cost Estimate
		Design Cost Estimate	Construction Cost Estimate			
Dyckman Avenue Reconstruction	\$ 556,059	\$ 33,364	\$ 55,606	\$ 645,028	\$ 350,000	\$ 995,028
Peterson Ravine Manhole Rehabilitation	\$ 61,711	\$ 6,171	\$ 6,171	\$ 74,054	\$ -	\$ 74,054
Kalamazoo Street Phase III & Cartwright Avenue	\$ 674,755	\$ 40,485	\$ 67,745	\$ 782,716	\$ -	\$ 782,716
Subtotal: Phase I Projects and Costs (COMPLETE)	\$ 1,292,525	\$ 80,020	\$ 129,253	\$ 1,501,798	\$ 350,000	\$ 1,851,798

Phase II Projects and Costs (IN PROGRESS)

Project Area	Construction Cost Estimate	Engineering		SRF Project Cost Estimate	City Funded Work	Total Project Cost Estimate
		Design Cost Estimate	Construction Cost Estimate			
Kalamazoo Street Reconstruction - Phase IV	\$ 480,647	\$ 28,839	\$ 48,065	\$ 557,551	\$ -	\$ 557,551
Monroe Blvd Reconstruction Project	\$ -	\$ -	\$ -	\$ -	\$ 2,485,212	\$ 2,485,212
Indian Grove Building and Controls	\$ 355,527	\$ 42,663	\$ 35,553	\$ 433,743	\$ -	\$ 433,743
Indian Grove Force Main Replacement	\$ 240,148	\$ 24,015	\$ 24,015	\$ 288,177	\$ -	\$ 288,177
Option A: Main Pump Station Consolidation	\$ 4,212,353	\$ 421,235	\$ 421,235	\$ 5,054,824	\$ -	\$ 5,054,824
WWTP Screen Chamber	\$ 800,000	\$ -	\$ -	\$ 800,000	\$ -	\$ 800,000
Black River Street Reconstruction	\$ 312,610	\$ 31,261	\$ 31,261	\$ 375,132	\$ -	\$ 375,132
North Shore Drive Reconstruction	\$ 2,175,731	\$ 130,544	\$ 217,573	\$ 2,523,848	\$ 1,254,160	\$ 3,778,008
Subtotal: Phase II Projects and Costs (IN PROGRESS)	\$ 8,577,016	\$ 678,557	\$ 777,702	\$ 10,033,275	\$ 3,739,372	\$ 13,772,647

Phase III Projects and Costs

Project Area	Construction Cost Estimate	Engineering		SRF Project Cost Estimate	City Funded Work	Total Project Cost Estimate
		Design Cost Estimate	Construction Cost Estimate			
Abell Avenue Reconstruction	\$ 319,028	\$ 131,253	\$ 23,915	\$ 277,416	\$ 146,377	\$ 423,793
Edgell Rehabilitation (East)	\$ 4,374,535	\$ 656,180	\$ 433,743	\$ 288,177	\$ 354,798	\$ 642,975
Lyon Street Reconstruction	\$ 113,149	\$ 6,789	\$ 11,315	\$ 131,253	\$ 279,181	\$ 410,434
WWTP Biosolids Storage	\$ 1,400,000			\$ 1,400,000		\$ 1,400,000
WWTP Aeration Blowers	\$ 600,000			\$ 600,000		\$ 600,000
Subtotal: Phase III Projects and Costs	\$ 6,806,712	\$ 794,222	\$ 468,973	\$ 2,696,846	\$ 780,356	\$ 3,477,202

Phase IV Projects and Costs

Project Area	Construction Cost Estimate	Engineering		SRF Project Cost Estimate	City Funded Work	Total Project Cost Estimate
		Design Cost Estimate	Construction Cost Estimate			
Indiana Avenue Reconstruction (North)	\$ 1,230,215	\$ 73,813	\$ 123,021	\$ 1,427,049	\$ 957,610	\$ 2,384,659
Indiana Ave. Rehabilitation (South)	\$ 422,606	\$ 22,049	\$ 36,748	\$ 481,403	\$ -	\$ 481,403
Indiana and Edgell Rehabilitation	\$ 104,817	\$ 10,482	\$ 10,482	\$ 125,780	\$ -	\$ 125,780
Center Street Reconstruction	\$ 291,733	\$ 17,504	\$ 29,173	\$ 338,411	\$ 234,676	\$ 573,087
Center Street Sewer Separation	\$ 370,172	\$ 22,210	\$ 37,017	\$ 429,399	\$ 332,007	\$ 761,406
WWTP Settling Tanks & Equipment Replacement	\$ 3,000,000	\$ -	\$ -	\$ 3,000,000	\$ -	\$ 3,000,000
WWTP Chemical Feed, Mech. Thickening, & Admin.	\$ 4,000,000	\$ -	\$ -	\$ 4,000,000	\$ -	\$ 4,000,000
WWTP Aeration Tanks, Chlorine Tank, & Site	\$ 3,963,000	\$ -	\$ -	\$ 3,963,000	\$ -	\$ 3,963,000
Subtotal: Phase IV Projects and Costs	\$ 13,382,543	\$ 146,058	\$ 236,441	\$ 13,765,042	\$ 1,524,293	\$ 15,289,335

Totals:

Project Phase	Construction Cost Estimate	Engineering		SRF Project Cost Estimate	City Funded Work	Total Project Cost Estimate
		Design Cost Estimate	Construction Cost Estimate			
Subtotal: Phase I Projects and Costs (COMPLETE)	\$ 1,292,525	\$ 80,020	\$ 129,253	\$ 1,501,798	\$ 350,000	\$ 1,851,798
Subtotal: Phase II Projects and Costs (IN PROGRESS)	\$ 8,577,016	\$ 678,557	\$ 777,702	\$ 10,033,275	\$ 3,739,372	\$ 13,772,647
Subtotal: Phase III Projects and Costs	\$ 6,806,712	\$ 794,222	\$ 468,973	\$ 2,696,846	\$ 780,356	\$ 3,477,202
Subtotal: Phase IV Projects and Costs	\$ 13,382,543	\$ 146,058	\$ 236,441	\$ 13,765,042	\$ 1,524,293	\$ 15,289,335
Totals:	\$ 30,058,796	\$ 1,698,857	\$ 1,612,369	\$ 27,996,961	\$ 6,394,021	\$ 34,390,982