



Facility Plan

Sims Street Improvements - Phase 2

Sanitary and Storm Sewer Improvements

City of Dickinson, ND





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City of Dickinson, ND

Apex Project Number 20.107.0162

DRAFT

Certification

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of North Dakota.

Signature

Susan Hazelett

Typed or Printed Name

Date

PE -7539

License Number

April 2024

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1.0 Introduction

In 2012 the City of Dickinson and Apex Engineering Group entered into an agreement to study the City's existing sanitary sewer system. The goal for that project was to assess the performance of the existing system and to plan the capital improvements required to meet future demands. A Facility Plan was written, and a Clean Water State Revolving Fund (CWSRF) loan was acquired to pay for some of those improvements. The projects funded by that loan have been completed. The City has decided to move forward with some of the projects that were identified in the original Facility Plan but not complete. The projects will be completed in phases as time and funding allows.

This report is to serve as a facility plan for one of the collection system projects identified in the former facility plan that the City is going to fund using a CWSRF loan. The facility plan also includes storm water improvements recently identified that will be constructed in 2024.

2.0 Background

2.1 Sanitary Sewer / 10th Avenue East Interceptor

The 10th Avenue East Interceptor collects all the wastewater in the northeast part of the City and conveys it south under I-94. After crossing under I-94 the wastewater flows south along 10th Avenue East. Wastewater flows in Basin A are added to the 10th Avenue East Interceptor as it travels south down 10th Avenue East. After crossing Villard Street, the 10th Avenue Interceptor crosses under the railroad tracks and flows to the Influent Pump Station. The 10th Avenue East Interceptor is shown in yellow in the figure below.



the future. The remaining capacities listed in Table 1 were calculated prior to the Lift Station 14 upgrades. The current capacity of Lift Station 14 is 564 gpm higher than when the above numbers were calculated, which has caused a deficiency in all but one of the limiting sections shown above. The 10th Avenue East Interceptor is in need of upgrades.

Lift Station 11 is located on the west side of Sims Street south of 14th Street. Lift Station 11 also pumps to the northern most point in the 10th Avenue East Interceptor. The current capacity of Lift Station 11 is 900 gpm per pump testing done in 2015. Since the completion of the last facility plan, Lift Station 11 has become increasingly unreliable. The emergency generator has failed to start during power outages. Corrosion of the electrical wiring and controls has resulted in pumps not starting and failed alarms. When Lift Station 11 fails, sewage backs up in the gravity line upstream from the lift station in Sims Street. This has resulted in sewage backing up into the townhomes on the southeast corner of Sims Street and 14th Street.

Lift Station 12 used to pump to Lift Station 11 but has been upgraded and rerouted to pump to the West Gravity Sewer. This has reduced the demands on Lift Station 11. As part of the Lift Station 12 upgrades, a new SCADA system was installed in Lift Station 11 to help notify operations staff of any alarms that may occur. This has not eliminated the operational issues, but personnel can respond more quickly. In addition, personnel have observed that the new SCADA system at Lift Station 11 is already showing signs of corrosion due to elevated concentrations of hydrogen sulfide gas in the building.

Lift Station 18 is located near Sims Street and Foster Drive. Lift Station 18 pumps sewage to the gravity line that feeds Lift Station 11. Lift Station 11 has an overflow mechanism whereby it can flow by gravity to the south. When Lift Station 18 was built, it intercepted that gravity line that accepted the overflow from Lift Station 11. As a result, if Lift Station 11 begins to back up, sewage will bypass Lift Station 11 and flow by gravity to Lift Station 18. Then Lift Station 18 will pump the sewage back up to Lift Station 11. This circular pumping only compounds the operational issues at Lift Station 11.

The 10th Avenue East Interceptor has also experienced problems with multiple manholes due to corrosion from hydrogen sulfide gas. In the last couple of years, several manholes have had to be repaired due to crumbling concrete barrel sections. Some were repaired using chemical grout injected into and behind the concrete to seal up leaks. Others were lined using synthetic liners impregnated with resin that, once hardened, provide new structural integrity for the manhole. A comprehensive study of the extent of the corrosion throughout the 10th Avenue East Interceptor is recommended to correct any defects in the system and propose methods to prevent further corrosion.

2.2 Sims Street Storm Sewer

Sims Street south of I-94 has little to no storm sewer infrastructure. As a result, there are multiple areas that flood during storm events. The intersection of Museum Drive and Sims Street is shown on the front cover of this report. This area has a risk of causing traffic accidents related to storm water flooding,



including but not limited to reduced visibility from splashing water and slippery conditions. As traffic in this area increases, so will the number of risk of accidents.

3.0 Project Need

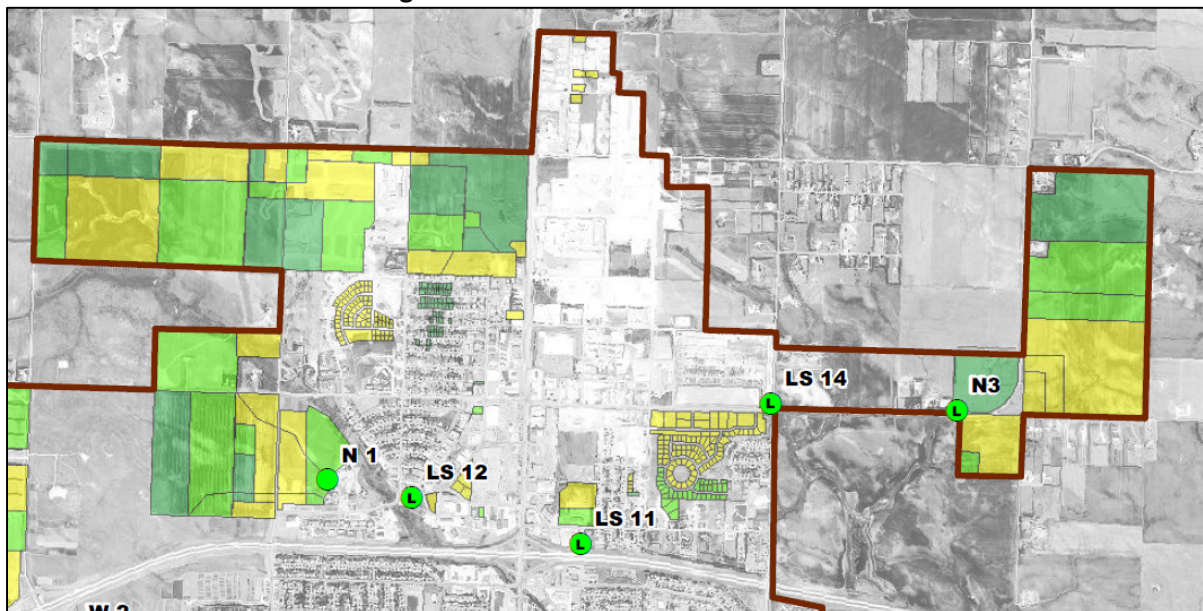
The City of Dickinson had exceeded much of the capacity of its existing wastewater collection and conveyance system. Some major upgrades to the system have been completed over the last few years, and the system has been performing adequately for current conditions. However, additional major improvements will be needed to accommodate growth and to more efficiently collect the wastewater.

The City of Dickinson experiences capacity issues in the existing stormwater collection and conveyance system. This has resulted in ponding in many locations during even minor rain events, creating hazardous conditions for drivers and pedestrians.

3.1 Sims Street Gravity Sewer / 10th Avenue East Interceptor

Wastewater flows from development on the north side of Dickinson flows by gravity to three lift stations. Lift Station 12 collects flows from development areas north of I-94 and between Highway 22 and 30th Avenue West. Lift Station 12 was upgraded in 2015 and now pumps to the West Gravity Sewer which flows to the West Pump Station. Lift Station 11 and Lift Station 14 collect flows from development areas north of I-94 and east of Highway 22. Lift Station 11 is currently experiencing operational issues as discussed earlier. Lift Station 14 has been upgraded to accommodate future flows.

Figure 2 North Dickinson Service Area



Both Lift Station 11 and Lift Station 14 pump to the north end of the 10th Avenue East Interceptor. Projected flows for LS 14 include a significant area of commercial and industrial development that is

currently being developed. Lift Station 14 has been upgraded to a firm capacity of 695 gpm, with the ability to expand to 2,200 gpm when needed.

While the 10th Avenue East Interceptor has some remaining capacity as shown in Table 1, it will not be able to accommodate the existing firm capacity of the upgraded Lift Station 14. The general alternatives are 1) do nothing, 2) replace the existing 10th Avenue East Interceptor, and 3) construct a new gravity sewer to remove some of the demands off of the 10th Avenue East Interceptor.

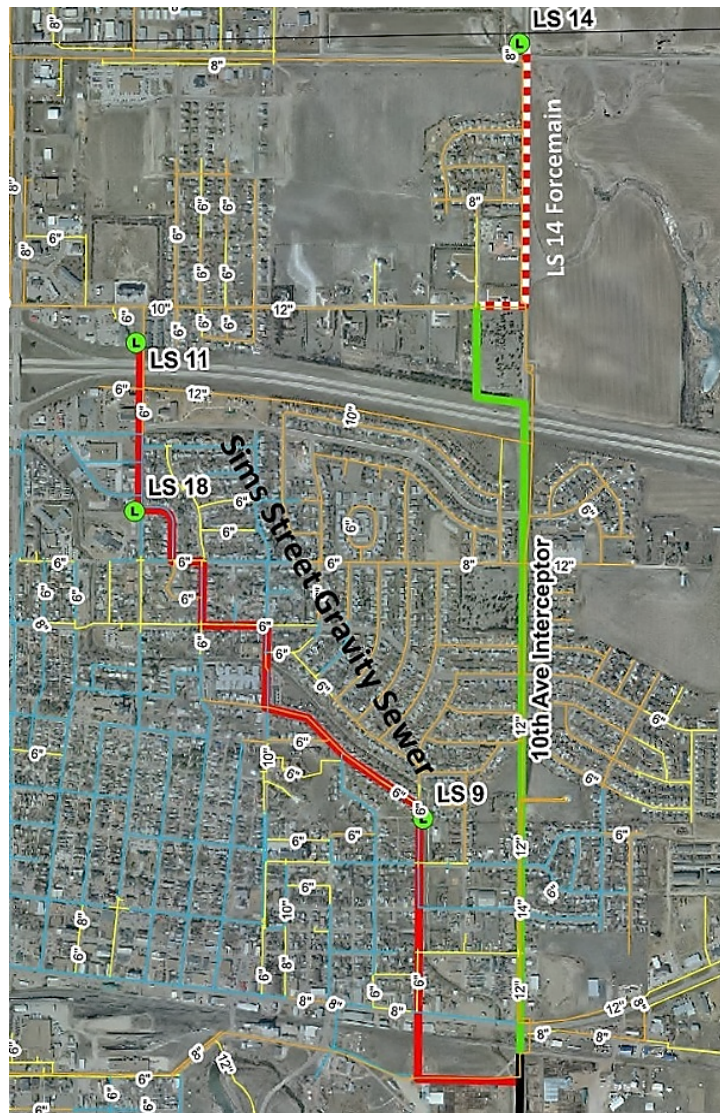
Do Nothing – The City could continue as they have been for several years now. The problems with Lift Station 11 will have to be dealt with eventually. Also, the capacity of the 10th Avenue East Interceptor will be overloaded as development continues, exacerbating the existing structural issues with the system. This alternative only pushes dealing with the issues into the future.

Replace Existing Route – Replacing the 10th Avenue East Interceptor would replace a significant amount of existing infrastructure. Lift Station 11 would still require upgrades to address the current operational issues. This alternative is complicated by the necessity of maintaining existing sewer service during construction. This alternative would also involve construction through highly developed areas and high traffic areas along much of the route.

Sims Street Gravity Sewer – To alleviate the issues with Lift Station 11 and the capacity issues of the 10th Avenue East Interceptor, a gravity sewer line would be constructed from Lift Station 11 on Sims Street south to Lift Station 18, and then continue on south past Lift Station 9 to the south end of the 10th Avenue Interceptor. Lift Stations 11, 18 and 9 would be decommissioned. This would eliminate the sewage backups on Sims Street. Eliminating three lift stations will save the City time and money since they will not have to deal with operation, maintenance, and future upgrades of three lift stations. This allows Lift Station 14 to be upgraded as necessary without having to upgrade the 10th Avenue Interceptor.

Figure 3 Sims Street Gravity Sewer





3.2 Sims Street Storm Water

Sims Street currently has very little Storm Water Sewer infrastructure. As a result, many intersections experience significant ponding during storm events. Particularly Museum Drive at Sims Street is a low spot that always floods during storm events. Museum Drive is a high traffic area, and the excess water causes hazardous driving and walking conditions as seen on the cover of this report. Several areas along Sims Street experience flooding including the outfall area at Osborn Drive. Storm water in this area also may end up entering the sanitary sewer during storm events.

Figure 4 Sims Street Storm Water Event at Osborn Drive



Figure 5 Sims Street Storm Event



The general alternatives are 1) do nothing or 2) construct a new storm sewer system in Sims Street.

Do Nothing – The City could continue to allow the flooding in the areas along Sims Street. As traffic along that corridor increases, flooding will contribute to more automobile accidents and possibly pedestrian accidents as well.

Construct New Storm Sewer System – Along with the modifications done during the street improvements, a new storm sewer system can be constructed along Sims Street to convey storm water to the Sims Street Watershed Outfall Ditch, and away from traffic areas. This alternative should greatly reduce hazards that arise during storm events.

4.0 Alternatives Analysis

4.1 Improvements and Recommendations

4.1.1 *Sims Street Gravity Sewer*

To alleviate the issues with Lift Station 11 and the capacity issues of the 10th Avenue East Interceptor, a gravity sewer line would be constructed from Lift Station 11 on Sims Street south to Lift Station 18, and then continue on south past Lift Station 9 to the south end of the 10th Avenue Interceptor. Lift Stations 11, 18 and 9 would be decommissioned. This would eliminate the sewage backups on Sims Street. Eliminating three lift stations will save the City time and money by eliminating the operation, maintenance and future upgrades of three lift stations. This allows Lift Station 14 to be upgraded as necessary without having to upgrade the 10th Avenue Interceptor.

It is recommended that the City construct the Sims Street Gravity Sewer in Phases. The first phase has been completed. The new sanitary sewer from 14th Street south to the south side of the interstate was completed in 2023. It was not funded using CWSRF funds, but it was designed according to the overall plan of constructing a gravity sewer as described above.

The second phase is going to be constructed with CWSRF funding. It will include the sewer from the south side of the interstate, where Phase 1 ended, and go south to 10th Street. This phase will enable the decommissioning of Lift Station 11. Wastewater will flow to Lift Station 18 and be pumped to the top of the 10th Avenue East Interceptor until the next phase of the project can be completed. See Figure 1.

4.1.2 *Stormwater Improvements*

The wastewater project is being combined with necessary street repairs and modifications. The condition of the street in this section is in need of reconstruction. Cast iron water lines in the area will be also replaced with PVC piping during the repair of the street. There are no lead service lines in this area to be replaced.



Sims Street from Museum Drive south receives a large amount of stormwater during rain events, including from some areas north of I-94. Currently there is little to no storm sewer infrastructure in this area and hazardous ponding occurs in numerous locations. The storm sewer system in the Phase 2 area will be installed to properly manage stormwater from the contributing watersheds to the Sims Street Watershed Outfall Ditch at the intersection of Sims Street and Osborn Drive. See Figure 1. The Sims Street Watershed Outfall Ditch is also in need of repairs and general maintenance. The City is going to be doing those repairs at the same time as this project is being constructed.



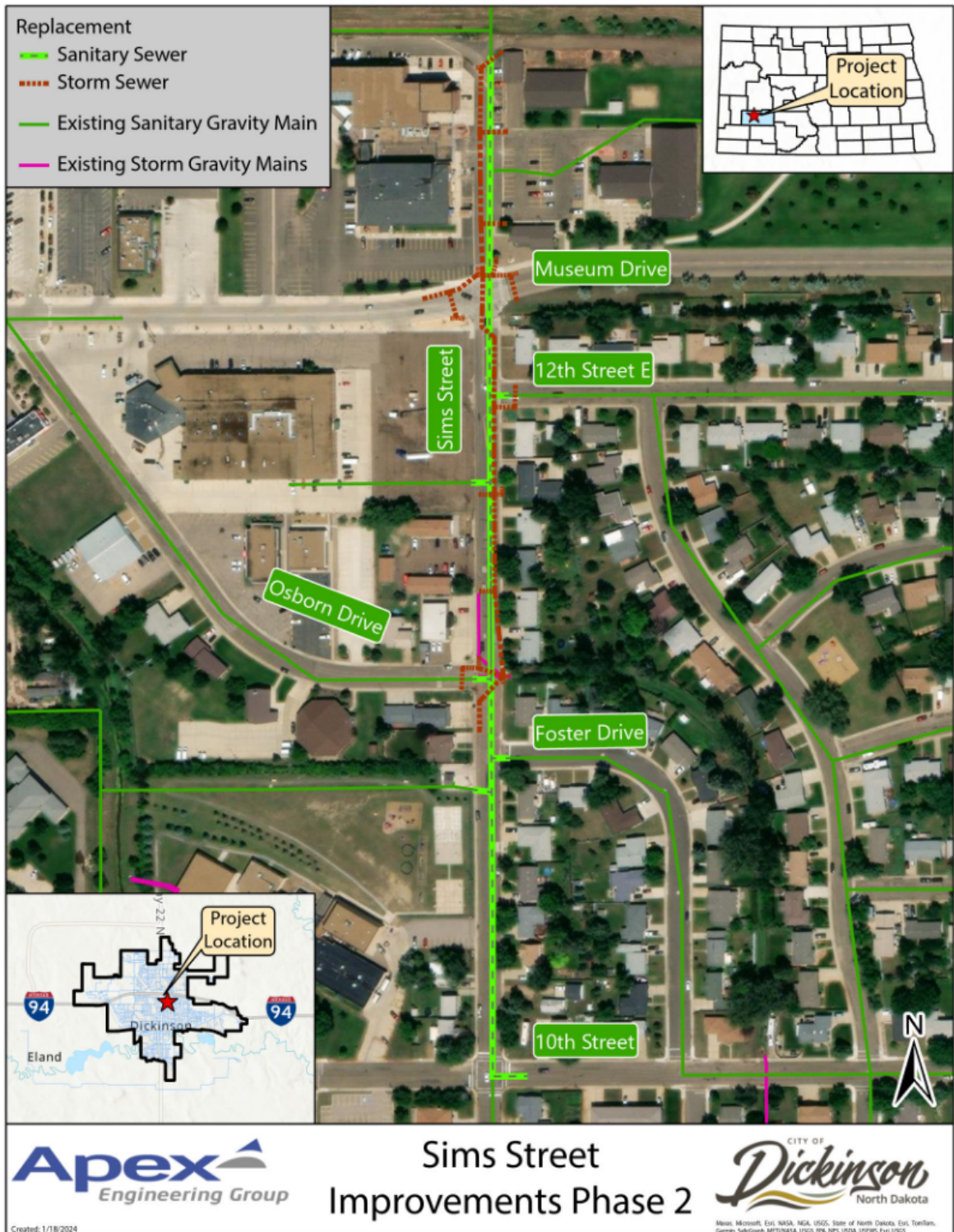


Figure 1



4.2 Project Schedule and Cost

The schedule for this project is as follows:

Advertise for Bids	February 7, 2024
Bid opening	February 28, 2024
Substantial Completion	October 31, 2024
Final Completion	June 1, 2025

Estimated Overall Project Cost: \$6,900,000

4.3 Environmental Benefits and Impacts

A solicitation of views from various agencies was completed and responses have been received. A copy of the letter sent to the agencies, a list of agencies contacted, and their responses are included in Appendix A of this report. The environmental issues resulting in not completing these collection system projects would potentially negatively impact the city and the environment. The potential impacts in the existing collection system include infrastructure surcharges, possible bypasses of untreated sewage and backups in homes and businesses due to the lack of capacity and a continued risk of causing traffic accidents related to storm water flooding. The city experienced recent significant growth and must be able to provide adequate sewer system and stormwater system capacity to residents, business, and industry in the area.



Appendix A

Environmental Solicitation Letter
Environmental Solicitation Agencies
Environmental Solicitation Response



Appendix B

Public Hearing Notice

Public Hearing

