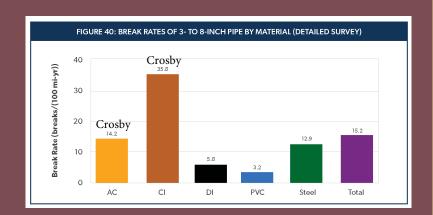
EMERGENCY REPAIR INFORMATION

DIRECT COST COMPARISON

Budgeted Improvements

- Average construction cost per foot of utility main - \$500 Emergent Repairs
- Estimated construction cost per foot of utility main \$2,500



Emergency repairs are 5x more expensive 2500/500 = 5x

WATER MAIN REPAIR & REPLACEMENT

STATISTICS* (Average \$10,000 per repair)

- The USA and Canada experience 260,000 water main breaks annually, representing \$2.6 billion in repair costs.
- In the USA, 11% of water is being lost due to leakage.
- 70% of utilities have a pipe replacement program.
- Water main break rates are significantly affected by pipe age, installation practices, and climate.
- The average age of failure for water mains is 53 years.
- There is a significant relationship between water main breaks and pipe material.
 - Break rates for cast iron water mains are more than 10x more likely than break rates for PVC water mains.
 - Break rates for asbestos cement water mains are 5x more likely than break rates for PVC water mains.



800 WATER

Barfuss, Steven L. (2023). Water Main Break Rates in the USA and Canada: A Comprehensive Study. Utah Water Research Laboratory & Utah State University.



OVERVIEW

The city has conducted an in-depth inventory and analysis of its infrastructure, revealing critical issues in the water distribution system. Over half of the water distribution system is over 50 years old, with significant deficiencies affecting water quality and fire protection capabilities.

PROJECT SCOPE

The project focuses on addressing deficiencies in the water distribution system, primarily targeting mains in the Hendrickson/Holmes area, which range from 64 to 74 years old. The average useful life of water lines is 50 years. These mains include 4-inch and 6-inch cast iron (CI) and asbestos cement (AC) pipes.

POPULATION IMPACT

Approximately 17% of the city's population (180 out of 1068) will benefit directly from this project. This represents roughly 1/5 of the mains identified for improvement, allowing us to estimate that about 20% of the identified mains will be addressed.

DEFICIENCIES TO BE ADDRESSED

<u>Unaccountable Water</u>

Due to aging pipes, unaccountable water has been as high as 50%, resulting in approximately \$250,000 in lost revenue for the city. This loss also hampers the city's ability to operate an enterprise fund and allocate funds for replacement projects.

Fire Protection Limitations

Over half of the intersections in the project area do not meet the standard 2-hour, 1000 gallons per minute (gpm) fire flow requirement, limiting the city's ability to protect homes in case of fire emergencies.

Sewer Main Separation

Ten of the 23 blocks in the project area do not meet the standard 10-foot separation from the water main to the sewer main, posing a risk of contamination and threatening the community's health.

System Reliability

The water distribution system is structurally fragile, leading to bursts in water mains when the water tank is at full capacity. To mitigate this, the city intentionally maintains the water tank at five feet below capacity, reducing storage by 13% and impacting daily water usage and fire suppression capabilities.

CONCLUSION

Addressing these deficiencies is crucial for maintaining the integrity and functionality of the city's water distribution system. This project aims to improve water quality, enhance fire protection capabilities, and ensure the health and safety of the community.



OVERVIEW

Five years ago, the city cleaned and televised most of the sewer system and inventoried each manhole. The inventory also included a citywide review of the age and condition of the mains. In 2019, the deficiency range for this project was scored from 2 to 3.6 on scoring (5 is the worst). The score is an average of all five categories; thus, the deficiency score is used as a benchmark. However, scores of individual categories need to be considered when deciding on repair and replacement. Photos of 20 of the various deficiencies identified throughout the City of Crosby area are available on this flier and online.

PROJECT SCOPE

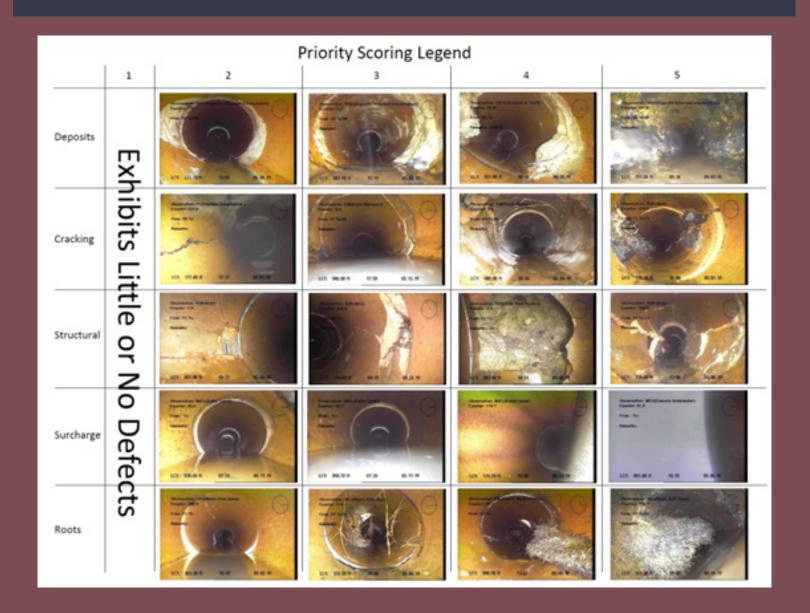
The project focuses on addressing deficiencies in the sewer system. The Hendrickson-Holmes project will address 1/5 of the identified sewer mains needing improvement. The bury depth of the mains is marginal, with less than seven feet in four dead ends at four dead ends. The shallow depth leads to frozen mains during harsh winters. The slope of the existing mains is insufficient through 6.5 blocks, leading to sewer deposits and blockage. The planned project addresses about half of these problem areas, approximately three blocks. As the sewer mains continue to age, the frequency and severity of the defects will increase, leading to more challenges for the system. Ultimately, this will mean more blockages, costly emergency repairs, and negative environmental impacts.

POPULATION IMPACT

Approximately 17% of the city's population (180 out of 1068) will benefit directly from this project. This represents roughly 1/5 of the mains identified for improvement, allowing us to estimate that about 20% of the identified mains will be addressed.

DEFICIENCIES

- 1. Deposits build up in the pipe that restricts flow and can cause backups.
- 2. Cracking first indication the pipe's structural integrity is starting to fail.
- 3. Structural occurs after cracking, pieces of pipe missing or deformed/collapsing, restricts flows, causes backups, and is detrimental to the environment.
- 4. Surcharge portions of the sewer where the level of sewage in the pipe is greater than the average flow. This is often a result of improper slope or sags in the main, which increases deposits and blockage.
- 5. Roots Tree roots seek a water source, typically through pipe joints or cracks and missing pipes. This creates blockage and backups.



SEWER SYSTEM ANALYSIS



In December 2022, the North Dakota Rural Water Systems Association (NDRWSA) prepared a water rate analysis for Crosby. A review of expenses and revenues revealed an average deficit of \$172,864 (27% less revenue than expenses).

In 2021, 43% of the water Crosby purchased was due to unaccounted-for water (2,619,541 gallons per month). The NDRWSA considers 10% water loss acceptable. For perspective, the city's elevated storage tank holds 500,000 gallons; the unaccounted-for water would fill this tank over <u>five</u> times! At the time of the study, residents purchased water at \$6.30 per thousand gallons. This cost has a negative financial impact but can be corrected with infrastructure upgrades, including replacing and repairing non-functioning water meters and replacing leaking water mains and services. The affordability index of 1.5% to 2.5% of household median income (MHI) is used to gauge affordability by EPA. At the time of the rate study, the household median income for Crosby was \$63,375. 1.5% MHI is \$79.22 per month for water service.

Recommendations from the study:

- Instituting a rate structure that is affordable, responsible, and will meet the community's long-term needs. Rate increases could be implemented incrementally over a multi-year period, allowing residents ample time to budget for the increases.
- Reduce the amount of unaccounted-for water by metering accurately and through leak detection and infrastructure upgrades as needed.

Monthly Base Rate	Montly Rate per 1000 Gallons	Monthly Affordability Rate
\$25	\$8.52	\$79.22
Gallons Used	Total Monthly Water Rate	Rate Increase to Affordable
3000 Gallons	\$50.56	\$28.66
3500 Gallons	\$54.82	\$24.40
4000 Gallons	\$59.08	\$20.14
5000 Gallons	\$67.60	\$11.62



While a sewer rate analysis of revenue and expenses has not been completed, this information provides the affordability criteria. The affordability index of 1.5% to 2.5% of household median income (MHI) is used to gauge affordability by EPA. The household median income for Crosby is \$63,375. 1.5% MHI is \$79.22 per month for sewer service.

Monthly Base Rate	Montly Rate per 1000 Gallons	Monthly Affordability Rate			
\$10	10% of Water Bill	\$79.22			
Gallons Used	Total Monthly Water Rate	Rate Increase to Affordable			
3000 Gallons	\$15.06	\$64.16			
3500 Gallons	\$15.48	\$63.74			
4000 Gallons	\$15.91	\$63.31			
5000 Gallons	\$16.76	\$62.46			

Recommendations from the study:

• Instituting a rate structure that is affordable, responsible, and will meet the community's long-term needs. Rate increases could be implemented incrementally over a multi-year period, allowing residents ample time to budget for the increases.



OVERVIEW

In the State of North Dakota, cities and counties may levy sales and use taxes, as well as special taxes such as lodging, restaurant, and motor vehicle rental. The Office of State Tax Commissioner administers these taxes on behalf of the city or county.

Tax Facts

- State of North Dakota Sales Tax is 5%
- Divide County does not have a county sales tax
- Crosby currently has a 3% city sales tax, with 1% designated for the hospital, 1% for parks, and 1% for city needs. 3% is the maximum city sales tax rate in North Dakota.

3% Sales Tax revenue for Crosby 2021-2023 and percent change year to year.

Year	20	21	20	2022			2023		
City	3%	1%	3%	3% 1%		3%	1%		
Crosby	\$560,317	\$186,772	\$536,805	\$187,935	\$62	3,172	\$207,724		

The 0.5% sales tax value for the City of Crosby (using average 2023 values) is \$8566 per month and \$102,793 per year.

The city could use a half percent sales tax for infrastructure replacement and maintenance funds, if a reallocation were done.

OIL & GAS PRODUCTION TAX REVENUE

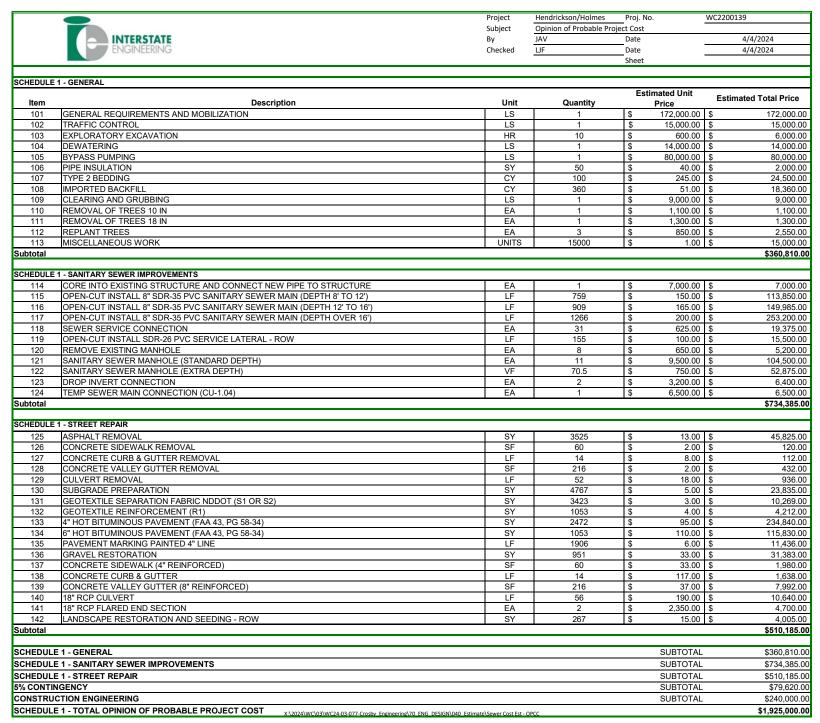
Year	Total Annual	Average Monthly
2013	\$1,470,184	\$122,515
2014	\$2,277,863	\$231,239
2015	\$1,813,897	\$151,158
2016	\$1,506,209	\$125,517
2017	\$1,494,695	\$124,558
2018	\$1,637,215	\$136,435
2019	\$1,243,421	\$103,618
2020	\$813,004	\$67,750
2021	\$1,392,061	\$116,005
2022	\$1,615,853	\$134,654
2023	\$1,477,019	\$123,085
2021-2023	\$4,484,933	\$124,581
2005-March 2024	\$21,742,227	\$111,499

Please Note: Only \$13k difference in average between last three years and entire 19 year period from 2005-March 2024, showing this is a consistent revenue source for city.

Recommend using Oil & Gas Production Tax to fund this project as well as future infrastructure needs. If 50% of the monthly Oil & Gas Production Tax was earmarked for infrastructure that would provide funds needed for repayment of debt incurred for this project. Using the Monthly average over past three years of \$124,581, allocating 50% to infrastructure would provide \$747,488 annually. This would also allow for modest water and sewer rate increases to occur over several years to build financial reserves needed for future infrastructure repairs and replacement.

Opinion of Probable Project Cost

Hendrickson Holmes Sewer Improvements - Sanitary Sewer Repair Cost for Schedule 1. Assumed 12' trench width for 14' depth sewer and if the sewer is greater than 14', the max. width of the trench increases 1' for every extra foot of depth. Services are connected within the trench only. Service lines not replaced to the right-of-way. Hot mix asphalt prices have increased due to low efficiency patching process.





Project	Hendrickson/Holmes	Proj. No.	WC2200139
Subject	Opinion of Probable Spo	ot Repair Construction	n Cost
Ву	JAV	Date	4/5/2024
Checked	LJF	Date	4/5/2024
		Sheet	

TOTAL OPINION OF PROBABLE SPOT REPAIR CONSTRUCTION COST - Unit price is based upon an average open cut length of 21 LF. The open cut repair includes traffic control, dewatering, bypass pumping, type 2 bedding, imported backfill, 8" PVC main, 1 sewer service connection, asphalt removal, subgrade preparation, separation fabric, 4" HMA, and misc. work. Asphalt prices are based upon including patching within a larger project. Locations are based upon an inventory done in 2019 that identified problem areas. This estimate excludes the Schedule 1 Hendrickson Holmes corridor.

	Item	Description	Unit	Quantity	Estimated Unit Price	Estimated Total Price
	101	SEWER MAIN SPOT REPAIR	EA	19	\$ 13,300.00	\$ 252,700.00
Sub	total				•	\$252,700.00
TOT	TOTAL OPINION OF PROBABLE SPOT REPAIR CONSTRUCTION COST SUBTOTAL \$					
5%	CONTIN	IGENCY			SUBTOTAL	\$ 12,300.00
SCH	IEDULE	SEWER - TOTAL OPINION OF PROBABLE SPOT REPAIR CONSTRUCTION COST				\$ 265,000.00

Project Budget

Hendrickson Holmes Sewer, Water and Street Improvements Summary

April 8, 2024

SCHEDULE 1 - SEWER, WATER & STREET IMPROVEMENTS (GENERAL)	\$ 847,960.00
SCHEDULE 1 - SANITARY SEWER IMPROVEMENTS	\$ 854,825.00
SCHEDULE 1 - WATER IMPROVEMENTS	\$ 1,216,025.00
SCHEDULE 1 - STREET RECONSTRUCTION	\$ 1,801,613.00
SCHEDULE 2 -SEWER, WATER & STREET IMPROVEMENTS (GENERAL)	\$ 876,550.00
SCHEDULE 2 - SANITARY SEWER IMPROVEMENTS	\$ 1,047,890.00
SCHEDULE 2 - WATER IMPROVEMENTS	\$ 1,155,125.00
SCHEDULE 2 - STREET RECONSTRUCTION	\$ 2,651,880.00
SCHEDULE 1 + 2 - TOTAL BID (BEK)	\$ 10,451,868.00
DESIGN ENGINEERING	\$ 634,000.00
CONSTRUCTION ENGINEERING	\$ 1,071,000.00
CONTINGENCY (10%)	\$ 1,045,000.00
EXTENDED WARRANTY ALTERNATE FOR SCHEDULE 1 (CONSTRUCTION ITEM TO BE REVIEWED DEC. 2024)	\$ 250,000.00
LEGAL, ADMINISTRATION/ADDITIONAL SERVICES	\$ 332,000.00
SCHEDULE 1 + 2 - TOTAL OPINION OF PROBABLE PROJECT COST	\$ 13,783,868.00

Notes: Engineer's opinions of probable Project Cost are to be made on the basis of Engineer's experience and qualifications and represent Engineer's estimate as an experienced and qualified professional generally familiar with the construction industry. However, because Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual Project Cost will not vary from opinions of probable Project Cost prepared by Engineer.

REVISED

2.54

33.01

Hendrickson-Holmes Project Proposed Funding Scenarios

10% Cash Flow Coverage

\$

Depreciation

Total

675 Accounts

Cost of the project 13,783,868

	Principal and Interest	Reserve of 1 annual payment	10% Cash Flow	TOTAL MONTHLY	TOTAL ANNUAL
Water Loan Monthly Payment	\$5,607.64	\$1,121.53	\$560.76	\$7,289.93	\$87,479.16
Sewer Loan Monthly Payment	\$24,608.22	\$4,921.64	\$2,460.82	\$31,990.68	\$383,888.16

\$471,367.32

SRF Loan Terms: 30 years, 2% interest, 10% for cash flow, reserve of 1 annual	payment, \$0/mo depreciation
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SRF Loan Terms: 30 years, 2% interest, 10	0% for cash flow, reserve of 1 annu	ual paymen	t, \$0/mo depreciation							
	Scenario 1 - Rate Increase		Scenario 1 - Rate Increase Scenario 2 - \$600,000 O&G		Scenario 3 - \$300,000 O&G/Rate Increase		Scenario 4 -\$141,300 O&G/Rate	e Increase	Scenario 4 -Other	
	Water Rate Increase (monthly) Sewer Rate Increase (monthly)		Water Rate Increase (monthly) Sewer Rate Increase (monthly)				Water Rate Increase (monthly) Sewer Rate Increase (monthly)			
DWSRF	(Ψ 17100	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Τ			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	7 00.02	, , , , , , , , , , , , , , , , , , , ,	
Grant	\$ 5,344,614		\$ 5,344,614		\$ 5,344,614		\$ 5,344,614		\$ 5,344,614	
Loan	\$ 1,517,139		\$ 1,517,139		\$ 1,517,139		\$ 1,517,139		\$ 1,517,139	
DWR	,		, , , , , , , , , , , , , , , , , , , ,		7 7 2 7		, , , , , , , , , , , , , , , , , , , ,		, , , , , , , , , , , , , , , , , , , ,	
Grant (Cost Share Program)	\$ 264,399		\$ 264,399		\$ 264,399		\$ 264,399		\$ 264,399	
Loan			-				-			
CWSRF										
Grant										
Loan	\$ 6,657,717		\$ 6,657,717		\$ 6,657,717		\$ 6,657,717		\$ 6,657,717	
TOTAL	\$ 13,783,868		\$ 13,783,869		\$ 13,783,869		\$ 13,783,869		\$ 13,783,869	
				_				_		
Amount & % Grant		41%		41%		41%				41%
Amount & % Loan	\$ 8,174,855	59%	\$ 8,174,856	59%	\$ 8,174,856	59%	\$ 8,174,856	59%	\$ 8,174,856	59%
								1		
Gross Production Tax (annual pledge)			\$ 600,000		\$ 300,000					
Sales Tax (Infrastructure Fund)										
City Cash			4	***	4	201				
Amount & % Local Funds			\$ 600,000	4%	\$ 300,000	2%		<u> </u>		
Water Rate Increase Breakdown			Debt Split 81% Sewer and 19% N	Mater	Debt Split 81% Sewer and 19% V	Nater	Debt Split 81% Sewer and 19% V	Mater		
Debt Retirement (30 yrs, 2%)	\$	8.31	Dest spiit 8178 sewer and 1978	water	\$	3.09		5.95		
Debt Service Reserve	\$	1.66			\$	0.62	\$	1.19		
10% Cash Flow Coverage	\$	0.83			\$ 0.02 \$		·			
Depreciation	\$	-			\$ -		\$ -			
Total	\$	10.80			\$ 4.02 \$		\$	7.74		
Sewer Rate Increase Breakdown										
Debt Retirement (30 yrs, 2%)	\$	36.46			\$	13.18	\$	25.39		
Debt Service Reserve	\$	7.29			\$	2.64	\$ 5.08			

\$

\$

1.32 \$

17.14 \$

Total Water & Sewer Rate Increase \$ 58.19 \$ - \$ 21.16 \$ 40.75

3.65

47.39

0.769231 0.153846 0.076923 0

0.769231 0.153846 0.076923