

Mobridge, South Dakota

Sewer & Water Infrastructure

August 10, 2022



Jerod Klabunde, PE
Kyle Meyer, PE



Population: 3,385
MHI: \$37,417





Jerod Klabunde, PE (ND & SD)

- **16 Years of Municipal Eng. Experience**
 - Civil Engineering – NDSU (2006)
 - Licensed in ND and SD
 - Senior Project Manager
 - Project Management Group Leader



Tyrel Clark, PE

- **12 Years of Water / Wastewater**
 - Civil Engineering - BYU
 - Water / Wastewater Group Leader
 - American Water Works Assoc. (A.W.W.A.)
 - Water Environment Federation (W.E.F.)
 - Licensed in North Dakota, South Dakota, Wyoming, Minnesota, Montana & Idaho



Kyle Meyer, PE (ND)

- **23 Years Municipal Eng. Experience**
 - Civil Engineering – NDSU (1999)
 - VP of Moore Engineering Regional Manager
 - Licensed in Minnesota & ND

Ongoing Infrastructure Work



2019 Water & Sewer Study

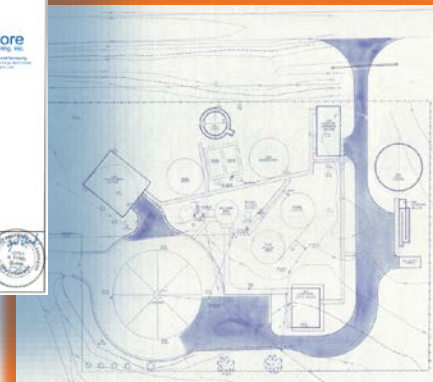
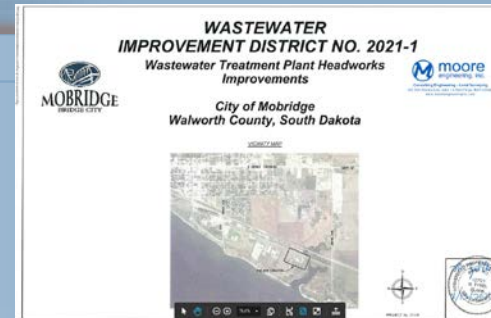
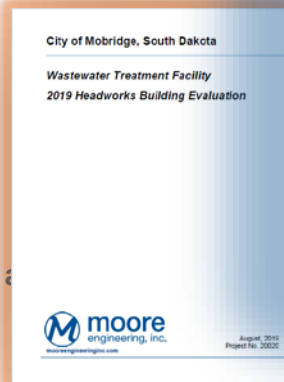
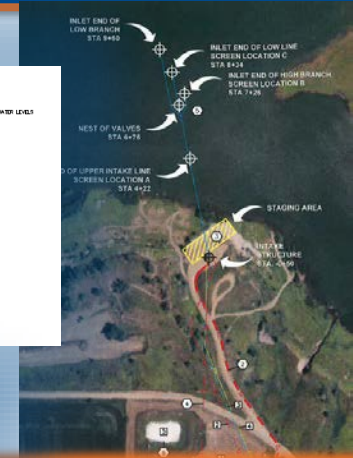
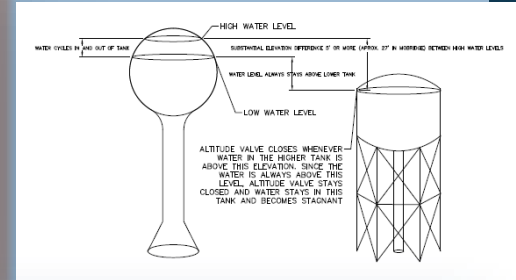
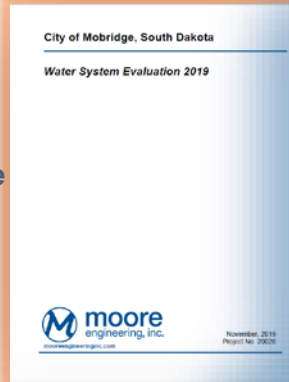
1. **\$4.0M Raw Water Intake**
2. **\$3.0M Treatment Plant**
3. **\$2.5M Northside Transmission Line & Storage**
4. **\$2.0M Wastewater Headworks**
 1. **Secured \$750,000 CDBG**

*ARPA (COVID) Funding Appropriated

**Data Missing: Water Mains, Sewer Mains, Wastewater Treatment Plant, how to fund & which projects to do first.

2022 Supplemental Study

1. **Water Distribution System Model**
2. **110 Blocks of Sewer Mains Televised**
3. **Wastewater Plant**
4. **Sludge Disposal Options**
5. **Recommendations, Costs, Prioritized List & Funding Roadmap**



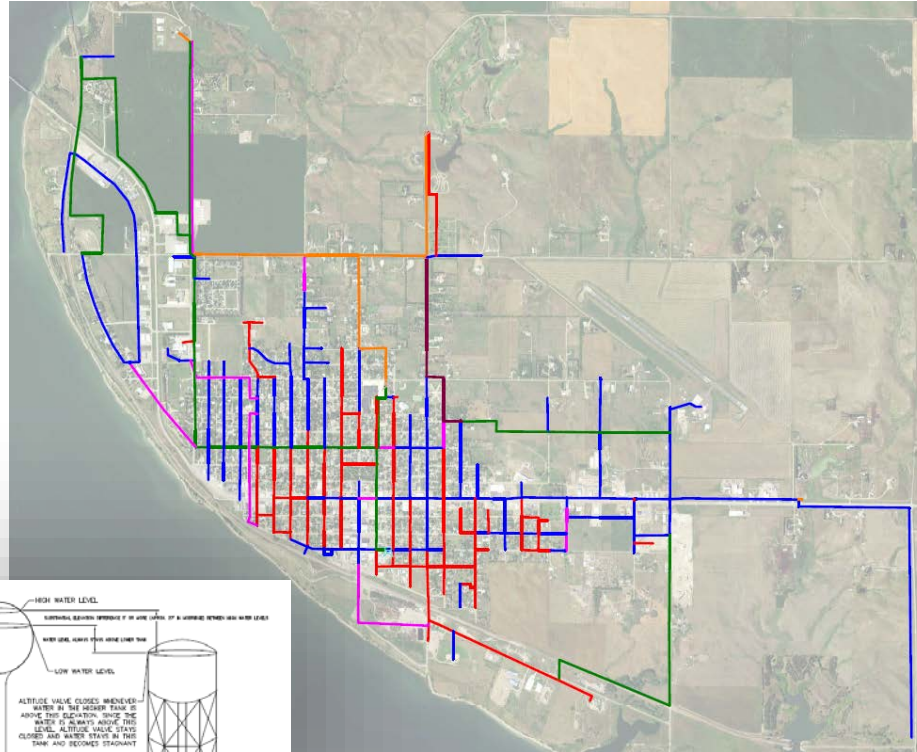
2022 Water Distribution System

Water Distribution Evaluation

- GIS 450 blocks of mains, service lines, hydrants & valves
- Map SD Rural Water
- Records & Maps
- Age / Type / Size
- 30 Dead End Blocks
- Estimate Corrosion
- Predict Remaining Life
- Pressure/Peak Flow/Fire Flow

Prepared Water System Model

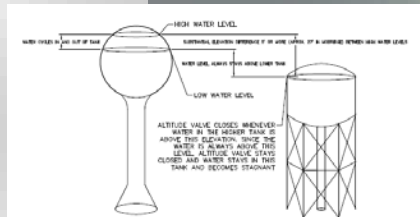
- Age/Type/Size
- Minimum Pressure
- Size Pipes for Future
- Avg Daily Demands
- Peak Demands
- Fire Protection
- Prioritize



Legend

Pipe Diameter

- 4-INCH
- 6-INCH
- 8-INCH
- 10-INCH
- 12-INCH
- 16-INCH



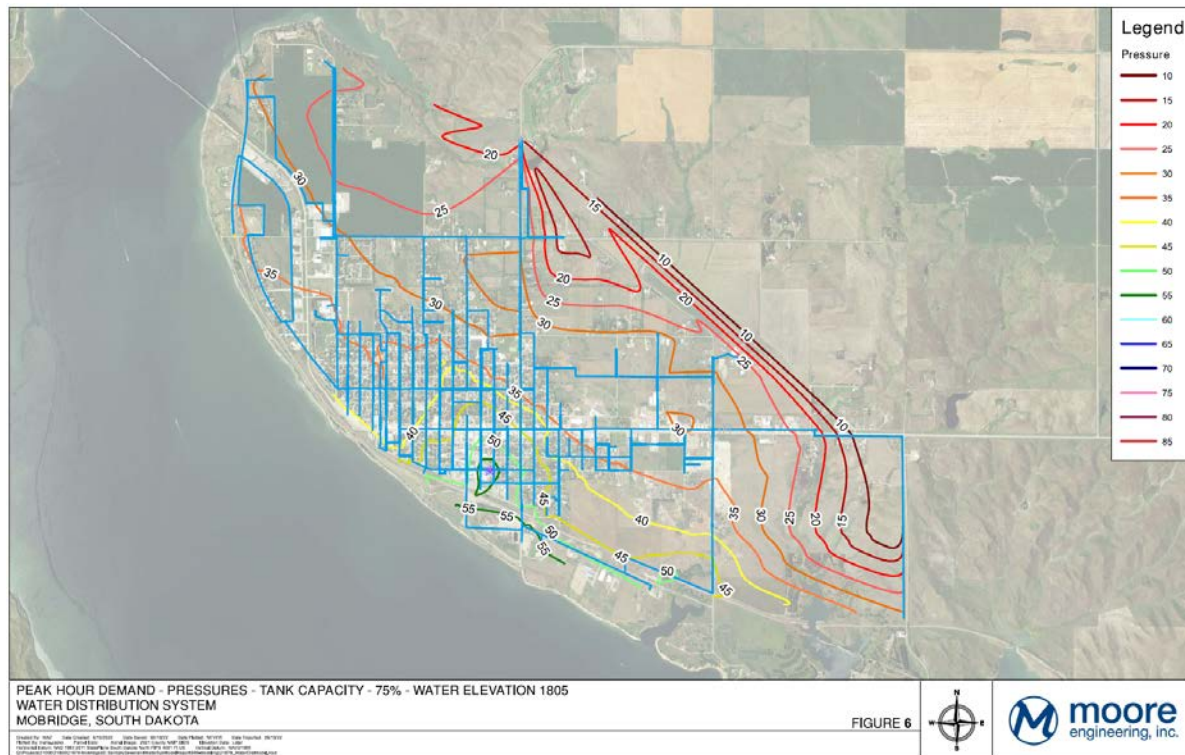
Water Mains – Age / Type

Water Distribution

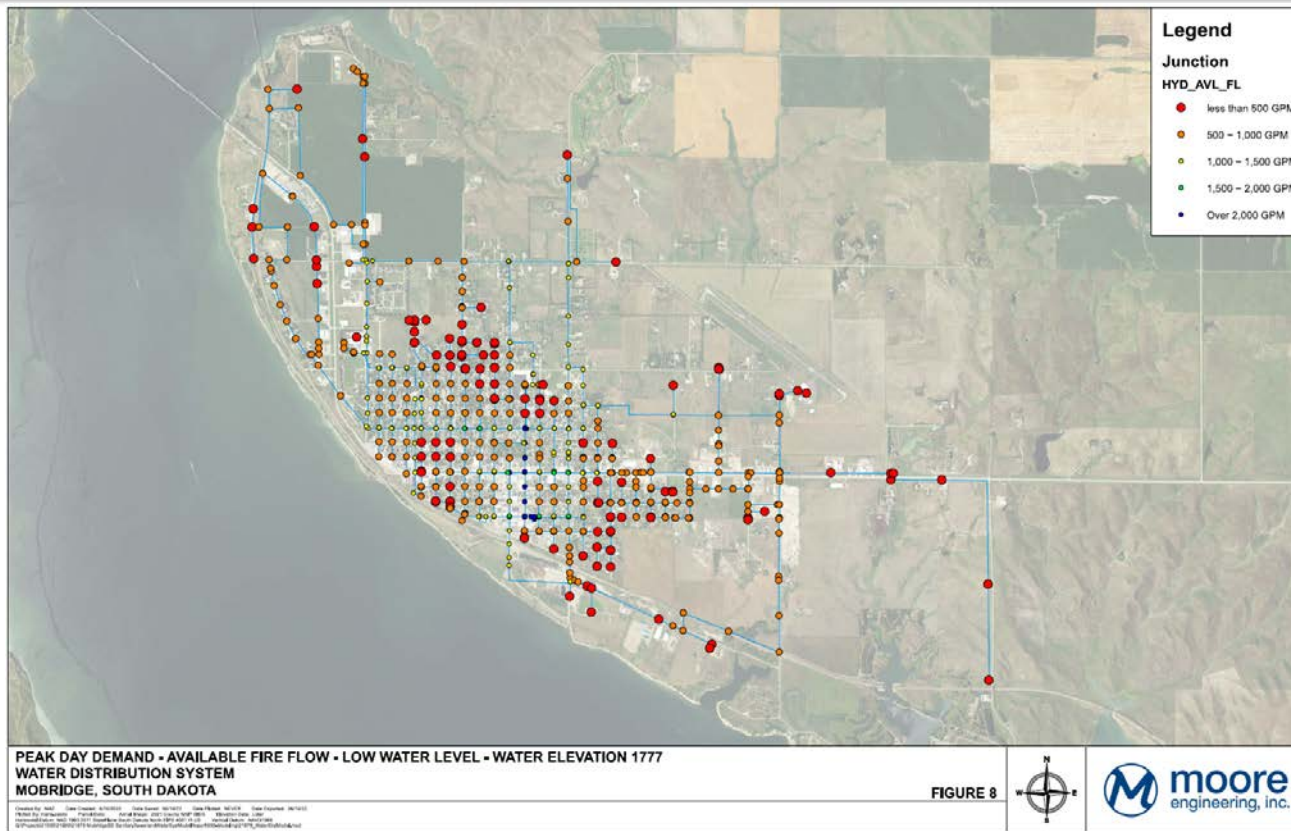
- Oldest: 1912
- 125 blocks of cast-iron pipe from 1910's & 1920's
- 50 blocks of cast-iron pipe from 1930's
- 120 blocks of 4" and 6" cast-iron Pipe from 1950's
- 40 Blocks of Asbestos-Cement Pipe from 1960's - 1970's
- These pipes have a finite life.



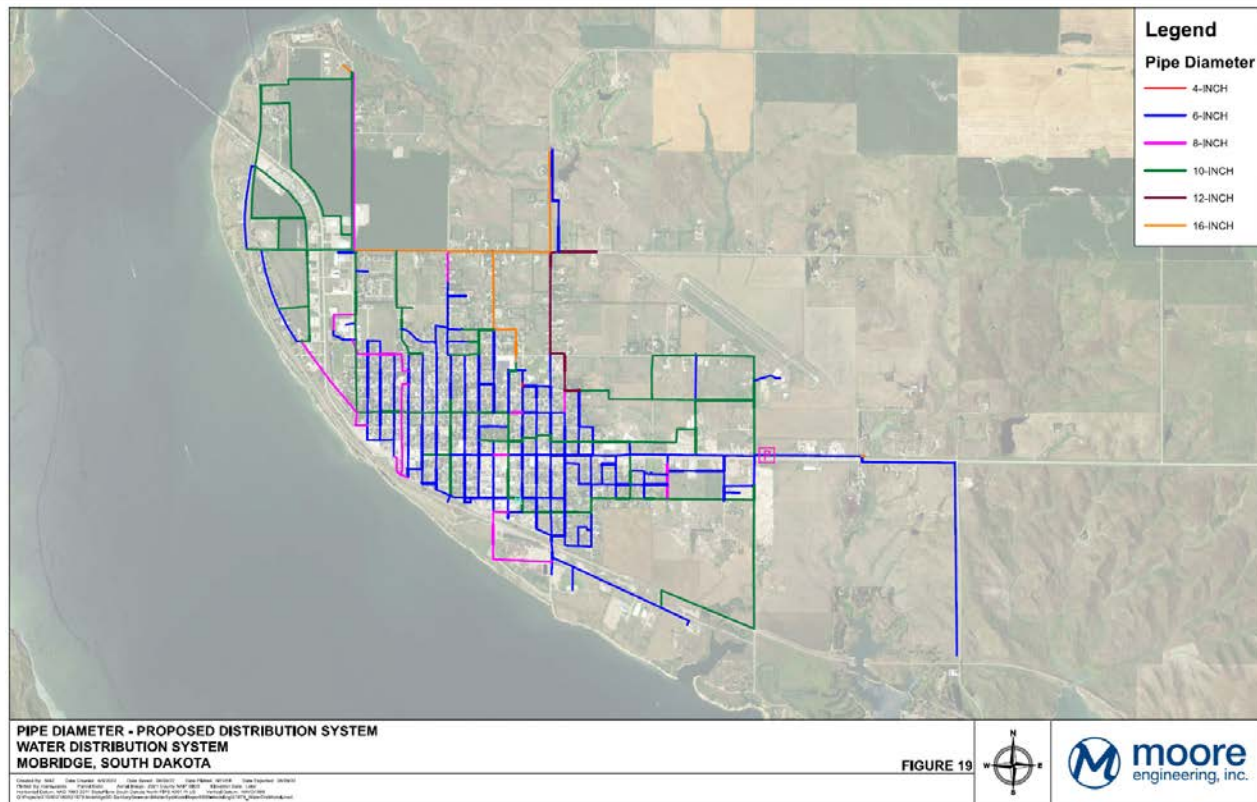
Existing Pressures



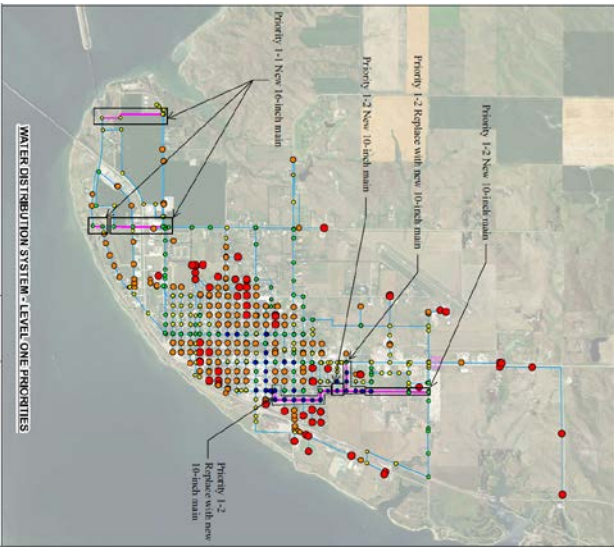
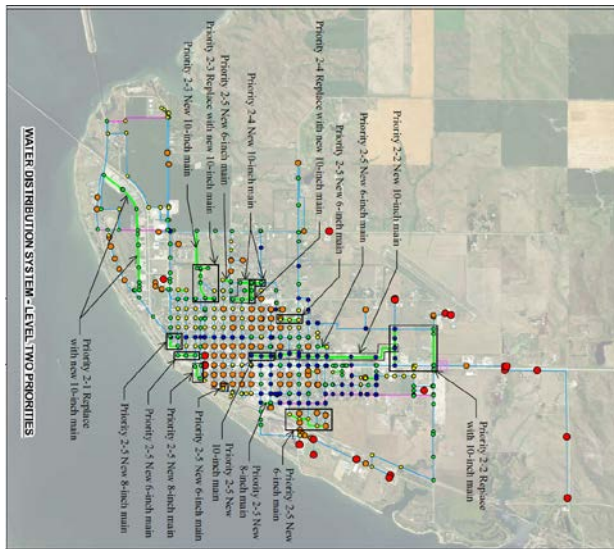
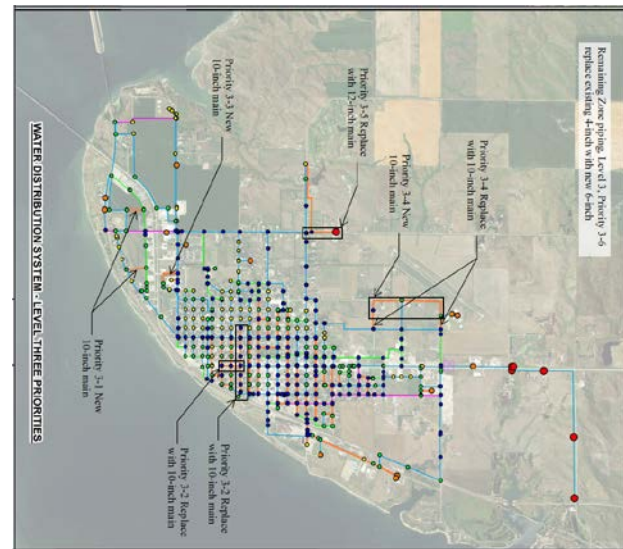
Existing Fire Flow



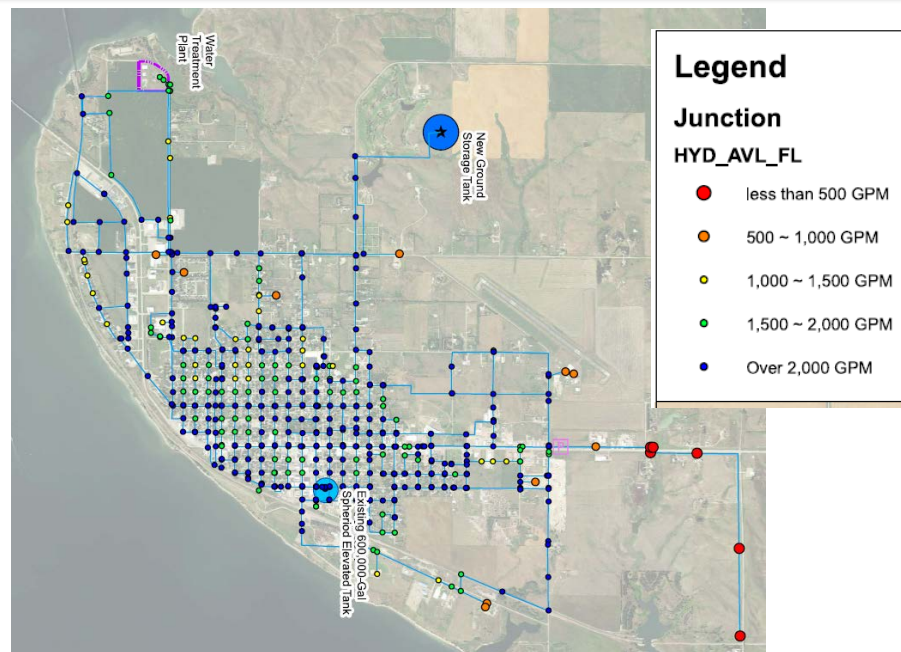
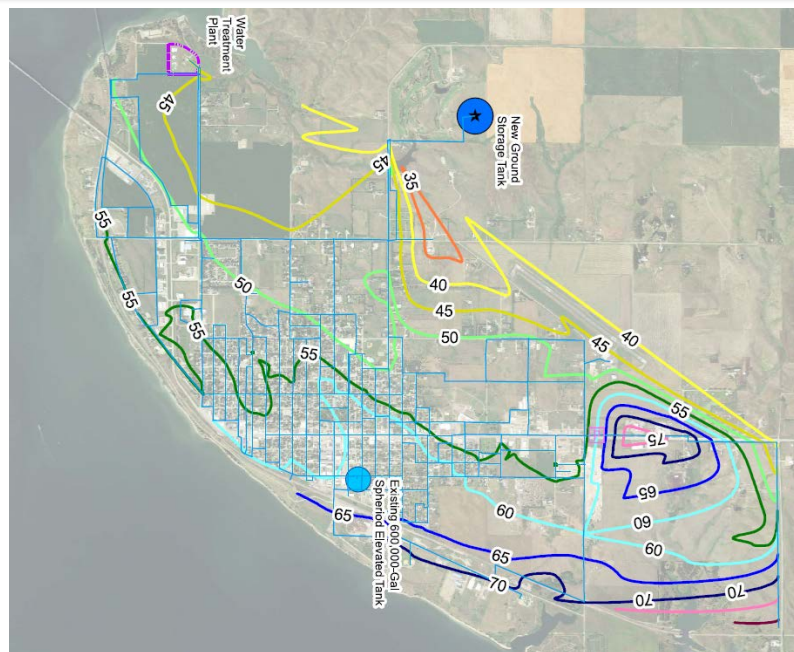
Recommended System Sizing



Water Distribution Priorities



Pressure & Flow Corrections



Water System Summary

Water Infrastructure Needs:

- \$4.0M Raw Water Intake
- \$3.0M Treatment Plant
- \$2.5M Northside Transmission Line & Storage
- 295 Blocks of Cast-Iron Pipe Water Mains
 - 125 blocks from 1910's & 1920's
 - 50 blocks from 1930's
 - 120 blocks from 1950's
- 5. 40 Blocks of Asbestos-Cement Pipe from 1960's - 1970's

Summary: \$40.0 M - \$50.0 M in Infrastructure Needs in Water System

Sanitary Sewer Collection System

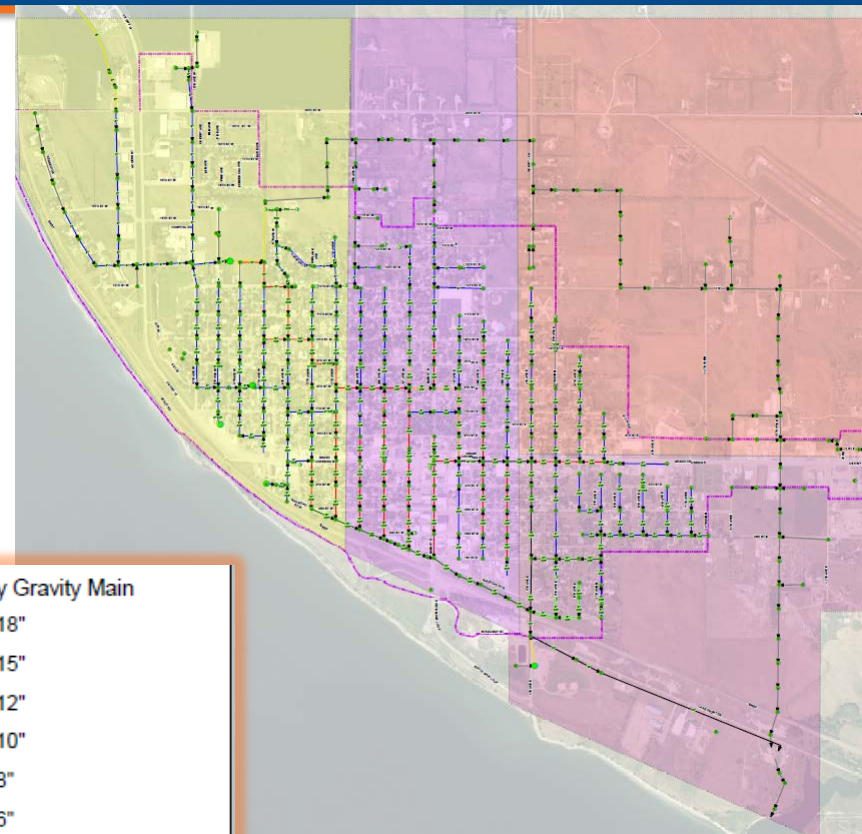
Wastewater Collection System

- 400 blocks of sewer mains
- Records & Maps
- Age / Type / Size
- Televised 110 Blocks
- Priorities and Costs

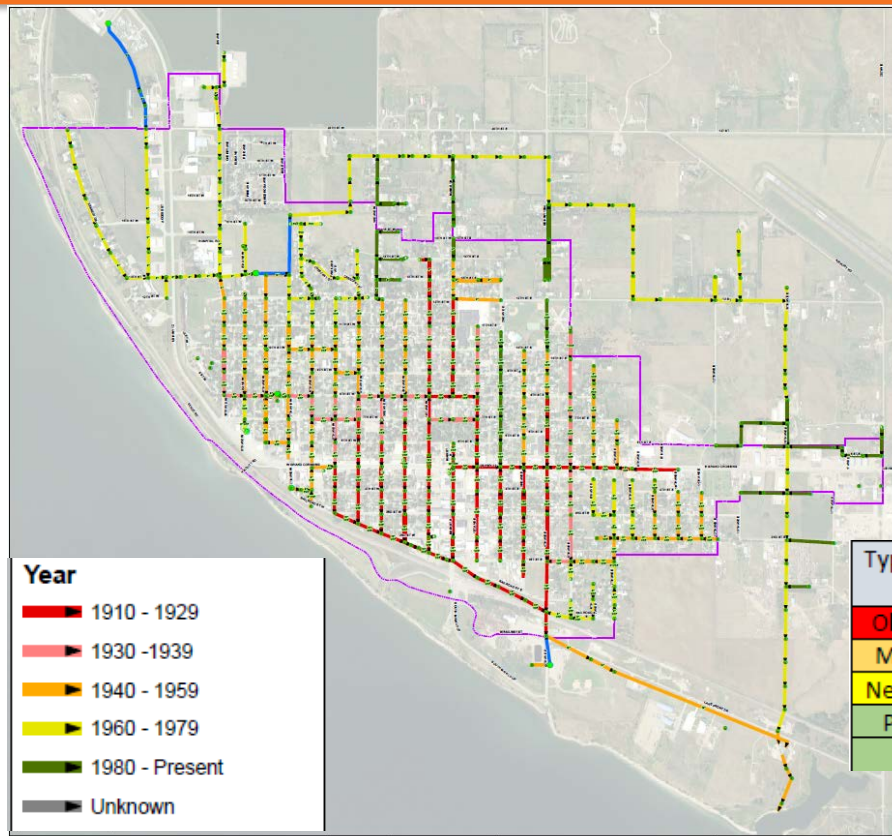


Sanitary Gravity Main

- 18"
- 15"
- 12"
- 10"
- 8"
- 6"



Sewer Infrastructure – Age / Type



Type of Pipe	Life Expectancy	Installation Time Period	Current Age	Number of Blocks	% Of Total System
Oldest VCP	80 Years	1910 - 1939	83-112 years	120	30%
Mid – VCP	80 Years	1940-1959	63-82 years	110	28%
Newest VCP	80 Years	1960-1979	43-62 years	125	31%
PVC Pipe	±100 Years	1980 - Current	10-42 years	40	10%
C.I.P.P.	+50 Years	Approx. 2020	2 Years	5	1%

Sewer Infrastructure

Clay Tile Sewer Mains

- Typical issues in clay tile sewer mains
- Photos of clay tile pipes

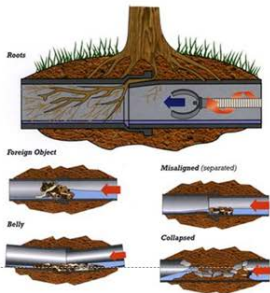


Figure 8 – Orangeburg Sewer Pipe



Figure 14 – Photo of Manhole



Sewer Televising Results



Sewer Televising Results



Sewer Televising Results



Sewer Televising Results



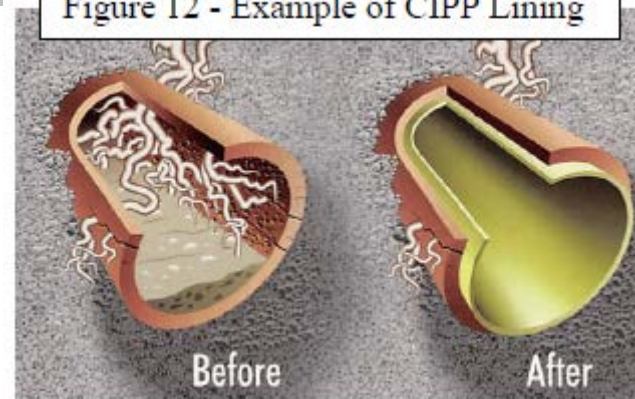
Sewer System Televising

Observations from Televising

- 140,000' of Sewer Mains
- 17,000' of PVC or Lined Pipe
- 123,000' of Clay Pipe
- Televised 42,000' (1/3 of Clay)
 - 30 Spot Repairs
 - 4,750' Need Replacement (11.3%)
 - 37,250' Need Cured-in-place (C.I.P.P.) Liner
- 20 Manholes Need Replacement
- 115 Manholes Need Rehabilitation



Figure 12 - Example of CIPP Lining



Sewer System Projections

Estimated Collection System Needs

- Priority #1 – Televising the other 2/3 of your Clay Pipes
- Priority #2 - Complete Spot Repairs
- Best Estimates for Now:
 - PVC Pipe and C.I.P.P. Need no work
 - 20% of Clay Pipe Needs Replacement
 - 80% of Clay Pipe needs C.I.P.P. Lining
 - Manholes & Service Lines in similar Condition
- Summary: \$25.0 M - \$35.0 M in Infrastructure Needs

Wastewater Plant & Sludge Disposal

Alternative 1: Minimum Needs:

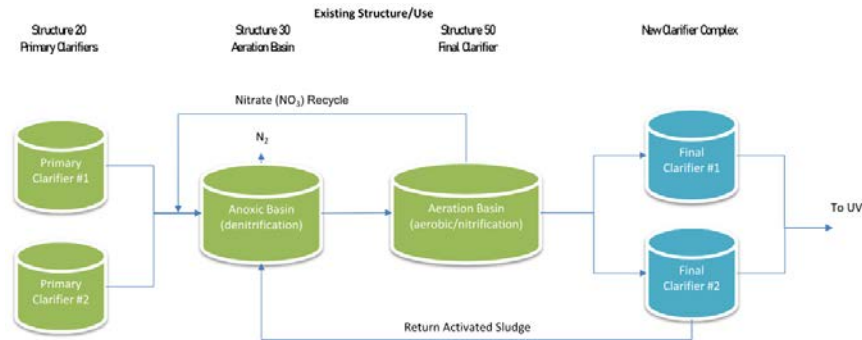
- Trickling Filter Rotating Equipment, Feed Pumps, Flow Device & Recycle Valve
- Aeration Basin Diffusers
- Divide Aeration Basin into two cells
- Aeration Blowers
- Final Clarification Equipment
- Redundant Final Clarifier
- Activated Sludge Pumps
- **Limitations to address Future Discharge Permit Requirements**

Summary: \$3.8M

Alternative 2: Upgrade Treatment Processes

- Construction 2 New Clarifiers
- Modify Trickling Filter Pumps
- Convert Aeration Basin to Anoxic Selector Basin
- Convert Final Clarifier to the Aeration Basin
- Three Aeration Blowers

Summary: \$6.0M

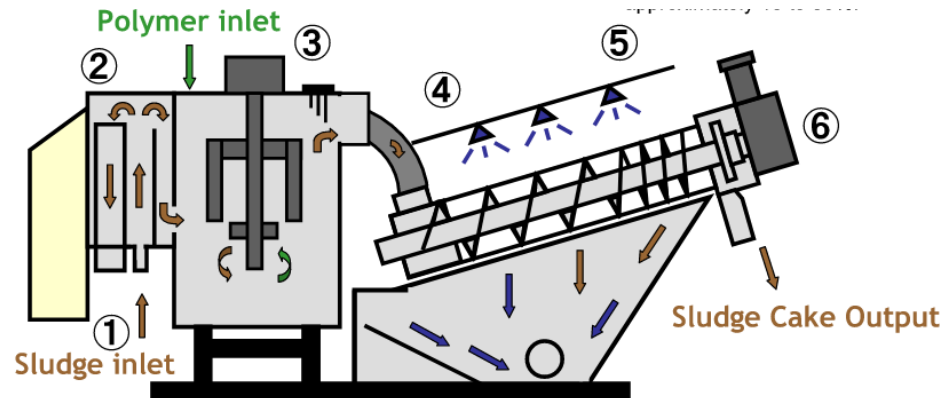


Wastewater Plant & Sludge Disposal

Biosolids Management Needs:

- Land application overwhelming during drought conditions
- Land Application Equipment Replacement
- Mechanical Dewatering Equipment
- Screw Press, Belt Filter Press or Centrifuges
- Flexibility to Land Apply or Landfill during drought

Summary: \$2.4M



Where are we at?

2019 Water & Sewer Study

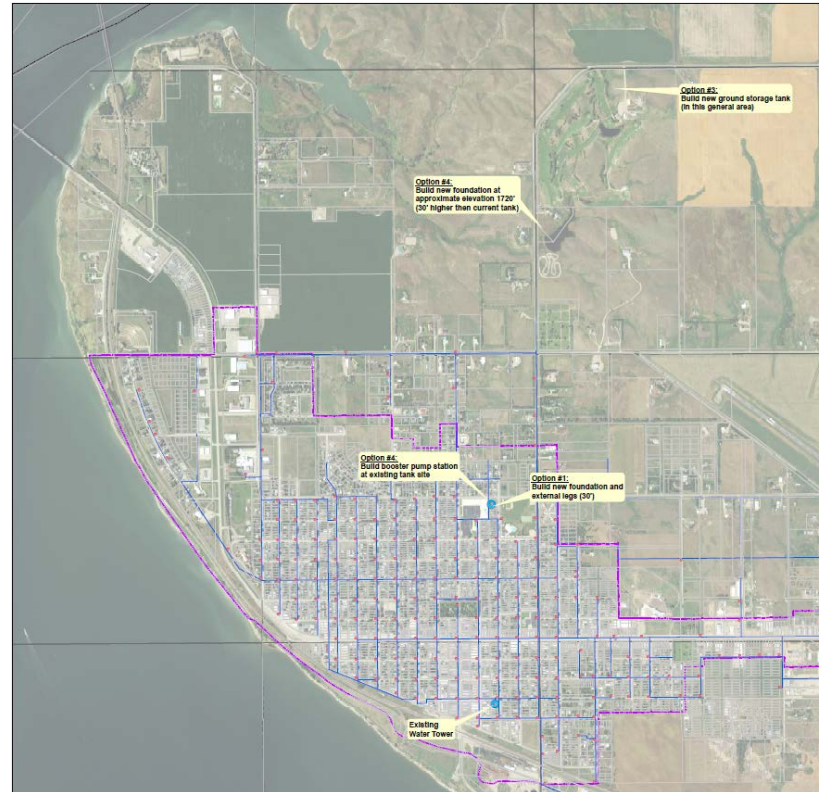
1. \$4.0M Raw Water Intake
2. \$3.0M Treatment Plant
3. \$2.5M Northside Transmission Line & Storage

2022 Supplemental Study

1. \$45M Water Distribution System
2. \$30M Sanitary Collection System
3. \$6M Wastewater Plant
4. \$2.4M Mechanical Sludge Disposal Option

Summary of Infrastructure Needs:

- Water System: \$54.5 M
- Sanitary System: \$38.4 M



Recommendations

Recommended Next Steps

- Finish the Televising
- Figure out how much?
- Rank your project needs
- Develop a Capital Improvement Plan
 - Introduce to Public, seek support
 - Post on Website
 - Utilize as a Roadmap for future councils
 - Address in fewer, larger projects with maximum grant amounts
- Seek Quality Funding



5 Year Infrastructure Plan To Support Housing Expansion: 2022 - 2027 Prepared For White Shield East Segment, Three Affiliated Tribes

Mark Fox, Chairman
Fred Fox, Councilman and East Segment Representative
Christopher Everett, Project Manager

Prepared By: Jerod Klabunde, PE

October 7, 2021
Project No. 21838




5.0 PROJECT SUMMARY

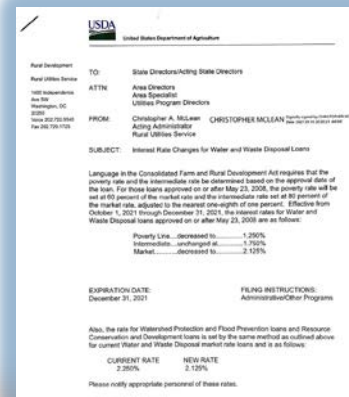
Below is a listing of the proposed projects contained within this plan. The table includes estimated projects costs and their project costs in the future.

Assume 3% Annual Increase in construction cost					
Title	Estimated Year Needed	Name of Project	Engineer's Opinion of Cost (2022 Dollars)	Engineer's Opinion of Cost in Future	
Project 1	2022	Storm Sewer, Sidewalks, and Street Improvements	\$680,000.00	\$680,000 (2022)	
Project 2	2022	Shared Use Path Improvements	\$1,400,000.00	\$1,400,000 (2022)	
Project 3	2023	Street Improvements (Awahil)	\$1,625,000.00	\$1,678,750 (2023)	
Project 4	2024	Water, Sewer, and Street (Awahil)	\$2,550,000.00	\$2,709,215 (2024)	
Project 5	2024	Street Extension	\$1,600,000.00	\$1,697,440 (2024)	
Project 6	2025	Water System Improvements	To Be Determined	To Be Determined	

Funding



- Savings for Projects
- FEMA B.R.I.C.
- H.U.D. (CDBG)
- USDA Rural Development
- D.A.N.R. (DWSRF)
- D.A.N.R. (CWSRF)
- American Rescue Plan Act of 2021 (A.R.P.A.) – \$1.9 trillion package
 - Allocated by 2024 & Spent by 2026
 - Local Funds
 - State Received Funds



16	Mobridge	C461016-06	Upgrades at the wastewater treatment facility to include replacement of the screw pumps, grit handling equipment, and screening system and repairs to the facility roof and electrical equipment.	\$1,830,000	2.00%, 20 yrs	Yes (Pending rate increase)
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Priority Points	Community/ Public Water System	Project Number	Project Description	Est. Loan Amount	Expected Loan Rate & Term	Pop. Served	Dis-advantaged
56	Mobridge	C462016-08	Problem: the existing water treatment facility is in need of significant repairs, the raw water intake system is beyond its useful life and in need of repair, and the North water tower height does not provide full system storage or adequate pressure. Project: upgrades at the water treatment facility to include controls, high service pumps, lime slaker, and HVAC system, repair or replace the existing raw water intake system, and increase the height of the North water tower.	\$11,350,000	1.875%, 30 years	3,465	Yes (Pending rate increase)

A.R.P.A. Funded Projects in SD



■ Mobridge DWSRF Application this Spring

- Project Cost - \$11.3 M

■ Available for State

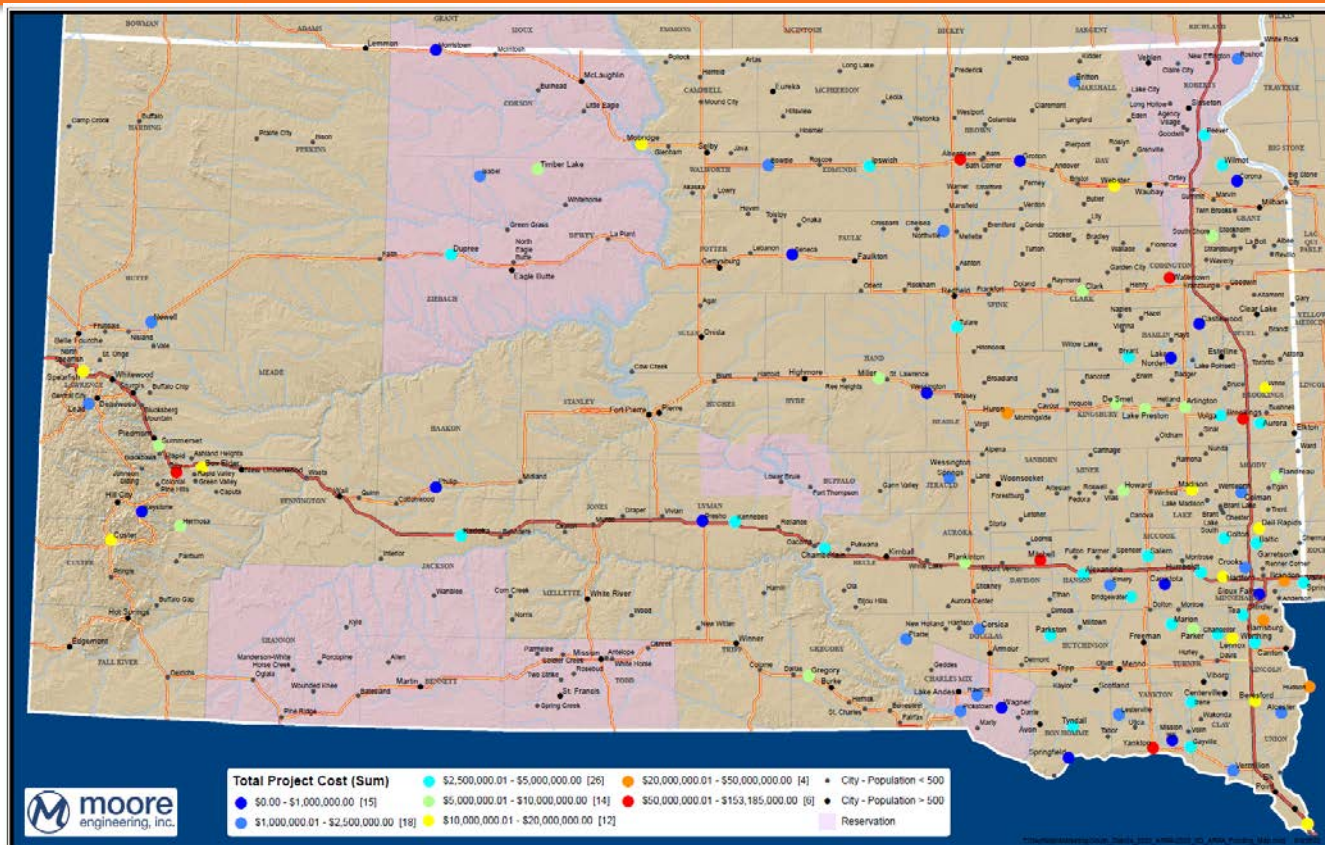
- 228 Projects Funded
- \$1.7 B Project Costs
- \$570M A.R.P.A. Grant
- Cost Share
 - 30% Grant
 - 50% Grant

■ Available for Mobridge

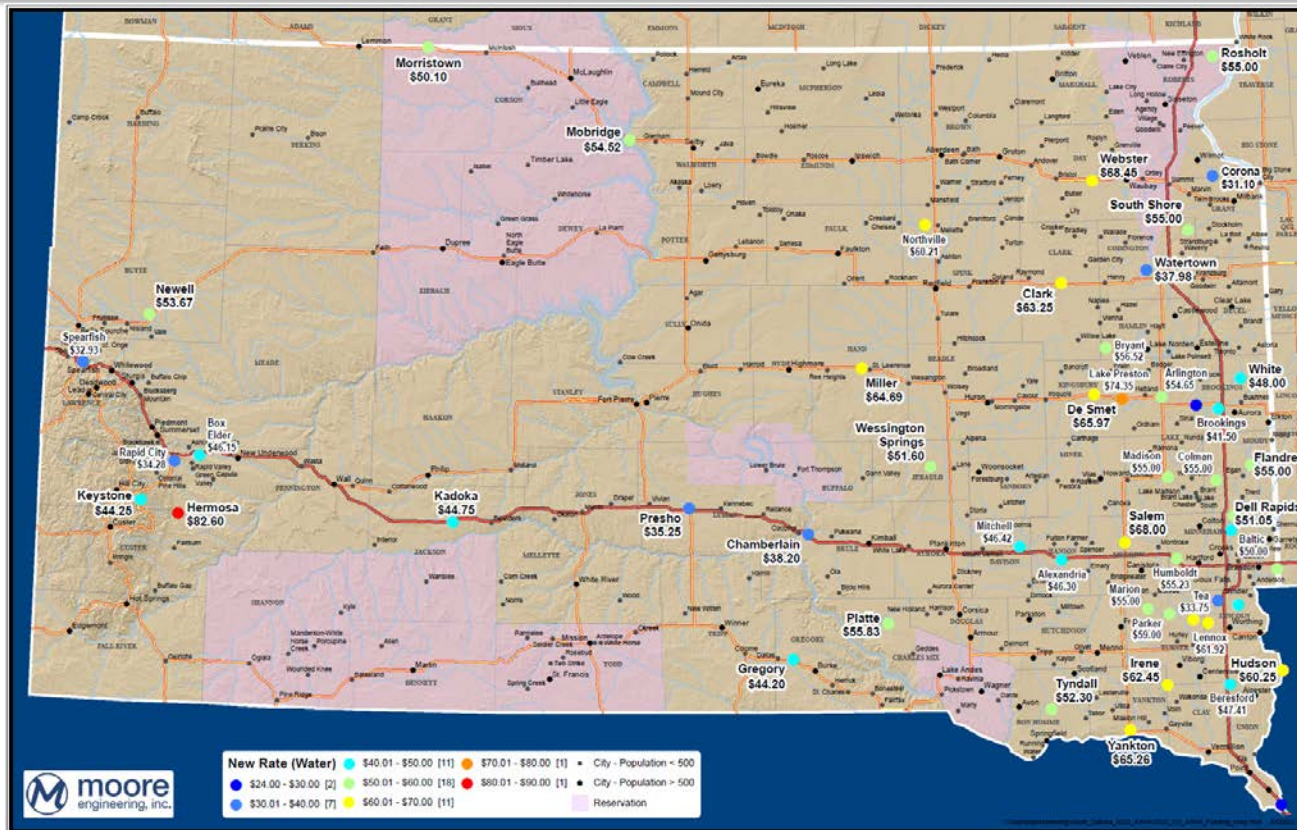
- Project Cost - \$11.3 M
- A.R.P.A. Grant - \$4.17M (37% Grant)
- Requirements
 - Bond Resolution
 - Rate Increase - \$17.55 / Month Surcharge

189	Dupree	Sewer	\$4,008,562.00	\$1,924,110.00	\$1,924,110.00	\$1,314,452.00	\$30.00	\$25.00	\$55.00	
190	Fall River Water Users District	Water	\$10,007,000.00	\$7,091,550.00	\$7,091,550.00	\$2,915,450.00	\$82.50	\$0.00	\$82.50	
191	Flandreau	Water	\$4,440,000.00	\$1,207,751.00	\$1,207,751.00	\$2,818,087.00	\$44.60	\$10.40	\$55.00	Rates to be restructured
192	Flandreau (2)	Sewer	\$4,380,000.00	\$1,189,751.00	\$1,189,751.00	\$2,776,087.00	\$44.00	\$11.00	\$55.00	Rates to be restructured
193	Howard	Sewer	\$5,274,000.00	\$2,529,728.00	\$2,529,728.00	\$2,472,000.00	\$33.40	\$21.60	\$55.00	
194	Huron	Water	\$13,032,000.00	\$2,465,874.00	\$2,465,874.00	\$0.00	\$0.00	\$0.00	\$0.00	
195	Huron (2)	Sewer	\$6,345,000.00	\$1,903,500.00	\$1,903,500.00	\$0.00	\$0.00	\$0.00	\$0.00	
196	Huron (3)	Sewer	\$5,030,000.00	\$720,000.00	\$720,000.00	\$0.00	\$0.00	\$0.00	\$0.00	Storm Water Improvements
197	Ipswich	Sewer	\$2,584,482.00	\$1,770,370.00	\$1,770,370.00	\$814,112.00	\$47.00	\$8.05	\$55.05	
198	Isabel	Sewer	\$2,044,374.00	\$391,500.00	\$391,500.00	\$828,204.00	\$7.50	\$27.90	\$35.40	
199	James River Water Development District	Water	\$46,895,340.00	\$5,000,000.00	\$5,000,000.00	\$0.00	\$0.00	\$0.00	\$0.00	Funding Request Exceeds guidelines
200	Keystone	Water	\$244,000.00	\$43,800.00	\$43,800.00	\$102,200.00	\$43.00	\$1.25	\$44.25	
201	Lead	Sewer	\$763,931.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	Project type wasn't specified
202	Lead (2)	Water	\$913,285.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	Project type wasn't specified
203	Lead/Deadwood Sanitary District	Water	\$3,720,000.00	\$1,116,000.00	\$1,116,000.00	\$2,604,000.00	\$14.50	\$0.00	\$14.50	
204	Lead/Deadwood Sanitary District (2)	Sewer	\$907,000.00	\$272,100.00	\$272,100.00	\$634,900.00	\$22.00	\$0.00	\$22.00	
205	Marion	Water	\$2,243,500.00	\$57,709.00	\$57,709.00	\$134,655.00	\$53.60	\$1.40	\$55.00	Rates to be restructured
206	Marion (2)	Sewer	\$2,293,500.00	\$57,709.00	\$57,709.00	\$134,655.00	\$49.50	\$1.45	\$50.95	
207	Mobridge	Water	\$11,297,730.00	\$2,834,980.00	\$2,834,980.00	\$7,123,072.00	\$36.97	\$17.55	\$54.52	1.875% Interest Rate
208	Newell	Water	\$1,142,000.00	\$342,600.00	\$342,600.00	\$649,400.00	\$46.07	\$7.60	\$53.67	
209	Newell (2)	Sewer	\$709,000.00	\$149,100.00	\$149,100.00	\$347,900.00	\$35.65	\$0.00	\$35.65	
210	Presho	Water	\$150,000.00	\$45,000.00	\$45,000.00	\$105,000.00	\$32.00	\$3.25	\$35.25	
211	Randall Community Water District	Water	\$49,991,000.00	\$11,256,825.00	\$11,256,825.00	\$38,724,175.00	\$65.25	\$0.00	\$65.25	
212	Rapid City	Sewer	\$785,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
213	Rapid City (2)	Water	\$7,400,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
214	Rosholt	Water	\$2,150,000.00	\$752,500.00	\$752,500.00	\$1,397,500.00	\$29.00	\$26.00	\$55.00	
215	South Dakota ellsworth development Authority	Water	\$300,000.00	\$300,000.00	\$300,000.00	\$0.00	\$0.00	\$0.00	\$0.00	Funding Request Exceeds guidelines
216	Spearfish	Water	\$4,620,000.00	\$1,386,000.00	\$1,386,000.00	\$3,234,000.00	\$32.93	\$0.00	\$32.93	
217	Spearfish (2)	Sewer	\$8,521,000.00	\$2,556,300.00	\$2,556,300.00	\$5,964,700.00	\$49.70	\$5.30	\$55.00	Rates to be restructured
218	Timber Lake	Sewer	\$3,513,400.00	\$464,334.00	\$464,334.00	\$2,229,066.00	\$25.00	\$36.70	\$61.70	
219	Tulare	Sewer	\$2,540,000.00	\$1,015,534.00	\$1,015,534.00	\$1,449,000.00	\$10.90	\$44.10	\$55.00	
220	Valley Springs	Water	\$3,605,000.00	\$2,953,288.00	\$2,953,288.00	\$521,168.00	\$50.50	\$6.00	\$56.50	
221	Vermillion	Sewer	\$1,075,000.00	\$52,500.00	\$52,500.00	\$0.00	\$0.00	\$0.00	\$0.00	
222	Watertown	Water	\$999,640.00	\$299,892.00	\$299,892.00	\$699,748.00	\$37.54	\$0.45	\$37.99	
223	Watertown (2)	Water	\$6,939,000.00	\$2,081,700.00	\$2,081,700.00	\$4,857,300.00	\$35.88	\$2.10	\$37.98	
224	Watertown (3)	Sewer	\$4,862,300.00	\$1,458,690.00	\$1,458,690.00	\$3,403,610.00	\$36.53	\$1.45	\$37.98	
225	Watertown (4)	Sewer	\$3,341,500.00	\$1,002,450.00	\$1,002,450.00	\$2,339,050.00	\$36.98	\$1.00	\$37.98	
226	Watertown (5)	Sewer	\$2,040,000.00	\$212,000.00	\$212,000.00	\$1,428,000.00	\$12.50	\$0.00	\$12.50	
227	WEB Water	Water	\$48,500,900.00	\$32,710,000.00	\$32,710,000.00	\$0.00	\$0.00	\$0.00	\$0.00	
228	Weston Heights Homeowners Association	Water	\$3,871,000.00	\$3,290,350.00	\$3,290,350.00	\$580,650.00	\$91.15	\$0.00	\$91.15	

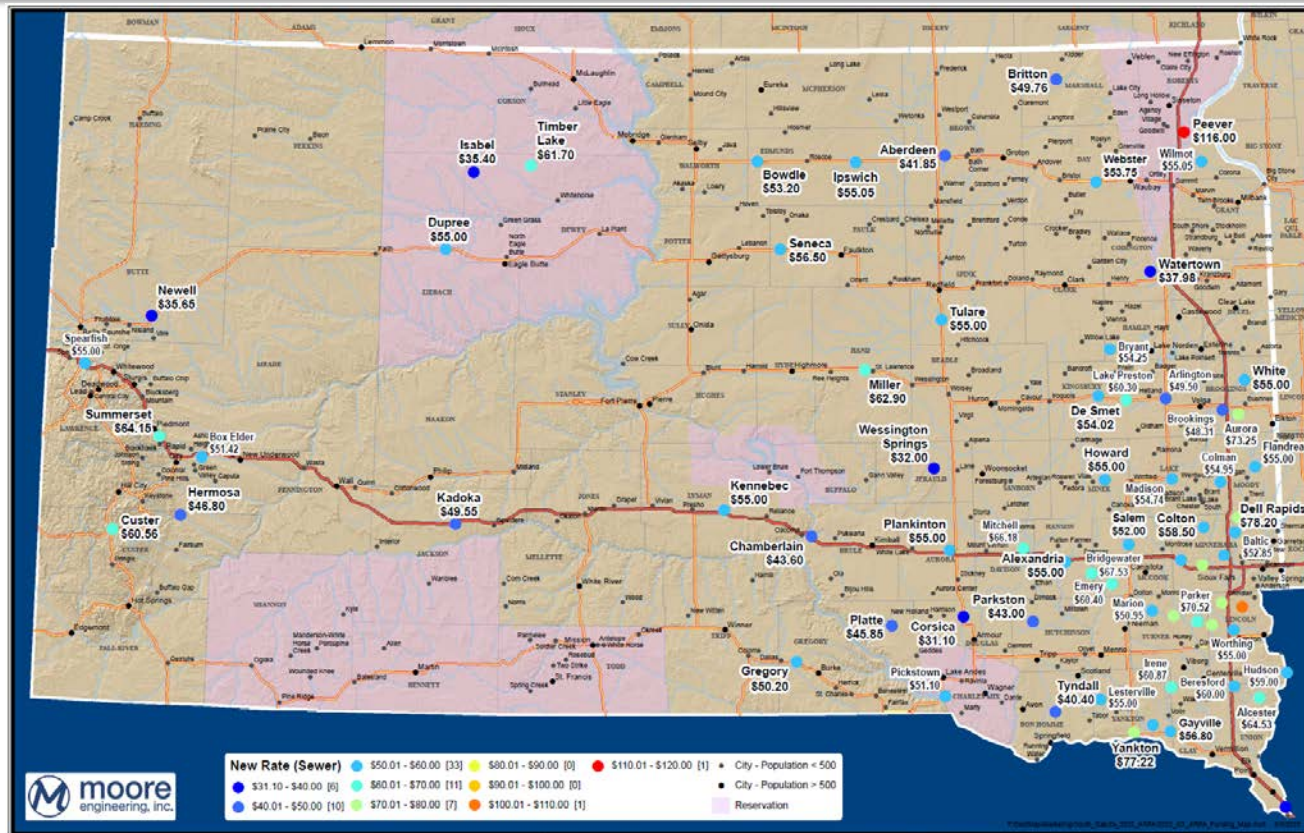
Map of Projects



Water: New Rate Requirements.



Sewer: New Rate Requirements.



Next Steps

- **Secure Initial Funding - Now**
- **Prioritize Needs – 2-3 Months**
- **Design / Bid – 6 Months**
- **Construction – 2-3 Years**
- **Continue to Seek Quality Funding**
 - Water & Sewer
 - USDA / DWSRF / B.R.I.C. / CDBG

Recommended Priority List

1. Raw Water Intake
2. Treatment Plant
3. Northside Transmission Line & Storage
4. Water Distribution System



moore
engineering, inc.

QUESTIONS?

Jerod Klabunde
Kyle Meyer