



**Antidegradation
Alternative Analysis**

for

**Wastewater Treatment
Facility Improvements**

**City of Custer
Custer, South Dakota**

June 2020

DGR Project No. 669021

Antidegradation Alternative Analysis
for
CITY OF CUSTER
WASTEWATER TREATMENT
FACILITY IMPROVEMENTS

CUSTER, SOUTH DAKOTA

I hereby certify that this plan, specification
or report was prepared by me or under my direct
supervision and that I am a duly
Registered Professional Engineer under the
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EXECUTIVE SUMMARY

The City of Custer owns and operates a sanitary sewer utility service which includes a gravity collection system within the City limits that discharges to the Wastewater Treatment Facility (WWTF) via an interceptor sewer. The collection system is routed east along South Dakota Highway 16 to the WWTF, located approximately 0.25 miles north of Highway 16 along Spring Place. The City's WWTF includes two (2) aerated cells, an internal lift station and four stabilization ponds located approximately ¼ mile further to the north. The effluent wastewater from the stabilization cells is pumped over eight miles south of Custer to a discharge location near Flynn Creek Road into Flynn Creek. The City operates under Surface Water Discharge Permit No. SD0022012. The existing WWTF system has been in operation since 1986.

The City of Custer's Surface Water Discharge Permit recently expired and is up for renewal. The new permit, and permits within the design life of a future treatment system, are expected to include more stringent wastewater effluent requirements, specifically, effluent ammonia-nitrogen. To accommodate more stringent limits as well as increased flows and loadings due to anticipated population increase, the City of Custer initiated a planning process to analyze the sanitary sewer system and prepare a report highlighting recommended alternatives. A significant portion of the analysis was to review alternate discharge locations due to the substantial operation and maintenance issues and costs related to the existing effluent force main location. A Facility Plan dated February 2020, prepared by DGR Engineering, highlights the various issues in greater detail and the alternatives considered to address them.

To avoid degradation of water quality of the proposed receiving stream, various alternatives were considered. The following alternatives are discussed within this analysis.

Alternative	Description
1	Pollution Prevention Measures
2	Reduction in scale of the project
3	Water recycle or reuse
4	Process changes
5	Innovative treatment technology
6	Advanced treatment technology
7	Seasonal or controlled discharge options to avoid critical water quality periods
8	Improved operation and maintenance of existing treatment systems
9	Alternate discharge locations and alternate receiving waters

This Antidegradation Alternative Analysis identifies and evaluates various factors considered in the recommendations to improve the wastewater effluent quality. The recommendation outlined in the Facility Plan is to construct a Submerged Attached Growth Reactor (SAGR) followed by ultraviolet disinfection, and, to relocate the proposed discharge to the French Creek drainage basin at a location downstream of Stockade Lake. Each of the alternatives were evaluated based on their practicability, economic efficiency, affordability, social and environmental impact to Custer and the surrounding communities, and potential degradation to receiving water body quality.

INTRODUCTION

This Antidegradation Alternative Analysis was prepared to analyze the impacts of the discharge location recommended in the Facility Plan in French Creek downstream of Stockade Lake. Increased flows and loads to the treatment facility due to population growth as well as more stringent effluent requirements imposed on the facility initiated an alternative analysis to review alternate discharge locations and treatment alternatives. The purpose of this report is to evaluate alternatives to handle the proposed design parameters while putting value on treatment techniques, effluent limits, cost effectiveness and affordability.

FACILITY PLAN SUMMARY

The Facility Plan dated February 2020 discusses in more detail the existing conditions, design parameters, force main alternatives and wastewater treatment alternatives. The Facility Plan highlights four different options for discharge locations to alleviate the operation and maintenance problems with the existing effluent force main. Wastewater treatment alternatives were also analyzed based on anticipated effluent permit requirements determined by the South Dakota Department of Environment and Natural Resources (SD DENR). The following sections highlight the information that went into the development of the recommended alternative.

EXISTING CONDITIONS

The population of Custer according to the 2010 Census was 1,983 and the area served by the City of Custer sanitary sewer system population in 2010 was 2,067. In 2019, the population estimate for this same area was 2,124. Wet weather and tourism both contribute to wastewater flows being highest during the summer months.

The existing discharge force main was constructed in 1985 using two different piping materials, Reinforced Thermosetting Resin Pipe (RTRP) class 250 pressure pipe and Polyvinyl Chloride (PVC) class 200 pressure pipe. The RTRP class 250 pressure pipe was installed in the first 14,170 feet while class 200 PVC pressure pipe is used for the next 28,854 feet. This force main to Flynn Creek has encountered numerous breaks, most of them in the RTRP pipe. The breaks typically occur at the mechanical joints, but there have also been some breaks caused by rocks puncturing the pipe walls. Since 2018, the City has made emergency repairs to several sections of pipe. In addition, the air release valves along the force main are difficult to operate and are in need or replacement. Some of the recent breaks are documented in the aerial photo in Figure 1.



Figure 1 - Aerial Photo of Recent Force Main Breaks

The existing wastewater treatment facility began operating in 1972 and was upgraded in 1986 and 1994. The WWTF serves both the City of Custer and the East Custer Sanitary District. The existing WWTF consists of two (2) aeration basins each 1.4 MG operated in parallel followed by an intermediate lift station that pumps to four (4) facultative treatment cells located north of the treatment plant. The four facultative ponds vary in size, depth and shape. The facultative pond effluent flows by gravity to high-head lift station pumps located in the treatment plant building which pumps the effluent through approximately 8 miles of 12-Inch force main to Flynn Creek.

DESIGN PARAMETERS

Treatment systems are sized based on hydraulic and organic loadings. The first method to sizing treatment systems is the hydraulic loading, or the amount of wastewater flow to the treatment facility. The influent flow data from the City of Custer as well as a projected population and use increase was analyzed to determine a proposed design flowrate. The population has been generally

increasing since 1990 at approximately 1.1%. Projecting a similar population increase for the design life of 20 years results in a design population of 2,680 (2040). This additional 556 people add an additional 41,700 gpd assuming 75 gallons/person/day. In addition, the growth of approximately 800 additional hotel guests and employees per day are anticipated during the life of the facility for an additional flow of approximately 60,000 gpd based on 75 gallons/cap/day. Table 1 shows the hydraulic loading calculations used to develop a proposed design flow of 750,000 gallons per day.

Table 1 - Hydraulic Loading

	Gallons per Day
Maximum Month Flow (June 2015)	646,374
Increase due to Population Increase	41,700
Increase due to tourism growth	60,000
Proposed Design Flow	~750,000

The second method to sizing treatment systems is organic loading, or the waste constituents present in the wastewater. Chapter I.C.2 of the South Dakota Design Criteria states that every person will generate an average of 0.17 pounds of Biochemical Oxygen Demand (BOD₅) per day. The future organic loading for the treatment system based on these requirements are shown in Table 2. The table indicates the proposed treatment system has adequate capacity for BOD₅ loading based on the assumed SD Design Criteria loading.

The Max Wet Weather (MWW) flow is higher due to infiltration and inflow during wet weather periods. However, the organic loading does not change during wet weather, so the wastewater strength is less concentrated during MWW.

Table 2 - Organic Loading

2019 Population	2,124		
Growth Rate (per year)	1.1%		
Number of Periods	22		
2040 Estimated Population	2,680		
	AWW - 30	MWW	
Flow, gpd	750,000	1,200,000	

	Average		Max	
	(mg/L)	(#/day)	(mg/L)	(#/day)
BOD	95	592	59	592
TSS	111	696	70	696
TKN	20	125	13	125

RECEIVING STREAM AND EFFLUENT LIMITS

Currently, the effluent is discharged into Flynn Creek with some water reuse directed to the Golf Course as needed for irrigation during summer months. Tables 3 and 4 illustrate the effluent limits at each of these discharge locations.

Table 3 - Existing Effluent Limits - Outfall 001A (Flynn Creek)

	30-Day Average	7-Day Average	Daily Maximum
BOD ₅ (mg/L)	30	45	N/A
Total Suspended Solids (mg/L)	30	45	N/A
pH	6.5-9.0		

Table 4 - Existing Effluent Limits - Outfall 002R (Golf Course)

	30-Day Average	7-Day Average	Daily Maximum
BOD ₅ (mg/L)	30	45	N/A
Total Suspended Solids (mg/L)	30	45	N/A
Fecal Coliform (#/100mL)	20	N/A	100
pH	6.5-9.0		

It was important to look at long term effluent limits when considering replacing the existing force main. One of the most recent updates to the effluent limits that set the design parameters for wastewater treatment was the ammonia-nitrogen effluent limit. Achieving high levels of ammonia removal also results in BOD and TSS removal. Therefore, the differences in ammonia-nitrogen effluent limits in the various streams was a primary design parameter. The existing discharge location at Flynn Creek is expected to have the following effluent limits for ammonia nitrogen for the next permit cycle:

Months	30-Day Average Ammonia Effluent Limit
May – August	1.0 mg/L
September –April	2.0 mg/L

JUSTIFICATION OF DEGRADATION

With the recurring force main breaks, construction and operation costs associated with the existing treatment facility and force main, and the pending changes to the NPDES permit at the existing discharge location, a new discharge location was recommended in the Facility Plan. The new discharge location of French Creek south of Stockade Lake requires an antidegradation ammonia nitrogen effluent limit of 0.2-0.6 mg/L as outlined below:

Months	30-Day Average Ammonia Effluent Limit
May - June	0.2 mg/L
July – August	0.3 mg/L
September – October	0.4 mg/L
November – April	0.6 mg/L

Since discharging to French Creek south of Stockade Lake would be the least expensive, and recommended alternative if these limits were increased to water quality standard based effluent limits, it is important to is to evaluate the social and economic impacts these limits for French Creek would have on the community and surrounding area in comparison to requiring the facility to meet antidegradation water quality standards.

WATER QUALITY STANDARDS BASED EFFLUENT LIMITS

The effluent limit for ammonia-nitrogen in French Creek downstream of Stockade Lake based on the existing water quality standards for the existing beneficial uses are as follows:

Months	30-Day Average Ammonia Effluent Limit
May - June	1.4 mg/L
July – August	1.0 mg/L
September –April	2.5 or 3.0 mg/L

The Facility Plan outlines a proposed treatment system that would meet the antidegradation limits based on water quality based effluent limits. Traditional biological mechanical plants for wastewater treatment have not been proven to discharge ammonia nitrogen levels less than 0.6 mg/L. Achieving 0.2 mg/L of ammonia nitrogen would require additional micro filtration, chlorination, or ion exchange as the final step of the wastewater treatment plant. The lack of feasibility and potential for additional degradation due to chemicals with these alternatives led to considering degradation of French Creek to the water quality standard based effluent limits. The proposed treatment alternative will meet an ammonia nitrogen effluent limit of 1.0-3.0 mg/L which is based on the water quality standards, according to SD DENR. Since South Dakota’s Antidegradation Implementation Procedures apply, the Social and Economic Importance of the project must be demonstrated.

EVALUATION OF ALTERNATIVES

With more stringent effluent limits and increased flows and loads, the City of Custer will need to increase the capacity and upgrade their existing wastewater treatment facility. The following alternatives were considered to find the least degrading and most economically affordable, and reasonable alternatives:

Alternative	Description
1	Pollution Prevention Measures
2	Reduction in scale of the project
3	Water recycle or reuse
4	Process changes
5	Innovative treatment technology
6	Advanced treatment technology
7	Seasonal or controlled discharge options to avoid critical water quality periods
8	Improved operation and maintenance of existing treatment systems
9	Alternate discharge locations and alternate receiving waters

POLLUTION PREVENTION MEASURES

Pollution prevention measures have been considered to protect the proposed receiving stream from the discharge of pollutants; however, these considerations will not fully prevent degradation of the receiving stream. Due to the fluctuation in flows and loads on an hourly basis but also a seasonal basis based on tourism activity, provisions for equalization have been considered. During periods of increased flows and loads, excess raw wastewater will be directed to an equalization pond for storage while the remaining flow will be properly treated through the upgraded treatment facility until flows subside. This will prevent untreated wastewater from reaching the receiving stream. In addition, frequent monitoring of the effluent wastewater quality will be implemented. If effluent wastewater quality standards are not being met, flow can get diverted to the equalization lagoons until the effluent requirements are met.

REDUCTION IN SCALE OF THE PROJECT

Reduction in the size of the project for antidegradation would require flow and load reduction to the City's wastewater treatment facility. This would require reduction in the waste from existing domestic, commercial, and industrial sources and would eliminate the ability for the City of Custer to grow in population and would provide no capacity for new commercial or industrial users. Thus, a reduced scale project would be damaging to the economic and social development of the City of Custer.

WATER RECYCLE OR REUSE

The City of Custer currently utilizes the local golf course for water reuse via land application of effluent wastewater. The existing system requires disinfection prior to land application to the golf course. During dry periods, the golf course utilizes a significant amount of the effluent wastewater. However, during wet periods, the utilization of the effluent wastewater for land application is decreased. The agricultural land within proximity of the City of Custer existing wastewater treatment site could provide some water reuse but not enough to convert to a zero-discharge facility. Furthermore, when there is wet weather or wet seasons the wastewater flows are higher and the need for irrigation waters is lower. Water reuse was considered but does not provide a full water reuse solution due to weather patterns and adequate available land.

PROCESS CHANGES

Currently, the facultative ponds provide treatment following the aerated ponds. With the proposed project, the facultative ponds will be used for equalization during heavy rainfall and high flow events. The proposed treatment process will have aerated ponds followed by a Submerged Attached Growth Reactor (SAGR), followed by ultraviolet disinfection. This process change will add air and an environment for nitrification. The SAGR is buried which prevents algae growth and allows for an effluent that can be disinfected by ultraviolet disinfection prior to discharging.

Currently, the golf course irrigation effluent is dosed with chlorine for disinfection on the way to the golf course. With the ultraviolet disinfection proposed at the treatment plant, it may not be necessary to disinfect with chlorine for the golf course irrigation.

INNOVATIVE TREATMENT TECHNOLOGY

Innovative technologies were considered and chosen as the preferred treatment alternative; use of a Submerged Attached Growth Reactor (SAGR). SAGR systems consist of a submerged aerated rock media filter that is installed after lagoon cells. The lagoon cells provide carbon oxidation while the SAGR system provides nitrification for ammonia conversion. The SAGR system is an innovative technology that produces a high-quality effluent in cold climates, such as Custer, SD. In addition, there is currently one other active SAGR system near Sylvan Lake in Custer State Park.

ADVANCED TREATMENT TECHNOLOGY

Advanced treatment options were considered to promote antidegradation, specifically water treatment options such as ion exchange and chlorination were considered. These advanced treatments discharge sodium or chloride into the environment and proved to be unaffordable when considering long term operation and maintenance.

SEASONAL OR CONTROLLED DISCHARGE OPTIONS TO AVOID CRITICAL WATER QUALITY PERIODS

Additional storage ponds were considered to allow the facility flexibility to avoid critical water quality period of the receiving stream, typically during the warmer weather months. However, the City of Custer experiences seasonal wastewater flow peaks during the summer months due to local tourism. A seasonal discharge facility would be required to store the peak flows during the summer months. Therefore, with the proposed flows and loadings to the City of Custer's wastewater treatment facility, adequate land area would not be available and would be topographically constrained to construct the additional storage required. In addition, a significant amount of timber land would be required to convert the existing facility into a seasonal discharge facility.

IMPROVED OPERATION AND MAINTENANCE OF EXISTING TREATMENT SYSTEMS

The proposed project includes improvements to the existing control building and wastewater treatment site. Utilizing the existing ponds for wet weather storage rather than treatment negates

the need for algae control in the existing ponds since there will be additional treatment and disinfection occurring after the ponds.

ALTERNATIVE DISCHARGE LOCATIONS AND ALTERNATIVE RECEIVING WATERS

As presented in the February 2020 Facility Plan, a number of alternative discharge locations were considered. Flynn Creek, French Creek and two locations within the Beaver Creek drainage basin were all considered. A discharge into French Creek upstream of Stockade Lake would remove the need for a discharge lift station altogether by discharging via a gravity pipe into the Creek along the south side of the existing wastewater treatment facility. However, with the fisheries beneficial uses of Stockade Lake, this option is not authorized.

Replacing the existing force main to Flynn Creek presents a constructability challenge in maintaining operation of the existing 8 miles of pipe while installing replacement pipe along the same alignment. It was determined in the 2020 Facility Plan that a discharge location on French Creek downstream of Stockade Lake proved to be the preferred alternative. This will allow the existing force main to Flynn Creek to remain in use while the new force main to French Creek is constructed.

ANALYSIS OF ABILITY TO PAY

The City of Custer has typically used sanitary sewer user fees to pay for sewer infrastructure costs. To finance the proposed project, the City will likely need to raise its sewer rates to accommodate the estimated project cost. The average residential monthly sewer rate for 5,000 gallons of usage is \$31.01 for a single family and \$49.62 for a commercial/multi-family. This averages to \$35.33 per user per month. An Affordability Analysis comparing the project costs for the different alternatives to their resulting annual payment per household based on varied grant/loan scenarios is outlined in Table 5. The Median Household Income for the City of Custer was \$48,167 (US Census estimate, 2018). The annual payment per household divided by the median household income resulted provides for the Percent of Median Household Income for wastewater costs.

Table 5 - WWTF Improvements Affordability Analysis

<u>Assumptions</u>									
	Number of Equivalent Customers		1,065						
	2019Avg Monthly Sewer Bill		\$ 35.33						
	Median Household Income (2018)		\$ 48,167						
	Debt	Number of Years	Interest Rate	Annual O&M	Annual Debt Service	Percent Rate Increase	New Sewer Rate	% of MHI	
French Creek Debt Service and O&M Annual Cost									
French Creek	\$11,271,000	20	2.75%	\$ 82,344	\$ 740,186	182%	\$ 99.69	2.48%	
\$2M Grant	\$ 9,271,000	20	2.75%	\$ 82,344	\$ 608,843	153%	\$ 89.41	2.23%	
\$4M Grant	\$ 7,271,000	20	2.75%	\$ 82,344	\$ 477,499	124%	\$ 79.13	1.97%	
50% Grant	\$ 5,635,500	20	2.75%	\$ 82,344	\$ 370,093	100%	\$ 70.73	1.76%	
80% Grant	\$ 2,254,200	20	2.75%	\$ 82,344	\$ 148,037	51%	\$ 53.35	1.33%	
Antidegradation Limits - French Creek Debt Service and O&M Annual Cost									
French Creek	\$11,871,000	20	2.75%	\$ 305,898	\$ 779,589	240%	\$ 120.26	3.00%	
\$2M Grant	\$ 9,871,000	20	2.75%	\$ 305,898	\$ 648,246	211%	\$ 109.99	2.74%	
\$4M Grant	\$ 7,871,000	20	2.75%	\$ 305,898	\$ 516,902	182%	\$ 99.71	2.48%	
50% Grant	\$ 5,935,500	20	2.75%	\$ 305,898	\$ 389,795	154%	\$ 89.76	2.24%	
80% Grant	\$ 2,374,200	20	2.75%	\$ 305,898	\$ 155,918	102%	\$ 71.46	1.78%	
Flynn Creek Debt Service and O&M Annual Cost									
Flynn Creek	\$17,607,000	20	2.75%	\$ 99,864	\$1,156,282	278%	\$ 133.62	3.33%	
\$2M Grant	\$15,607,000	20	2.75%	\$ 99,864	\$1,024,939	249%	\$ 123.34	3.07%	
\$4M Grant	\$13,607,000	20	2.75%	\$ 99,864	\$ 893,595	220%	\$ 113.06	2.82%	
50% Grant	\$ 8,803,500	20	2.75%	\$ 99,864	\$ 578,141	150%	\$ 88.38	2.20%	
80% Grant	\$ 3,521,400	20	2.75%	\$ 99,864	\$ 231,256	73%	\$ 61.24	1.53%	
Beaver Creek Debt Service and O&M Annual Cost									
Beaver Creek	\$13,821,000	20	2.75%	\$ 91,104	\$ 907,649	221%	\$ 113.48	2.83%	
\$2M Grant	\$11,821,000	20	2.75%	\$ 91,104	\$ 776,306	192%	\$ 103.20	2.57%	
\$4M Grant	\$ 9,821,000	20	2.75%	\$ 91,104	\$ 644,962	163%	\$ 92.92	2.31%	
50% Grant	\$ 6,910,500	20	2.75%	\$ 91,104	\$ 453,824	121%	\$ 77.97	1.94%	
80% Grant	\$ 2,764,200	20	2.75%	\$ 91,104	\$ 181,530	60%	\$ 56.66	1.41%	

The table includes line items for grant amounts of both \$2 million, \$4 million, 50%, and 80%. This assumes a maximum of \$2 million in grant funds available through SRF funding for a project in any given year. In addition, the City of Custer is eligible to receive forgivable loans. A conservative estimate is that \$2 million in grant funds would be available for the project if SRF funding was pursued. If antidegradation limits were required to be met, assuming \$2 million in grant funds received, the sewer rate per month per user would be \$108.96. A discharge to Flynn Creek or Beaver Creek would not be required to meet the antidegradation limit of 0.2-0.6 mg/L ammonia so their monthly rates would be \$122.32 or \$102.18 per user per month, respectively. It is proposed to discharge to French Creek with the same level of treatment that would be required at either Flynn Creek or Beaver Creek with a limit of 1-3 mg/L of ammonia nitrogen. With the proposed improvement project to French Creek, the new sewer rate per month per user would be approximately \$88.39, based on the City of Custer receiving a \$2 million grant to facilitate the recommended project as outlined in the Facility Plan.

If the annual payment as a percentage of MHI is greater than 2%, the project is determined to be unaffordable (US EPA, 1995). Based on this, the antidegradation limits would result in a project that is unaffordable according to the EPA workbook even with \$6 million in grant funds. However, the proposed project results in a project that is considered affordable if \$4 million is received in grant funds resulting in a new sewer rate of \$79.13 per user.

SOCIAL AND ECONOMIC IMPORTANCE

The proposed project is necessary for the City to be able to grow and allow local tourism while also meeting anticipated effluent wastewater requirement. The community of Custer will benefit due to tourism, growth, and additional employment opportunities.

TOURISM

Currently the City of Custer is a tourism hub during summer months. There are a number of businesses serving tourists such as hotels, restaurants, supply stores, as well as businesses providing tourism activities. Mt. Rushmore is about 20 miles north, and Crazy Horse National Monument is located just 5 miles north of Custer. Custer State Park is located 3 miles east of Custer, and Jewel Cave and Wind Cave are both located within 30 minutes of Custer. The businesses within the City of Custer provide food and lodging for these tourist attractions. Custer is also located on a main route for tourists traveling to Hot Springs, SD or to Wyoming from the Black Hills.

COUNTY SEAT

Custer is the county seat of Custer County.

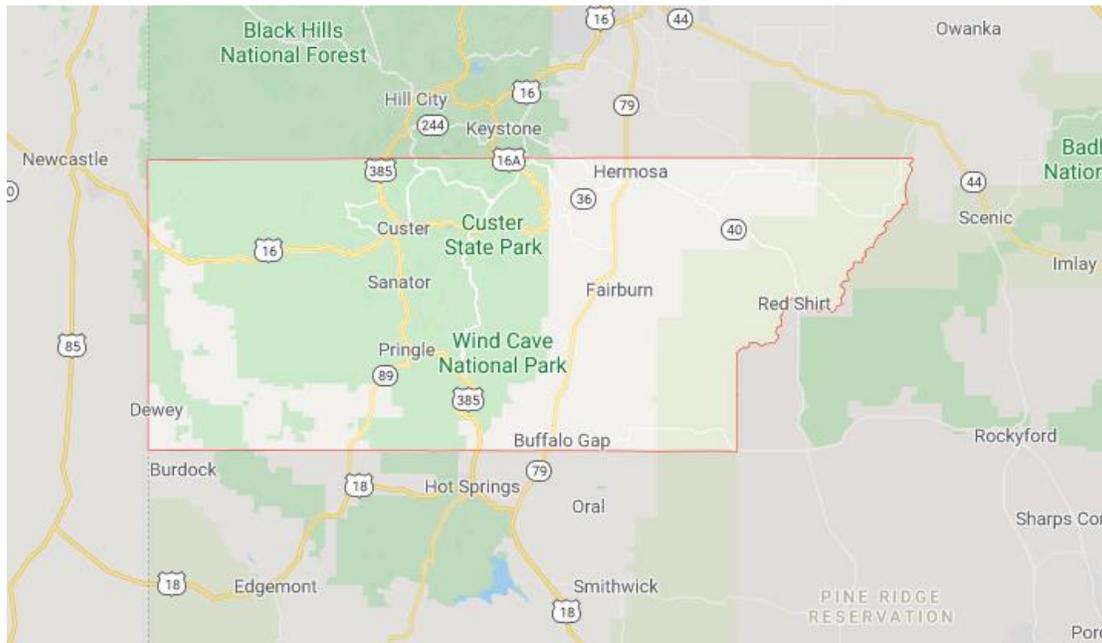


Figure 2 - Map of Custer County

COMMUNITY OF CUSTER

In January of 2019, a Custer Empower Community Gathering was held from which a Harvest Document was created. This document is included in Appendix A. A summary of recent major accomplishments includes a New Hospital & Clinic, YMCA programs, continued West Dam recreation development, Community Center Plans, successful Buffalo Roundup, Custer State Park amenities, Kidstep, etc.

CUSTER SCHOOL DISTRICT 16-1

Custer School District No 16-1 serves a large area encompassing the majority of Custer County. The Custer Elementary School and Custer High School are located within the City of Custer. The Hermosa Elementary and Middle School serves the eastern portion of the Custer School District with high school students from those locations attending Custer High School.

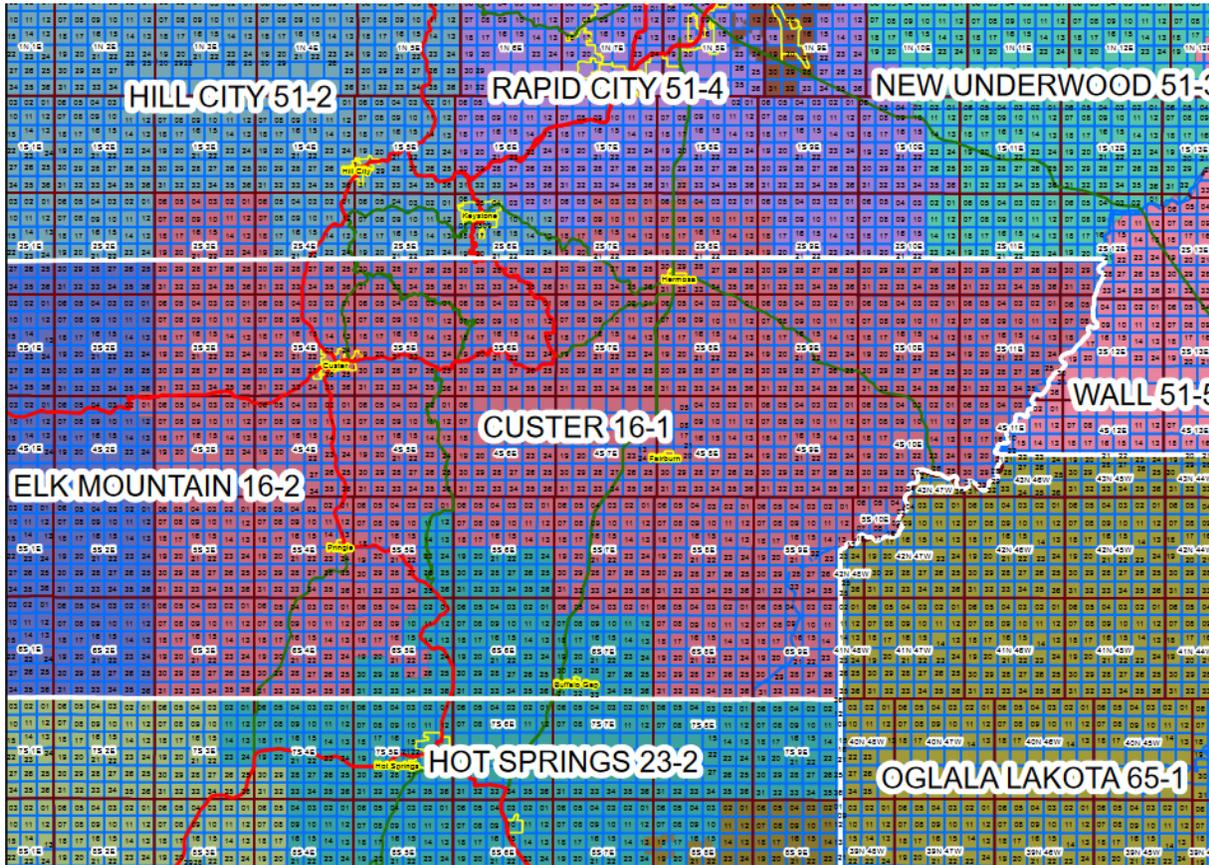


Figure 3 - School District Boundary Map

OPERATOR EMPLOYMENT

Currently the City of Custer sanitary sewer and wastewater treatment system is operated by local personnel. A SAGR treatment system is similar in operation to the existing treatment plant with the use of aeration and pumps, requiring the same operator class as the current system requires. The operator position of the proposed treatment system provides a source of local employment.

CONSTRUCTION PROVIDES EMPLOYMENT

The temporary construction process will include rock crushing, excavation, pipe laying, lift station construction, etc. The construction period for the recommended project will take one to two years which has the potential to result in local workers being hired. If the work is done by crews from out of town, this would affect local sales, community income levels, and potentially housing starts.

CONTINUED GROWTH

By increasing the treatment capacity, the project will allow for continued growth of the community. There have been times in other community systems outside of Custer where building permits are not allowed due to an undersized or dilapidated treatment system. The new treatment plant in Custer will be designed to allow for future growth.

CORRECTS FORCE MAIN BREAKS

The force main breaks have an associated repair cost that the city of Custer bears with each repair. The existing force main will be abandoned as part of the proposed project and the City would not have to pay for the unplanned repairs post construction.

LOWEST LONG-TERM O&M AND CAPITAL COST

The discharge location to French Creek south of Stockade lake is lower in elevation providing the lowest pumping cost of all the discharge locations. The SAGR system allows for the same operator grade and does not require the purchase of treatment chemicals in order to meet effluent limits.

ENVIRONMENTAL BENEFITS

PROVIDE ADDITIONAL TREATMENT

The current permit to Flynn Creek allows for discharge of treated effluent ammonia nitrogen of 11 mg/L. The proposed project will decrease the levels of ammonia to approximately 1.0 mg/L released into the surrounding environment.

BASE FLOW DURING DRY YEARS

This project will benefit the fish and wildlife surrounding the community, especially during dry years. During years when area streams and creeks dry completely wildlife migrate to look elsewhere for water. During dry years, the effluent into French Creek may provide an additional water source for wildlife.

BIOLOGICAL TREATMENT

The treatment process selected will not introduce additional sodium, chloride, or other treatment chemicals into the system. There are no hazardous chemicals planned to be trucked into Custer as a part of this treatment process. Ultraviolet disinfection prevents the storage of mass chemical at the wastewater treatment plant. Biological treatment is proposed rather than chemical dosing.

REFERENCES

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Map of Custer County:

<https://www.google.com/maps>

School District Boundary Map:

<https://doe.sd.gov/ofm/documents/SchoolDistrictMaps/CUSTER.pdf>

Appendix A

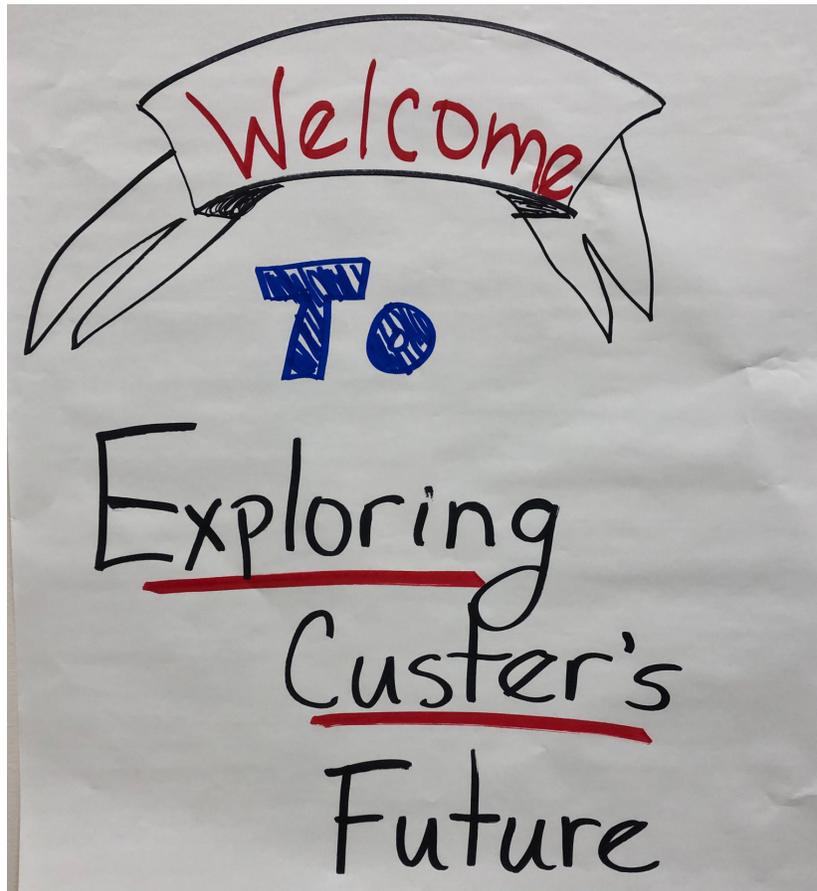
Custer Empower Community Gathering - Harvest Document



Custer Empower Community Gathering

Tuesday, January 29, 2019

— *Harvest Document* —



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Team Summary

Custer Empower – ‘Exploring Custer’s Future’ has been working the past 2 years in (4) areas: Housing, Recreation / Wellness, Education, and Child Care with over 100 citizens engaged in making things happen for Custer’s future.

On Tuesday, January 29, 2019 approximately 90 community members gathered to hear what was accomplished in the last 18 – 24 months and what is possible for 2019 and beyond. Those in attendance were given an opportunity to bring new possibilities for the future.

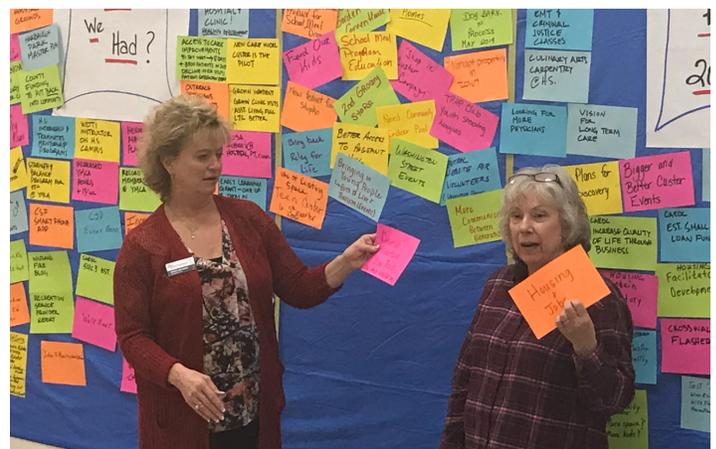
Mayor Corbin Herman gave a State of the City update along with other leadership gave updated on Custer County, the Custer County Schools, Custer Hospital, YMCA, Custer State Park, the Custer Chamber of Commerce and the Custer Economic Development Corp.

Along with many Custer County community leaders, citizens and volunteers, twelve (12) members of the Custer High School participated. The youth of the community shared their vision for the community and the region as we Explore Custer’s Future.



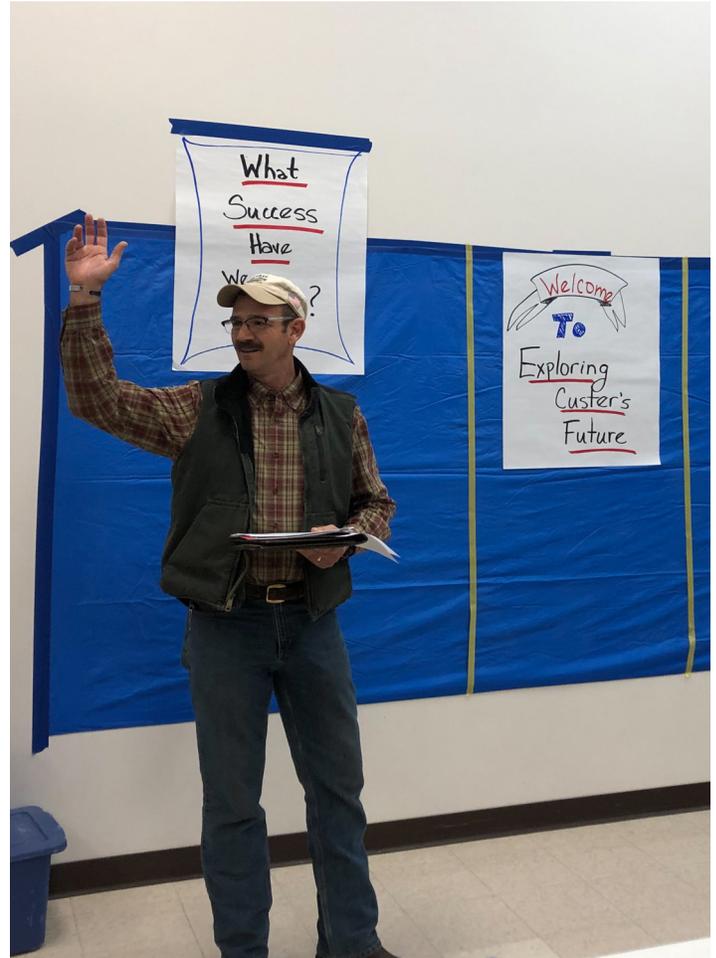
Major Accomplishments

- High School Internships – Teammates – Mentorship Programs
- New Hospital & Clinic – Healing environment
- Access to care improvement
 - 31 day wait to 8 days
 - 3500 + patients in 2018
 - Decline in ER Visits
 - Patient satisfaction steady
- New care model – Custer is the pilot
- Grown Inpatient
- Grown Clinic visits
- Assisted Living is full
- Early Learnings grant – one of 8 YMCAs in the country
- Outreach Physicians – specialist
- \$100,000 donation for furniture and lighting at Healing Garden
- Record Fundraising at the YMCA
- Hermosa School Master Plan
- Record Memberships at the YMCA
- Western Dakota Tech instructor on High School campus
- Increased YMCA hours to + 15 / week
- Custer State Park Event Barn



Major Accomplishments

- Strength & Balance program for 55 + at YMCA
- Custer State Park Smart Phone App
- City of Custer is planning for an area for search & rescue
- Harbaugh Park Master Plan
- County Funding to put back into community
- City ownership of old hospital grounds
- Comprehensive plan underway – plancuster.com
- West Dam
- Community Center Plans
- Successful Buffalo Roundup
- Custer State Park additional seasonal housing
8-Dorms 3-Apartments
- Legion Lake Fire Rehab
- Wildland Fire Building
- Peter Norbeck Outdoor Education Center
- Recreation Service Provider Report – on City of Custer Web Site
- Idea to reality worksheet for Recreation / Wellness
- Wellmark – Walk Audit Complete
- Custer Area Economic Development Corp 501-c-3 EST.
- Cooperation with school – Child Care
- Custer Chamber new Website
- Chamber increased social media presence & followers

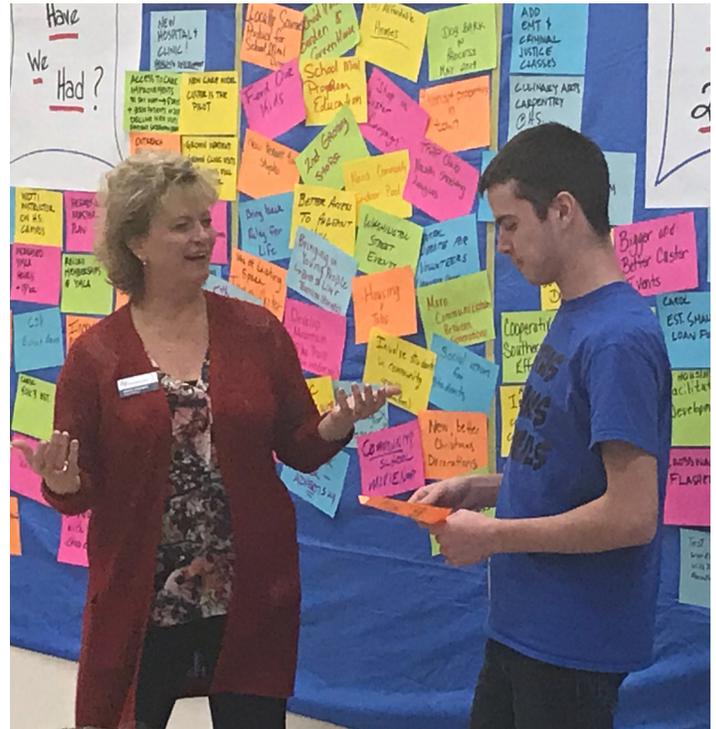


- New Custer Events
- Increased Chamber Membership
- Custer Area Economic Dev Corp Housing needs study
- Custer Area Economic Dev Corp Community Assessment
- Housing team working with Neighbor works and Dakota Land Trust
- Housing Team working with South Dakota Housing Authority
- Childcare;
 - 15 more at Kidstep – Hermosa
- 2nd Kidstop – Custer
- Rural development application in the works to create new community center / day care
- 21st Century Grant



What Might be Possible: 2019-2022

- Completed Custer Community Center
- Custer Hospital Garden
- Add EMT and Criminal Justice Classes at the High School
- Add Culinary Arts and Carpentry at High School
- Look for next generation of business owners, volunteers and employees
- YMCA – at new Community Center
- Indoor Swimming Pool
- New plans for Gold Discovery Days
- Local sourced produce for school meal program
- Shop in Custer Campaign
- Trap Club – Youth Shooting League
- Housing program seminars to educate public & employees
- More community dances
- Job creation – more employment opportunities for locals
- Winter Recreation for High School Students
- Library addition – educational opportunities
- Community – School movie night
- Custer Cruisin revamp – family friendly – find a ‘niche’
- Job Fair – Career Fair – CAEDC assist
- Feed our Kids

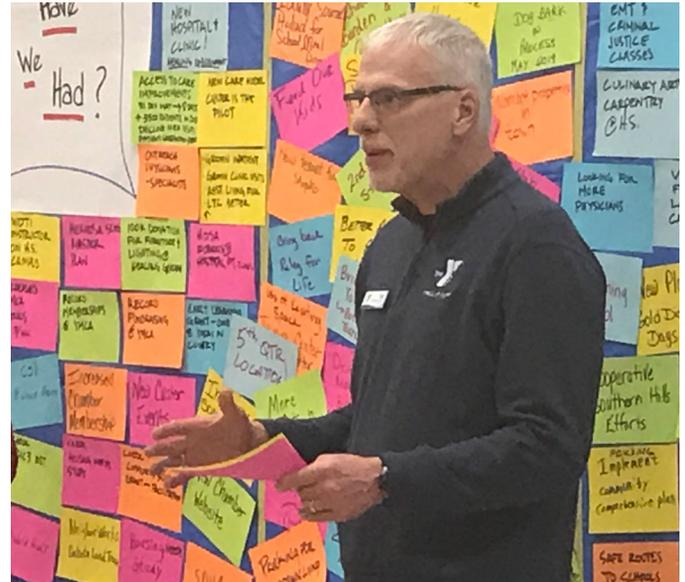


- New tenant for Shopko Building
- Bring Back Relay for Life
- Use of existing space – Teen Center ex. 5th quarter at Custer High School (or other location)
- Big Art Project – More Arts in the community
- Recycling
- Parking for downtown living
- Custer State Park Master Plan (Grow shoulder season)
- Continue Fire Rehab at Custer State Park
- Custer State Park – ADM building climate-controlled archive for research
- Custer State Park – New interpretive programs & displays
- Custer Area Econ Dev Corp Building stronger relationships with community organizations
- Custer Area Econ Dev Corp increase quality of life through businesses
- Custer Area Econ Dev Corp focusing on vacant property and rehab
- Custer Area Econ Dev Corp working on post-secondary education



What Might be Possible

- Housing Team Focus – Rental – Affordable workforce housing – senior market rate housing
- Implement community housing plan
- Maintain a housing inventory
- Housing facilitated development
- Custer Area Econ Dev Corp learning about creating a small business loan fund
- Implementing the Healthy Hometown 9 tactics – creating the action plan
- Crosswalk flashers
- Safe routes to schools
- Custer pedestrian master plan – Healthy Hometown
- Recreation providers report – 2nd edition
- Test “Idea to Reality” worksheet – maybe with the school and Parks, Recreation & Forestry Board
- Develop www.nextdoor.com social media sties
- Attract more year-round businesses – diversify markets
- Infrastructure emphasis – ex. potholes
- Community protection of our forest
- Community Technical Education (CTE) – Center – developing curriculum and needs list
- SHED – continue the cooperative Southern Hills efforts
- Harbach Park implementation of 1st phase
- Finish West Dam Project
- Bigger and Better Custer Events
- Vision for Long Term Care
- Looking for more Physicians



- School Yard Garden & Green House
- School Meal Program Education
- 10 Affordable workforce homes completed
- Dog Park completed
- Education thru college prep courses
- More rigorous honors classes
- Possible collaboration on Strong program
- Vision & Repurpose historic Feldspar plant on 385
 - Big Art – Business – Housing
- Grow the Beetle Celebration
- High Paying summer jobs
- Involve student in community groups (committees)
- New better Christmas decorations for the community
- Social Venues for Students
- More communication between generations
- Housing & Jobs
- Develop Mountain Bike Trails (and other outdoor recreation)
- Bring in young people both to live and tourism (events)
- Better Access to pageant hill
- Washington Street Events
- Central Website for Volunteers (volunteer bank)
- 2nd grocery store



