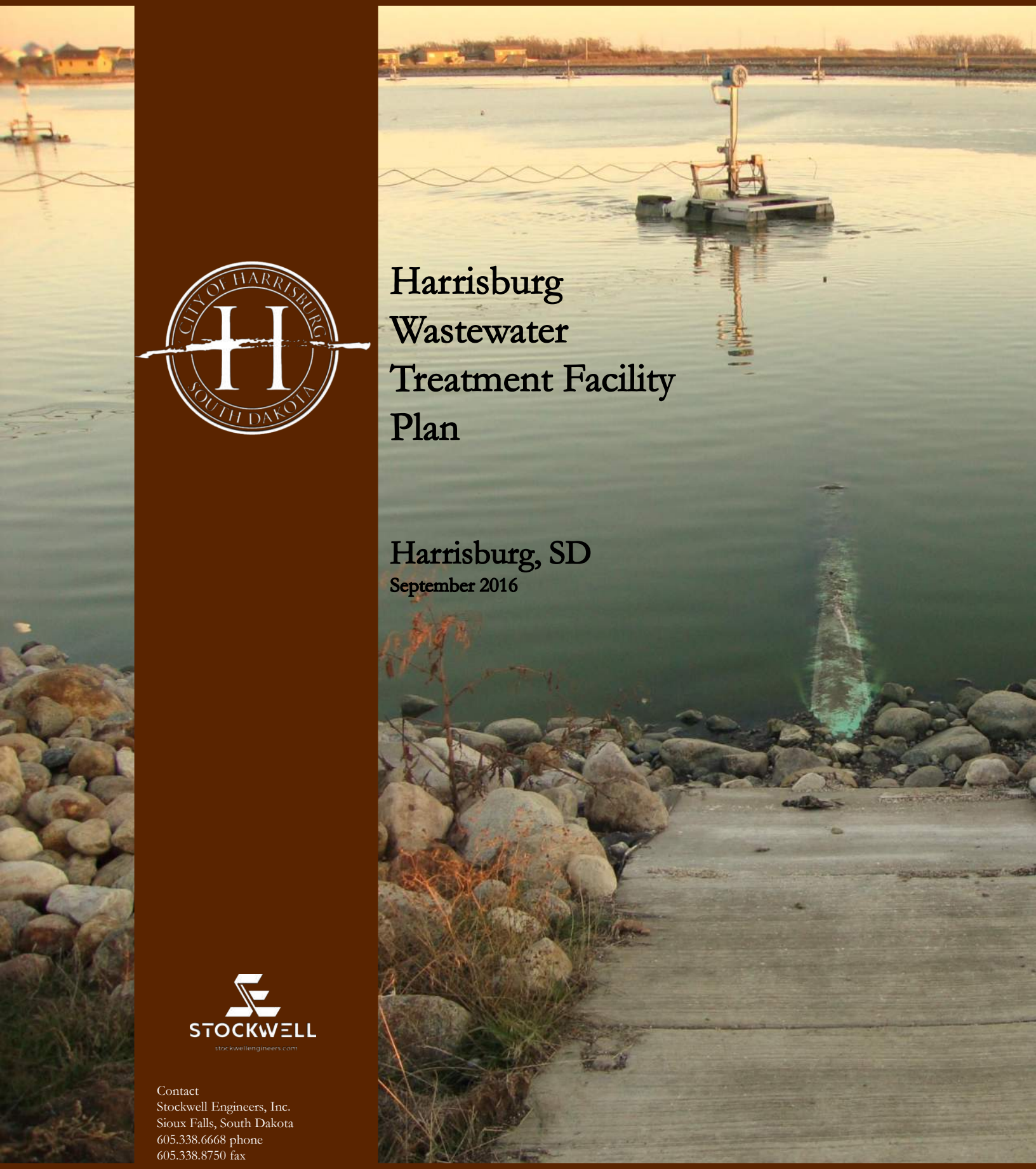

Harrisburg Wastewater Treatment Facility Plan

Harrisburg, SD

September 2016

STOCKWELL

stockwellengineers.com

Contact
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Sioux Falls, South Dakota
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WASTEWATER FACILITIES PLAN

FOR

THE

CITY OF HARRISBURG

September 2016

SEI NO. 4915

I hereby certify that this report was prepared
by me or under my direct supervision and that
I am a duly Registered Professional Engineer
under the laws of the State of South Dakota.

_____

Jon Brown, P.E.

S.D. Registration No. 6853

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INTRODUCTION

PURPOSE OF STUDY

The purpose of this study is to amend the Wastewater Facilities Plan that was completed by Stockwell Engineers in December 2014. The city has outgrown their existing wastewater treatment facility and is considering options for future treatment. Furthermore, this study will examine improvements necessary to the existing infrastructure and make recommendations to facilitate future growth of the city. It will also review previous recommendations and revise the alternatives with newly available information and cost estimates.

SCOPE OF STUDY

The scope of the study is as follows:

1) Utilize the previously prepared Facilities Plan
2) Identify sanitary sewer trunk lines to facilitate future growth in the city.
3) Evaluate the following wastewater treatment alternatives: sequencing batch reactor, oxidation ditch, modified activated sludge, regionalization with Sioux Falls regionalization with other communities and submerged attached growth reactors.
4) Recommend improvements to the conveyance system to support the current population and future growth.
5) Update previous recommendations based on new community information
6) Prepare a “draft” facilities plan and review with the city of Harrisburg
7) Submit the amended document to the South Dakota State Water Plan

COMMUNITY INFORMATION

GENERAL

The city of Harrisburg was incorporated as a city on January 25, 1902. Today, the city is a Class 1 municipality located in southeastern South Dakota. Harrisburg is situated on Lincoln County Highway 110 four miles east of Interstate 29. The city encompasses an area of approximately 1,780 acres. Land uses range from low density residential to commercial and industrial properties. Harrisburg is governed by a Mayor and a four member Council. The municipality has a City Administrator, Finance Officer and Public Works Director that oversee the day-today operations.

FINANCIAL STATISTICS

Based on the American Community Survey 5-Year Estimates (2010-2014), Harrisburg has an estimated median household income of $67,303 as of 2014. 8.2% of the people in the city Harrisburg live in poverty compared to the state average of 14.2%.

POPULATION STATISTICS

From the 2010 census, Harrisburg had a population of 4,089. As of today (2016), the population is 5,698. The city has witnessed an unprecedented growth rate between the years of 2000-2010 with an average population increase of 15.6% per year. Harrisburg is still experiencing a steady growth rate around 6% per year despite most other communities in South Dakota seeing a decline. Harrisburg's close proximity to Sioux Falls creates a unique opportunity for people to work in Sioux Falls and live in Harrisburg. The 2010 census indicated that 2.0% of the people living in Harrisburg were over the age of 65 compared to 14.3% for the State of South Dakota. It is anticipated that the population will continue to increase due to Harrisburg's location and their low percentage of people over 65.

Population projections are shown in the figure below. Previously the city requested to use a population projection provided in a 2014 housing study by Community Partners Research Inc. (CPRI). The report projected a population of 10,216 by 2035. This projection is consistent with a 3% yearly growth rate based on the 2016 special census data. Since the current growth rate is significantly higher than predicted by CPRI, it is our recommendation that future sewer improvements be based on a population growth of 4% per year.

Table 1 Population Statistics

Year	Population	Year	Population
1910	164	2000	958
1920	193	2010	4,089
1930	205	2016	5,698
1940	241	2020 (proj)	6,666
1950	274	2025 (proj)	8,110
1960	313	2030 (proj)	9,867
1970	338	2035 (proj)	12,005
1980	558	2040 (proj)	14,606
1990	727	2045 (proj)	17,770

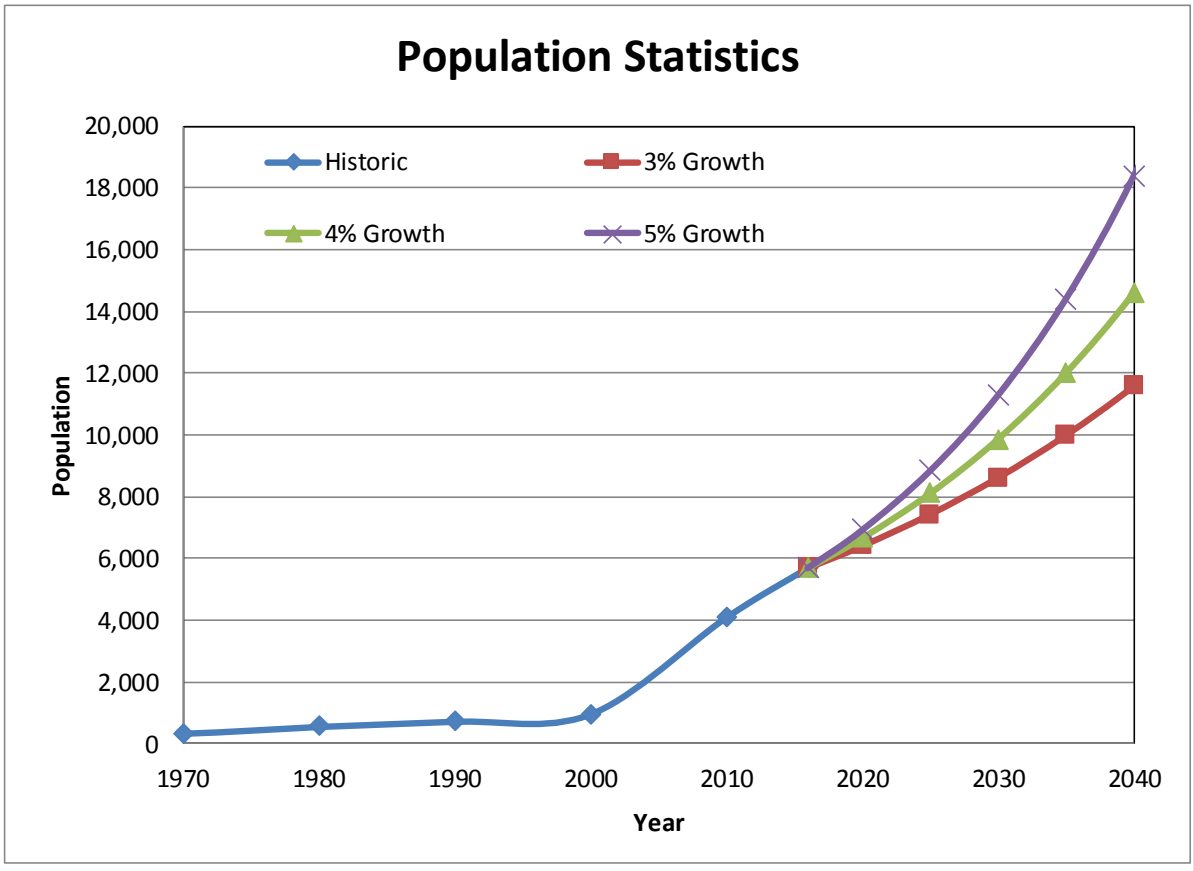

Figure 1 Population Statistics

EXISTING WASTEWATER SYSTEM

GENERAL COLLECTION SYSTEM

The current system consists of 24 miles of vitrified clay pipe (VCP) and polyvinyl chloride (PVC) pipe, 7 lift stations with 12 miles of force main. There are currently 1,780 users connected to the system with an estimated 114,000 ft. of service line.

There are two areas that currently are not served by gravity sewer in and around the city. The first area is on Willow Street between Cliff Avenue and Columbia Street. The second location is by the Fire Hall at the southwest corner of Willow Street and Southeastern Avenue. The existing system is shown in Figure 3.

EXISTING LIFT STATIONS

The current collection system includes 6 area lift stations and one lift station that pumps to Sioux Falls. These lift stations pump to other areas of the collection system that gravity flow to the treatment system. On March 13, 2014 Stockwell Engineers helped the city calibrate all the area lift station pumps. The lift station calibration determined that some repairs needed to be done to the lift stations. Two floats, several gauges and a heater needed to be replaced. The flow rates between the two pumps were fairly consistent. The city provided the flow records for all the lift stations for the years of 2011, 2012 and 2013. The records were used to develop graphs for each lift station showing the average daily pumping. Copies of the graphs are located in Appendix C.

During the lift station inspection, it was determined that only the Coyote Lift Station had a trash basket. However, the lift station didn't have a crane to raise and lower the trash basket. Conversations with city staff indicated that the lift station pumps clog due to household cleaning products being flushed down the drain. It is recommended that all lift stations have a trash basket and a crane to raise and lower the trash baskets. It is also recommended that any areas of rust or paint flaking in the dry well be ground down to bare metal and be repainted. The city should also consider getting a service contract with the pump manufacturer to pull and check the pumps, motors and valves on an annual basis. This will help to extend the life of these products and reduce the possibility for emergency repairs. Information about the lift stations is shown in the following table. The lift station locations are shown in Figure 3.

Table 2 Lift Station Information

Lift Station	Installed	Type	Pump #1 (gpm)	Pump #2 (gpm)	Pump Variation %
Tiger	2002	Wet/Dry Well	332	302	9%
Honeysuckle	2002	Wet/Dry Well	367	371	1%
Coyote	2004	Wet/Dry Well	198	245	23%
Stencil	2005	Wet/Dry Well	362	362	0%
South Cliff	2006	Wet/Dry Well	493	494	0%
Nielson	2008	Wet/Dry Well	215	215	0%
Gravity	2010	Wet/Dry Well	1,250	1,250	0%

Figure 2 Rust and Paint Deterioration at the Stencil Lift Station

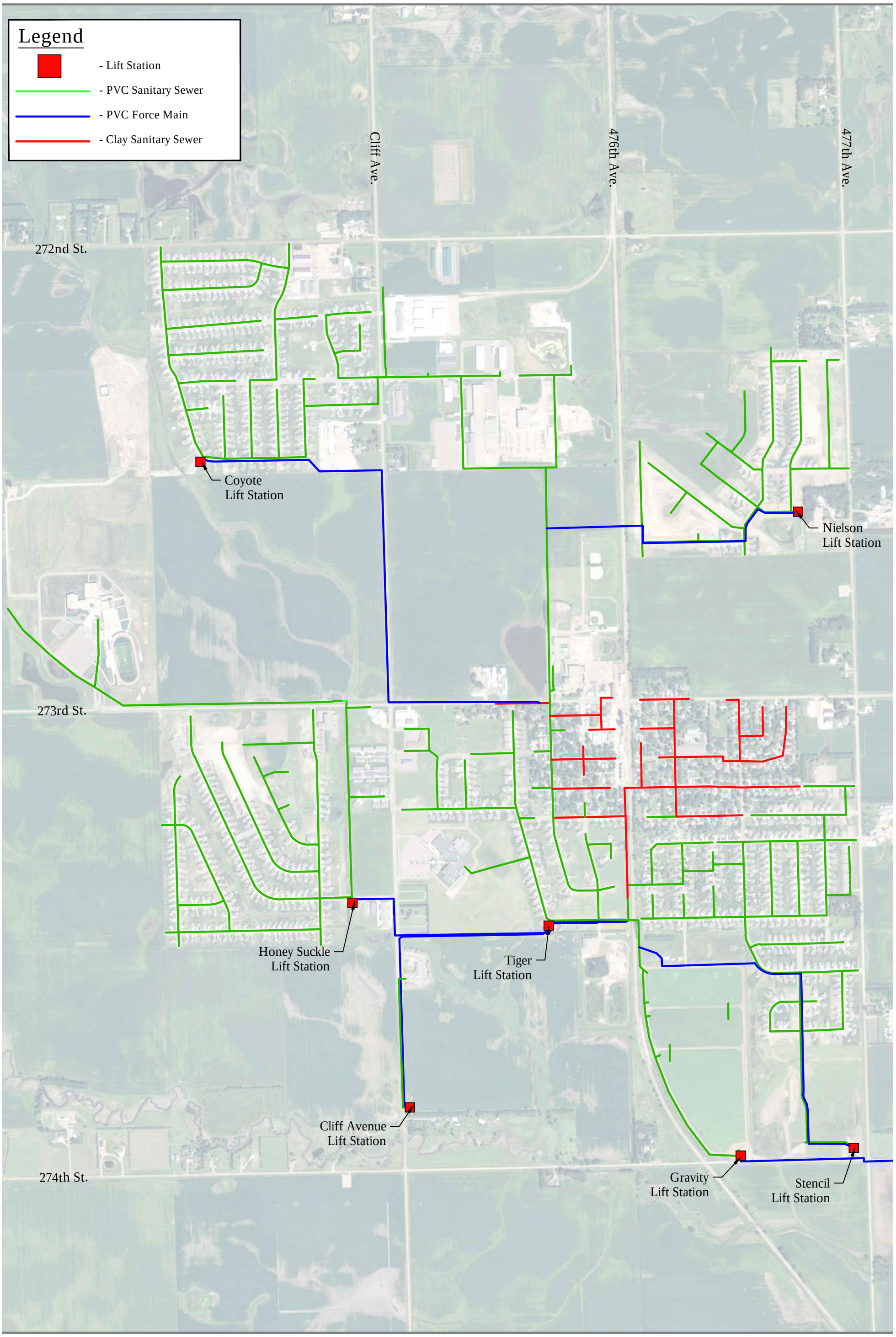

Figure 3 | Existing Wastewater Collection System

STOCKWELL ENGINEERS

EXISTING BASIN INFORMATION

Harrisburg's existing collection system can be divided into 7 basins. These basins include 6 lift station basins and one basin that gravity flows to the treatment system. Determining flow in a basin is largely contingent upon the size of the contributing watershed boundary. The watershed boundary is determined by the topography of the basin. The boundary is defined by the surrounding area that contributes flow to a given point on a stream. A basin is separated from adjacent basins by a divide or ridge that can be traced on topographic maps. Watershed boundaries can be very large depending on the size and location of the stream. Typically, they are divided into smaller tributary basins and subbasins.

The age old method of designing sewer systems generally involves installing trunk line sewers at the lowest point of interception and extending lateral sewers towards higher or more specific locations. Trunk line sewers are typically responsible for capturing all the flow in a primary basin while lateral sewers are dedicated to intercept individual sub-basins. Lateral sewers are typically the direct interceptors for individual properties. It is critical to consider the overall drainage basin when sizing the trunk sewers. The size of the current service area for each basin and the number of acres for each zoning classification is shown in the following table.

Table 3 Existing Basin Information

Basin	Area (acres)	Acres in Each Zoning Classification								
		NRC	R-1	R-2	R-3	CB	GB	LI	HI	PD
Coyote	164	6	152					5		
Honeysuckle	213		159	54						
Cliff	16	11	4							
Tiger	81	20	53	8						
Stencil	121	12	105	4						
Nielson	96		35	61						
Core	264		251	3		5			5	
Total	954	50	760	130	0	5	0	5	5	0

NRC Natural Resource Conservation District
R-1 Single Family Residential District
R-2 Multi-Family Residential District
R-3 Manufactured Housing Residential District
CB Central Business District
GB General Business District
LI Light Industrial District
HI Heavy Industrial District
PD Planned Development District

CLEANING AND TELEVISING

Over the years the city has only done spot televising when there was a problem with the sewer. There are no comprehensive televising reports to review. It is recommended that the city start a cleaning and televising program to get the entire system televised. This would give the city a good base line to establish the condition of their collection system. An approximate cost to clean and televise the entire gravity sewer is $290,000. The estimated cost to clean and televise only the VCP is $36,000. The city should start a phased approach to clean and televise the entire system. The clay lines should be prioritized. In order to verify the quality of new construction, the city should require all new sewer lines be televised before they are accepted from the developer.

SMOKE TESTING

During the summer of 2014, Stockwell Engineers conducted smoke tests of the entire collection system. The smoke tests revealed a couple minor concerns including: open pick manholes, manholes that could be submerged along the drainage way north of the Honeysuckle Lift Station and manholes that had smoke coming from the joints. The smoke tests also discovered several locations that need to be cleaned because of solids buildups. City Hall and a couple of residences had smoke coming into them. This was due to dry traps and open drain lines.

Figure 4 Smoke Testing

Figure 5 Smoke From Cracks Around Manhole

WASTEWATER FLOWS

The wastewater flows in a collection system are comprised of domestic water and clear water. Domestic water comes from homes and businesses. Clear water comes from rain water and groundwater. Clear water is also called infiltration and inflow (I&I). Infiltration is ground water leaking through joints, cracks in the pipe and manhole walls. Inflow is sump pumps, roof drains, perforated manhole covers and storm sewers that are connected to the sanitary collection system. Every system is subject to some level of I&I. When I&I become excessive, there is potential for sewage backups and flooding of basements.

Domestic wastewater flow can be determined using water use records. The South Dakota Design Criteria states that projected wastewater flows for a community could be calculated by using 80% of the actual water consumption. Alternatively, during the winter months of December, January and February, it can be assumed that 100% of the metered water at the homes reaches the collection system. The city reads the water meters monthly with a radio drive-by system. Based on these records for 2010-2015, the average daily flow is 45 gallons per capita per day (gpcpd) in the winter months. Chapter I.C.2 of the SD Design Criteria states that an alternate method to determine design capacity could be justified by local water consumption records but shall not be less than 60 gpcpd. The city of Harrisburg uses an online website called OmniSite to maintain lift station records and wastewater treatment influent. Previously, Stockwell Engineers used these records and cross referenced them with lift station calibration information from 2011-2013. However, recent hydraulic overloading has flooded the Parshall flume at the wastewater treatment facility which has resulted in unrealistically high flow readings at the influent of the facility. In response, Stockwell Engineers installed a 2150 Area Velocity flow meter by Teledyne ISCO in a manhole near the plant influent. Readings have been taken since July 2016. The results so far are consistent with the findings below. The total wastewater that was pumped by each lift station for 2011, 2012 and 2013 is shown in the following table.

Table 4 Wastewater Flows

Lift Station	WW Flow (gpd)
Tiger	26,740
Honeysuckle	60,363
Coyote	45,494
Stencil	37,281
South Cliff	6,681
Nielson	25,896
Remaining Gravity Flow	5,961
Wastewater Pond Influent	208,416

The average daily flow for the years 2011 thru 2013 from the lift stations was 202,455 gpd and the wastewater ponds received 208,416 gpd. The difference in flow is assumed to be gravity flow from the core basin area. A graph for the wastewater pond influent is shown in Appendix D. The graph shows how the amount of precipitation affects the wastewater flows. The amount of I&I can be determined by comparing the calculated domestic wastewater flows to the wastewater pond influent. The pond influent readings from 2011 and 2013 where compared with the winter water usage records from the same time period. The daily influent to the wastewater ponds was 242,241 gpd whereas the water usage was 211,264 gpd. This results in an average I&I flow rate of 30,977 gpd (242,241 gpd – 211,264 gpd). In comparison, the maximum daily I&I that the treatment plant experienced was 1,246,736 gpd (1,458,000 gpd – 211,264 gpd) on June 11, 2013. This was due to an intense two-inch rainfall that occurred.

Typically, infiltration is considered constant during the winter months because the ground is frozen and the water table is stable. During the summer months, wet periods and dry periods can affect the ground water table having a significant effect on the I&I rate. As the ground water table rises, more of the collection system is submerged. Therefore, the amount of infiltration increases. The higher the groundwater table, the higher the pressure is on the sewer, forcing more water into the system. For the city of Harrisburg, lift station and influent records show how rainfall events affect the wastewater flows.

The SD Design Criteria Manual states in section I.C.2 that the design allowance for a sewer system shall be 200 gallons per inch of pipe diameter per mile of pipe per day for VCP. Current practice recommends an allowance for PVC of 50 gallons per inch of pipe diameter per mile of pipe per day. Based on this allowance, Harrisburg's collection

system can have a maximum allowable infiltration rate of 19,943 gpd which is lower than the average I&I rate of 30,977 gpd.

Table 5 Allowable Collection System Infiltration

Sanitary Sewer Dia (in)	Pipe Type	Length (ft)	Diameter-Length (in-mile)	Allowable Infiltration (gpd)
4	Clay	12,510	9.5	1,895
8	Clay	13,523	20.5	4,098
4	PVC	102,151	77.4	3,869
6	PVC	1,844	2.1	105
8	PVC	81,487	123.5	6,173
10	PVC	6,676	12.6	632
12	PVC	5,165	11.7	587
15	PVC	4,544	12.9	645
16	PVC	41	0.1	6
18	PVC	7,177	24.5	1,223
21	PVC	3,011	12.0	599
24	PVC	482	2.2	110
			Total =	19,943

The Environmental Protection Agency (EPA) has established guidelines to determine dry weather flow and wet weather flow. The dry weather flow is 120 gpcpd and the wet weather flow is 275 gpcpd. Wastewater flows over these amounts are considered excessive. The dry weather period is during the winter months when the collection system is subject to domestic flow and infiltration. The wet weather period is during the summer when the collection system is subject to domestic flow, infiltration and inflow. Based on these limits, the city of Harrisburg should not experience flows over 566,280 gpd (120 gpcpd x 4,719). Records show the wet weather flow was exceeded 2 days and the dry weather flow was never exceeded during 2011, 2012 and 2013.

WASTEWATER TREATMENT

Harrisburg's wastewater treatment system was built in 1999 and it is located in the southeast corner of the community on the east side of the railroad tracks and south of Tiger Street. The wastewater treatment plant consists of a three cell lagoon system. As wastewater enters the facility, it passes through a grinder followed by a Parshall flume flow meter prior to entering cell one. The first cell is fitted with Air Inductors Co. aerators. The remaining cells are facultative. The system operates under Surface Water Discharge (SWD) Permit #SDG823728 and is permitted as "No Discharge". A copy of the permit is located in Appendix A. Cell one has a water surface area of 10.21 acres, cell two

has a water surface area of 10.18 acres and cell three has a water surface area of 19.6 acres. Cell one has an effective storage depth of three feet, cell two has an effective storage depth of four feet and cell three has an effective storage depth of six feet. Typically, the dikes are eight feet deep. The top three feet are for freeboard and the bottom two feet are for residual storage resulting in an effective storage depth of three feet. The SD Design Criteria does allow deeper effective storage depths when aeration is provided. Freeboard is used as a safety factor and the water level should never be into the freeboard. The freeboard also keeps wave action from overtopping and breaching of the berm. The existing treatment system is shown in the following figures.

Figure 6 Air Inductors Company Aerator

Figure 7 Inlet Channel with Grinder

Figure 8 | Existing Treatment System

1" = 500'

CITY OF HARRISBURG SOUTH DAKOTA

STOCKWELL ENGINEERS

On July 17, 2015 the SD DENR completed a Surface Water Discharge Compliance Inspection. A copy of the inspection is located in Appendix B. The inspection provided the following recommendations:

- Weed growth in the riprap of the stabilization ponds should be eliminated.
- The city staff is encouraged to attend more training course sponsored by the State.

SLUDGE

Approximately nine years ago the city used a sludge judge to measure the depth in cell one. At that time the sludge depth ranged from 6" – 12". It can be assumed that the depth has increased over the years. Based on conversation with the city and the following picture the sludge is currently a problem around the inlet structure. The inlet structure does not meet the design criteria because it does not extend 1/3 the distance into the cell. The city should plan to remove this sludge in the near future. Typically, the sludge is dredged out of the cell and then land applied as a dry product or landfilled in liquid form. The sludge does have nutrient value and farmers utilize it for fertilizer.

Figure 9 Sludge Build-up

INTAKE STRUCTURE

All of the wastewater flow from the city of Harrisburg currently flows through an intake structure before entering cell one. This structure consists of a grinder followed by a nine-inch Parshall flume. The flume is equipped with an ultrasonic level transducer which measures flow. The grinder was installed to help break-down the solids entering the treatment system. The flows through the Parshall flume are recorded by OmniSite.

AERATORS

In the spring of 2014 the city experienced longer and more predominant smells from the ponds. It is typical for wastewater ponds to smell in the spring. The warm spring weather heats the surface of the water and causes the colder water at the bottom of the lagoons to rise. The rising cold water brings offensive odors to the surface. The smell during spring turnover will become longer and more predominant as the treatment system is overloaded organically. The city took dissolved oxygen tests on the ponds in the spring of 2014. The results indicated the levels were very low. The city investigated the problem and determined several of the aerators were malfunctioning. The problems with the aerators included the pumps falling off because the bolts rusted, the air hoses have fallen off, the diffuser has fallen off and the motors have quit. The city has started to rebuild the aerators in order to try and improve the treatment in cell one.

Figure 10 Failed Aerator

M

GRAVITY LIFT STATION

In 2010 the city of Harrisburg added a lift station at the backside of the treatment system to pump wastewater to the city of Sioux Falls. The lift station was added because the treatment system was overloaded and the city of Sioux Falls was willing to take the additional wastewater that Harrisburg could not treat. A wet/dry well lift station with three pumps and a back-up generator was added at the southeast corner of cell three. The lift station is capable of pumping from cell three or the bypass line. Currently, the city pumps approximately 600,000 gpd to Sioux Falls whenever cell three is full and the city needs more storage. Each of the three pumps has a capacity of 1,250 gpm. The cost to the city for the lift station and force main was $2,544,000. The city uses a sale tax bond to make the $133,074 annual payment.

Figure 11 Gravity Lift Station

Figure 12 Gravity Lift Station Pumps

Harrisburg's current contract with the city of Sioux Falls was signed in Fall 2013. The initial term of the agreement is five years and can be extended three times for an additional five years. However, the city of Sioux Falls approved a new ordinance that sets rates and charges for regional wastewater customers. Sioux Falls is not willing to extend the current contract when the initial term expires and wants the city of Harrisburg to sign the Regional Wastewater System Agreement.

Starting on January 1, 2016 the Regional Wastewater Agreement set the charge per 1,000 gallons at $4.51. The city of Harrisburg can receive a $0.50 per 1,000-gallon credit for equalization and $0.61 per 1,000-gallon credit for partial treatment. The charge and credits are set to increase by 6% effective January 1st each year in 2017, 2018 and 2019. The city should receive the equalization credit because they have more than 30-day continuous storage volume. Based on sampling records at the Gravity Lift Station the city of Harrisburg would only meet the partial treatments requirements half the time. The strength parameters to meet the partial treatment credit is 20 mg/l for BOD, 10 mg/l for

TKN and 45 mg/l for TSS. Continued growth of the city will increase the loading to the wastewater treatment system and therefore increase the test results. The city should not plan on receiving partial treatment credit. The city also pays a 2 times multiplier on their charges after the credits are taken into account. This multiplier will cease if the city renews their contract in 2018. Section 6 of the Joint Powers Agreement for Use of Regional Wastewater System established flow limitations. The daily maximum flow is 1,003,000 gallons and the monthly maximum is 15,531,000 gallons. These limits are a concern because Harrisburg has already exceeded the daily maximum 18 times and the monthly maximum was exceeded in June 2013. This agreement is for 20 years and the continued growth of the city will add to the wastewater flows increasing the number of times these limits are exceeded. Information on the pumping charges are shown in the following table.

Table 6 Pumping Charges to Sioux Falls

Year	Cost of Service	Multiplier	Charge per Thousand Gallons	Cost to Pump to Sioux Falls
2010	$ 1.85	1.25	$ 2.31	$98,743.75
1/1/11-6/30/11	$ 1.94	1.25	$ 2.43	$46,879.15
7/1/11-12/31/11	$ 1.94	1.50	$ 2.91	$49,518.00
2012	$ 1.98	2.00	$ 3.96	$64,517.29
2013	$ 2.92	2.00	$ 5.84	$369,210.83
2014	$ 2.92	2.00	$ 5.84	$264,416.64
2015	$ 3.02	2.00	$ 6.04	$345,370.80
2016	$ 3.40	2.00	$ 6.80	
2017*	$ 4.25	2.00	$ 8.50	
2018*	$ 4.50	2.00	$ 9.00	
2019*	$ 4.78	2.00	$ 9.56	
*Assuming Harrisburg no longer achieves the treatment credit				

Sioux Falls also implemented a new System Development Charge “SDC”. The city of Harrisburg will be required to pay the city of Sioux Falls for every sewer connection. The charge will range from $2,391 for a ¾” water meter to $60,000 for a four-inch water meter. Other Regionalization customers have been pumping wastewater to Sioux Falls for several years and the existing customers were grandfathered in. Unfortunately, the city of Harrisburg will be required to pay for all existing customers. As of August 2016, there are approximately 1,780 sewer customers. The current SDC estimate for these customers is $4,950,000. The city has also indicated that the accumulated fees from the multiplier will be applied towards the SDC. As of August 2016, this credit is approximately $680,000.

WASTEWATER TREATMENT HYDRAULIC LOADING

Treatment systems are sized based on the hydraulic and organic loading. The volumes are sized for both loadings and the larger of the two areas govern the final volume. Hydraulic loading is the amount of wastewater that is flowing to the treatment system. The following table shows the wastewater flows that the treatment system is experiencing. The table also shows the current and projected hydraulic loading for the treatment system. The current treatment system is overloaded hydraulically as shown by the required surface area. The overloading is due to the city's population increasing by over 500% since the treatment system was built.

Table 7 Treatment System Hydraulic Loading

	Constructed 1999	Current 2016	Future 2036
Population	958	5,698	12,485
Wastewater Flow (gpcpd)	100	60	60
Infiltration & Inflow (gpd)	0	31,000	31,000
Design Storage Time (days)	365	365	365
Total Pond Influent (gal)	34,967,000	136,101,200	284,736,931
Total Pond Influent (ac/ft)	107	418	874
Primary Seepage (in/day)	1/16	1/16	1/16
Secondary Seepage (in/day)	1/8	1/8	1/8
Seepage (ft/yr)	3.3	3.3	3.3
Evaporation (in/yr)	35.4	35.4	35.4
Evaporation (ft/yr)	3.0	3.0	3.0
Precipitation (in/yr)	23.5	23.5	23.5
Precipitation (ft/yr)	2.0	2.0	2.0
Total Losses	4.3	4.3	4.3
Required Surface Area (ac)	**25**	**97**	**203**

WASTEWATER TREATMENT ORGANIC LOADING

Treatment systems are sized based on the hydraulic and organic loading. The volumes are sized for both loadings and the larger of the two areas govern the final volume. Organic loading is the amount of biological material that can be consumed by the treatment system. The South Dakota Design Criteria states in Section B.1a of Chapter IV that the maximum design loading on the primary cell shall not exceed 30 pounds of Biochemical Oxygen Demand (BOD_5) per acre. Based on this criteria, the primary pond should receive less than 291 pounds of BOD_5. Furthermore, Section B.1.d states the total organic loading for the total surface area shall not exceed 20 pounds of BOD_5 per acre per day. Based on this criteria, the treatment system should receive less than 756 pounds of BOD_5. The South Dakota Design Criteria also states that on average a person will generate 0.17 pounds of BOD_5.

Wastewater influent sampling completed in April 2014 indicated the average influent composite BOD sample was 427 mg/L or 534 lbs. This results in a per capita loading of 0.19 pounds per person per day. The influent samples and the loading in the following table both indicate the system is overloaded organically.

Table 8 Treatment System Organic Loading

	Constructed 1999	Current 2016	Projected 2034
Population	958	5,698	12,485
Per Capita Loading (lbs)	0.19	0.19	0.19
Total Loading (lbs)	182	1,083	2,372
Primary Loading Limit (lbs/ac)	30	30	30
Primary Size Required (ac)	6.1	36.1	79.1
Total System Loading Limit (lbs/ac)	20	20	20
Total System Size Required (ac)	9.1	54.1	118.6

DEVELOPMENT OF WASTEWATER ALTERNATIVES

GENERAL ALTERNATIVE INFORMATION

Each of the following alternative includes an estimate of the total project cost. Included in the total project cost are the construction, contingencies, legal, administration, engineering and testing costs. It should be noted that these are only estimates and does not guarantee the cost of actual construction. Field measurements will be taken during the design phase to complete a more accurate estimate. Contract prices can be affected by project location, contractor work load, project size, contract duration and the time of year that the project is built. These estimates should be updated on a yearly basis to reflect current industry conditions. Inflation factors have not been included in the estimates.

EQUIVALENT UNIFORM ANNUAL COST

When choosing the most cost effective solution to a problem, you have to consider the initial cost, long term cost and lifetime of the system. The alternative that reflects the cheapest initial cost may not be the least expensive alternative when operation and maintenance cost are taken into account. An equivalent uniform annual cost (EUAC) is used to include annual costs when determining the most cost effective alternative. The capital cost and EUAC are provided for some of the alternatives. The EUAC is evaluated over 20 years with an interest rate of 3.0%. The salvage value at the end of 20 years will be 0% or 60%. However, any land purchase will assume a 100% salvage value. The EUAC will provide the owner with the best long term solution.

WASTEWATER COLLECTION ALTERNATIVES

The following alternatives were developed to correct the deficiencies listed below:

1) The VCP has outlived its useful life expectancy and needs to be replaced or rehabilitated.
2) The system is experiencing excessive I&I.
3) New trunk sewers should be installed to eliminate lift stations.
4) Trash baskets should be installed on the lift stations.
5) A SCADA system should be installed to closely monitor lift stations and the treatment system.

COLLECT ALTERNATIVE 1: DO NOTHING

The first collection alternative is the “Do Nothing” alternative. This alternative is not considered acceptable because it will not address any of the deficiencies identified above.

COLLECTION ALTERNATIVE 2: REPLACE VCP WITH PVC

Alternative 2 includes replacement of all the remaining VCP with PVC. The service lines would be replaced from the main line to the property line and the streets would be rebuilt. The new PVC lines would reduce the amount of I&I and thereby reduce the hydraulic loading on the wastewater treatment system. This will extend the life of the system.

It should be noted that the cost for this alternative may be reduced if during the design it is determined that sections of the sewer system can be lined. The estimated cost to clean and televise the clay lines is $36,000. Reviewing the televising video and reports would determine which rehabilitation method should be used. Normally liner is more cost effective because the street surface doesn't need to be replaced. The cost estimate for this alternative is shown in the following table.

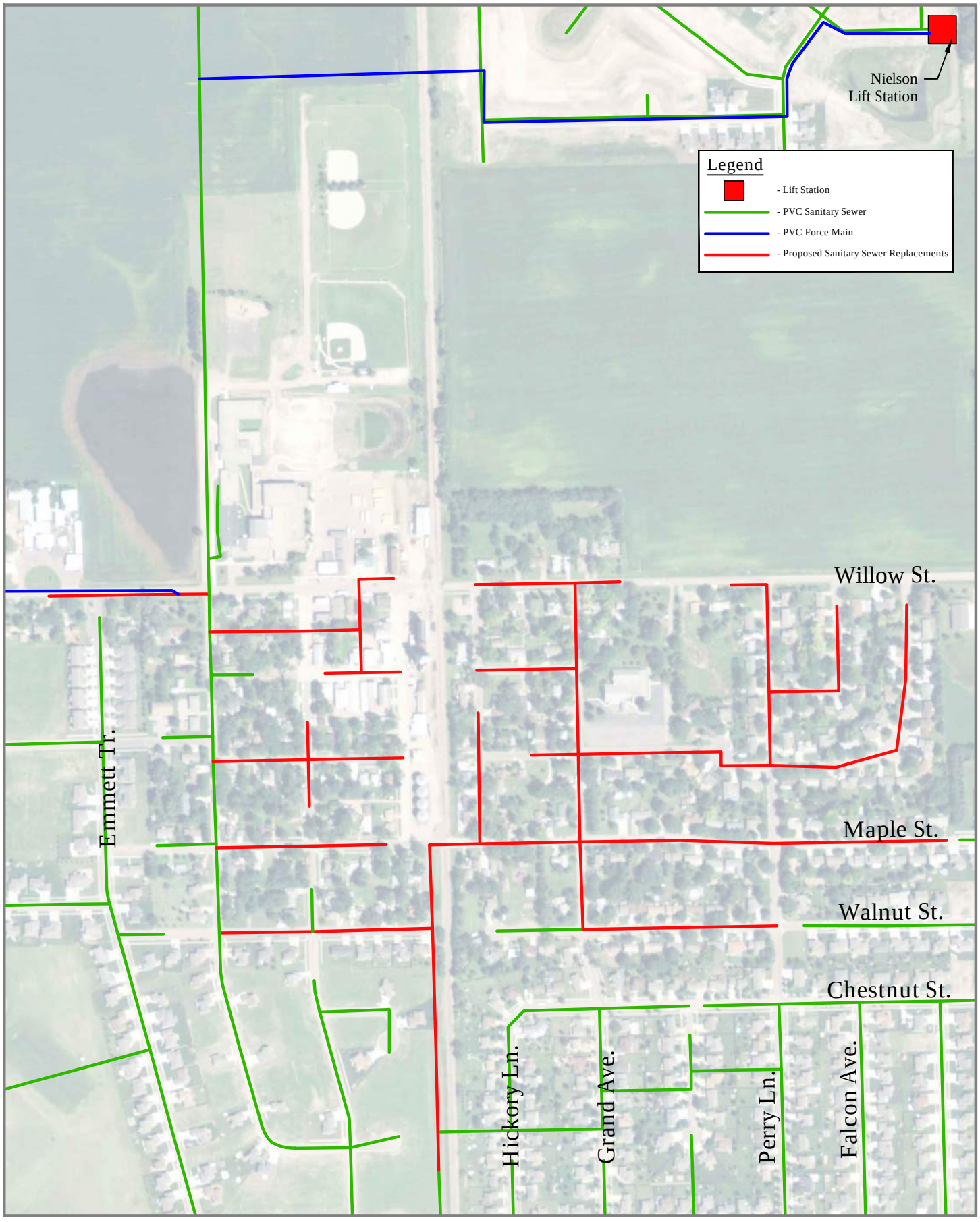

Figure 13 | Collection Alternative 2

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Table 9 Cost Estimate for Collection Alternative 2: Replace VCP with PVC

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$397,000.00	$397,000.00
2	Clearing	1	LS	$10,500.00	$10,500.00
3	Remove Sewer Pipe	13,600	FT	$4.25	$57,800.00
4	Remove Asphalt Concrete Pavement	42,100	SY	$2.65	$111,565.00
5	Remove Existing Manhole	50	EA	$425.00	$21,250.00
6	Remove Concrete Curb & Gutter	27,200	FT	$4.25	$115,600.00
7	Saw Existing Surfacing	440	FT	$7.50	$3,300.00
8	Unclassified Excavation	23,400	CY	$6.36	$148,824.00
9	Scarify & Recompact Subgrade	52,600	SY	$1.05	$55,230.00
10	Sanitary Sewer Manhole	50	EA	$3,200.00	$160,000.00
11	4" PVC Sanitary Service Line	6,000	FT	$26.50	$159,000.00
12	8" PVC Sanitary Sewer Pipe	13,600	FT	$37.00	$503,200.00
13	Railroad Crossing	100	FT	$212.00	$21,200.00
14	Sanitary Sewer Pipe Bedding Material	13,600	FT	$6.25	$85,000.00
15	Sewer Wye	180	EA	$325.00	$58,500.00
16	Sewer Fittings	540	EA	$105.00	$56,700.00
17	Reconnect Sewer Main	12	EA	$525.00	$6,300.00
18	Reconnect Sewer Service	180	EA	$265.00	$47,700.00
19	Salvage & Place Topsoil	10,900	CY	$5.25	$57,225.00
20	Aggregate Base Course (12")	34,400	TON	$12.75	$438,600.00
21	Asphalt Concrete Surfacing (4")	9,800	TON	$74.25	$727,650.00
22	Concrete Curb & Gutter	27,200	FT	$12.75	$346,800.00
23	Geotextile Fabric	52,600	SY	$2.65	$139,390.00
24	6" Concrete Fillet Section	1,870	SY	$47.75	$89,292.50
25	6" Concrete Valley Gutter	1,940	SY	$47.75	$92,635.00
26	4" Concrete Sidewalk	5,760	SF	$4.25	$24,480.00
27	Detectable Warning Surface	390	SF	$47.75	$18,622.50
28	Traffic Control	1	LS	$21,200.00	$21,200.00
29	Seeding, Fertilizing & Mulching	65,400	SY	$1.60	$104,640.00
30	Post Televising	13,600	FT	$1.05	$14,280.00
31	Erosion Control	1	LS	$16,000.00	$16,000.00
32	Bypass Pumping	1	LS	$16,000.00	$16,000.00
33	Trench Dewatering	1	LS	$10,500.00	$10,500.00
				Subtotal	$4,135,984.00
				Contingencies (15%)	$621,000.00
				Total Estimated Construction Costs	**$4,756,984.00**
				ENGINEERING	**$635,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$191,000.00**
				TOTAL ESTIMATED PROJECT COST	**$5,583,000.00**

Table 10 EUAC for Collection Alternative 2: Replace VCP with PVC

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$397,000	$0	$0	$397,000
Clearing	$10,500	$0	$0	$10,500
Remove Sewer Pipe	$57,800	$0	$0	$57,800
Remove Asphalt Concrete Pavement	$111,565	$0	$0	$111,565
Remove Existing Manhole	$21,250	$0	$0	$21,250
Remove Concrete Curb & Gutter	$115,600	$0	$0	$115,600
Saw Existing Surfacing	$3,300	$0	$0	$3,300
Unclassified Excavation	$148,824	$0	$0	$148,824
Scarify & Recompact Subgrade	$55,230	$0	$0	$55,230
Sanitary Sewer Manhole	$160,000	$96,000	$53,153	$106,847
4" PVC Sanitary Service Line	$159,000	$95,400	$52,821	$106,179
8" PVC Sanitary Sewer Pipe	$503,200	$301,920	$167,166	$336,034
Railroad Crossing	$21,200	$12,720	$7,043	$14,157
Sanitary Sewer Pipe Bedding Material	$85,000	$0	$0	$85,000
Sewer Wye	$58,500	$35,100	$19,434	$39,066
Sewer Fittings	$56,700	$34,020	$18,836	$37,864
Reconnect Sewer Main	$6,300	$0	$0	$6,300
Reconnect Sewer Service	$47,700	$0	$0	$47,700
Salvage & Place Topsoil	$57,225	$0	$0	$57,225
Aggregate Base Course (12")	$438,600	$263,160	$145,705	$292,895
Asphalt Concrete Surfacing (4")	$727,650	$436,590	$241,729	$485,921
Concrete Curb & Gutter	$346,800	$208,080	$115,209	$231,591
Geotextile Fabric	$139,390	$0	$0	$139,390
6" Concrete Fillet Section	$89,293	$53,576	$29,663	$59,629
6" Concrete Valley Gutter	$92,635	$55,581	$30,774	$61,861
4" Concrete Sidewalk	$24,480	$14,688	$8,132	$16,348
Detectable Warning Surface	$18,623	$11,174	$6,186	$12,436
Traffic Control	$21,200	$0	$0	$21,200
Seeding, Fertilizing & Mulching	$104,640	$0	$0	$104,640
Post Televising	$14,280	$0	$0	$14,280
Erosion Control	$16,000	$0	$0	$16,000
Bypass Pumping	$16,000	$0	$0	$16,000
Trench Dewatering	$10,500	$0	$0	$10,500
Remaining Capital Costs	$1,447,000	$0	$0	$1,447,000
Total Construction Cost	**$5,582,984**	**$1,618,008**	**$895,852**	**$4,687,132**

Annual Operation and Maintenance Cost

Description	EUAC			Net Present Worth
Equipment	$2,000			$40,000
Supplies	$2,000			$40,000
Labor	$3,000			$60,000
Total Annual Cost	**$7,000**			**$140,000**
			Total Net Present Worth	**$4,827,132**
			EUAC	**$324,459**

COLLECTION ALTERNATIVE 3: LIFT STATION IMPROVEMENTS

Collection Alternative 3 proposed improvements to the existing lift stations. Conversations with city staff has indicated that the existing lift station pumps clog due to wipes, rags or other flushable products getting stuck in the impellers. Installing trash baskets on the influent lines in the wet wells would help capture this material and prevent it from clogging the pumps. However, trash baskets need to be cleaned on a regular basis to prevent the material from overflowing. Currently, the Coyote Lift Station is the only site with a trash basket. This alternative also includes recoating the floor of the Stencil Lift Station because the paint is starting to deteriorate.

The city should consider hiring the manufacturer of the lift station or another company to complete annual maintenance on the stations. It is recommended that the pumps be pulled and the valves checked on a regular basis. A good maintenance program for the lift stations will help extend the life of the stations. It will also help to discover issues with the pumps before the pump fails and there is an emergency. New parts for pumps could take several weeks to arrive leaving the city with a difficult situation until the station is fully operational again.

During the lift station inspection and calibration, it was also discussed to add a Supervisory Control and Data Acquisition (SCADA) system for the wastewater treatment system. SCADA allows the remote monitoring of several facilities from one location. The base unit consisting of a computer and radio antenna would be installed at the city shop. Radios would then be installed at each lift station and the influent structure at the ponds. The computer screen would show an icon for each site. The screen would show if pumps are running and what the water level is in the wet well. Submersible level transducers would be added in the wet well to track the water level and control the pumps. Floats would remain in the wet well as back-up in case the transducer would malfunction. The influent at the wastewater treatment plant could be shown on the screen. All alarm conditions would show up on the screen as well. The installation of a SCADA system would reduce the time spent going to each individual site and it would also notify the operators sooner if there was a problem. During the design phase the existing water SCADA system would be evaluated to determine if it could be expanded to add the sewer sites. The cost estimate for this alternative is shown in the following table.

Table 11 Cost Estimate for Collection Alternative 3: Lift Station Improvements

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$21,000.00	$21,000.00
2	SCADA System	1	LS	$121,000.00	$121,000.00
3	Radio Installation	1	LS	$10,500.00	$10,500.00
4	Recoat Deteriorated Paint Areas	1	EA	$2,650.00	$2,650.00
5	Furnish Trash Basket	5	EA	$3,800.00	$19,000.00
6	Install Trash Basket	5	EA	$1,150.00	$5,750.00
7	Furnish Crane	5	EA	$3,800.00	$19,000.00
8	Install Crane	5	EA	$325.00	$1,625.00
9	Furnish New Wet Well Lid	5	EA	$1,900.00	$9,500.00
10	Install New Wet Well Lid	5	EA	$1,150.00	$5,750.00
				Subtotal	$215,775.00
				Contingencies (15%)	$33,000.00
				Total Estimated Construction Costs	**$248,775.00**
				ENGINEERING	**$56,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$10,000.00**
				TOTAL ESTIMATED PROJECT COST	**$315,000.00**

Table 12 EUAC for Collection Alternative 3: Lift Station Improvements

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$21,000	$0	$0	$21,000
SCADA System	$121,000	$0	$0	$121,000
Radio Installation	$10,500	$0	$0	$10,500
Recoat Deteriorated Paint Areas	$2,650	$0	$0	$2,650
Furnish Trash Basket	$19,000	$11,400	$6,312	$12,688
Install Trash Basket	$5,750	$0	$0	$5,750
Furnish Crane	$19,000	$11,400	$6,312	$12,688
Install Crane	$1,625	$0	$0	$1,625
Furnish New Wet Well Lid	$9,500	$5,700	$3,156	$6,344
Install New Wet Well Lid	$5,750	$0	$0	$5,750
Remaining Capital Costs	$99,000	$0	$0	$99,000
Total Construction Cost	**$314,775**	**$28,500**	**$15,780**	**$298,995**

Annual Operation and Maintenance Cost Description	Annual Cost			Net Present Worth
Equipment	$2,000			$40,000
Supplies	$2,000			$40,000
Labor	$3,000			$60,000
Total Annual Cost	**$7,000**			**$140,000**
			Total Net Present Worth	**$438,995**
			EUAC	**$29,507**

COLLECTION ALTERNATIVE 4: BASIN IMPROVEMENTS

Collection Alternative 4 proposes a basin plan to reduce or eliminate lift stations. Harrisburg's recent rapid growth has led the city to install area lift stations to service new developments. Lift stations are a constant maintenance item and should be eliminated when possible. Generally, this can be accomplished by installing new trunk sewers along the bottom of the basin. The truck sewers will be sized to ensure adequate capacity for future population growth. Five different phases have been identified to eliminate four of the seven current lift stations.

The city of Sioux Falls has an extensive basin plan map. Currently, Sioux Falls is not developing any more basins to the south until they have filled their existing basins.Figure 14 on the following page shows the basins around Harrisburg and the current limits for the city of Sioux Falls. Figure 15 is a more in depth look at the subbasins and the proposed trunk sewer lines. The lines have been prioritized and organized into phases. Long term future trunk lines are also shown. The map encompasses the future growth area that the South Eastern Council of Governments developed in their Comprehensive Plan.

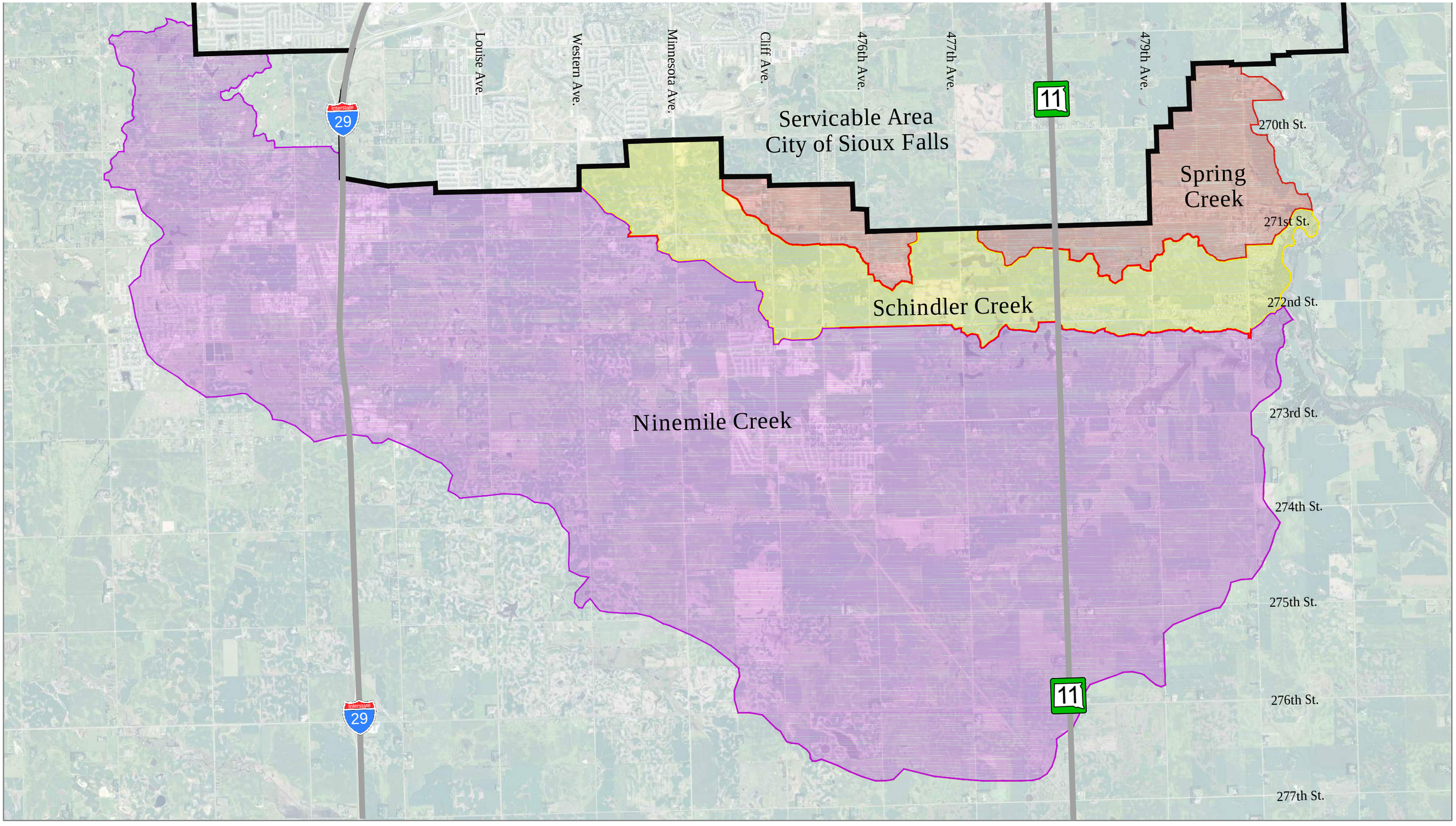

Figure 14 | Master Basin Plan

1" = 5000'

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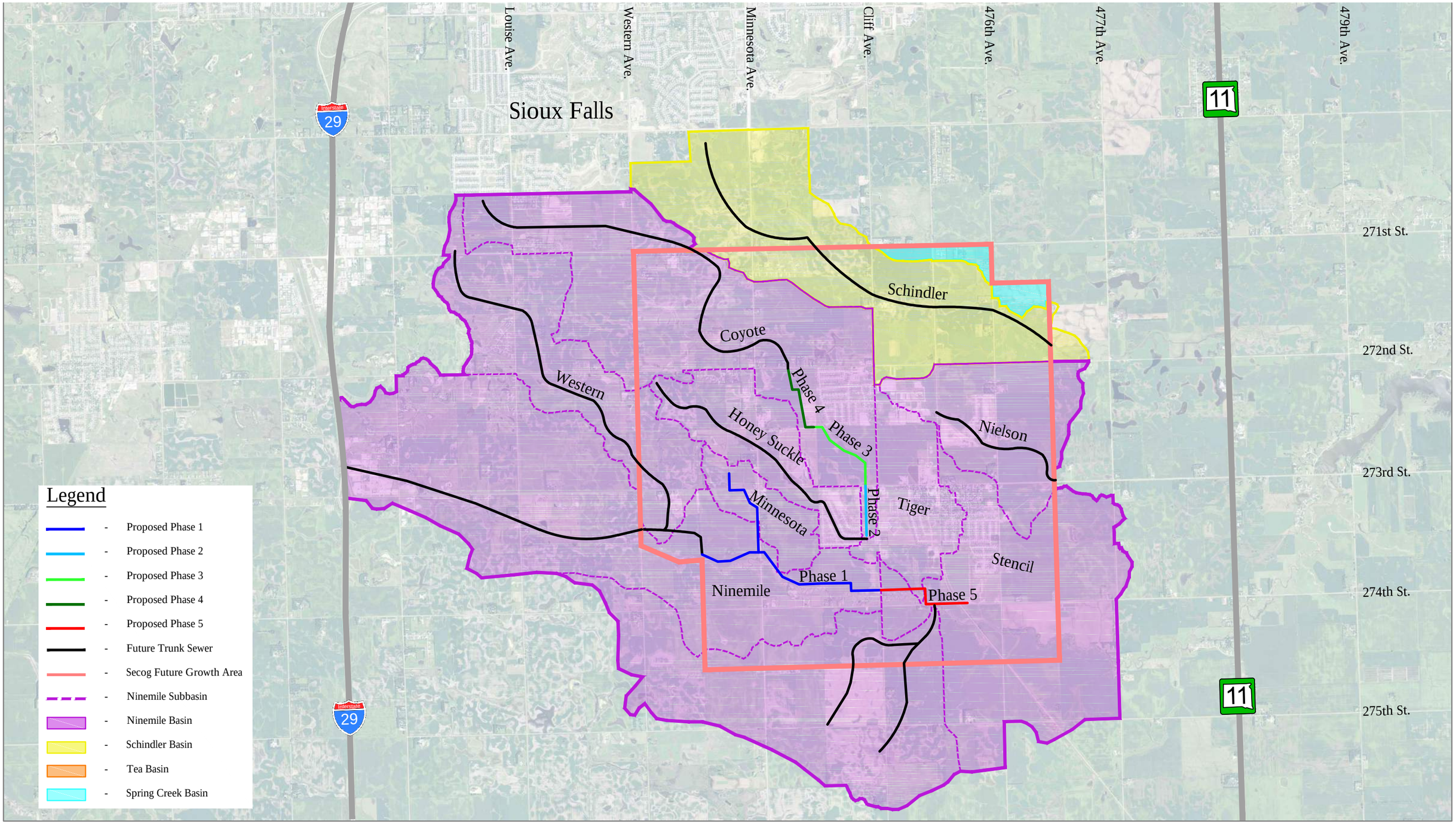

Figure 15 | Growth Area Basin Plan

1" = 4000'

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Trunk lines through the Coyote, Minnesota and Ninemile subbasins have been prioritized to eliminate existing lift stations (see Figure 3). Phase 1 proposes lines through the Ninemile and Minnesota subbasin which will help eliminate the need for the Cliff Avenue Lift Station. Phases 2, 3 and 4 are needed to eliminate the Coyote Lift Station. Phase 5 ties all the phases together by eliminating the Cliff Avenue Lift Station, Tiger Lift Station and the Honey Suckle Lift Station. The Stencil Lift Station could also be eliminated depending on future treatment improvements.

The two main components in the design of trunk sewers are the location and size. Trunk line sewers are typically responsible for capturing all the flow in a primary basin while lateral sewers are dedicated to intercept individual sub-basins. Lateral sewers are typically the direct interceptors for individual properties. It is critical to consider the overall drainage basin when sizing the trunk sewers. The wastewater flow from a basin can be calculated by knowing the size of the basin and the land use. The recommended wastewater flows for each land use type is shown in the following table. These recommendations were established from conversations with city staff about current and future lot sizes. The land use type is based on the current zoning and the future land use established in the Harrisburg Comprehensive Plan. The city has recently updated their Design Standards which are consistent with the table below.

Table 13 Density Design

Districts	A_D Area Density (Units/Acre)	U_D Unit Density (People/Unit)	R Rate (gpcd)	F Flow (gal/ac)
Natural Resource Conservation (NRC)	1	3	100	300
Single Family Residential (R-1)	4	3	100	1,200
Multi-Family Residential (R-2)	12	3	100	3,600
Manufactured Housing Residential (R-3)	6	3	100	1,800
Central Business (CB)	2	10	100	2,000
General Business (GB)	2	10	100	2,000
Light Industrial (LI)	2	3	100	600
Heavy Industrial (HI)	1	15	100	1,500
Planned Development (PD)	2	10	100	2,000

The current Design Standards allow the design engineer to estimate more appropriate flows for the business (CB&GB), industrial(LI&HI) and planned development(PD) districts.

Table 14 determines the average daily flow from a basin by multiplying the number of acres from each zoning classification by a unit density and flow rate. The flow of wastewater varies throughout the day and the year. The peak daily flow from a small

residential area will typically occur around noon or in the early evening hours and may vary from 200 to 4000 percent of the average daily flow. Due to storage and lag time in larger basins, daily peak flows are more consistent and may only vary 180 to 250 percent of the average daily flow. For this reason, a peak daily flow factor or peaking factor is assumed and multiplied by the average daily flow to obtain the peak daily flow. The SD Design Criteria Manual requires a peaking factor of 2.5 for trunk sewers and 4 for lateral sewers. The peak daily flow is typically used in the design and sizing of sanitary sewer mains. The wastewater flows from the future basins are shown in the following table.

Table 14 Future Basin Flows

Basin	Area (acres)	Acres in Each Zoning Classification									Average Daily Flow (cfs)	Peaking Factor	Peak Flow (cfs)
		NRC	R-1	R-2	R-3	CB	GB	LI	HI	PD			
Schindler	1,904	231	1,361						312		3.4	2.5	8.4
Coyote	2,388	290	1,971				31			97	4.2	2.5	10.5
Honeysuckle	640		505				5			130	1.4	2.5	3.4
Nine Mile	3,020	181	2,839								5.4	2.5	13.4
Tiger	558	31	493				34				1.0	2.5	2.6
Stencil	2,037	149	1,886				2				3.6	2.5	8.9
Nielson	852	22	808				21				1.6	2.5	3.9
Minnesota	294		154				16			124	0.7	2.5	1.8
Total	11,692	904	10,017	0	0	0	109	0	312	350			

The following tables show the cost estimates for each of the Phases.

Table 15 Cost Estimate for Collection Alternative 4: Phase 1

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$91,000.00	$91,000.00
2	Erosin Control	1	LS	$30,000.00	$30,000.00
3	Traffic Control	1	LS	$4,000.00	$4,000.00
4	Removals	1	LS	$12,000.00	$12,000.00
5	Connect to existing Lift Station	1	EA	$3,500.00	$3,500.00
6	Connect to existing Sanitary Sewer	1	EA	$1,500.00	$1,500.00
7	30" Sanitary Sewer Pipe	13,200	FT	$80.00	$1,056,000.00
8	Sanitary Sewer Pipe Bedding Material	13,200	FT	$8.00	$105,600.00
9	Trench Dewatering	13,200	FT	$10.00	$132,000.00
10	48" Manhole	17	EA	$7,500.00	$127,500.00
11	8" Boots For Manhole	32	EA	$50.00	$1,600.00
12	Adjust Manhole	17	EA	$500.00	$8,500.00
13	Roadway Crossing	100	FT	$200.00	$20,000.00
				Subtotal	$1,593,200.00
				Contingencies (15%)	$239,000.00
				Total Estimated Construction Costs	**$1,832,200.00**
				ENGINEERING	**$266,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$74,000.00**
				TOTAL ESTIMATED PROJECT COST	**$2,173,000.00**

Table 16 EUAC for Collection Alternative 4: Phase 1

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$91,000	$0	$0	$91,000
Erosin Control	$30,000	$0	$0	$30,000
Traffic Control	$4,000	$0	$0	$4,000
Removals	$12,000	$0	$0	$12,000
Connect to existing Lift Station	$3,500	$1	$1	$3,499
Connect to existing Sanitary Sewer	$1,500	$2	$1	$1,499
30" Sanitary Sewer Pipe	$1,056,000	$633,600	$350,809	$705,191
Sanitary Sewer Pipe Bedding Material	$105,600	$63,360	$35,081	$70,519
Trench Dewatering	$132,000	$0	$0	$132,000
48" Manhole	$127,500	$76,500	$42,356	$85,144
8" Boots For Manhole	$1,600	$960	$532	$1,068
Adjust Manhole	$8,500	$0	$0	$8,500
Roadway Crossing	$20,000	$0	$0	$20,000
Remaining Capital Costs	$579,000	$0	$0	$579,000
Total Construction Cost	**$2,172,200**	**$774,423**	**$428,779**	**$1,743,421**

Annual Operation and Maintenance Cost Description	Annual Cost			Net Present Worth
Equipment	$4,000			$40,000
Supplies	$4,000			$40,000
Labor	$4,000			$60,000
Total Annual Cost	**$12,000**			**$140,000**
			Total Net Present Worth	**$1,883,421**
			EUAC	**$126,595**

Table 17 Cost Estimate for Collection Alternative 4: Phase 2

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$16,000.00	$16,000.00
2	Erosin Control	1	LS	$12,000.00	$12,000.00
3	Traffic Control	1	LS	$2,000.00	$2,000.00
4	Removals	1	LS	$2,500.00	$2,500.00
5	Connect to existing Sanitary Sewer	2	EA	$1,500.00	$3,000.00
6	24" Sanitary Sewer Pipe	2,300	FT	$65.00	$149,500.00
7	Sanitary Sewer Pipe Bedding Material	2,300	FT	$8.00	$18,400.00
8	Trench Dewatering	2,300	FT	$10.00	$23,000.00
9	48" Manhole	4	EA	$7,500.00	$30,000.00
10	8" Boots For Manhole	8	EA	$50.00	$400.00
11	Adjust Manhole	8	EA	$500.00	$4,000.00
12	Roadway Crossing	40	FT	$200.00	$8,000.00
				Subtotal	$268,800.00
				Contingencies (15%)	$41,000.00
				Total Estimated Construction Costs	**$309,800.00**
				ENGINEERING	**$66,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$13,000.00**
				TOTAL ESTIMATED PROJECT COST	**$389,000.00**

Table 18 EUAC for Collection Alternative 4: Phase 2

Capital Cost				
Description	**Price**	**Salvage Value**	**Present Worth of Salvage Value**	**Net Present Worth**
Mobilization	$16,000	$0	$0	$16,000
Erosin Control	$12,000	$0	$0	$12,000
Traffic Control	$2,000	$0	$0	$2,000
Removals	$2,500	$0	$0	$2,500
Connect to existing Sanitary Sewer	$3,000	$2	$1	$2,999
24" Sanitary Sewer Pipe	$149,500	$89,700	$49,665	$99,835
Sanitary Sewer Pipe Bedding Material	$18,400	$11,040	$6,113	$12,287
Trench Dewatering	$23,000	$0	$0	$23,000
48" Manhole	$30,000	$18,000	$9,966	$20,034
8" Boots For Manhole	$400	$240	$133	$267
Adjust Manhole	$4,000	$0	$0	$4,000
Roadway Crossing	$8,000	$0	$0	$8,000
Remaining Capital Costs	$120,000	$0	$0	$120,000
Total Construction Cost	**$388,800**	**$118,982**	**$65,877**	**$322,923**

Annual Operation and Maintenance Cost				
Description	**Annual Cost**			**Net Present Worth**
Equipment	$2,000			$40,000
Supplies	$2,000			$40,000
Labor	$3,000			$60,000
Total Annual Cost	**$7,000**			**$140,000**
			Total Net Present Worth	**$462,923**
			EUAC	**$31,116**

Table 19 Cost Estimate for Collection Alternative 4: Phase 3

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$24,000.00	$24,000.00
2	Erosin Control	1	LS	$20,000.00	$20,000.00
3	Traffic Control	1	LS	$2,000.00	$2,000.00
4	Removals	1	LS	$2,500.00	$2,500.00
5	Connect to existing Sanitary Sewer	1	EA	$1,500.00	$1,500.00
6	24" Sanitary Sewer Pipe	3,800	FT	$65.00	$247,000.00
7	Sanitary Sewer Pipe Bedding Material	3,800	FT	$8.00	$30,400.00
8	Trench Dewatering	3,800	FT	$10.00	$38,000.00
9	48" Manhole	5	EA	$7,500.00	$37,500.00
10	8" Boots For Manhole	10	EA	$50.00	$500.00
11	Adjust Manhole	10	EA	$500.00	$5,000.00
12	Roadway Crossing	40	FT	$200.00	$8,000.00
				Subtotal	$416,400.00
				Contingencies (15%)	$63,000.00
				Total Estimated Construction Costs	**$479,400.00**
				ENGINEERING	**$93,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$20,000.00**
				TOTAL ESTIMATED PROJECT COST	**$593,000.00**

Table 20 EUAC for Collection Alternative 4: Phase 3

Capital Cost				
Description	**Price**	**Salvage Value**	**Present Worth of Salvage Value**	**Net Present Worth**
Mobilization	$24,000	$0	$0	$24,000
Erosin Control	$20,000	$0	$0	$20,000
Traffic Control	$2,000	$0	$0	$2,000
Removals	$2,500	$0	$0	$2,500
Connect to existing Sanitary Sewer	$1,500	$2	$1	$1,499
24" Sanitary Sewer Pipe	$247,000	$148,200	$82,055	$164,945
Sanitary Sewer Pipe Bedding Material	$30,400	$18,240	$10,099	$20,301
Trench Dewatering	$38,000	$0	$0	$38,000
48" Manhole	$37,500	$22,500	$12,458	$25,042
8" Boots For Manhole	$500	$300	$166	$334
Adjust Manhole	$5,000	$0	$0	$5,000
Roadway Crossing	$8,000	$0	$0	$8,000
Remaining Capital Costs	$176,000	$0	$0	$176,000
Total Construction Cost	**$592,400**	**$189,242**	**$104,779**	**$487,621**

Annual Operation and Maintenance Cost				
Description	**Annual Cost**			**Net Present Worth**
Equipment	$2,000			$40,000
Supplies	$2,000			$40,000
Labor	$3,000			$60,000
Total Annual Cost	**$7,000**			**$140,000**
			Total Net Present Worth	**$627,621**
			EUAC	**$42,186**

Table 21 Cost Estimate for Collection Alternative 4: Phase 4

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$21,000.00	$21,000.00
2	Erosin Control	1	LS	$20,000.00	$20,000.00
3	Traffic Control	1	LS	$2,000.00	$2,000.00
4	Removals	1	LS	$2,500.00	$2,500.00
5	Connect to existing Sanitary Sewer	1	EA	$1,500.00	$1,500.00
6	24" Sanitary Sewer Pipe	3,450	FT	$65.00	$224,250.00
7	Sanitary Sewer Pipe Bedding Material	3,450	FT	$8.00	$27,600.00
8	Trench Dewatering	3,450	FT	$10.00	$34,500.00
9	48" Manhole	4	EA	$7,500.00	$30,000.00
10	8" Boots For Manhole	7	EA	$50.00	$350.00
11	Adjust Manhole	4	EA	$500.00	$2,000.00
12	Roadway Crossing	30	FT	$100.00	$3,000.00
				Subtotal	$368,700.00
				Contingencies (15%)	$56,000.00
				Total Estimated Construction Costs	**$424,700.00**
				ENGINEERING	**$84,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$17,000.00**
				TOTAL ESTIMATED PROJECT COST	**$526,000.00**

Table 22 EUAC for Collection Alternative 4: Phase 4

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$21,000	$0	$0	$21,000
Erosin Control	$20,000	$0	$0	$20,000
Traffic Control	$2,000	$0	$0	$2,000
Removals	$2,500	$0	$0	$2,500
Connect to existing Sanitary Sewer	$1,500	$2	$1	$1,499
24" Sanitary Sewer Pipe	$224,250	$134,550	$74,497	$149,753
Sanitary Sewer Pipe Bedding Material	$27,600	$16,560	$9,169	$18,431
Trench Dewatering	$34,500	$0	$0	$34,500
48" Manhole	$30,000	$18,000	$9,966	$20,034
8" Boots For Manhole	$350	$210	$116	$234
Adjust Manhole	$2,000	$0	$0	$2,000
Roadway Crossing	$3,000	$0	$0	$3,000
Remaining Capital Costs	$157,000	$0	$0	$157,000
Total Construction Cost	**$525,700**	**$169,322**	**$93,749**	**$431,951**

Annual Operation and Maintenance Cost Description	Annual Cost			Net Present Worth
Equipment	$2,000			$40,000
Supplies	$2,000			$40,000
Labor	$3,000			$60,000
Total Annual Cost	**$7,000**			**$140,000**
			Total Net Present Worth	**$571,951**
			EUAC	**$38,444**

Table 23Cost Estimate for Collection Alternative 4: Phase 5

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$32,000.00	$32,000.00
2	Erosin Control	1	LS	$15,000.00	$15,000.00
3	Traffic Control	1	LS	$2,500.00	$2,500.00
4	Removals	1	LS	$10,000.00	$10,000.00
5	Connect to existing Lift Station	1	EA	$3,500.00	$3,500.00
6	Connect to existing Sanitary Sewer	1	EA	$1,500.00	$1,500.00
7	30" Sanitary Sewer Pipe	4,500	FT	$80.00	$360,000.00
8	Sanitary Sewer Pipe Bedding Material	4,500	FT	$8.00	$36,000.00
9	Trench Dewatering	4,500	FT	$10.00	$45,000.00
10	48" Manhole	6	EA	$7,500.00	$45,000.00
11	8" Boots For Manhole	14	EA	$50.00	$700.00
12	Adjust Manhole	6	EA	$500.00	$3,000.00
13	Roadway Crossing	40	FT	$200.00	$8,000.00
				Subtotal	$562,200.00
				Contingencies (15%)	$85,000.00
				Total Estimated Construction Costs	**$647,200.00**
				ENGINEERING	**$115,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$26,000.00**
				TOTAL ESTIMATED PROJECT COST	**$789,000.00**

Table 24 EUAC for Collection Alternative 4: Phase 5

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$32,000	$0	$0	$32,000
Erosin Control	$15,000	$0	$0	$15,000
Traffic Control	$2,500	$0	$0	$2,500
Removals	$10,000	$0	$0	$10,000
Connect to existing Lift Station	$3,500	$1	$1	$3,499
Connect to existing Sanitary Sewer	$1,500	$2	$1	$1,499
30" Sanitary Sewer Pipe	$360,000	$216,000	$119,594	$240,406
Sanitary Sewer Pipe Bedding Material	$36,000	$21,600	$11,959	$24,041
Trench Dewatering	$45,000	$0	$0	$45,000
48" Manhole	$45,000	$27,000	$14,949	$30,051
8" Boots For Manhole	$700	$420	$233	$467
Adjust Manhole	$3,000	$0	$0	$3,000
Roadway Crossing	$8,000	$0	$0	$8,000
Remaining Capital Costs	$226,000	$0	$0	$226,000
Total Construction Cost	**$788,200**	**$265,023**	**$146,737**	**$641,463**

Annual Operation and Maintenance Cost Description	Annual Cost			Net Present Worth
Equipment	$4,000			$40,000
Supplies	$4,000			$40,000
Labor	$4,000			$60,000
Total Annual Cost	**$12,000**			**$140,000**
			Total Net Present Worth	**$781,463**
			EUAC	**$52,527**

WASTEWATER TREATMENT ALTERNATIVES

The following alternatives were developed to correct the deficiencies listed below:

1) The existing treatment system is overloaded hydraulically.
2) The existing treatment system is overloaded organically.
3) The city receives several complaints about smell from the ponds.
4) Sludge is building up around the inlet structure.

WASTEWATER FLOWS

Wastewater flows for the following alternatives assumed an initial population of 5,698 with a 4% growth rate to 12,485 by 2036. Wastewater flows based on prior flow readings and water purchases range from 50 to 55 gallons per capita per day. The minimum flow specified by the SD design criteria is 60 gpcpd. An additional 5 gpcpd was allotted to account for I&I for a total flow of 65 gpcpd. The average 20-year design flow is thus 0.81 MGD (12,485 population x 65 gpcpd).

PERMIT LIMITS

Harrisburg currently does not have discharge permit limits because they do not discharge. However, Kathleen Grigg with the SD DENR was contacted about potential discharge limits for the various streams to determine if discharging would be a possible treatment option. The streams that were evaluated include Ninemile Creek, Schindler Creek, Spring Creek and the Big Sioux River. Ninemile Creek is not a feasible discharge site because the ponds are within five miles of Lake Alvin (see Appendix H). Schindler and Spring Creeks were investigated because the existing force main to Sioux Falls crosses these streams. The force main could be repurposed into an outfall to save construction costs. However, the DENR proposed low limits for these two streams because they have similar low flows. Beaver Creek was also considered in previous conversations but the proposed limits would be similar to Schindler and Spring Creek. Therefore, any proposed discharges are recommended to go to the Big Sioux River. The Big Sioux River has the least restrictive discharge limits because it has the highest flow. The most recent predicted effluent limits were obtained in November 2015 by Banner Associates, Inc. as part of a regionalization study between Harrisburg, Tea, Worthing and local county residents. The proposed discharge limits for the Big Sioux River are shown in the following table. A correspondence letter is included in Appendix I.

Table 25 Predicted Big Sioux River Discharge Limits

Predicted Effluent Flows		2015	2020	2030	2040
gallons per day		1,277,336	1,615,672	2,026,298	3,613,695
ft^3/sec		1.98	2.5	3.85	5.59
Predicted Effluent Limits					
Ammona	Daily Max	6.6	2.5	2.1	2.2
(mg/L)	30-Day Average	1	0.5	0.5	0.5
TSS	Max 7-day Average	45			
(mg/L)	30-Day Average	30			
BOD_5	Max 7-day Average	45			
(mg/L)	30-Day Average	30			
pH	Daily Max	9			
(su)	Daily Min	6.5			
E. coli	Daily Max	235			
(#/100mL)	30-day Geometic Mean	117			
DO (mg/L)	Daily Min	5			
Temperature	Daily Max	32.2			
(°C)	30-Day Average	Monitor			
Nitrate	Daily Max	Monitor			
(mg/L)	30-Day Average	Monitor			
Total P	Daily Max	Monitor			
(mg/L)	30-Day Average	Monitor			

Future changes to the permit limits were also considered. Albert Spangler with the DENR was contacted to determine how limits would change in the future. The Environmental Protection Agency directs the SD DENR on changes to the Water Quality Standards. The DENR renews their Water Quality Standards every three years. The latest revision occurred in early 2014. The DENR indicated that the next change to permit limits will be lower ammonia limits in 2017. The lower limits can be seen in 2020 onwards.

The DENR also indicated that nutrient removal could be required as early as the 2020 renewal; although there is no official schedule for implementation. Preliminary indications are that total nitrogen would be less than 10 mg/L and phosphorus would be less than 1 mg/L. These removal processes are not included in the estimates but the city should be aware of the future requirements. Additional area should be included with the proposed improvements to add this process at a later date.

The previous facility plan considered alternatives involving total retention, 180-day storage, artificial wetlands, irrigation, submerged attached growth reactors (SAGR), regionalization with Sioux Falls, regionalization with area communities and a mechanical treatment plant. The city has expressed interest in foregoing lagoon-based systems due to difficulties in securing large amounts of land, potential odor issues and public

resistance. Instead, the city would like to examine mechanical processes as well as regionalizing with other communities and the SAGR system in more detail. The following alternatives are broken into subcategories to evaluate different types of mechanical treatment plants and different strategies for regionalization.

TREATMENT ALTERNATIVE 1: DO NOTHING

The first treatment alternative is the "Do Nothing". This alternative is not considered acceptable because it will not address any of the deficiencies identified above.

TREATMENT ALTERNATIVE 2: MECHANICAL TREATMENT

The next alternative is to build a mechanical treatment facility. Stockwell Engineers have reviewed three options: sequencing batch reactor (SBR), oxidation ditch, SEQUOX® by Aero-mod. All of the options are variations of a typical activated sludge process. Each one of these processes are capable of meeting the proposed effluent limits. Future nutrient removal may require further plant upgrades. With proper operational settings, the plants are capable of biologically removing phosphorus down to 1 mg/L and total nitrogen below 10 mg/L. If future permit limits are more stringent, it is anticipated that chemical addition(s) and filtration will be required.

TREATMENT ALTERNATIVE 2.1: SEQUENCING BATCH REACTOR

Sequencing batch reactors (SBR) treat wastewater within a single tank in a batch system. When the tank is full, the wastewater is fully treated before more water is accepted into the tank. Multiple tanks are used to ensure continuous treatment. Each tank undergoes a predetermined treatment cycle. The five steps in an SBR is as follows: fill, react, settle, decant and idle. During the fill step, wastewater fills the basin. The next step is the react stage where the water is mixed and aerated. During this phase, microorganisms in the water are very active and consume much of the waste. The third step is the settling phase. Mixing is ceased and solids are allowed to settled to the bottom of the basin. At the end of the settling phase, the water at top of the basin is relatively clear with few remaining solids. The decant phase follows. The clear water at the top of the basin is drained. The settled solids are pumped out of the basin for further processing. A portion of the solids remain. The solids contain microorganisms that are responsible for treating the water. The last step is the idle period in which the reactor sits idle waiting for more wastewater. This step is optional depending on the incoming flow.

Sequencing batch reactors are common throughout the Midwest. In South Dakota, there are facilities in Hill City, Huron, Box Elder and Lennox. These were all constructed within the last decade. The city of Dell Rapids has also secured funding and will start construction on an SBR system in 2017.

The benefit of an SBR system is the relatively low capital and operating costs. This is primarily due to the small plant foot print. The plant has low hydraulic residence times which results in less mixing requirements and thus lower energy costs. All the process equipment can be located indoors to allow for easier maintenance in hot and cold weather.

Because of the batch process and low hydraulic residence time, the process is more prone to upsets that can impact plant performance. Upsets may result from excessive flows, untreated industrial waste or improper operation. An SBR requires a skilled operator that can quickly respond to changing conditions. Recent technological advances in online controls and automated process responses have been SBR a more attractive treatment option. Most vendors offer a training period ranging from a few weeks to a couple of months where they will train the operator(s) to use their equipment and help troubleshoot the plant.

This alternative will require a bar screen at the head of the plant. Wastewater treated by the SBR will be disinfected by ultraviolet radiation. Following disinfection, the water will be aerated to maintain a dissolved oxygen concentration of DO of 5 mg/L. The final effluent will be pumped approximately 5 miles to discharge into the Big Sioux River.

A building will enclose the bar screen. The bar screen building will be equipped with an odor control scrubber. An office with the system controls and a small lab is included. Wasted sludge will be treated through aerobic digestion. The treated sludge will be pumped to a dewatering belt press. Dewatered sludge will be landfilled. The belt press and blowers will be located inside a building. An underground gallery will house most of the remaining process equipment.

Effluent equalization will be needed for the UV treatment and lift station to function properly. Effluent equalization, UV treatment and post aeration equipment may be located outside. A cover for the SBR basins will be evaluated during the design process.

Annual costs include maintenance and replacement of process equipment, lab testing fees, sludge handling and labor. The cost estimates for this alternative are shown in the following tables.

Table 26 Cost Estimate for Treatment Alternative 2.1: SBR

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Site Grading/Paving	1	LS	$200,000.00	$200,000.00
2	Influent Pumps	1	LS	$150,000.00	$150,000.00
3	Effluent Pumps	1	LS	$150,000.00	$150,000.00
4	Bar Screen Building	1	LS	$500,000.00	$500,000.00
5	Bar Screen and Compactor	1	LS	$200,000.00	$200,000.00
6	Office, Lab and Final Effluent Pump Building	1	LS	$600,000.00	$600,000.00
7	Mechanical/Biosolids Dewatering Building	1	LS	$950,000.00	$950,000.00
8	Process Equipment	1	LS	$2,000,000.00	$2,000,000.00
9	Odor Control	1	LS	$250,000.00	$250,000.00
10	Power to Site	1	LS	$100,000.00	$100,000.00
11	Standby Power/Generator	1	LS	$250,000.00	$250,000.00
12	Instrumentation and Controls/SCADA	1	LS	$750,000.00	$750,000.00
13	Electrical Inside Plant	1	LS	$250,000.00	$250,000.00
14	Concrete Work Influent Pumping	95	CuYd	$650.00	$61,750.00
15	Concrete Work Effluent Pumping	85	CuYd	$650.00	$55,250.00
16	Concrete Work Basins	1200	CuYd	$650.00	$780,000.00
17	Concrete Work Disinfection/Post Aeration	310	CuYd	$650.00	$201,500.00
18	Effluent Equalization	1	LS	$500,000.00	$500,000.00
19	Storm Water and Bio Solids Holding Ponds	1	LS	$500,000.00	$500,000.00
20	Plant Piping	1	LS	$250,000.00	$250,000.00
21	Mechanical Room Equipment	1	LS	$700,000.00	$700,000.00
22	Lift Station Pump and Piping Assembly	1	LS	$350,000.00	$350,000.00
23	16" Force Main	36,000	FT	$70.00	$2,520,000.00
24	16" Sanitary Bedding Material	36,000	FT	$6.00	$216,000.00
				Subtotal	$12,484,500.00
				Contingencies (20%)	$2,496,900.00
				Total Estimated Construction Costs	$14,981,400.00
				ENGINEERING	$2,248,000.00
				LAND PURCHASE	$1,250,000.00
				LEGAL, ADMINISTRATION & TESTING (4%)	$740,000.00
				TOTAL ESTIMATED PROJECT COST	$19,220,000.00

Table 27 EUAC for Treatment Alternative 2.1: SBR

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Site Grading/Paving	$200,000	$0	$0	$200,000
Influent Pumps	$150,000	$90,000	$49,831	$100,169
Effluent Pumps	$150,000	$90,000	$49,831	$100,169
Bar Screen Building	$500,000	$300,000	$166,103	$333,897
Bar Screen and Compactor	$200,000	$120,000	$66,441	$133,559
Office, Lab and Final Effluent Pump Building	$600,000	$360,000	$199,323	$400,677
Mechanical/Biosolids Dewatering Building	$950,000	$570,000	$315,595	$634,405
Process Equipment	$2,000,000	$1,200,000	$664,411	$1,335,589
Odor Control	$250,000	$150,000	$83,051	$166,949
Power to Site	$100,000	$0	$0	$100,000
Standby Power/Generator	$250,000	$150,000	$83,051	$166,949
Instrumentation and Controls/SCADA	$750,000	$450,000	$249,154	$500,846
Electrical Inside Plant	$250,000	$150,000	$83,051	$166,949
Concrete Work Influent Pumping	$61,750	$37,050	$20,514	$41,236
Concrete Work Effluent Pumping	$55,250	$33,150	$18,354	$36,896
Concrete Work Basins	$780,000	$468,000	$259,120	$520,880
Concrete Work Disinfection/Post Aeration	$201,500	$120,900	$66,939	$134,561
Effluent Equalization	$500,000	$300,000	$166,103	$333,897
Storm Water and Bio Solids Holding Ponds	$500,000	$300,000	$166,103	$333,897
Plant Piping	$250,000	$150,000	$83,051	$166,949
Mechanical Room Equipment	$700,000	$420,000	$232,544	$467,456
Lift Station Pump and Piping Assembly	$350,000	$210,000	$116,272	$233,728
16" Force Main	$2,520,000	$1,512,000	$837,158	$1,682,842
16" Sanitary Bedding Material	$216,000	$0	$0	$216,000
Contingencies	$2,496,900	$0	$0	$2,496,900
Enginering	$2,248,000	$0	$0	$2,248,000
Legal, Administation & Testing	$740,000	$0	$0	$740,000
Land	$1,250,000	$1,250,000	$1,250,000	$0
Total Construction Cost	**$19,219,400**	**$8,431,100**	**$5,226,001**	**$13,993,399**

Annual Operation and Maintenance Cost Description	EUAC			Net Present Worth
Equipment	$53,000			$1,060,000
Solids Handling	$75,000			$1,500,000
Testing	$15,000			$300,000
Utilities	$60,000			$1,200,000
Labor	$164,000			$3,280,000
Total Annual Cost	**$367,000**			**$7,340,000**
			Total Net Present Worth	**$21,333,399**
			EUAC	**$1,433,940**

TREATMENT ALTERNATIVE 2.2: OXIDATION DITCH

This alternative is to build an oxidation ditch. An oxidation ditch is a large oval or circular basin for extended aeration treatment. Wastewater circles through the basins on a continuous basis. Typical hydraulic residence times range from 24-48 hours. Water is mixed and aerated as it flows through the basin. Aerators can be spaced out to allow for aerobic and anaerobic processes to occur which allow for nutrient removal. Wastewater flows out of the basin and into a clarifier. The clarifier allows solids to settle at the bottom of the tank. A portion of the solids are recycled back through the oxidation ditch in order to better maintain the population of microorganisms responsible for treatment. The rest of the solids are sent through additional treatment processes. The relatively clear water at the top of the clarifier flows through a weir.

Oxidation ditches are a tried and true technology. Thousands of oxidation ditches have been built worldwide. In South Dakota, there are oxidation ditches in Spearfish, Clark, Alcester and Madison. Other nearby installations include Dawson, MN and Luverne, MN.

The benefit of an oxidation ditch is in its resilient and forgiving biological process. This is primarily due to long hydraulic residence times. This makes the plant more resistant to upsets and thus easier to operate. The oxidation ditch has a larger footprint which results in larger capital costs. There is more equipment to operate and maintain. This results in higher replacement costs and more power consumption. Much of the equipment is also located outside which can be difficult to repair during inclement weather.

This alternative will require a bar screen at the head of the plant. Wastewater treated by the oxidation ditch will be sent to a clarifier. Clear water from the clarifier will be disinfected by ultraviolet radiation. Following disinfection, the water will be aerated to maintain a dissolved oxygen concentration of DO of 5 mg/L. The final effluent will be pumped approximately 5 miles to discharge into the Big Sioux River.

A building will enclose the bar screen. The bar screen building will be equipped with an odor control scrubber. An office with the system controls and a small lab is included. Wasted sludge will be treated through aerobic digestion. The treated sludge will be pumped to a dewatering belt press. Dewatered sludge will be landfilled. The belt press and blowers will be located inside a building. Much of the aeration equipment and mixers will be located outside within the oxidation ditch.

Effluent equalization will be needed for the UV treatment and lift station to function properly. Effluent equalization, UV treatment and post aeration equipment may be located outside. A cover for the clarifiers will be evaluated during the design process.

Annual costs include maintenance and replacement of process equipment, lab testing fees, sludge handling and labor. The cost estimates for this alternative are shown in the following tables.

Table 28 Cost Estimate Treatment Alternative 2.2: Oxidation Ditch

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Site Grading/Paving	1	LS	$200,000.00	$200,000.00
2	Influent Pumps	1	LS	$150,000.00	$150,000.00
3	Effluent Pumps	1	LS	$150,000.00	$150,000.00
4	Bar Screen Building	1	LS	$500,000.00	$500,000.00
5	Bar Screen and Compactor	1	LS	$200,000.00	$200,000.00
6	Office, Lab and Final Effluent Pump Building	1	LS	$600,000.00	$600,000.00
7	Mechanical/Biosolids Dewatering Building	1	LS	$950,000.00	$950,000.00
8	Process Equipment	1	LS	$2,000,000.00	$2,000,000.00
9	Odor Control	1	LS	$250,000.00	$250,000.00
10	Power to Site	1	LS	$100,000.00	$100,000.00
11	Standby Power/Generator	1	LS	$250,000.00	$250,000.00
12	Instrumentation and Controls/SCADA	1	LS	$750,000.00	$750,000.00
13	Electrical Inside Plant	1	LS	$250,000.00	$250,000.00
14	Concrete Work Influent Pumping	95	CuYd	$650.00	$61,750.00
15	Concrete Work Effluent Pumping	85	CuYd	$650.00	$55,250.00
16	Concrete Work Basins	2700	CuYd	$650.00	$1,755,000.00
17	Concrete Work Disinfection/Post Aeration	310	CuYd	$650.00	$201,500.00
18	Effluent Equalization	1	LS	$500,000.00	$500,000.00
19	Storm Water and Bio Solids Holding Pond	1	LS	$500,000.00	$500,000.00
20	Plant Piping	1	LS	$350,000.00	$350,000.00
21	Mechanical Room Equipment	1	LS	$700,000.00	$700,000.00
22	Lift Station Pump and Piping Assembly	1	LS	$350,000.00	$350,000.00
23	16" Force Main	36,000	FT	$70.00	$2,520,000.00
24	16" Sanitary Bedding Material	36,000	FT	$6.00	$216,000.00
				Subtotal	$13,559,500.00
				Contingencies (20%)	$2,711,900.00
				Total Estimated Construction Costs	$16,271,400.00
				ENGINEERING	$2,441,000.00
				LAND PURCHASE	$1,250,000.00
				LEGAL, ADMINISTRATION & TESTING (4%)	$799,000.00
				TOTAL ESTIMATED PROJECT COST	$20,762,000.00

Table 29 EUAC Treatment Alternative 2.2: Oxidation Ditch

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Site Grading/Paving	$200,000	$0	$0	$200,000
Influent Pumps	$150,000	$90,000	$49,831	$100,169
Effluent Pumps	$150,000	$90,000	$49,831	$100,169
Bar Screen Building	$500,000	$300,000	$166,103	$333,897
Bar Screen and Compactor	$200,000	$120,000	$66,441	$133,559
Office, Lab and Final Effluent Pump Building	$600,000	$360,000	$199,323	$400,677
Mechanical/Biosolids Dewatering Building	$950,000	$570,000	$315,595	$634,405
Process Equipment	$2,000,000	$1,200,000	$664,411	$1,335,589
Odor Control	$250,000	$150,000	$83,051	$166,949
Power to Site	$100,000	$0	$0	$100,000
Standby Power/Generator	$250,000	$150,000	$83,051	$166,949
Instrumentation and Controls/SCADA	$750,000	$450,000	$249,154	$500,846
Electrical Inside Plant	$250,000	$150,000	$83,051	$166,949
Concrete Work Influent Pumping	$61,750	$37,050	$20,514	$41,236
Concrete Work Effluent Pumping	$55,250	$33,150	$18,354	$36,896
Concrete Work Basins	$1,755,000	$1,053,000	$583,021	$1,171,979
Concrete Work Disinfection/Post Aeration	$201,500	$120,900	$66,939	$134,561
Effluent Equalization	$500,000	$300,000	$166,103	$333,897
Storm Water and Bio Solids Holding Pond	$500,000	$300,000	$166,103	$333,897
Plant Piping	$350,000	$210,000	$116,272	$233,728
Mechanical Room Equipment	$700,000	$420,000	$232,544	$467,456
Lift Station Pump and Piping Assembly	$350,000	$210,000	$116,272	$233,728
16" Force Main	$2,520,000	$1,512,000	$837,158	$1,682,842
16" Sanitary Bedding Material	$216,000	$0	$0	$216,000
Contingencies	$2,711,900	$0	$0	$2,711,900
Enginering	$2,441,000	$0	$0	$2,441,000
Legal, Administation & Testing	$1,250,000	$0	$0	$1,250,000
Land	$1,250,000	$1,250,000	$1,250,000	$0
Total Construction Cost	**$21,212,400**	**$9,076,100**	**$5,583,122**	**$15,629,278**

Annual Operation and Maintenance Cost

Description	EUAC			Net Present Worth
Equipment	$73,000			$1,460,000
Solids Handling	$75,000			$1,500,000
Testing	$15,000			$300,000
Utilities	$80,000			$1,600,000
Labor	$164,000			$3,280,000
Total Annual Cost	**$407,000**			**$8,140,000**
			Total Net Present Worth	**$23,769,278**
			EUAC	**$1,597,669**

TREATMENT ALTERNATIVE 2.3: SEQUOX® BY AEROMOD, INC.

This alternative involves a continuous flow process promoted as SEQUOX® by Aeromod, Inc. The process features two staged aeration to allow for aerobic and anaerobic processes to occur for better nutrient removal. Wasted sludge is typically aerobically digested. All treatment basins share a common wall and wastewater flows via gravity throughout the basin. The result is a more compact design akin to the SBR; while also being more resistant to shock loads similar to an oxidation ditch.

Aeromod, Inc. has over 400 installations constructed over the last 25 years. The nearest plant is located in Alta, IA. There are currently no Aeromod plants located in South Dakota; however, there are approximately 40 installations in Nebraska and Iowa.

The benefit of the SEQUOX® process is its efficient, compact design. Common wall construction saves on capital costs. Very few motorized equipment is needed which saves on maintenance. All the process equipment can be located indoors to allow for easier maintenance during hot or cold weather. Because there are no plants currently in South Dakota, an Aeromod plant may have to undergo a vetting process before a full scale plant is built.

This alternative will require a bar screen at the head of the plant. Wastewater treated by the SEQUOX will be disinfected by ultraviolet radiation. Following disinfection, the water will be aerated to maintain a dissolved oxygen concentration of DO of 5 mg/L. The final effluent will be pumped approximately 5 miles to discharge into the Big Sioux River.

A building will enclose the bar screen. The bar screen building will be equipped with an odor control scrubber. An office with the system controls and a small lab is included. Wasted sludge will be treated through aerobic digestion. The treated sludge will be pumped to a dewatering belt press. Dewatered sludge will be landfilled. The belt press and blowers will be located inside a building. The remaining process equipment will be located indoors.

Effluent equalization will be needed for the UV treatment and lift station to function properly. Effluent equalization, UV treatment and post aeration equipment may be located outside. A cover for the clarifiers will be evaluated during the design process.

Annual costs include maintenance and replacement of process equipment, lab testing fees, sludge handling and labor. The cost estimates for this alternative are shown in the following tables.

Table 30 Cost Estimate for Treatment Alternative 2.3: SEQUOX®

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Site Grading/Paving	1	LS	$200,000.00	$200,000.00
2	Influent Pumps	1	LS	$150,000.00	$150,000.00
3	Effluent Pumps	1	LS	$150,000.00	$150,000.00
4	Bar Screen Building	1	LS	$500,000.00	$500,000.00
5	Bar Screen and Compactor	1	LS	$200,000.00	$200,000.00
6	Office, Lab and Final Effluent Pump Building	1	LS	$600,000.00	$600,000.00
7	Mechanical/Biosolids Dewatering Building	1	LS	$950,000.00	$950,000.00
8	Process Equipment	1	LS	$2,000,000.00	$2,000,000.00
9	Odor Control	1	LS	$250,000.00	$250,000.00
10	Power to Site	1	LS	$100,000.00	$100,000.00
11	Standby Power/Generator	1	LS	$250,000.00	$250,000.00
12	Instrumentation and Controls/SCADA	1	LS	$750,000.00	$750,000.00
13	Electrical Inside Plant	1	LS	$250,000.00	$250,000.00
14	Concrete Work Influent Pumping	95	CuYd	$650.00	$61,750.00
15	Concrete Work Effluent Pumping	85	CuYd	$650.00	$55,250.00
16	Concrete Work Basins	1750	CuYd	$650.00	$1,137,500.00
17	Concrete Work Disinfection/Post Aeration	310	CuYd	$650.00	$201,500.00
18	Effluent Equalization	1	LS	$500,000.00	$500,000.00
19	Storm Water and Bio Solids Holding Ponds	1	LS	$500,000.00	$500,000.00
20	Plant Piping	1	LS	$250,000.00	$250,000.00
21	Mechanical Room Equipment	1	LS	$750,000.00	$750,000.00
22	Lift Station Pump and Piping Assembly	1	LS	$350,000.00	$350,000.00
23	16" Force Main	36,000	FT	$70.00	$2,520,000.00
24	16" Sanitary Bedding Material	36,000	FT	$6.00	$216,000.00
				Subtotal	$12,892,000.00
				Contingencies (20%)	$2,578,400.00
				Total Estimated Construction Costs	$15,470,400.00
				ENGINEERING	$2,321,000.00
				LAND PURCHASE	$1,250,000.00
				LEGAL, ADMINISTRATION & TESTING (4%)	$762,000.00
				TOTAL ESTIMATED PROJECT COST	$19,804,000.00

Table 31 EUAC for Treatment Alternative 2.3: SEQUOX®

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Site Grading/Paving	$200,000	$0	$0	$200,000
Influent Pumps	$150,000	$90,000	$49,831	$100,169
Effluent Pumps	$150,000	$90,000	$49,831	$100,169
Bar Screen Building	$500,000	$300,000	$166,103	$333,897
Bar Screen and Compactor	$200,000	$120,000	$66,441	$133,559
Office, Lab and Final Effluent Pump Building	$600,000	$360,000	$199,323	$400,677
Mechanical/Biosolids Dewatering Building	$950,000	$570,000	$315,595	$634,405
Process Equipment	$2,000,000	$1,200,000	$664,411	$1,335,589
Odor Control	$250,000	$150,000	$83,051	$166,949
Power to Site	$100,000	$0	$0	$100,000
Standby Power/Generator	$250,000	$150,000	$83,051	$166,949
Instrumentation and Controls/SCADA	$750,000	$450,000	$249,154	$500,846
Electrical Inside Plant	$250,000	$150,000	$83,051	$166,949
Concrete Work Influent Pumping	$61,750	$37,050	$20,514	$41,236
Concrete Work Effluent Pumping	$55,250	$33,150	$18,354	$36,896
Concrete Work Basins	$1,137,500	$682,500	$377,884	$759,616
Concrete Work Disinfection/Post Aeration	$201,500	$120,900	$66,939	$134,561
Effluent Equalization	$500,000	$300,000	$166,103	$333,897
Storm Water and Bio Solids Holding Ponds	$500,000	$300,000	$166,103	$333,897
Plant Piping	$250,000	$150,000	$83,051	$166,949
Mechanical Room Equipment	$750,000	$450,000	$249,154	$500,846
Lift Station Pump and Piping Assembly	$350,000	$210,000	$116,272	$233,728
16" Force Main	$2,520,000	$1,512,000	$837,158	$1,682,842
16" Sanitary Bedding Material	$216,000	$0	$0	$216,000
Contingencies	$2,578,400	$0	$0	$2,578,400
Enginering	$2,321,000	$0	$0	$2,321,000
Legal, Administation & Testing	$762,000	$0	$0	$762,000
Land	$1,250,000	$1,250,000	$1,250,000	$0
Total Construction Cost	**$19,803,400**	**$8,675,600**	**$5,361,375**	**$14,442,025**

Annual Operation and Maintenance Cost

Description	EUAC			Net Present Worth
Equipment	$33,000			$660,000
Solids Handling	$75,000			$1,500,000
Testing	$15,000			$300,000
Utilities	$60,000			$1,200,000
Labor	$164,000			$3,280,000
Total Annual Cost	**$347,000**			**$6,940,000**
			Total Net Present Worth	**$21,382,025**
			EUAC	**$1,437,208**

TREATMENT ALTERNATIVE 3: REGIONALIZE WITH SIOUX FALLS

The city of Harrisburg has been pumping wastewater to Sioux Falls since 2010. In 2013 Sioux Falls established a Regional Wastewater System. The city has signed a 5-year agreement to continue to pump to Sioux Falls as part of the Regional Wastewater System. The contract is due to expire in 2018. The current pumping charge is $4.51 per 1,000-gallons. The city of Harrisburg can receive a $0.50 per 1,000-gallons credit equalization and $0.61 per 1,000-gallons credit for partial treatment.

Pumping rates are set to increase 6% each year for 2017, 2018 and 2019. It is assumed pumping rates will increase at 3% year thereafter. The equalization credit requires to city to maintain 30 days of continuous storage. The strength parameters to meet the partial treatment credit is 20 mg/L for BOD, 10 mg/L for TKN and 45 mg/L for TSS. It is also recommended the city increase the daily maximum flow of 1,000,3000 gallons and the monthly maximum flow of 15,531,000 gallons in the Joint Power Agreement.

Sioux Falls also implemented a new System Development Charge "SDC". The city of Harrisburg will be required to pay the city of Sioux Falls for every sewer connection. The charge will range from $2,391 for a ¾" water meter to $60,000 for a four-inch water meter. Other Regionalization customers have been pumping wastewater to Sioux Falls for several years and the existing customers were grandfathered in. Unfortunately, the city of Harrisburg will be required to pay for all existing customers. As of August 2016, there are approximately 1,780 sewer customers. The current SDC estimate for these customers is $4,950,000. The city has also indicated that the accumulated fees from the multiplier will be applied towards the SDC. As of August 2016, this credit is approximately $680,000. The calculation for the SDC charge is shown in the following table.

Table 32 System Development Charge

System Development Charges			
Meter Size	**Meter Charge**	**Customers**	**Total Charge**
5/8" to 3/4"	$2,391	1,719	$4,110,129
1"	$5,978	27	$161,406
1 1/2"	$11,954	9	$107,586
2"	$19,127	21	$401,667
3"	$35,863	3	$107,589
4"	$60,000	1	$60,000
		1,780	$4,948,377

The average cost per meter from the table above is $2,780. This value was used to project new customers. The SDCs were assumed to increase at 3% per year once the initial SDCs are paid.

A major benefit of pumping wastewater to Sioux Falls is Harrisburg doesn't need to worry about implementing new treatment processes because Sioux Falls handles the treatment. Treatment requirements will change over time and Sioux Falls will be required to implement these changes at their wastewater treatment plant. Harrisburg can continue to operate just like they have over the last few years.

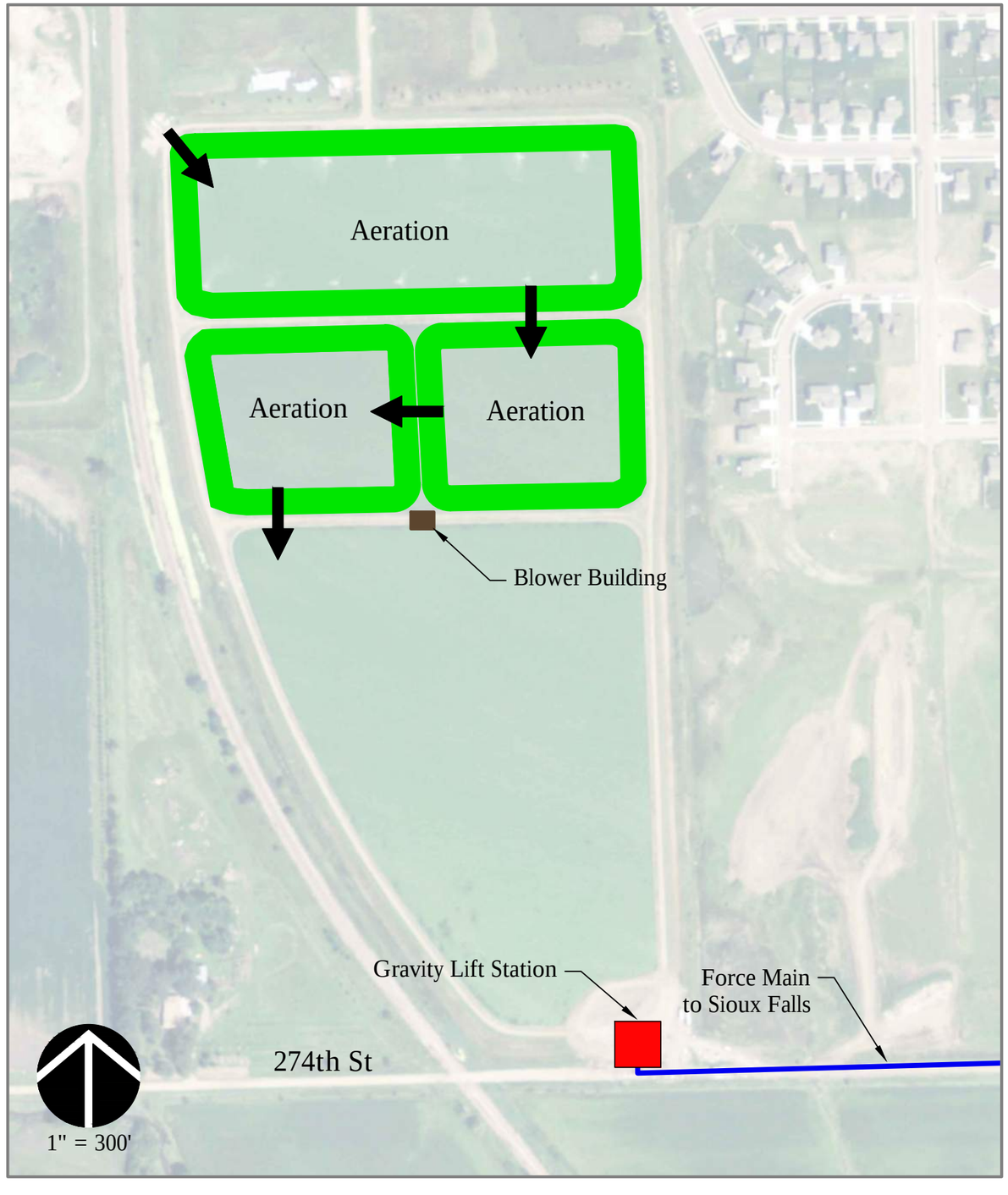
The regionalization agreement also includes a requirement that the city of Harrisburg will have to extend their force main to the new wastewater treatment plant that will be built at Pump Station No. 240. Currently, the force main discharges to a trunk sewer northeast of Sycamore Avenue and 69th Street. The city of Sioux Falls will work with Harrisburg city staff to determine an appropriate timeline for the construction of the force main extension. Sludge removal in cell one is included in this alternative.

TREATMENT ALTERNATIVE 3.1: PARTIAL PUMPING

Based on sampling records at the Gravity Lift Station the city of Harrisburg would only meet treatment credits approximately half the time with the current lagoons. The treatment plant would also become further organically overloaded and will eventually have difficulties managing odor. This alternative includes adding aeration in cells one and two. Aeration will improve the treatment and reduce the odor. Aeration also reduces the setback requirements. This alternative assumes the city will receive the partial treatment credit for 10 years and the equalization credit for the entire duration. The previous and projected annual costs are shown in the table below.

Table 33 Future Treatment Costs

Year	Charge per Thousand Gallons	Charge With Credit	Annual Cost to Pump to Sioux Falls	SDC	Annual Sioux Falls Cost
2013	$ 7.78	$ 5.84	$369,211		$369,211
2014	$ 8.02	$ 6.04	$264,417		$264,417
2015	$ 8.50	$ 6.40	$345,371		$345,371
2016	$ 9.02	$ 6.80	$445,576	$4,948,377	$445,576
2021	$ 5.70	$ 4.30	$380,872	$248,130	$629,002
2026	$ 6.60	$ 4.98	$685,899	$301,888	$987,787
2031	$ 7.66	$ 6.82	$1,026,856	$367,293	$1,394,149
2036	$ 8.88	$ 7.90	$1,516,369	$446,868	$1,963,237



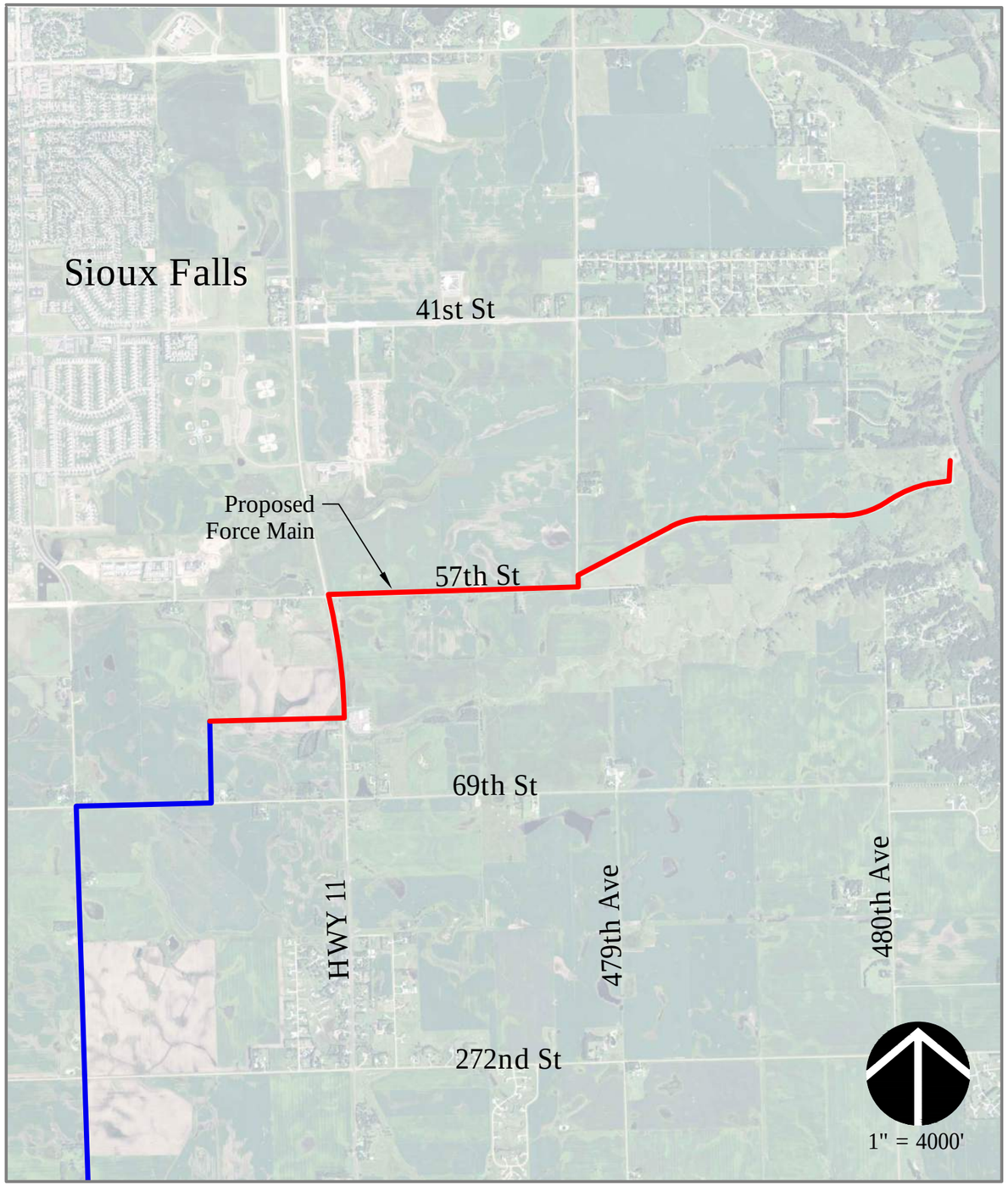


Figure 16 | Treatment Alternative 3.1 Partial Pumping to Sioux Falls

STOCKWELL ENGINEERS

Table 34 Cost Estimate for Treatment Alternative 3.1: Partial Pumping

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$455,000.00	$455,000.00
2	Clearing	1	LS	$10,500.00	$10,500.00
3	Traffic Control	1	LS	$10,500.00	$10,500.00
4	Gravel Surfacing	1,800	TON	$12.75	$22,950.00
5	Unclassified Excavation	122,000	CY	$3.20	$390,400.00
6	Salvage & Place Topsoil	6,000	CY	$5.25	$31,500.00
7	Class B Rip Rap	10,000	TON	$37.00	$370,000.00
8	Type B Drainage Fabric	13,800	SY	$2.65	$36,570.00
9	16" Force Main	21,000	FT	$70.00	$1,470,000.00
10	16" Sanitary Bedding Material	21,000	FT	$6.00	$126,000.00
11	Bar Screen	1	LS	$200,000.00	$200,000.00
12	Bar Screen Building	1	LS	$300,000.00	$300,000.00
13	Blower Building	1	LS	$300,000.00	$300,000.00
14	Control & SCADA System	1	LS	$80,000.00	$80,000.00
15	Electrical Service	1	LS	$27,500.00	$27,500.00
16	Aeration System	1	LS	$530,000.00	$530,000.00
17	Aeration Site Piping	1,500	LF	$32.00	$48,000.00
18	Sludge Removal	15,000	CY	$32.00	$480,000.00
19	Seeding, Fertilizing & Mulching	70,000	SY	$1.60	$112,000.00
				Subtotal	$5,000,920.00
				Contingencies (20%)	$1,001,000.00
				Total Estimated Construction Costs	**$6,001,920.00**
				INITIAL SDC	**$4,268,377.00**
				ENGINEERING	**$901,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$241,000.00**
				TOTAL ESTIMATED PROJECT COST	**$11,413,000.00**

Table 35 EUAC for Treatment Alternative 3.1: Partial Pumping

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$455,000	$0	$0	$455,000
Clearing	$10,500	$0	$0	$10,500
Traffic Control	$10,500	$0	$0	$10,500
Gravel Surfacing	$22,950	$0	$0	$22,950
Unclassified Excavation	$390,400	$0	$0	$390,400
Salvage & Place Topsoil	$31,500	$0	$0	$31,500
Class B Rip Rap	$370,000	$222,000	$122,916	$247,084
Type B Drainage Fabric	$36,570	$0	$0	$36,570
16" Force Main	$1,470,000	$882,000	$488,342	$981,658
16" Sanitary Bedding Material	$126,000	$0	$0	$126,000
Bar Screen	$200,000	$120,000	$66,441	$133,559
Bar Screen Building	$300,000	$180,000	$99,662	$200,338
Blower Building	$300,000	$180,000	$99,662	$200,338
Control & SCADA System	$80,000	$48,000	$26,576	$53,424
Electrical Service	$27,500	$16,500	$9,136	$18,364
Aeration System	$530,000	$318,000	$176,069	$353,931
Aeration Site Piping	$48,000	$28,800	$15,946	$32,054
Sludge Removal	$480,000	$0	$0	$480,000
Seeding, Fertilizing & Mulching	$112,000	$0	$0	$112,000
Remaining Capital Costs	$6,411,377	$0	$0	$6,411,377
Total Construction Cost	**$11,412,297**	**$1,995,300**	**$1,104,749**	**$10,307,548**

Annual Operation and Maintenance Cost Description	EUAC	Net Present Worth
Equipment	$44,000	$880,000
Supplies	$5,000	$100,000
Utilities	$15,000	$300,000
Labor	$17,000	$340,000
Pumping Fees	$653,000	$13,061,000
SDC	$226,000	$4,525,000
Total EUAC	**$960,000**	**$19,206,000**
	Total Net Present Worth	**$23,368,548**
	EUAC	**$1,570,733**

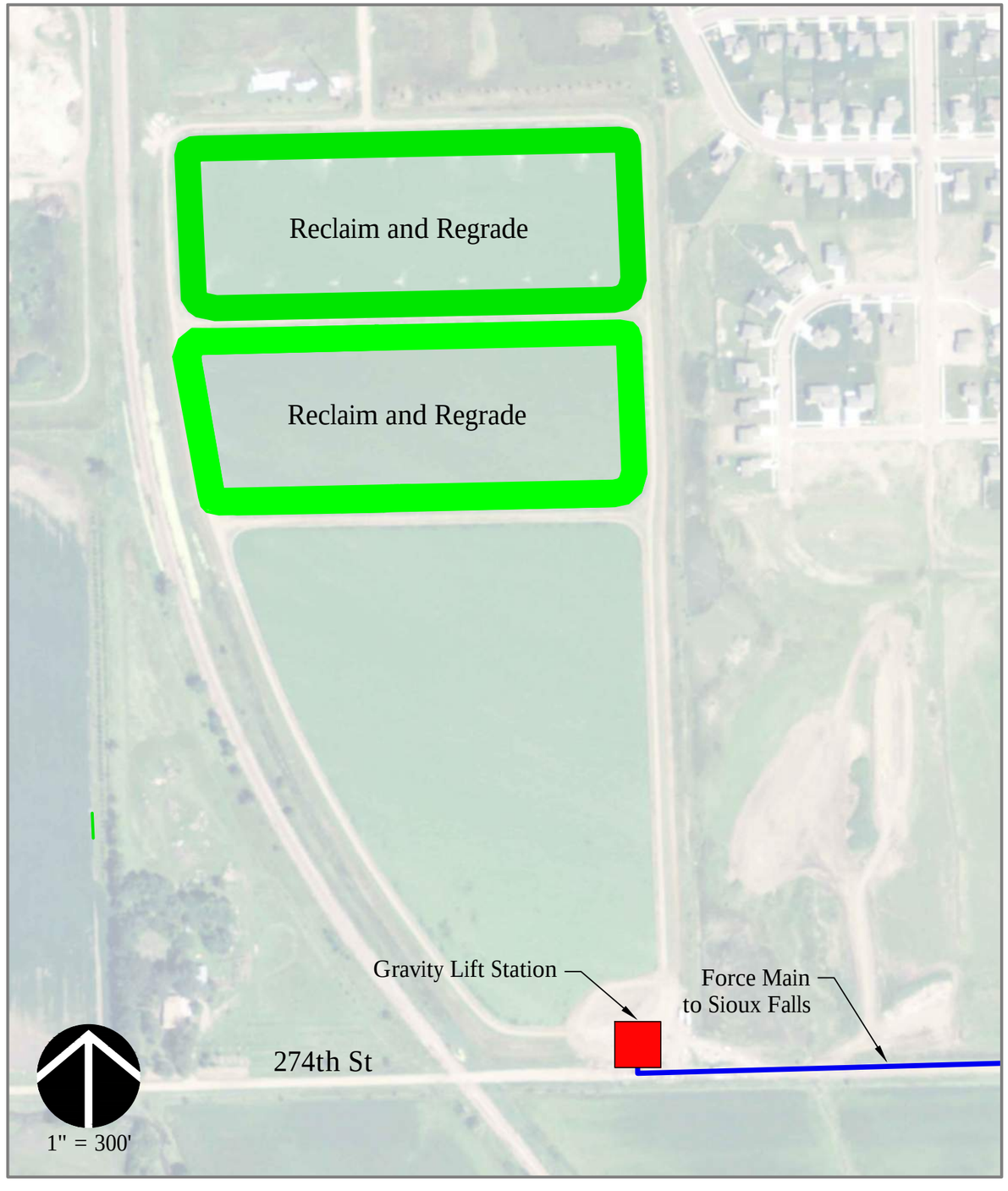
TREATMENT ALTERNATIVE 3.2: COMPLETE PUMPING

This alternative involves abandoning cells 1 and 2 and maintaining cell 3 for emergency storage. All wastewater will be pumped to Sioux Falls for treatment. Therefore, the city will not receive either the treatment or equalization credit. The table below illustrates how the pumping charge will increase over time. Pumping rates are set to increase 6% each year for 2017, 2018 and 2019.

Table 36 Future Treatment Cost

Year	Charge per Thousand Gallons	Charge With Credit	Annual Cost to Pump to Sioux Falls	SDC	Annual Sioux Falls Cost
2013	$ 7.78	$ 5.84	$369,211		$369,211
2014	$ 8.02	$ 6.04	$264,417		$264,417
2015	$ 8.50	$ 6.40	$345,371		$345,371
2016	$ 9.02	$ 6.80	$295,522	$4,948,377	$5,243,899
2021	$ 5.70	$ 5.70	$505,008	$248,130	$753,138
2026	$ 6.60	$ 6.60	$770,560	$301,888	$1,072,449
2031	$ 7.66	$ 7.66	$1,153,602	$367,293	$1,520,895
2036	$ 8.88	$ 8.88	$1,703,536	$446,868	$2,150,404

A major benefit of pumping wastewater to Sioux Falls is Harrisburg doesn't need to worry about implementing new treatment processes because Sioux Falls handles the treatment. Treatment requirements will change over time and Sioux Falls will be required to implement these changes at their wastewater treatment plant. Harrisburg can continue to operate just like they have over the last few years.



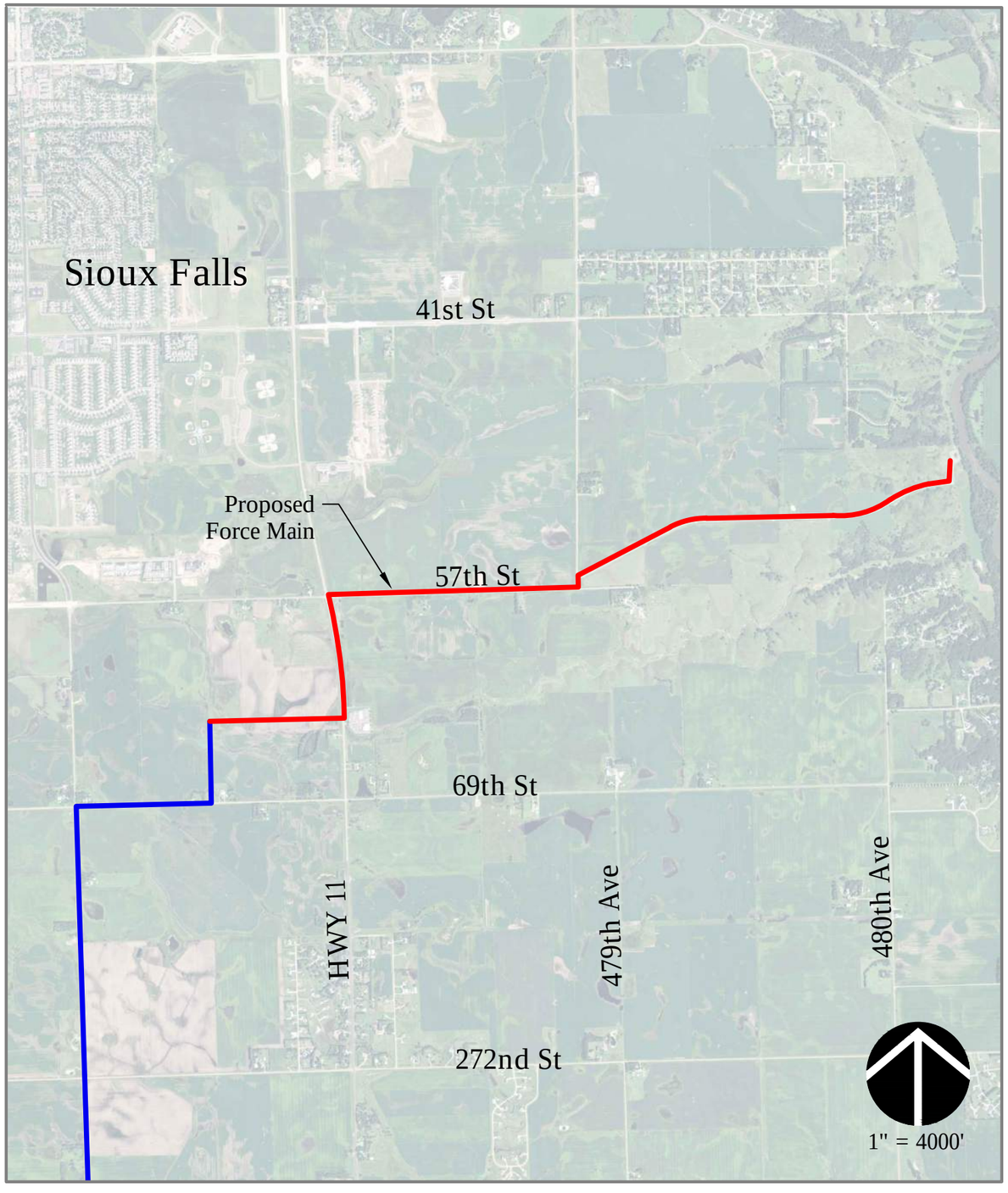


Figure 17 | Treatment Alternative 3.2 Complete Pumping to Sioux Falls

CITY OF HARRISBURG SOUTH DAKOTA

STOCKWELL ENGINEERS

Table 37 Cost Estimate for Treatment Alternative 3.2: Complete Pumping

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$241,000.00	$241,000.00
2	Clearing	1	LS	$10,500.00	$10,500.00
3	Traffic Control	1	LS	$10,500.00	$10,500.00
4	Gravel Surfacing	100	TON	$22.50	$2,250.00
5	Remove Existing Dikes	37,500	CY	$4.25	$159,375.00
6	Salvage & Place Topsoil	6,000	CY	$5.25	$31,500.00
7	16" Force Main	21,000	FT	$70.00	$1,470,000.00
8	16" Sanitary Bedding Material	21,000	FT	$6.00	$126,000.00
9	Sludge Removal	15,000	CY	$32.00	$480,000.00
10	Seeding, Fertilizing & Mulching	70,000	SY	$1.60	$112,000.00
				Subtotal	$2,643,125.00
				Contingencies (20%)	$529,000.00
				Total Estimated Construction Costs	**$3,172,125.00**
				INITIAL SDC	**$ 4,269,000.00**
				ENGINEERING	**$476,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$127,000.00**
				TOTAL ESTIMATED PROJECT COST	**$8,044,125.00**

Table 38 EUAC for Treatment Alternative 3.2: Complete Pumping

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$241,000	$0	$0	$241,000
Clearing	$10,500	$0	$0	$10,500
Traffic Control	$10,500	$0	$0	$10,500
Gravel Surfacing	$2,250	$0	$0	$2,250
Remove Existing Dikes	$159,375	$0	$0	$159,375
Salvage & Place Topsoil	$31,500	$0	$0	$31,500
16" Force Main	$1,470,000	$882,000	$488,342	$981,658
16" Sanitary Bedding Material	$126,000	$0	$0	$126,000
Sludge Removal	$480,000	$0	$0	$480,000
Seeding, Fertilizing & Mulching	$112,000	$0	$0	$112,000
Remaining Capital Costs	$5,401,000	$0	$0	$5,401,000
Total Construction Cost	**$8,044,125**	**$882,000**	**$488,342**	**$7,555,783**

Annual Operation and Maintenance Cost Description	EUAC			Net Present Worth
Equipment	$1,500			$30,000
Supplies	$1,500			$30,000
Utilities	$15,000			$300,000
Labor	$3,000			$60,000
Pumping Fees	$887,500			$17,746,000
SDC	$226,000			$4,525,000
Total EUAC	**$1,134,500**			**$22,691,000**
			Total Net Present Worth	**$30,246,783**
			EUAC	**$1,642,367**

TREATMENT ALTERNATIVE 4: REGIONALIZATION WITH OTHER AREA COMMUNITIES

The city of Harrisburg wanted to investigate the possibility of a regional system as part of this facility plan. However, the potential customers were expanded to include Harrisburg, Tea, Worthing, Canton, Lennox, Lincoln County and Lincoln County Rural Water. The biggest hurdle to overcome with a regional system will be the capital cost for all the customers to build the pipeline from their system to the treatment site. Each community was contacted to determine their interest in a regional system.

The city of Worthing's engineer was contacted about their current treatment system. The current system is designed for 180-day storage and has a capacity of 11,180,000 gallons. The current population is 877 based on the 2010 Census and requires a storage volume of 11,800,000 gallons. The projected population in 2025 is 2,377 and requires a storage volume of 40,600,000 gallons. Worthing's treatment system is currently overloaded and they need to expand. The city of Worthing was interested in exploring the possibility of regionalization.

The city of Canton's engineer was contacted about their current treatment system. The current system is design for 180-day storage and discharges to the Big Sioux River. The current population is 3,057 based on the 2010 Census and requires a storage volume of 72,700,000 gallons. The projected population in 2028 is 4,303 and requires a storage volume of 92,000,000 gallons. The wastewater treatment system was just upgraded in 2011 to include aeration, storage and disinfection. The system has adequate capacity for the 20-year design life and the city doesn't need to regionalize.

The Public Works Director for the city of Lennox was contacted about their current treatment system. The current system is a mechanical treatment plant that discharges to Long Creek. The current population is 2,111 based on the 2010 Census. The mechanical plant was built in 2009 with an average annual capacity of 305,000 gpd and a peak monthly capacity of 670,000 gpd. The system has adequate capacity for the 20-year design life and the city doesn't need to regionalize.

The city of Tea's engineer was contacted about their current treatment system. The current system is designed for 180-day storage and discharges to Ninemile Creek. The system includes an aeration cell, future aeration cell and four facultative ponds. The current population is 3,806 based on the 2010 Census and requires a storage volume of 63,000,000 gallons. The projected population in 2035 is 11,642 and requires a storage volume of 360,000,000 gallons. The system is currently overloaded hydraulically and will exceed the organic loading within five years. The engineer has investigated six

alternatives for the treatment system but regionalization with communities other than Sioux Falls was not investigated.

Paul Aslesen with Lincoln County Planning and Zoning was contacted about a potential regional system. Paul has been in a couple meetings over the last year with the communities in Lincoln County. Discussions have been very brief and nothing has really developed. Stockwell assumes that Lincoln County would not build the system and one of the communities in the county would take the lead. The county administration would assist with the permitting process because a treatment system outside city limits would be a conditional use. This would be a hurdle to overcome because local residents are typically against wastewater treatment systems being in their backyard.

Robin Dykstra with Lincoln County Rural Water System was contacted about a potential regional wastewater system. In 2005 they investigated the potential to build a regional system for Tea and Harrisburg. They would also stub a line for rural residential areas like Baker's Crossing. The proposed system would install a gravity sewer along Ninemile Creek. Then a lift station would be installed before Lake Alvin and the wastewater would be pumped to a treatment site along the Big Sioux River. The study only evaluated three different treatment options and didn't include the cost to get the wastewater form the community to the treatment site. The cost of collection lines is significant due to the separation between the communities and the treatment site. The idea of building this regional system in 2005 never really gained any traction and therefore it was never built.

In 2016, Banner Associates, Inc. completed a regionalization study between Harrisburg, Tea, Worthing and local county residents. The study evaluated two discharge locations, regionalizing with Sioux Falls and the recommended alternative from each community's respective facility plan. The two sites included the Big Sioux River east of Harrisburg and Beaver Creek north of Worthing. The study concluded that the most cost effective option is for Harrisburg and Tea to regionalize and construct a facility that discharges into the Big Sioux River. Worthing should pursue its own treatment system. The major contributing factor against regionalization were the high capital costs of building the necessary sewer lines. It is difficult to provide a just cost comparison between Harrisburg's individual treatment alternatives and regionalizing with Tea. This is due to differences in assumptions in wastewater flows, population growth and other cost factors between this facility plan and Banner's study.

There are definite costs savings in building extra treatment capacity to serve regional communities; however, they are largely offset by the cost to convey the wastewater over long distances. Furthermore, a governing body and bylaws would need to be drafted to

ensure the plant is properly operated and each party is fairly treated. System Development Charges or a similar method should be implemented so each party pays for their fair share of the system's capacity. Unfortunately, Harrisburg must soon make a decision on their treatment alternatives before their current agreement with Sioux Falls expires in 2018. There needs to be adequate time allotted for the design and construction of a new treatment facility. A governing body would need to be formed before a facility can be properly designed to ensure there is adequate capacity. The plant could be upgraded at a later date for regionalization.

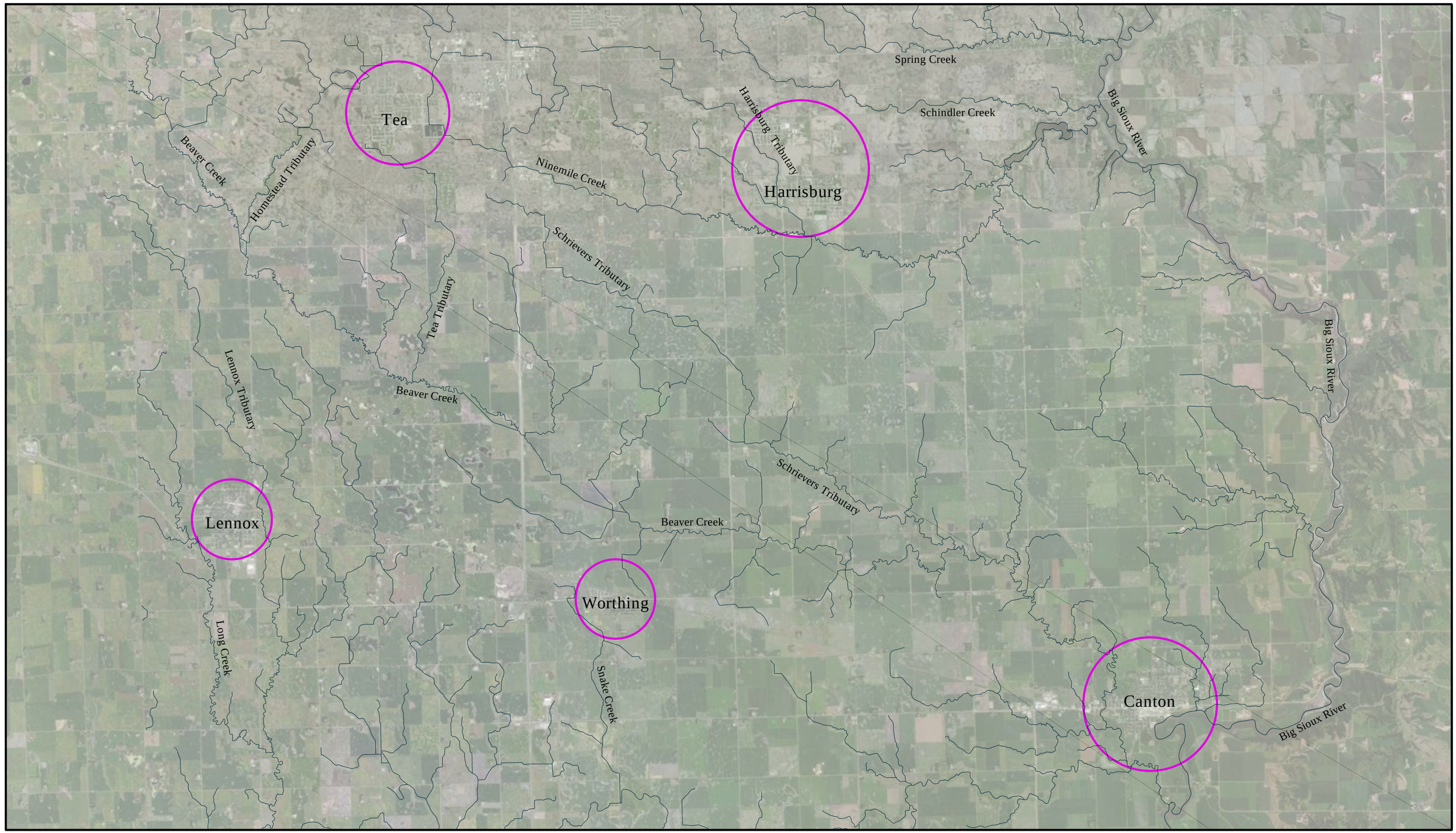


Figure 18 ι Potential Regional Customers

1" = 8,000'

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TREATMENT ALTERNATIVE 5: SUBMERGED ATTACHED GROWTH REACTOR (SAGR)

This alternative utilizes an aerated lagoon followed by an aerated rock media to provide enhanced ammonia removal. The rock media is clean gravel with diffusers buried underneath the media. A mulch layer is placed on top of the gravel to for insulation. Due to the insulation and aeration, ammonia removal is achieved despite cold winter temperatures. The lagoons can be configured to allow for alternative aerobic and anaerobic zones to provide better nutrient removal. The water will be aerated by fine bubble diffusers. Fine bubble aeration is a more efficient aeration method which will reduce utility costs and provide for better odor control; however, they require more maintenance compared to other alternatives.

The SAGR system is very popular in cold northern climates with close to 100 installations in Canada. There are handful of installations in the Midwestern United States. There is a system operating at Sylvan Lake in the Black Hills. The closest installation is located at Hull, IA.

The chief benefit of the SAGR system is it will require the least amount of labor compared to any of the mechanical options. This is due to the lack of sludge handling. Sludge will remain within the system and will eventually need to be dredged out of the system. The SAGR system also has fewer operational controls so it will be more difficult to adjust the system for better energy efficiency. Furthermore, the system has diffusers buried underneath the rock media. While the expected lifespan of the diffuser pipe is a several decades, the only way to repair a premature failure will be to remove the media.

This alternative will require pumping approximately 5 miles to a site located along the Big Sioux River. It is anticipated that the existing Gravity Lift Station could be modified to serve this purpose. A bar screen will be required at the head of the plant. Wastewater treated by the SAGR will be disinfected by ultraviolet radiation. Following disinfection, the water will be aerated to maintain a dissolved oxygen concentration of DO of 5 mg/L.

A building will enclose the bar screen. The bar screen building will be equipped with an odor control scrubber. An office with the system controls and a small lab is included as well as a building for the blower equipment.

Annual costs include maintenance and replacement of process equipment, lab testing fees, and labor. The cost estimates for this alternative are shown in the following tables.

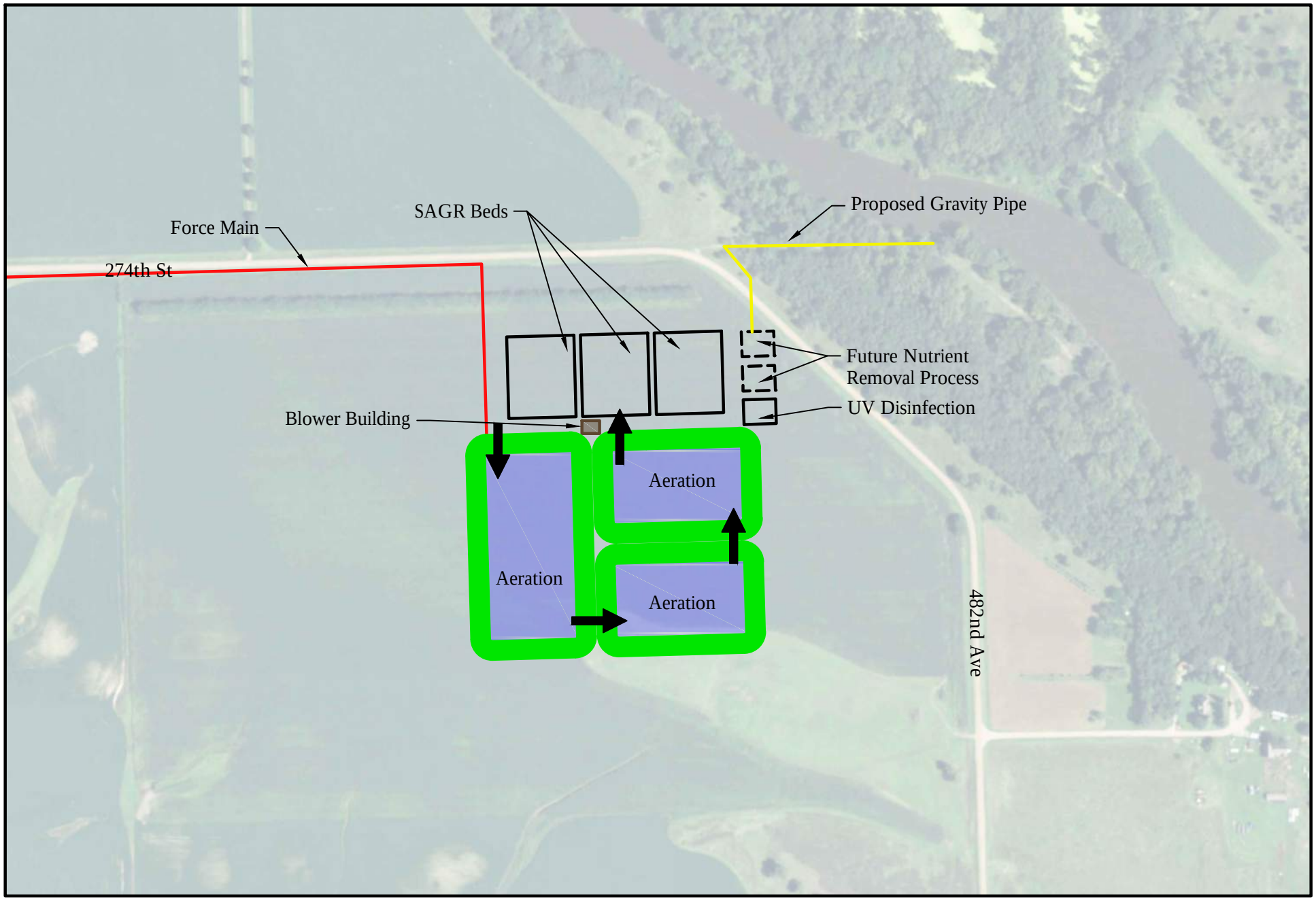

Figure 19l Treatment Alternative 5 SAGR

1" = 400'

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Table 39 Capital Cost for Treatment Alternative 5: SAGR

Item No.	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS	$1,208,000.00	$1,208,000.00
2	Seeding, Fertilizing & Mulching	93,000	SY	$1.65	$153,450.00
3	Gravel Surfacing	1,800	TON	$12.25	$22,050.00
4	Remove Existing Dikes	47,800	CY	$4.25	$203,150.00
5	Unclassified Excavation	205,000	CY	$3.25	$666,250.00
5	Salvage & Place Topsoil	48,000	CY	$3.25	$156,000.00
6	Class B Rip Rap	20,400	TON	$37.00	$754,800.00
7	Type B Drainage Fabric	28,200	SY	$2.75	$77,550.00
8	16" Force Main	36,000	FT	$70.00	$2,520,000.00
9	16" Sanitary Bedding Material	36,000	FT	$6.00	$216,000.00
10	Bar Screen	1	LS	$200,000.00	$200,000.00
11	Blower Building	1	EA	$300,000.00	$300,000.00
12	Bar Screen Building	1	Ea	$300,000.00	$300,000.00
13	Lab & Office Building	1	EA	$300,000.00	$300,000.00
14	Control & SCADA System	1	LS	$80,000.00	$80,000.00
15	Power to Site	1	LS	$100,000.00	$100,000.00
16	Aeration & SAGR System	1	LS	$3,000,000.00	$3,000,000.00
17	Sludge Removal	15,000	CY	$32.00	$480,000.00
18	Clean Graded Rock	78,800	TON	$21.00	$1,654,800.00
19	Mulch Insulation	6,900	CY	$10.50	$72,450.00
20	Geotextile Fabric	37,600	SY	$1.65	$62,040.00
21	HDPE Liner	183,100	SF	$1.30	$238,030.00
22	Aerated Rock Bed Walls	2,800	LF	$17.00	$47,600.00
23	Piping, Fittings, Valves	1	LS	$143,000.00	$143,000.00
24	Aeration Site Piping	1,900	LF	$32.00	$60,800.00
25	Discharge Piping	1,200	LF	$53.00	$63,600.00
26	UV Disinfection System	1	LS	$200,000.00	$200,000.00
				Subtotal	$13,279,570.00
				Contingencies (20%)	$2,655,914.00
				Total Estimated Construction Costs	**$15,935,484.00**
				ENGINEERING	**$2,391,000.00**
				LAND PURCHASE (50 AC.)	**$1,250,000.00**
				LEGAL, ADMINISTRATION & TESTING (4%)	**$638,000.00**
				TOTAL ESTIMATED PROJECT COST	**$20,215,000.00**

Table 40 EUAC for Treatment Alternative 5: SAGR

Capital Cost Description	Price	Salvage Value	Present Worth of Salvage Value	Net Present Worth
Mobilization	$1,208,000	$0	$0	$1,208,000
Seeding, Fertilizing & Mulching	$153,450	$0	$0	$153,450
Gravel Surfacing	$22,050	$0	$0	$22,050
Remove Existing Dikes	$203,150	$0	$0	$203,150
Unclassified Excavation	$666,250	$1	$1	$666,249
Salvage & Place Topsoil	$156,000	$0	$0	$156,000
Class B Rip Rap	$754,800	$452,880	$250,749	$504,051
Type B Drainage Fabric	$77,550	$0	$0	$77,550
16" Force Main	$2,520,000	$1,512,000	$837,158	$1,682,842
16" Sanitary Bedding Material	$216,000	$0	$0	$216,000
Bar Screen	$200,000	$120,000	$66,441	$133,559
Blower Building	$300,000	$180,000	$99,662	$200,338
Bar Screen Building	$300,000	$180,000	$99,662	$200,338
Lab & Office Building	$300,000	$180,000	$99,662	$200,338
Control & SCADA System	$80,000	$48,000	$26,576	$53,424
Power to Site	$100,000	$60,000	$33,221	$66,779
Aeration & SAGR System	$3,000,000	$1,800,000	$996,616	$2,003,384
Sludge Removal	$480,000	$0	$0	$480,000
Clean Graded Rock	$1,654,800	$992,880	$549,734	$1,105,066
Mulch Insulation	$72,450	$0	$0	$72,450
Geotextile Fabric	$62,040	$0	$0	$62,040
HDPE Liner	$238,030	$142,818	$79,075	$158,955
Aerated Rock Bed Walls	$47,600	$0	$0	$47,600
Piping, Fittings, Valves	$143,000	$85,800	$47,505	$95,495
Aeration Site Piping	$60,800	$36,480	$20,198	$40,602
Discharge Piping	$63,600	$38,160	$21,128	$42,472
UV Disinfection System	$200,000	$120,000	$66,441	$133,559
Remaining Capital Costs	$4,279,000	$0	$0	$4,279,000
Total Construction Cost	**$14,562,825**	**$4,591,455**	**$2,542,177**	**$14,264,742**

Annual Operation and Maintenance Cost Description	Annual Cost	Net Present Worth
Equipment	$53,000	$1,060,000
Utilities	$60,000	$1,200,000
Testing	$15,000	$300,000
Labor	$110,000	$2,200,000
Total Annual Cost	**$238,000**	**$4,760,000**
	Total Net Present Worth	**$19,024,742**
	EUAC	**$1,278,762**

IMPLEMENTATION OF ALTERNATIVES

WASTEWATER COLLECTION

Collection Alternative 1 “Do Nothing” is not recommended. This alternative will not address any of the deficiencies of the system. The city needs to continue to improve the collection system and reduce the amount of I&I.

Collection Alternative 2 “Replace VCP with PVC” should be implemented by the city. However, due to the large capital cost the city should break the project into multiple phases and budget for the first phase. The city needs to clean and televise the existing clay lines to determine the condition of the existing lines and the type of rehabilitation method that can be used. This information will also help determine the phasing for this alternative. These improvements will reduce the amount of I&I and correct the deficiencies that will be discovered during televising. This alternative will also replace streets that are beyond their useful life and can be combined with water line and storm sewer improvements.

Collection Alternative 3 “Lift Station Improvements” should be implemented by the city. This alternative will reduce the frequency that the pumps clog. It will also help monitor the lift stations remotely and warn the city of a problem before it becomes an emergency. The scope of these improvements can be reduced if Collection Alternative 4 is pursued because several lift stations will be eliminated.

Collection Alternative 4 “Basin Improvements” should be implemented by the city. The identified basins will allow the city to eliminate half of the lift stations. The long term plan will eliminate most of the remaining lift stations. Eliminating lift stations will simplify the collection system and therefore reduce operation and maintenance costs. The city should use this plan as a guide for new development.

WASTEWATER TREATMENT

The EUAC for each system proposed needs to be compared in order to determine the most cost effective long term solution for the wastewater treatment system. The following table compares the capital cost and EUAC for all of the treatment alternatives.

Table 37 Comparison of Water Treatment Alternatives

Treatment Alternatives	Capital Cost	Equivalent Uniform Annual Cost
2.1 Sequencing Batch Reactor	$19,220,000	$1,433,940
2.2 Oxidation Ditch	$20,762,000	$1,597,669
2.3 Aero-Mod SEQUOX®	$19,804,000	$1,437,208
3.1 Partial Pumping to city of Sioux Falls	$11,413,000	$1,570,733
3.2 Complete Pumping to city of Sioux Falls	$8,044,125	$1,642,367
5. Submerged Attach Growth Reactor	$20,215,000	$1,278,762

Treatment alternative 5 has the lowest EUAC; however, due to land requirements, future sludge removal, more difficulty in meeting future permit requirements and potential major maintenance issues, this alternative is not recommended. The mechanical plant options all have very similar equivalent uniform annual costs. The decision between the best alternative must include judgement on the individual characteristics of each the options. SBR's are more vulnerable to system upsets which can lead to compliance issues. An oxidation ditch and Aero-Mod's plant are more stable processes. The SEQUOX® process is the simplest of the three mechanical options; however, because there are no existing plants within South Dakota, State regulators may require a vetting process before the plant can be built. City employees have been encouraged to attend presentations and site visits with equipment suppliers to help them form their own opinions.

The Sioux Falls Regionalization alternatives have low capital costs but significantly higher annual costs. The benefit of these options is the simplicity. The city does not have to worry about future expansions to their wastewater system for the foreseeable future. System Development Charges allow the city to pay for capacity as they need it so future growth will not be limited due to insufficient sewer capacity. The city of Sioux Falls will also assume the risk for compliance issues. However, the pumping costs and capacity charges for regionalization are expensive. Sewer rates will need to rise at a much higher rate to cover the cost of regionalization. Furthermore, Harrisburg will be in a poor financial position to handle future wastewater treatment requirements if either party decides to end the Joint Power Agreement. A mechanical treatment facility will provide

the city the infrastructure and experience necessary to pursue future permit requirements.

It is our recommendation that the city of Harrisburg construct an oxidation ditch to meet their future treatment needs. An oxidation ditch will more easily meet the anticipated strict permit requirements when compared to the SBR. There are also several oxidation ditches present in South Dakota and thus will not require a vetting process like Aero-mod's SEQUOX®.

IMPACT ON OWNER'S BUDGET

There are several alternatives the City needs to implement. Due to budget constraints and priority, the following alternatives should be implemented immediately. The following table shows the combined recommendations in order of priority.

Table 41 Recommended Improvements

Alternative	Capital Cost
Treatment Alternative 2.2: Oxidation Ditch	$20,762,000
Collection Alternative 4: Phase 1	$2,173,000
Collection Alternative 4: Phase 2	$389,000
Collection Alternative 4: Phase 3	$593,000
Collection Alternative 4: Phase 4	$526,000
Collection Alternative 4: Phase 5	$789,000
Combined Project Cost	**$23,917,000**

In 2015, Stockwell Engineers has completed an in depth rate study for the city. Stockwell developed a rate model to determine the appropriate rates needed to fund the various alternatives. The rate model considered annual revenues and expenditures as well as the water usage for each customer in the city. The model can predict revenues based on increases in the base minimum monthly fee or the volume usage rate. Stockwell has proposed a 3-year rate increase to fund the recommended improvements. The council has voted to enact two of the three rate increases so far. In early 2016, the sewer rates were raised to a $18.28 minimum monthly rate and a usage charge of $7.92 per 1,000 gallons. The city council recently approved a sewer rate increase to a base minimum fee of $20.96 and a usage charge of $9.08 per 1,000 gallons effective January 1st, 2017. The recommended rates by the year 2018 are a $24.12 minimum monthly rate and usage charge of $10.45 per 1,000 gallons. The recommended rates will be adjusted in response to the actual capital costs, loans, grants, design modifications, inflation, etc.

ENVIRONMENTAL EVALUATION

Funding agencies will require an environmental review to be completed for the proposed improvements before funding can be obtained. Stockwell Engineers will request comments on the proposed improvements prior to construction from various agencies. These comment letters will be provided to the funding agencies.

VIEWS OF THE PUBLIC AND CONCERNED INTEREST GROUPS

The city of Harrisburg will be required by the funding agencies to hold a public hearing to discuss the proposed improvements. Typically, these meetings are held during council meetings. The city will work with Stockwell Engineers and the South Eastern Council of Governments to schedule this meeting and keep minutes of the meeting. These minutes will be provided to the funding agencies.

JUSTIFICATION AND DESCRIPTION OF SELECTED PLAN

This Comprehensive Study identified several deficiencies with the sewer system that do not meet current SD Design Criteria Standards. The alternatives will bring the system into compliance and provide an improved system to adequately handle growth.

DESIGN OF SELECTED PLAN

The selected alternatives will be designed by a licensed engineer. All construction plans and specifications will be reviewed and approved by the SD DENR. All State bid laws will be followed for the bidding process.

STAGED CONSTRUCTION

Typically, communities do not see the growth rate that Harrisburg has experienced. Staging the construction is recommended to so the facility can more appropriately adapt to the actual population growth. If the facility is constructed to handle the projected 20-year flows, the facility would be significantly larger than what is needed for several years after construction. Staging the construction should be considered during the design phase. Adequate land will be acquired for the full build out but there is the potential that some of the improvements could be implemented later when wastewater flows require it.

LAND ACQUISITION

Land acquisition, temporary construction easements and permanent easements will be necessary to complete the improvements. Land acquisition costs have been included in the estimates. All easements will be obtained before construction is started. For the recommended treatment alternative, the city will pursue annexing any land purchased. This will avoid the conditional use permitting process, but may require purchasing additional land adjacent to the current city limits. For the treatment alternatives, the city and Stockwell Engineers have identified potential parcels and are undergoing negotiations with property owners. The locations are shown in the following figure. The city currently plans to purchase the entirety of either Site 1 or 2. It is anticipated that the agreement will be conditional based on satisfactory cultural and environmental site reviews. The city owns the land for Site 3. Site 3 is considered the fallback option if land negotiations are unsuccessful. This site is not a preferred location due to proximity to nearby development and its position within the basin would require additional lift stations in the future. The Sites are included in the follow figure. A summary of the potential site locations based on setback requirements for the entire area is included in Appendix F.

IMPLEMENTATION SCHEDULE

The city should implement the recommended improvements as soon as possible. Funding applications should be submitted as soon as possible. The earliest construction could begin is 2017.

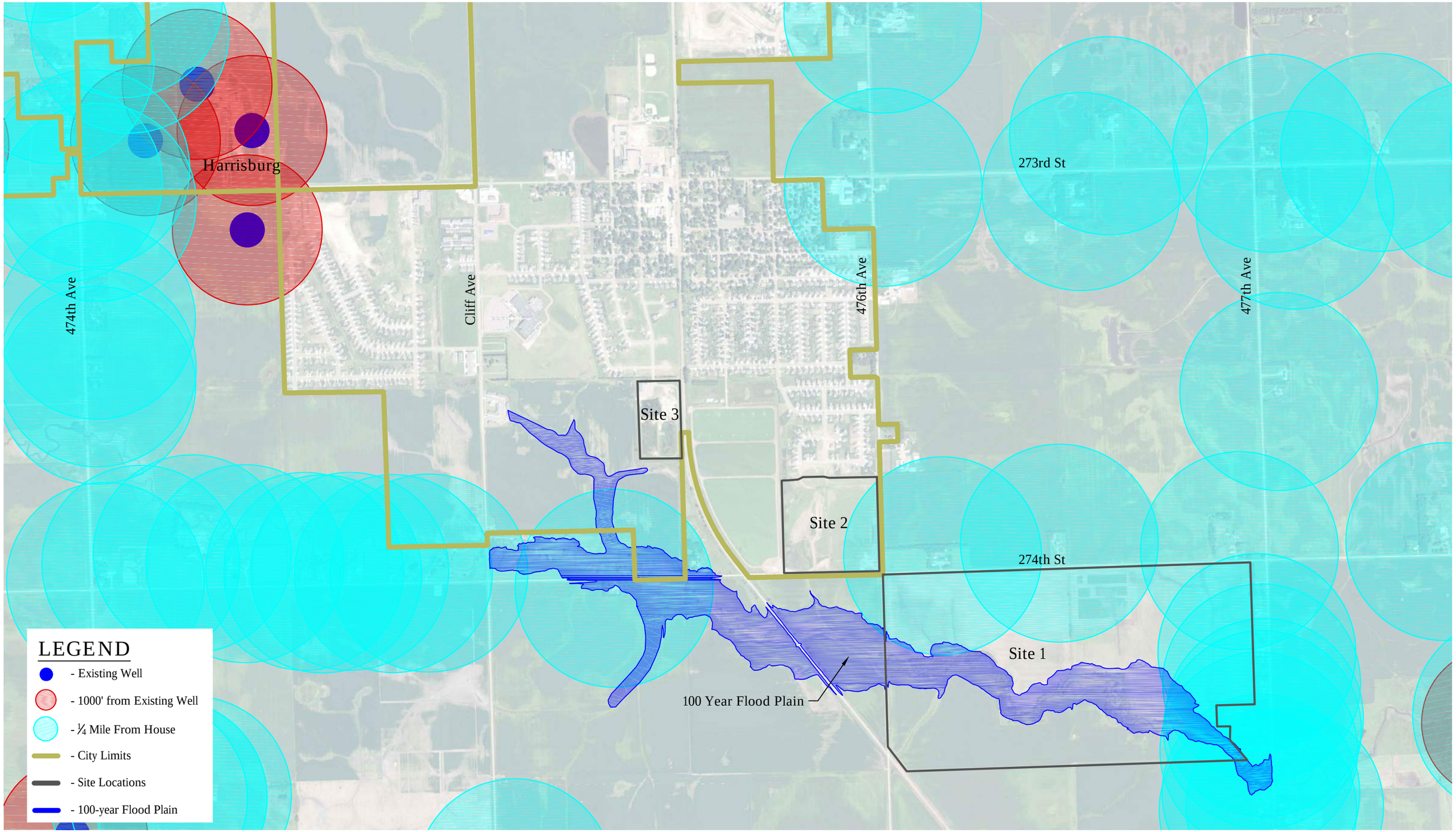

Figure 20 | Proposed Wastewater Treatment Sites

1" = 3000'

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REFERENCES

National Weather Service Forecast Office, Sioux Falls, SD, 10 January 2014 <http://www.weather.gov/climate/index.php?wfo=fsd>.

South Dakota Department of Environment and Natural Resources, (March 1991). Recommended Design Criteria Manual Wastewater Collection and Treatment Facilities, Pierre, SD: Division of Environmental Services.

Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, (2004). Recommended Standards for Wastewater Facilities, Health Research Inc., Albany NY.

Appendix A
Surface Water Discharge Permit

Permit No.: SDG823728

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

General Surface Water Discharge Permit
For Minor Non-Discharging Domestic Wastewater Treatment Facilities

In compliance with the provisions of the South Dakota Water Pollution Control Act and the Administrative Rules of South Dakota (ARSD), Article 74:52,

City of Harrisburg

is directed by the South Dakota Department of Environment and Natural Resources to have **no discharge** from its facility located in the Southwest 1/4 of Section 1, T99N, R50W, in Lincoln County, in accordance with the requirements as contained in the provisions of this General Permit. The permittee shall comply with all conditions of this General Permit. Any permit noncompliance constitutes a violation of the South Dakota Water Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

This general permit shall become effective October 1, 2011.

General permit coverage for the City of Harrisburg shall become effective October 1, 2011.

This general permit shall expire at midnight, September 30, 2016.

Signed this 24th day of August, 2011,

Authorized Permitting Official

Steven M. Pirner
Secretary
Department of Environment and Natural Resources

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COVER SHEET – Issuance and Expiration Dates

APPENDICES

1.0 DEFINITIONS

"ARSD" means the Administrative Rules of South Dakota.

"BOD_5" means Five-Day Biochemical Oxygen Demand. BOD is a measurement of the amount of oxygen utilized by the decomposition of organic material, over a specified time period (usually 5 days) in a sample.

A **"Bypass"** is the intentional diversion of waste streams from any portion of a treatment facility. Bypasses do not include releases from the sanitary sewer collection system (see "**Sanitary Sewer Overflow**) or emergency releases from the treatment facility (see "**Emergency Discharge**").

"Composite Samples" shall be flow proportioned. The composite sample shall contain at least four samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

1. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

2. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

3. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

4. Continuous collection of sample, with sample collection rate proportional to flow rate.

"Daily Maximum (Daily Max.)" is the maximum value allowable in any single sample or instantaneous measurement.

An **"Emergency Discharge"** is a discharge from the lower end of the treatment or containment system through a release structure or over or through retention dikes. An emergency discharge is distinguished from a sanitary sewer overflow in that a sanitary sewer overflow discharges wastewater prior to reaching the treatment or containment system.

"EPA" or **"US EPA"** means the United States Environmental Protection Agency.

A **"Grab Sample**,**"** for monitoring requirements, is a single "dip and take" sample collected at a representative point in the discharge stream.

An **"Industrial User"** is a non-domestic source of pollutants discharged into a publicly owned treatment works.

An **"Instantaneous Measurement**,**"** for monitoring requirements, is a single reading, observation, or measurement.

"pH" is the measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.

A **"Publicly-Owned Treatment Works"** or **"POTW"** is any device or system used in the treatment, including recycling and reclamation, of municipal sewage or industrial waste of a liquid nature that is owned by the state or a municipality. This term includes sewers, pipes, or other conveyances only if they convey wastewater to a publicly owned treatment works providing treatment.

A **"Sanitary Sewer Overflow"** or **"SSO"** is the intentional or unintentional discharge of untreated sewage from the sanitary sewer collection system, including sewer lines, manholes, lifts stations, etc.

"SDDENR" means the South Dakota Department of Environment and Natural Resources.

"Secretary" means the Secretary of the South Dakota Department of Environment and Natural Resources, or authorized representative.

"Severe Property Damage" is substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

"Sewage Sludge" is any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes but is not limited to solids removed during primary, secondary or advanced wastewater treatment, scum, septage, portable toilet pumpings, and sewage sludge products. Sewage sludge does not include grit, screenings, or ash generated during the incineration of sewage sludge.

A **"Significant Industrial User"** is defined as an industrial user discharging to a publicly-owned treatment works (POTW) that satisfies any of the following:

1. Is subject to Categorical Pretreatment Standards under ARSD Chapter 74:52:10 (a.b.r. 40 CFR 403.6 and 40 CFR chapter I, subchapter N);

2. Discharge an average of 25,000 gallons per day or more of process wastewater to the publicly owned treatment works (excluding sanitary, non-contact cooling water, and boiler blowdown wastewater);

3. Contributes a process wastewater that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the publicly owned treatment works; or,

4. Is designated as such by the Secretary on the basis that the Industrial User has a reasonable potential for adversely affecting the publicly owned treatment works or for violating any pretreatment standard or requirement.

"TSS" means Total Suspended Solids. TSS is a measure of the filterable solids present in a sample.

"**Upset**" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2.0 PERMIT COVERAGE

2.1 Request for Coverage under General Permit

1. This general permit is potentially applicable to any minor, non-discharging wastewater treatment facilities within South Dakota that are treating primarily domestic wastewater. In order for a facility to be eligible for coverage under this general permit, the owner, operator, and/or authorized agent of any facility wishing to obtain coverage under this general permit must complete and submit a Notice of Intent form, located in **Appendix A** of this general permit. Applications for individual Surface Water Discharge permits may also serve as a Notice of Intent form and be accepted by the Secretary, provided they contain the information and signatures required to properly grant or deny general permit coverage. The original form must be sent to the following address:

   South Dakota Department of Environment and Natural Resources
   Surface Water Quality Program
   PMB 2020
   523 East Capitol
   Pierre, South Dakota 57501-3182

   Telephone: (605) 773-3351 or 1-800-GET-DENR (1-800-438-3367)

2. Coverage provided under this general permit is limited to those activities specifically designated in the permittee's Notice of Intent and as approved in the letter from the Secretary granting general permit coverage. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from the permittee first learning of an unauthorized discharge could subject the permittee to penalties as provided under the South Dakota Water Pollution Control Act.

2.2 Permit Transfers

1. Coverage under this general permit may be transferred to a new permittee if:

   a. The current permittee notifies the Secretary at least 30 days in advance of the proposed transfer date;

   b. The notice includes a written agreement between the current and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

   c. The new permittee submits as Certification of Applicant form certifying the new permittee is qualified to perform the obligations of a permit holder in accordance with South Dakota Codified Law 1-40-27.

2. The Secretary will notify the existing and new permittee of his or her intent to transfer, modify, or revoke and reissue the coverage under the general permit based on the information received and other permit information.

2.3 Reopener Provisions

This general permit may be reopened and modified (following proper administrative procedures) to include appropriate effluent limits (and compliance schedules, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving waters applicable to this general permit or a specific permittee are modified in such a manner as to require different conditions than contained in this general permit;

2. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted that calls for different conditions than contained in this general permit;

3. Effluent Guidelines: Effluent limit guidelines are promulgated or revised for point sources covered by this general permit;

4. Total Maximum Daily Load: Additional controls in the permit are necessary to implement a total maximum daily load approved by the Secretary and/or EPA;

5. Noncompliance: The discharger is a significant contributor of pollution to waters of the state, presents a health hazard, or is in noncompliance with the conditions of the permit;

6. Pretreatment Program: The permittee is required to develop and implement a pretreatment program, regulating indirect discharges of wastewater into its publicly owned treatment works; or

7. Other Changes: Other conditions or standards change so that the permittee no longer qualifies for this permit, such as the permittee being designated as a major discharger, changes in necessary influent or effluent pollutant monitoring, additional industrial pretreatment requirements become applicable to the permittee, or other items.

2.4 Duty to Reapply

If the permittee wishes to continue an activity regulated by this general permit after its expiration date, the permittee must apply for and obtain coverage under a new general permit. The Notice of Intent must be submitted at least 180 days before the expiration date of this general permit. If the permittee wishes to apply for an individual permit, the application must also be submitted at least 180 days before the expiration date of this general permit. Periodically during the term of this general permit and at the time of reissuance, the permittee may be requested to reaffirm its eligibility for coverage under this general permit.

2.5 Continuation of the Expired General Permit

1. An expired general permit continues in full force and effect until a new general permit is issued. Any permittee with coverage under the general permit at the time of expiration will continue to have coverage until a new general permit is issued.

2. If the permittee wishes to continue an activity regulated by this general permit after its expiration date, the permittee must submit a Notice of Intent at least 180 days before the expiration date of the general permit.

2.6 Requiring an Individual Permit

1. The Secretary may require any permittee covered under this general permit to apply for and obtain an individual permit if any of the following occur:

   a. Noncompliance: The discharger is a significant contributor of pollution to waters of the state, presents a health hazard, or is in noncompliance with the conditions of the general permit;

   b. Compliance Schedule: The Secretary determines a compliance schedule is necessary to ensure compliance with the federal Clean Water Act, the Administrative Rules of South Dakota, or the South Dakota Surface Water Quality Standards; or

   c. Other Changes: Other conditions or standards change so that the permittee no longer qualifies for this general permit, such as the permittee being designated as a major discharger, changes in necessary influent or effluent pollutant monitoring, additional industrial pretreatment requirements become applicable to the permittee, or other items that would necessitate an individual permit.

2. The Secretary will notify the permittee in writing that an application for an individual permit is required. When an individual permit is issued to a permittee otherwise covered under this general permit, the permittee's general permit coverage shall be automatically terminated upon the effective date of the individual permit.

2.7 Property Rights

1. The Secretary's issuance of this permit, adoption of design criteria, and approval of plans and specifications, does not convey any property rights of any sort, any exclusive privileges, any authorization to damage, injure or use any private property, any authority to invade personal rights, any authority to violate federal, state or local laws or regulations, or any taking, condemnation or use of eminent domain against any property owned by third parties.

2. The State does not warrant that the permittee's compliance with this permit, design criteria, approved plans and specifications, and operation under this permit, will not cause damage, injury or use of private property, an invasion of personal rights, or violation of federal, state or local laws or regulations. The permittee is solely and severably liable for all damage, injury or use of private property,

invasion of personal rights, infringement of federal, state or local laws and regulations, or taking or condemnation of property owned by third parties, that may result from actions taken under the permit.

2.8 Permit Actions

The Secretary may modify, revoke and reissue, or terminate coverage under this general permit for cause, including failure to comply with any provision of the general permit or any condition imposed by the Secretary upon granting coverage under the general permit. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

2.9 Severability

The provisions of this general permit are severable, and if any provision of this general permit, or the application of any provision of this general permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this general permit, shall not be affected thereby.

3.0 EFFLUENT LIMITS

3.1 Emergency Discharges

1. Discharges of wastewater are prohibited and the Secretary may take enforcement action against a permittee, unless the discharge or sanitary sewer overflow is an emergency and meets each of the following conditions:

   a. The emergency discharge or sanitary sewer overflow was unavoidable to prevent loss of life, threat to public health, personal injury, or severe property damage;

   b. There were no feasible alternatives to the emergency discharge or sanitary sewer overflow, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment or proper operation and maintenance to prevent an emergency release that occurred during normal periods of equipment downtime or preventive maintenance; and,

   c. The permittee submitted notices as required under **Section 4.5 – Discharge Reporting Requirements**.

2. If an emergency discharge, sanitary sewer overflow, or other discharge occurs or is expected to occur, the permittee shall take the appropriate measures to minimize the discharge of pollutants. Such measures may include the closing of facilities that contribute wastewater to the sewer system until the discharge is terminated.

3. Any emergency discharge or sanitary sewer overflow that meets the conditions of paragraph 1 above shall be reported as soon as possible (but in no case less than 24 hours after becoming aware of the circumstances) in accordance with the provisions in **Section 4.5 – Discharge Reporting Requirements**. The report shall be made to the Secretary at (605) 773-3351 during regular business hours (8:00 a.m. – 5:00 p.m. Central Time) or to the South Dakota Emergency Management at (605) 773-3231 any other time.

3.2 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and treatment and control systems that are installed or used by the permittee to achieve compliance with the conditions of this general permit or other conditions required by the Secretary upon granting coverage under this general permit.

1. This may include the maintenance of freeboard levels of lagoons or holding ponds.

2. Proper operation and maintenance may also include adequate laboratory controls and appropriate quality assurance procedures. This provision requires the

operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the general permit.

3.3 Inspection Requirements

The permittee shall inspect its wastewater treatment facility, outfall structures, and lift stations regularly as outlined below. The inspections shall be conducted to determine if a discharge is occurring, has occurred since the previous inspection, and/or if a discharge is likely to occur before the next inspection. In addition, the inspection shall be performed to determine if proper operation and maintenance procedures are being undertaken at the wastewater treatment facility and lift stations. The permittee shall maintain a notebook recording information obtained during the inspection.

1. The permittee shall inspect the facility and discharge location on at least a **monthly** basis. During any emergency discharge, the facility and discharge location shall be inspected on a **daily** basis. At a minimum, the inspection notebook shall include the following items for the facility inspections:

    a. Date and time of the inspection;

    b. Name of the inspector(s);

    c. The facility's discharge status;

    d. The measured amount of freeboard or water depth in each pond and wetland;

    e. Identification of operational problems and/or maintenance problems;

    f. Recommendations, as appropriate, to remedy identified problems;

    g. A brief description of any actions taken with regard to problems identified;

    h. Other information, as appropriate.

2. The permittee shall inspect each lift station on at least a **weekly** basis. During any sanitary sewer overflow, the lift stations shall be inspected on a **daily** basis. At a minimum, the inspection notebook shall include the following for each lift station inspection:

    a. Date and time of the inspection;

    b. Name of the inspector(s);

    c. Whether a sanitary sewer overflow is occurring or has occurred;

    d. Identification of operational problems and/or maintenance problems;

    e. Cleaning of screenings, if applicable;

    f. Testing of alarms, if applicable;

    g. Hour meter readings;

    h. Recommendations, as appropriate, to remedy identified problems;

    i. A brief description of any actions taken with regard to problems identified;

j. Other information, as appropriate.

3. The permittee shall maintain the notebook(s) for the facility and each lift station in accordance with proper record-keeping procedures and shall make the notebook(s) available for inspection, upon request, by the Secretary or the U.S. EPA.

3.4 Capacity, Management, Operation, and Maintenance Program

In the event that the Secretary notifies the permittee of the need to develop a capacity, management, operation, and maintenance program in order to address, reduce, or eliminate the frequency of sanitary sewer overflows or emergency discharges, the permittee shall develop and submit the program to the Secretary. The program shall, at a minimum, address the following areas:

1. Sewer management program: This program includes personnel organizational structure, training, communication information systems, noncompliance notification program, and other appropriate items;

2. Collection system operation program: This program includes operational budgeting, monitoring, safety, emergency preparedness and response, pump stations, operational recordkeeping, and other appropriate items;

3. Collection system maintenance program: This program includes maintenance budgeting, planned and unplanned maintenance; sewer cleaning; maintenance recordkeeping, parts and equipment inventory, and other appropriate items; and

4. Sewer system capacity evaluation: The capacity evaluation includes the following:

   a. System inventory (sewer locations, sizes, slopes, materials, age, condition, etc.);

   b. Identification of problem areas (overflows, surcharged lines, basement backups, etc.);

   c. Capacity evaluation of problem areas (utilizing flow and precipitation records, infiltration and inflow investigation, manhole and pipe inspections and televising, smoke and dye testing, and building inspections); and

   d. Sewer rehabilitation recommendations.

5. Timelines: This program shall identify timelines and specific dates for completing any identified changes or improvements.

6. SDDENR Approval: The permittee shall submit the program to SDDENR for approval. Upon approval, the permittee shall implement the program.

4.0 MONITORING, RECORD KEEPING, & REPORTING REQUIREMENTS

4.1 Self-Monitoring Requirements

Promptly upon discovery of an emergency discharge, bypass, sanitary sewer overflow, or other discharge, the discharge shall be monitored as shown below. Knowingly discharging or failing to report a discharge within a reasonable time from the permittee first learning of a discharge could subject the permittee to penalties as provided under the South Dakota Water Pollution Control Act. The permittee shall report the monitoring results in accordance with **Section 4.4 – Reporting of Monitoring Results.**

Effluent Characteristic	Frequency	Reporting Value	Sample Type [1]
Total Flow, million gallons	Each Discharge [2]	Event Total	Calculated
Duration of Discharge, days	Each Discharge [2]	Event Total	Calculated
Flow Rate, million gallons per day	Daily [3]	Actual Value	Instantaneous
pH, standard units	Daily [3,4]	Actual Value	Instantaneous [5]
Total Residual Chlorine, mg/L *(only if chlorinating)*	Daily [3,]	Actual Value	Instantaneous
Water Temperature, °C	Daily [3, 4]	Actual Value	Instantaneous [6]
Total Suspended Solids (TSS), mg/L	Daily [3]	Actual Value	Grab
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L	Daily [3]	Actual Value	Grab
Ammonia as N, mg/L	Daily [3, 4]	Actual Value	Grab
Escherichia Coli, no./l00 mL	Daily [3]	Actual Value	Grab
Total Coliform, no./l00 mL	Daily [3]	Actual Value	Grab

[1] See Definitions.

[2] The permittee shall report the date and time of the start and termination of each discharge, along with the total number of gallons discharged during the entire discharge event.

[3] The permittee shall take a minimum of one sample per day during any emergency release, bypass, sanitary sewer overflow, or other discharge unless SDDENR authorizes an alternative sampling schedule.

[4] The pH and temperature of the effluent shall be determined when ammonia samples are collected.

[5] pH shall be taken within 15 minutes of sample collection with a pH meter. The pH meter must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH meter must read to 0.01 standard units and be equipped with temperature compensation adjustment. Readings shall be reported to the nearest 0.1 standard units.

[6] The water temperature of the effluent shall be taken as a field measurement. Measurement shall be made with a mercury-filled, or dial type thermometer, or a thermistor. Readings shall be reported to the nearest whole degree Celsius.

4.2 Monitoring Procedures

1. Effluent samples taken in compliance with the monitoring requirements established under this general permit shall be collected prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

2. Monitoring shall be conducted according to test procedures approved under ARSD §74:52:03:06, (a.b.r. 40 CFR, Part 136), unless other test procedures have been specified in this general permit or approved by the Secretary.

4.3 Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this general permit, using test procedures approved under ARSD §74:52:03:06 (a.b.r. 40 CFR 136) or as specified in this general permit, the results of this monitoring shall be used in determining compliance with this general permit.

4.4 Reporting of Monitoring Results

1. Monitoring results shall be reported on a photocopy of the Discharge Monitoring Summary Form located in **Appendix B** of this general permit, postmarked no later than the 28th day of the month following the discharge. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with **Section 4.7 – Signatory Requirements** and submitted to the Secretary at the following address:

   South Dakota Department of Environment and Natural Resources
   Surface Water Quality Program
   PMB 2020
   523 East Capitol
   Pierre, South Dakota 57501-3182

2. In accordance with SDCL 1-40-39, the Secretary is authorized to accept a document with an electronic signature. SDDENR shall provide for the authenticity of each electronic signature by adhering to any standards established by the South Dakota Bureau of Information and Telecommunications pursuant to SDCL 53-12-47 and 53-12-50 or any other standards established by rules promulgated pursuant to SDCL Chapter 1-26.

4.5 Discharge Reporting Requirements

1. The permittee shall report any emergency related to this general permit or permitted facility that may endanger health or the environment as soon as possible, but no later than 24 hours after becoming aware of the circumstances. The report shall be made to the Secretary at (605) 773-3351 during regular business hours (8:00 a.m. – 5:00 p.m. Central Time), or to South Dakota Emergency Management at (605) 773-3231 any other time.

2. Emergency discharges, sanitary sewer overflows, and other unauthorized releases that do not meet the conditions of Paragraph 1 above shall be reported to the

Secretary within 24 hours from the time the permittee becomes aware of the circumstances as follows:

a. During regular business hours (8:00 a.m. - 5:00 p.m. Central Time), the report shall be made at (605) 773-3351.

b. Outside of normal business hours, the permittee shall leave a message at 1-800-GET-DENR (1-800-438-3367).

3. Anticipated overflows shall be reported to the Secretary in advance, if possible.

4. The Secretary may require the permittee to notify the general public or downstream users that could be or will be impacted by the discharge.

a. In making the decision to require public notification, the Secretary will consider the potential impacts as a result of the discharge, the downstream beneficial uses (such as drinking water or recreation), and the potential for public contact.

b. If required by the Secretary, the permittee shall notify the public and/or downstream users as soon as possible, but in no case more than 24 hours after the discharge begins.

5. In addition to verbal notification, the permittee shall submit to the Secretary a written report of the circumstances above.

a. Reports shall be submitted in accordance with **Section 4.4 – Reporting of Monitoring Results**.

b. The written submission shall contain:

i. A description of the event and its cause;
ii. The period of the event, including exact dates and times;
iii. Where the wastewater was discharged;
iv. The estimated time the event is expected to continue if it has not been corrected;
v. Any adverse effects, such as fish kills;
vi. If public notification was required, describe how the public was notified of the discharge; and
vii. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the event.

c. The written report shall be submitted on the Discharge Monitoring Summary Form in **Appendix B** by the 28th day of the following month. The Secretary may require a written report to be submitted sooner or may require additional information if the discharge has the potential to impact human health or the environment.

4.6 Bypass Reporting

1. The permittee may allow anticipated bypasses to occur that do not result in a discharge and will not result in a violation of the effluent limits, but only if for essential maintenance to ensure efficient operation.

2. The permittee shall submit notice of a bypass as follows:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, the permittee shall submit notice to the Secretary at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass to the Secretary at (605) 773-3351 by the first workday (8:00 a.m. - 5:00 p.m. Central Time) following the day the permittee became aware of the circumstances.

4.7 Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or names of the individuals who performed the sampling or measurements;

3. The dates analyses were performed;

4. The time analyses were initiated;

5. The initials or names of individuals who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and,

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

4.8 Signatory Requirements

1. All applications, reports or information submitted to the Secretary shall be signed and certified.

2. All Notice of Intent forms shall be signed by either a principal executive officer or ranking elected official.

3. All reports required by the general permit and other information requested by the Secretary shall be signed by a principal executive officer or ranking elected official, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Secretary; and,

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of superintendent or equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may be either a named individual or any individual occupying a named position.)

4. If an authorization under paragraph 3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization shall be submitted to the Secretary.

5. Any person signing a document under this section shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

4.9 Retention of Records

1. The permittee shall retain records of all monitoring information and other data required by the general permit. This includes:

a. Data collected on site;

b. Copies of all Discharge Monitoring Summary Forms;

c. A copy of the general permit and the letter granting coverage under this general permit;

d. All calibration and maintenance records;

e. All original strip chart recordings for continuous monitoring instrumentation;

f. Copies of all other reports required by this general permit; and

g. Records of all data used to complete the application for this general permit.

2. This information must be retained for a period of at least **three years** from the date of the sample, measurement, report, or application. This period may be extended by request of the Secretary at any time.

4.10 Availability of Reports

Except for data determined to be confidential under ARSD §74:52:02:17, all reports prepared in accordance with the terms of this general permit shall be available for public inspection at the office of SDDENR. The name and address of the permittee, permit applications, notices of intent, permits, and effluent data shall not be considered confidential.

4.11 Duty to Provide Information

1. The permittee shall furnish to the Secretary, within a reasonable time, any information the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this general permit, or to determine compliance with this general permit. The permittee shall also furnish to the Secretary, upon request, copies of records required to be kept by this general permit.

2. If the permittee becomes aware that it failed to submit any relevant facts in a Notice of Intent form, or submitted incorrect information in a Notice of Intent form or any report to the Secretary, it shall promptly submit such facts or information.

4.12 Planned Changes

The permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutant discharged, or could result in noncompliance with permit conditions. This notification applies to pollutants that are not subject to effluent limits or other notification requirements in the general permit.

5.0 COMPLIANCE REQUIREMENTS

5.1 Duty to Comply

The permittee shall comply with all conditions of this general permit. Any permit noncompliance constitutes a violation of the South Dakota Water Pollution Control Act and the federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. A violation of a condition of the general permit is subject to SDCL § 34A-2-75.

5.2 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use in violation of this general permit that has a reasonable likelihood of adversely affecting human health or the environment.

5.3 Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this general permit.

5.4 Upset Conditions

1. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limits if the requirements of Paragraph 3 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limits).

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

    a. An upset occurred and that the permittee can identify the cause(s) of the upset;

    b. The permitted facility was at the time being properly operated;

    c. The permittee submitted notice of the upset in accordance with **Section 4.5 – Discharge Reporting Requirements**; and

    d. The permittee complied with mitigation measures required under **Section 5.2 – Duty to Mitigate**.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

5.5 Penalties for Violations of Permit Conditions

Any person who violates a permit condition is in violation of the provisions of SDCL 34A-2-36, and is subject to penalties under SDCL 34A-2-75. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state. Except as provided in Section 5.4, nothing in this general permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

5.6 Penalties for Tampering

Any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this general permit is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state.

5.7 Penalties for Falsification

1. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this general permit, including monitoring reports or reports of compliance or noncompliance, is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75.

2. Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75.

3. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state.

5.8 Oil and Hazardous Substance Liability

Nothing in this general permit shall be construed to preclude the Secretary from taking any legal action or relieve the permittee from any responsibilities, liabilities, or penalties the permittee is or may be subject under section 311 of the federal Clean Water Act.

6.0 INDUSTRIAL WASTES (for Publicly Owned Treatment Works Only)

6.1 Industrial Users

1. During the life of the permit, the permittee shall conduct an industrial waste survey to identify the character and volume of pollutants from each significant industrial user, as well as documenting production data.

2. The permittee shall notify the Secretary of any new introductions by new or existing industrial users or any substantial change in pollutants from any industrial user. Such notice must contain the information described in paragraph 1 above and be submitted to the Secretary no later than 60 days following the introduction or change.

3. The permittee shall provide adequate notice to the Secretary of any substantial change in the volume or character of pollutants being introduced into the POTW by any other industrial users. For the purposes of this section, adequate notice shall include information on:

    a. The quality and quantity of effluent to be introduced into the POTW; and,

    b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

6.2 Prohibited Discharges

1. Under no circumstances shall the permittee allow the introduction of the following pollutants to the publicly owned treatment works from any source of nondomestic discharge:

    a. Pollutants that create a fire or explosion hazard in the publicly owned treatment works, including but not limited to wastestreams with a closed cup flashpoint of less than 60 degrees Celsius (140 degrees Fahrenheit) using the test methods specified in ARSD §74:28:22:01 (a.b.r. 40 CFR 261.21);

    b. Pollutants that will cause corrosive structural damage to the publicly owned treatment works, but in no case discharges with pH lower than 5.0 standard units nor greater than 12.5 standard units;

    c. Solid or viscous pollutants in amounts that will cause obstruction to the flow in the POTW, or other interference with the operation of the POTW;

    d. Any pollutant, including oxygen-demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW;

    e. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees Celsius (104 degrees Fahrenheit);

f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

g. Pollutants that result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

h. Any trucked or hauled pollutants, except at discharge points designated by the POTW;

i. Any pollutant that causes pass through or interference; and,

j. In addition to the general limits expressed above, more specific pretreatment limits have been promulgated for specific industrial categories under Section 307 of the federal Clean Water Act (see ARSD, Chapter 74:52:10, a.b.r. 40 CFR Subchapter N, Parts 405 through 471, for specific information).

2. The Secretary retains the right to take legal action against the industrial user and/or the permittee, in those cases where a permit violation has occurred because of the failure of an industrial user to discharge at an acceptable level.

7.0 ADDITIONAL PERMIT CONDITIONS

7.1 Inspection and Entry

The permittee shall allow the Secretary or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this general permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this general permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this general permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the South Dakota Water Pollution Control Act, any substances or parameters at any location.

7.2 Removed Substances

1. Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard in accordance with applicable requirements of SDCL 34A-2, -6, and -11.

2. If sludge disposal is necessary, the permittee shall submit to the Secretary a sludge disposal plan for review and approval prior to the removal and disposal of sludge. The permittee shall not dispose of sludge without the Secretary's approval.

APPENDIX A

Notice of Intent to Receive Coverage Under the

General Surface Water Discharge Permit for

Minor Non-Discharging Publicly Owned Treatment Works

APPENDIX B

Discharge Monitoring Summary Form

DISCHARGE MONITORING SUMMARY FORM

This form is to be used to summarize effluent monitoring information for discharges from facilities covered under the General Surface Water Discharge Permit for Minor Non-Discharging Domestic Wastewater Treatment Facilities.

Address:			
Facility Contact:		**Phone:**	

Description of Event

(Attach additional sheets if necessary)

Date and Time the discharge began or was discovered:	
Date and Time the discharge was stopped:	

Describe the events resulting in the discharge and its cause(s):

Where was the wastewater discharged:

Describe the steps taken or planned to reduce, eliminate, and prevent reoccurrence:

Time and Date 24-Hour Notice of Noncompliance given to SDDENR:	
Describe any adverse effects, such as fish kills, etc.:	
Duration of discharge (include dates and times):	
Total flow, million gallons:	

ANALYTICAL RESULTS

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
Date and time of sample							
Flow Rate, million gallons per day							
pH, standard units							
Water Temperature, °C							
Total Residual Chlorine, mg/L (if chlorinating)							
Escherichia Coli, no./l00 mL							
Total Coliform, no./l00 mL							
Ammonia as N, mg/L							
Total Suspended Solids (TSS), mg/L							
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L							

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print): _____ Title: _____

Signature: _____ Date: _____

Appendix B
Surface Water Discharge Compliance Inspection

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

PMB 2020

JOE FOSS BUILDING

523 EAST CAPITOL AVENUE

PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

July 17, 2015

The Honorable Reed Ramstad
Mayor, City of Harrisburg
PO Box 26
Harrisburg, SD 57032

RE: Surface Water Discharge Compliance Inspection (SWD Permit Number: SDG823728)

Dear Mayor Ramstad:

The South Dakota Department of Environment and Natural Resources conducted a Surface Water Discharge Compliance Inspection of the city's wastewater treatment facility on June 17, 2015. I appreciate Dan Fink and Toby Huizenga's time and cooperation in supplying the requested information.

I have attached an inspection summary and a copy of the inspection report. Please pay special attention to the Inspection Summary tables and implement the required corrective actions as soon as possible. All corrective actions taken will be reviewed during our next inspection at your facility.

Thank you for your continued efforts to protect the environment and natural resources of South Dakota. Please review this report for accuracy, and respond within thirty days with any needed corrections. If you have any questions about this letter or the inspection reports, please contact me at (605) 362-3543.

Sincerely,

Jill M. Riedel, E.I.T.
Engineer II
Surface Water Quality Program

Enclosures

cc: Dan Fink, City of Harrisburg, Public Works Director
SWD File - Pierre

INSPECTION SUMMARY

Facility: City of Harrisburg WWTF

SWD Permit: SDG823728

Inspection Date: June 17, 2015

The following comments and corrective actions are ***recommended*** and are items that will improve the operation of your facility.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
There is some weed growth in the riprap on the stabilization ponds.	Continue efforts to eliminate weed growth to prevent dike damage from erosion. This vegetation also tends to inhibit the air action on the ponds, which in turn inhibits the biological action necessary to treat the wastes and keep odors to a minimum.
We would like to encourage you to give Mr. Fink, Mr. Huizenga, or another representative of Harrisburg the opportunity to attend the wastewater training courses sponsored by the state to upgrade skills and share knowledge concerning the operation and maintenance of municipal wastewater systems.	For more information as to dates and locations of upcoming courses in your area, contact South Dakota Association of Rural Water Systems, under contract with DENR, at 5009 W. 12th Street, Suite 5, Sioux Falls, SD 57106. Phone: (605) 336-7219 Website: http://www.sdarws.com.

NO DISCHARGE INSPECTION CHECKLIST

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

I. GENERAL INFORMATION

Name	City of Harrisburg		
Location	203 S Prairie		
SWD Permit No.	SDG823728		
Contact Person / Title	Dan Fink, WW Operator	**Phone Number**	(605) 767-0075
Responsible Party/Title	Reed Ramstad, Mayor	**Phone Number**	(605) 743-5872

Persons present during the inspection:

Name	Title / Phone Number	Affiliation
Dan Fink	Public Works Director / (605) 201-6570	City of Harrisburg
Toby Huizenga	Wastewater Supervisor / (605) 231-6168	City of Harrisburg
Jill Riedel	Engineer II / (605) 773-3351	SDDENR

Mailing Address	PO Box 26 Harrisburg, SD 57032		
Inspection Date	June 17, 2015	**Last Inspection Date**	**Onsite:** August 15, 2011
Entrance Time	10:15 AM	**Exit Time**	11:45 AM
Permit Effective Date	October 01, 2011	**Permit Expiration Date**	September 30, 2016

Type of "No Discharge" Facility:

☒ Stabilization Ponds Only ☐ Other: _____

Design Population Equivalent	4,890	**Average Design Flow**	250,000 gpd
Present Population Served	4,089 (2010 census)		
Date Facility Began Operation	1999	**Dates of Facility Upgrades**	2008 – floating aerators 2010 – lift station to pump WW to Sioux Falls
Industries Served by Facility (list names of industries)	None		

Facility Description:

The city of Harrisburg operates a wastewater treatment facility located about 1/2 mile south of the city in Lincoln county. The wastewater treatment facility serves a population of 958 (2000 Census), with no known industrial contributions. Wastewater flows by gravity to the three-cell stabilization pond system, which was designed for total retention. The wastewater enters cell one (10.21 acres) and flows in series to cell two

(10.18 acres) and cell three (19.60 acres). The city constructed this system in 1999. The collection system consists of 20,000 linear feet of sanitary sewer and a collection system pumping station. In 2010, the city constructed a lift station and piping to pump excess wastewater to the city of Sioux Falls.

Does the facility match the above description? Yes

Is a permit modification needed? No

II. PERSONNEL AND BUDGET REVIEW

Number of Personnel: **3**

Certification	Class I	Class II	Class III	Class IV
Treatment	X, X			
Collection	X	X, X		
Stabilization Pond	X, X			
State certification requirements (if required)	Class I Wastewater Treatment Class II Wastewater Collection			

Budget: FY 2014

Yearly expenditures for the facility. **$ 666,417.23**

Residential Sewer Use Fee: **$15.91 flat rate +$3.83/1,000 gallons water used; +$3.06/1,000 gallons water used for surcharges**

Yearly revenue for the facility. **$ 760,424.95**

Commercial Sewer Use Fee: **Same as Residential**

Describe any wastewater projects planned during the next three years. **Installing a recirculating pipe from Pond 3 to Pond 1, relining some manholes around town**

Describe measures taken to raise funds for the project(s). **Budget and savings**

Comments*:* No additional comments

III. PERMIT VERIFICATION

	Yes	No	N/A
1. A current copy of the permit is on site.	X		
2. Operator is aware of permit conditions (especially unauthorized release procedures).	X		
3. O&M manuals for the treatment facility and the lift stations are available.	X		
4. Facility is as described in permit. If no, what is different?	X		
5. Facility, address and contact information is correct in the SWD Database? (Including: Fees, SSO's, PTD's, Inspections, PDF's, Flooding Reports, etc.)	X		
6. Facility, address and contact and permit information is correct in the ICIS Database? (Including: Monitoring and Limits, Inspections, Construction Schedules, etc.)	X		
7. Have there been any new, different, or increased loadings to the WWTF since the last inspection? If yes, describe.	X		

Comments*:* No additional comments

IV. RECORDKEEPING AND REPORTING EVALUATION

	Yes	No	N/A
1. An inspection notebook is maintained for the treatment facility.	X		
2. A notebook is maintained for lift station inspections, and/or hour meter readings?	X		
3. Discharge Monitoring Reports have been submitted as required (for land application facilities only).			X
4. Information is maintained for the required 3-year period.	X		

If overflows occurred from this facility, the information from questions 5-7 should be entered in the SSO Database.

	Yes	No	N/A
5. Facility has experienced an emergency release, such as overflows (pond or sanitary sewer) or bypasses (internal, collection system, total). If yes, describe the release (dates, total volumes, receiving waters, etc.): ***On May 27, 2013 heavy rains caused a detention pond overflow and sewer line break that went into the storm sewer***	X		
6. DENR was notified of any emergency releases (treated and/or untreated). If no, why not? ***Yes***	X		
7. Samples were collected for all emergency releases/bypasses. If yes, list sampling results in the following table. If no, why not? ***Yes***	X		

Comments*:* No additional comments

V. FACILITY PROCEDURES REVIEW

		Yes	No	N/A
1.	A water balance has been done for the facility. Describe the results.		X	
2.	Written emergency procedures are established (in the event of a major storm event, a chemical release into the sewer system, a sewer main break, etc.)	X		
3.	Modifications to the facility have been made since the last inspection. Describe the modifications:		X	
4.	Facility can be bypassed (internal, collection system, total). Describe bypass procedures:		X	
5.	Sludge has been disposed of at this facility. If yes, describe disposal procedures:		X	
6.	Hauled waste (septage) or industrial waste is accepted at this facility. If yes, list contact information:		X	
7.	Chemicals or enzymes are added to the wastewater. If yes, list products:		X	
8.	The facility has experienced problems with industrial or hauled wastes. If yes, explain:			X
9.	Does the facility have sampling kits in case of a discharge or SSO?	X		

Comments*:* The facility does pump wastewater from the ponds to the city of Sioux Falls and has sent 33MG to Sioux Falls so far in 2015.

VI. COMPLIANCE SCHEDULE STATUS REVIEW

		Yes	No	N/A
1.	Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of enforcement action.		X	
2.	List milestones that remain in the schedule:			
3.	Has facility has missed milestone dates? If yes explain:			X
4.	Will the facility meet or do they plan to meet final compliance schedule date?			X

Comments: Facility is not subject to a compliance schedule.

VII. COLLECTION SYSTEM REVIEW

Piping and Manholes

Type of Collection System: [ ] Combined [X] Separate [ ]

[ ] Other (explain): _____

		Yes
1.	A routine sewer-cleaning schedule is maintained. If yes, what is the schedule and what type of equipment is used? **As-needed, city owns a jetter truck**	X
2.	Sewer backups into basements occur during high flows. If yes, explain:	
3.	The community has a sump pump ordinance. If yes, how is it enforced? **Checks sump pump hook up when water meter readings are collected**	X
4.	Testing for inflow/infiltration sources has been conducted since the last inspection. If yes, describe testing and corrective actions taken to fix problems: **Stockwell Engineering smoke tested last year and didn't find any issues with the entire town**	X
5.	Miles of collection system, if known: **20,000 ft (from Facility Description)**	

Comments: No additional comments

Lift Stations

Item	Comments
Number of lift stations	**6 area, 1 to Sioux Falls**
Type of lift stations (wetwell/drywell or submersible)	**Wetwell/drywell for all**
List areas served	**See below**
Inspection frequency	**Weekly onsite, continuous Omnisite monitoring**
Condition of lift stations	**Good, clean**
Alternative power source available for each lift station	**Yes, backup generators onsite for each and are tested every Tuesday**
Wetwell baskets (quantity)	**Basket in Coyote only**
Cleaning schedule	**As-needed**
Bar screens (quantity)	**None**
Cleaning schedule	**NA**
Screening disposal method	**Lagoons**
Dehumidifier working properly (if applicable)	**Yes**
Ventilation system working properly (if applicable)	**Yes**
Type of alarm system	**Visible light and Omnisite has alarms for high/low wetwell, pump fail, generator running, etc.**
Alarm system working properly	**Yes**
Lift station have hour meters	**Yes**
Hour meters are logged in an inspection notebook	**Yes logged through Omnisite**
Pump ratings	**Various, main is 150 HP**
Pump calibration schedule	**Yearly or as needed. Last calibration was March 13, 2014. See attached**

Comments*:* The Neilson, Honeysuckle, and Main lift stations were physically inspected during the inspection and notes are below. Coyote is the only lift station with flushable wipe issues. See Attachment 1 for sample maintenance notes on Coyote lift station from Omnisite, as well as a copy of the latest pump calibrations for the area lift stations.

Neilson – newest and biggest area lift station serves Legendary Estates. The drywell looked very good, clean, and well maintained. Wetwell also looked good. The vac truck is used 2-3 time s year to remove grease on an as-needed basis.

Honeysuckle – Wetwell looked a little greasy, but not bad. The drywell was clean and looked well maintained.

Main lift to Sioux Falls – has portable hoists, gas monitors, looked clean and well maintained. The city has sent 33 MG to date in 2015 to the city of Sioux Falls.

VIII. TREATMENT PROCESS REVIEW

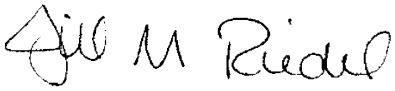
Stabilization Ponds

Item	Comments
Inspection frequency	**At least monthly**
Weeds and/or trees growing on the dikes	**Some weeds in riprap**
Vegetation growing in the ponds	**No**
Pond dikes protected from erosion with riprap	**Yes**
Pond seepage surfacing reported	**No**
Dike structure failure (sloughing and/or sagging)	**No**
If aerators are used, number per cell	**14 in Pond #1, floating aerators, 1 HP power generated blowers each**
Aerator information and comments	**In good condition**
Condition of fencing	**Good**
All access gates are kept locked	**Yes**
Signs legible and properly located	**Yes**
Facility accessible in all weather conditions	**Yes**
Evidence of burrowing animals	**No**
Evidence of grazing animals	**No**
Odor problem (except seasonal turnover)	**For about one month in the fall and spring is all**
Inter-pond piping valves are working and used	**Yes**
Flow measurement (weir, flume, etc.)	**Flow meter**
Depth indicator(s)	**Yes – concrete slabs**
Effluent destination	**City of Sioux Falls WWTF**
Discharge structure (valve control, overflow, etc.)	**Valve**
Latest discharge (date)	**Discharged to Sioux Falls in May 2015**
Duration of discharge	**As-needed**
Cells operated in series or parallel	**Series**

Cell information

	Cell #1	Cell #2	Cell #3	
Maximum operation depth (feet)	**5.0 ft**	**6.0 ft**	**8.0 ft**	
Current operating depth (feet)	**3.8 ft**	**4.2 ft**	**6.0 ft**	
Minimum operating depth (feet)	**2.0 ft**	**2.0 ft**	**2.0 ft**	
Surface area at maximum depth (acres)	**10.21 acres**	**10.18 acres**	**19.60 acres**	

Comments: The city sludge judged the ponds since the last inspection and found an average of 6" of sludge. City is also planning on installing a recirculating pipe from Pond 3 to Pond 1.

For Office Use Only			
Rating: ☒ **S** ☐ **M** ☐ **U**	**Other: MOD** ☐ **ASSIST** ☐ **SEV** ☐ **ENF** ☐		
Name of Inspector	**Signature**	**Affiliation / Phone**	**Date**
Jill M. Riedel, E.I.T.		***SDDENR / (605) 362-3543***	**07/15/2015**
Name of Reviewer	**Signature**	**Affiliation / Phone**	**Date**
Albert Spangler, P.E.		***SDDENR / (605) 773-3351***	**7/16/2015**

ATTACHMENT 1

Lift Station Information

Toby Huizenga

From: Gabe Laber <glaber@stockwellengineers.com>
Sent: Thursday, March 13, 2014 3:07 PM
To: dan.fink@harrisburgsd.gov; Toby Huizenga
Subject: Lift Station Calibration

Hi Dan and Toby,
Below is a table showing the pumping rates that we calibrated today. I was really surprised to see how close the bottom three stations were. Thanks for your help.

Lift Station	Constructed	Type	Pump #1 (gpm)	Pump #2 (gpm)	Pump variation %
Tiger	2002	Wet/Dry Well	332	302	9%
Honeysuckle	2002	Wet/Dry Well	367	371	1%
Coyote	2004	Wet/Dry Well	198	245	23%
Stencil	2005	Wet/Dry Well	362	362	0%
South Cliff	2006	Wet/Dry Well	493	494	0%
Nielson	2008	Wet/Dry Well	215	215	0%

Gabriel Laber, P.E.

600 North Main Avenue, Suite 100
Sioux Falls, SD 57104
Office: 605.338.6668
Cell: 605.261.0360
Fax: 605.338.8750
glaber@stockwellengineers.com
www.stockwellengineers.com

STOCKWELL
ENGINEERS

Notifications

All Stations

Help

Date Range: 6/15/2015 To 6/16/2015 Refresh

Commands Charts Options Export using SCADABridge Acknowledge Notifications

Select Stations: All Stations

NOTE: If you have a large number of Notifications the Acknowledge process may take several minutes.

Acked via GuardDog Acked via Email Acked via Call-In Acked via Call-Out Acked automatically

- Notifications -

Appended	Device ID	Station	Date/Time	Trigger	Description	Status Change	Callout List	Acknowledged	Ack Date/Time	Ack Method
⊞	21220	Tiger Lift Station	Tue - 6/16/15 1:02:38 PM	Digital Input 6	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 1:03:16 PM	
⊞	10080	Stencil Lift Station	Tue - 6/16/15 12:59:44 PM	Digital Input 7	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 1:00:24 PM	
⊞	21224	South Cliff Avenue lift station	Tue - 6/16/15 12:59:27 PM	Digital Input 7	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 1:00:46 PM	
⊞	21974	Honey Suckle Lift Station	Tue - 6/16/15 11:42:29 AM	Digital Input 6	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 11:43:19 AM	
⊞	24360	Gravity Lift Station	Tue - 6/16/15 9:08:54 AM	Digital Input 8	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 9:11:47 AM	
⊞	23103	Nielson Lift Station	Tue - 6/16/15 9:01:59 AM	Digital Input 7	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 9:02:46 AM	
⊞	21057	Coyote Lift Station	Tue - 6/16/15 8:34:55 AM	Digital Input 6	Generator Running	Alarm	Main	Yes	Tue - 6/16/2015 8:35:35 AM	

+ Show +

Station Notes

21057 - Coyote Lift Station (21057)

Help

Add Station Note

Commands Charts Options Export using SCADABridge™

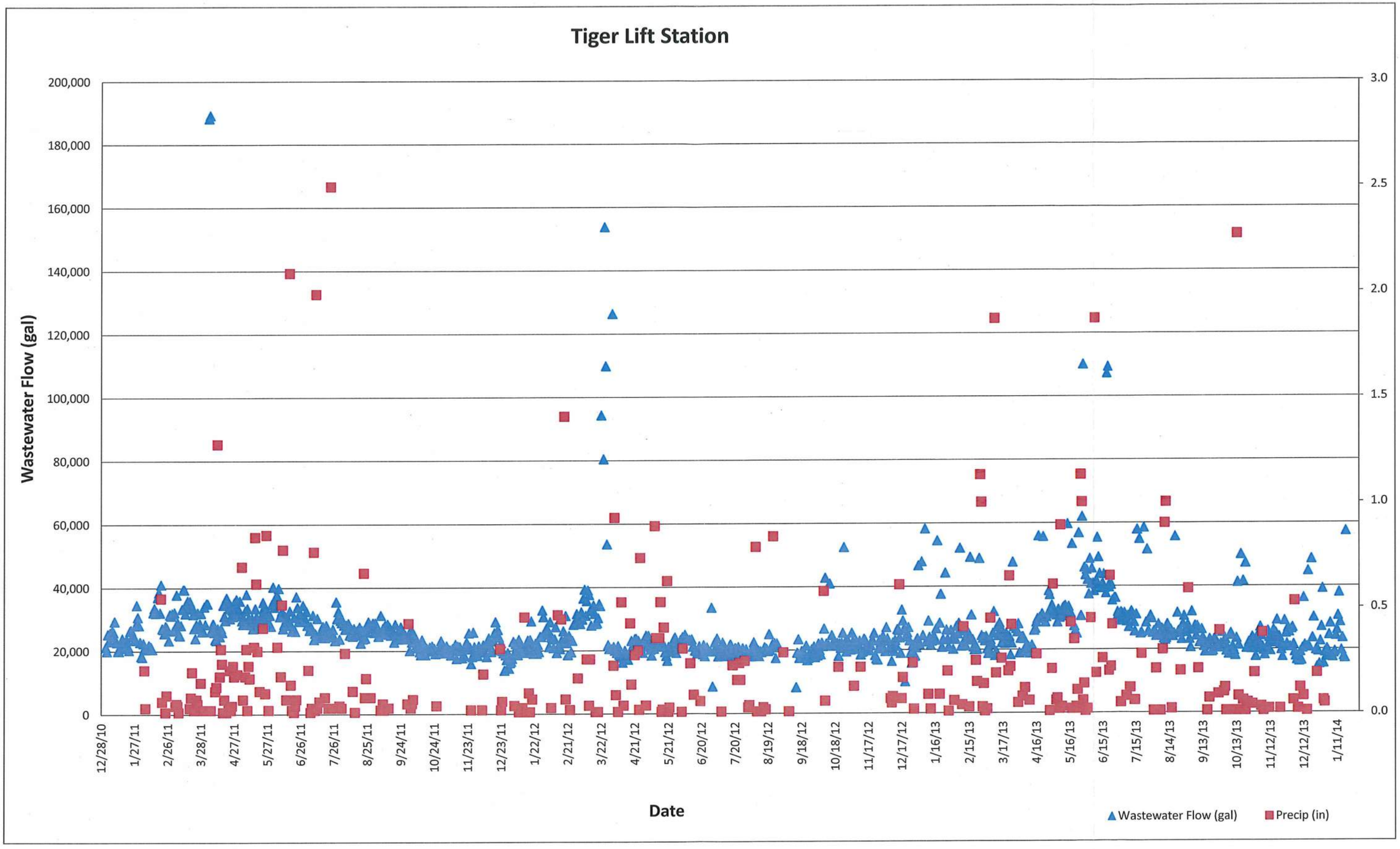
Jump To: 21057 - Coyote Lift Station

- Station Notes -

Edit	Title	Note	Last Modified	Modified By
	pump 1 rags	pulled pump 1 for rags	5/5/2015 - 4:40 PM	hardan
	new off and lead floats	no cycles on 1 pump. put new lead float on and still wouldnt alternate. put new off float on and it works.	3/30/2015 - 3:43 PM	hardan
	basket	cleaned basket and added dawn	3/27/2015 - 4:50 PM	hardan
	transfer switch fail	generator ran all day after gen test. was noticed at 2:53 that gen was still running. went up and transfer switch said aux switch open. transferred manually and then lights came on in can.pulled pumps and both pumps had rags in them when we pulled them. put pumps together and it took about 45 minutes to get wet well down to normal level.	12/30/2014 - 4:41 PM	hardan
	basket	cleaned trash basket w/vactor	12/22/2014 - 3:08 PM	hardan
	12-16-14	neighbor called and said generator had been running for last 4 hours. then got call on high wetwell. both pumps running and in high wetwell when we arrived. pulled both pumps. rags in pump 2. transfer switch stuck in test. reset and it transferred back to normal power.	12/22/2014 - 11:14 AM	hardan
	generator	set generator to test on the transfer switch. hasnt been starting on test day for a couple weeks.	8/19/2014 - 11:52 AM	hardan
	pulled pumps	pulled pumps due to excessive runtime on pump 1. small amount of rags. pulled pump 2 and found no rags.	8/14/2014 - 2:07 PM	hardan
	cleaned basket	cleaned basket out on 6-18-14	6/19/2014 - 11:28 AM	hardan
	cleaned trash basket	cleaned trash basket. 1/2 full of rags	3/17/2014 - 4:21 PM	hardan
	cleaned basket	vacuumed out trash basket	3/7/2014 - 4:15 PM	hardan
	pulled pump 2	1 minute runtime difference. pulled pump. rags under impeller	2/7/2014 - 4:50 PM	hardan
	Pulled pump 2	noticed pump 2 was kicking out after a few seconds.. pulled pump 2 and cleaned rags out	1/31/2014 - 4:34 PM	hardan
	generator alarm	neighbor called dan about alarm on gen. overcrank. called paul and he adjusted carb. bad fuel mixture	1/24/2014 - 11:13 AM	hardan
	installed new sump pump	Installed new sump pump as a result of dry well flooding alarm on Friday night. sump pump had a leak in the rubber seal on top where electrical is + Show +	1/16/2014 - 8:20 AM	hardan
	cleaned basket	cleaned basket	1/16/2014 - 8:18 AM	hardan
	pulled pumps	noticed pumps short cycling. pulled both pumps and had rags in both pumps. turned pumps on and both pumps kicked in. opened wet well and lag float wrapped around lead float and wetwell was pumped all the way down.	1/10/2014 - 12:56 PM	hardan
	filters	changed filters and cleaned cooling lines	12/17/2013 - 4:33 PM	hardan
	replaced off and lead floats	replaced floats due to uneven cycles	10/4/2013 - 11:44 AM	hardan
	pulled pumps on oct 30	pulled pumps due to long runtimes. rags in both pumps.	10/3/2013 - 12:17 PM	hardan
	pulled pumps	pulled both pumps. rags in both, barely pumping.	9/23/2013 - 4:43 PM	hardan
	pulled pumps	pulled pumps. found weedeater string and rags in pump 2. some rags in pump1.	9/19/2013 - 3:27 PM	hardan

	pulled pumps	pulled pumps due to running times on 8-9 and 8-13	8/13/2013 - 4:42 PM	hardan
	changed lead float	changed lead float on 4-3 due to cycles.	4/17/2013 - 3:07 PM	hardan
	cleaning	cleaned wet well and added dawn. due to cycles. also generator did not start on test tuesday. cranked about 5 seconds before start.	4/17/2013 - 3:04 PM	hardan
	Pulled pump 1 and 2	had 43 starts on pump 1 and 21 starts on pump 2. pulled both pumps. had rags in both pumps	4/2/2013 - 3:19 PM	hardan
	pulled pump 1	pulled pump 1 and found rags. 3rd week in a row. pulled pump 2, rag floating in water right below pump.	3/20/2013 - 11:11 AM	hardan
	pulled pump 1	pulled pump 1 and found rags.	1/9/2013 - 1:48 PM	hardan
	pulled pumps	pump runtimes were doubled for 1 pump. pulled pumps and found rags in pump	12/19/2012 - 11:34 AM	hardan
	Filters	changed white filters and cleaned cooling lines	12/7/2012 - 2:56 PM	hardan
	pulled pump 1	PULLED PUMP 1 AND 2 AND REMOVED RAG5 ON 11-13-12	11/20/2012 - 4:41 PM	hardan
	Cleaning	cleaned wet well and added 1 gallon Dawn	8/29/2012 - 5:00 PM	hardan
	cleaning	cleaned grease and added dawn	5/23/2012 - 4:47 PM	hardan
	Pulled pump 1	pump one kicked out when backflushed. pulled and found rags.	4/24/2012 - 10:44 AM	hardan
	sump pump	took sump pump apart. line to wet well was plugged. cleaned with power hose. put pump back together. washed down station and cleaned out basket.	3/22/2012 - 3:06 PM	hardan
	Pulled Pumps	pulled pumps and cleaned rags out of both pumps. sump pump plugged	3/19/2012 - 5:12 PM	hardan
	cleaning	cleaned wet well and basket and added 2 gallons of dawn	3/12/2012 - 11:54 AM	hardan
	1-13-12 Back Plate	Dakota Pump changed back plate on pump and put new seals and oring on pump #1.	1/13/2012 - 12:35 PM	hardan
	cleaned wet well 12-13-11	pumped down and cleaned wet well of grease chunks and basket. added 1 gallon of dawn to wet well and 1 gallon to manhole in street.	12/14/2011 - 3:45 PM	hardan
	bait	put new bait in generator	12/6/2011 - 4:27 PM	hardan
	filters	changed filters	12/5/2011 - 4:35 PM	hardan
	cleaning	cleaned basket and wet well. added 2 gallons of dawn.	10/11/2011 - 4:30 PM	hardan
	generator not calling in on test days	checked out generator and started fine. looked at omni site and noticed no signal strength or status lights on. signal strength was at -114. played with antenna and got it to -94. checked on 8-24 am and it was back to -104. replaced antenna with used one and signal strength went to -98.	8/24/2011 - 4:23 PM	hardan
	mouse bait	added mouse bait to generator	8/24/2011 - 4:18 PM	hardan
	cracks in pump housing	noticed no runtime on pump 1. checked and switch was off. also noticed crack on pump 1 by mounting bolt and also by adjustment bolt on northwest side of pump.	8/18/2011 - 1:13 PM	hardan
	cleaning	cleaned wet well and basket on 8-12 and added 2 gallons of dawn upstream 2 manholes	8/15/2011 - 12:34 PM	hardan
	Filters	Changed Filters 4-5-11	4/6/2011 - 7:35 AM	hardan
	cleaned and pulled pumps	cleaned basket and pulled pumps on both. pulled down and sucked to bottom. cleaned dry well with power hose and sump pump.	2/15/2011 - 4:53 PM	hardan
	pulled pumps	pulled both pumps and got rags out of both. 2-14-11	2/15/2011 - 4:51 PM	hardan
	1-19-2011	pulled both pumps and changed 3 filters and changed shut off float cleaned wet well	1/22/2011 - 2:05 PM	hardan

Appendix C
Lift Station Records


Tiger Lift Station
Wastewater Flow (gal)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
3.0
2.5
2.0
1.5
1.0
0.5
0.0
12/28/10
1/27/11
2/26/11
3/28/11
4/27/11
5/27/11
6/26/11
7/26/11
8/25/11
9/24/11
10/24/11
11/23/11
12/23/11
1/22/12
2/21/12
3/22/12
4/21/12
5/21/12
6/20/12
7/20/12
8/19/12
9/18/12
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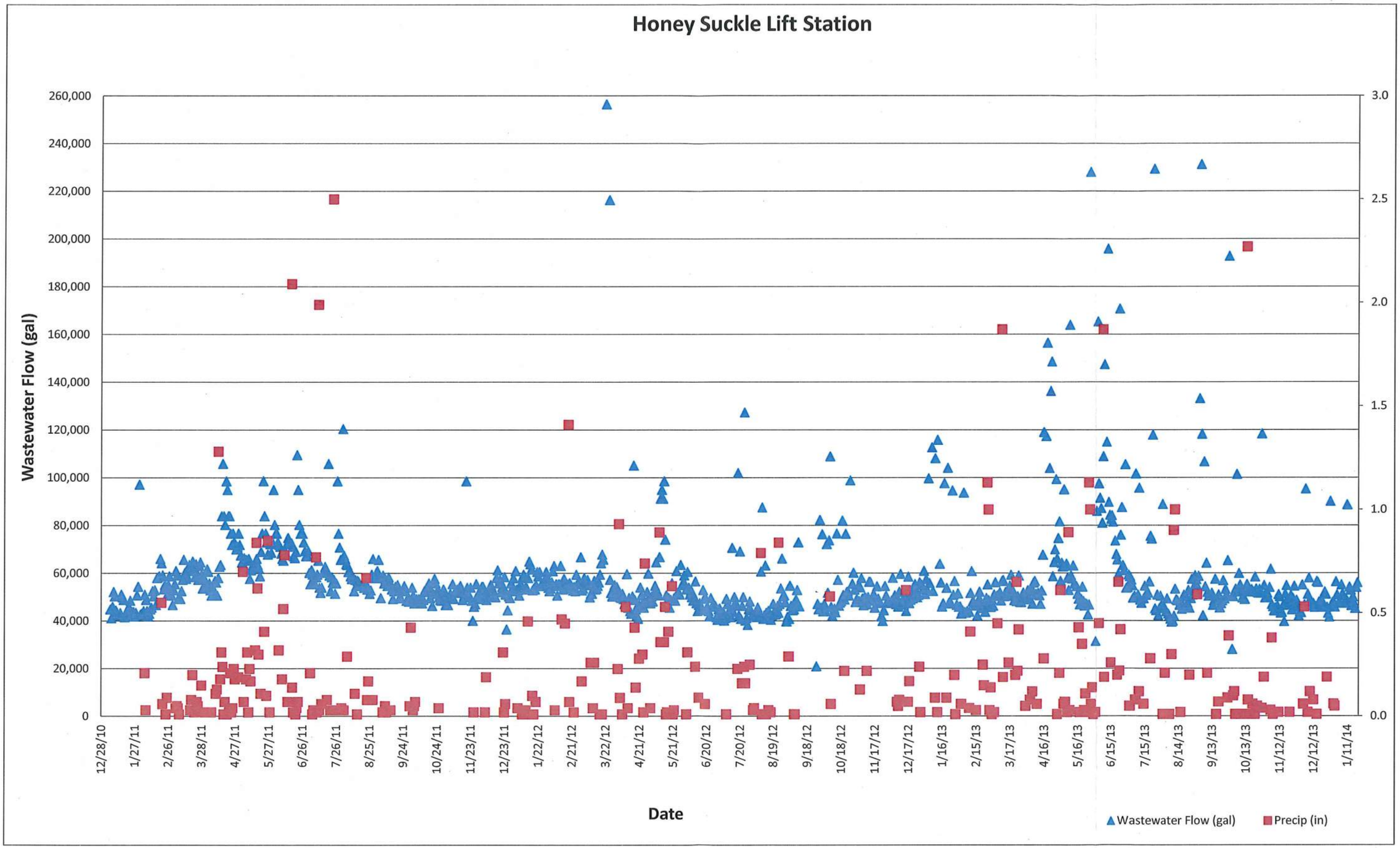
11/17/12
12/17/12
1/16/13
2/15/13
3/17/13
4/16/13
5/16/13
6/15/13
7/15/13
8/14/13
9/13/13
10/13/13
11/12/13
12/12/13
1/11/14
Date
Wastewater Flow (gal)
Precip (in)


Honey Suckle Lift Station
Wastewater Flow (gal)
260,000
240,000
220,000
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
3.0
2.5
2.0
1.5
1.0
0.5
0.0
12/28/10
1/27/11
2/26/11
3/28/11
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6/15/13
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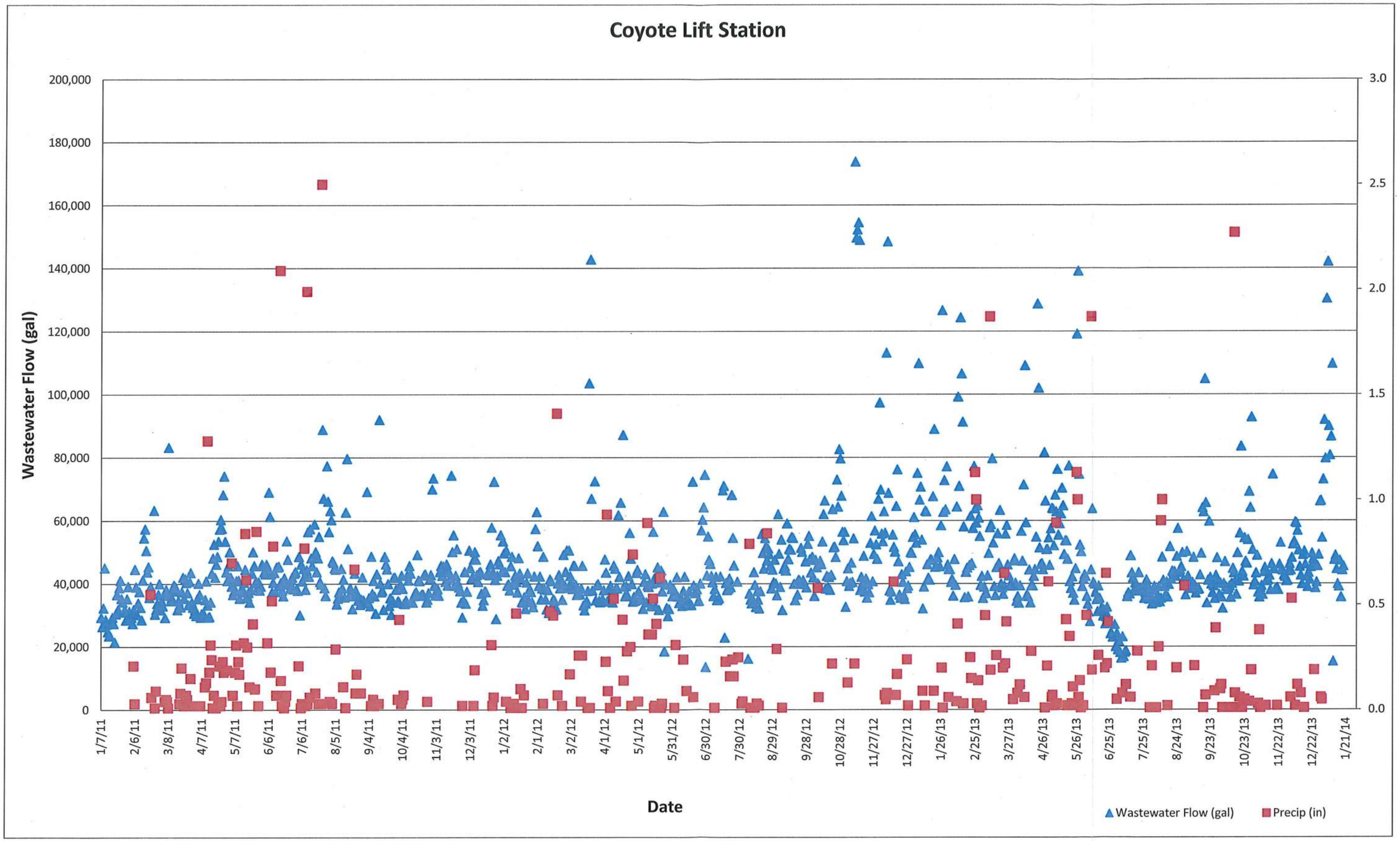
8/14/13
9/13/13
10/13/13
11/12/13
12/12/13
1/11/14
Date
Wastewater Flow (gal)
Precip (in)


Coyote Lift Station
Wastewater Flow (gal)
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160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
3.0
2.5
2.0
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0.0
1/7/11
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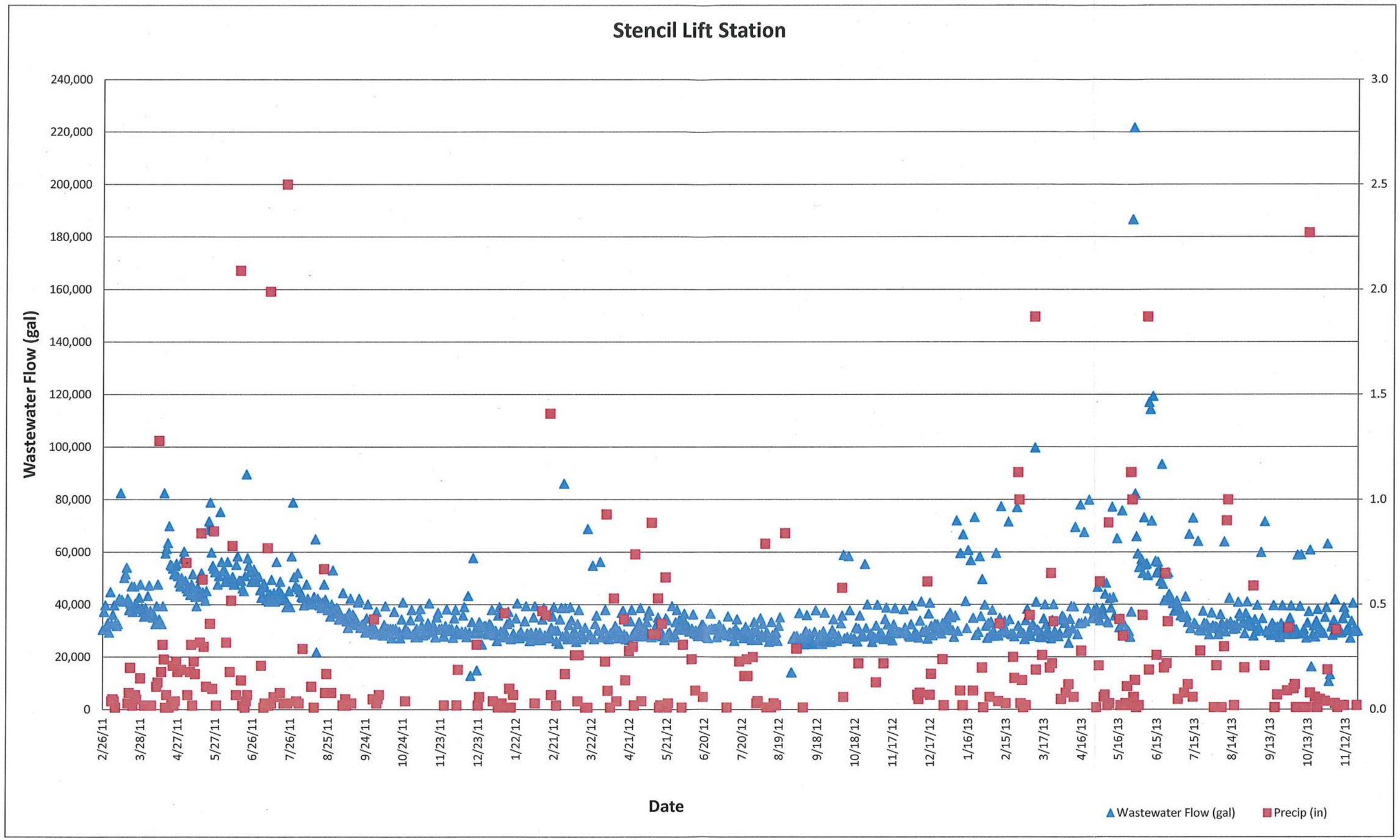
10/23/13
11/22/13
12/22/13
1/21/14
Date
Wastewater Flow (gal)
Precip (in)


Stencil Lift Station
Wastewater Flow (gal)
240,000
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200,000
180,000
160,000
140,000
120,000
100,000
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40,000
20,000
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3.0
2.5
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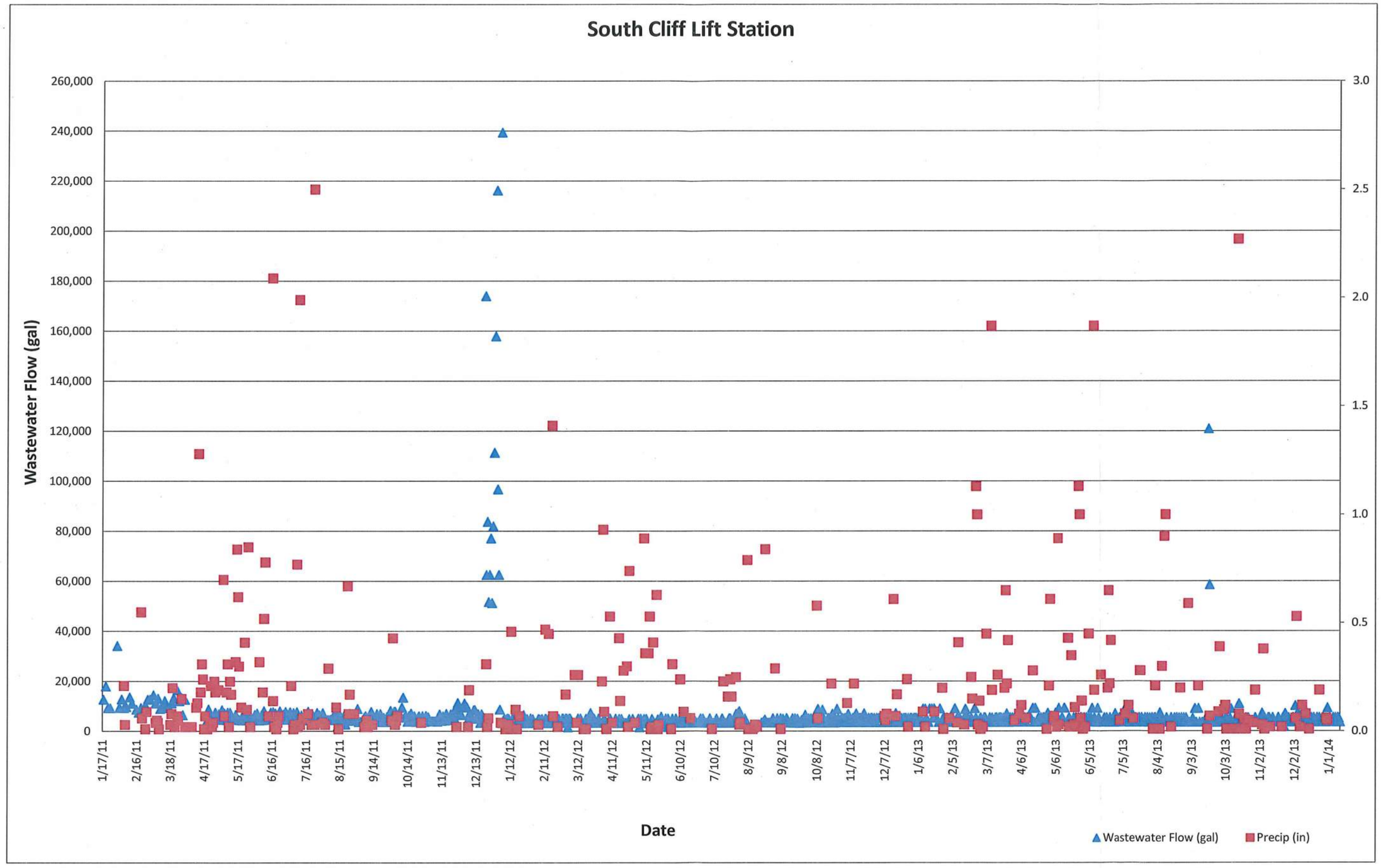
Date
Wastewater Flow (gal)
Precip (in)


South Cliff Lift Station
Wastewater Flow (gal)
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240,000
220,000
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
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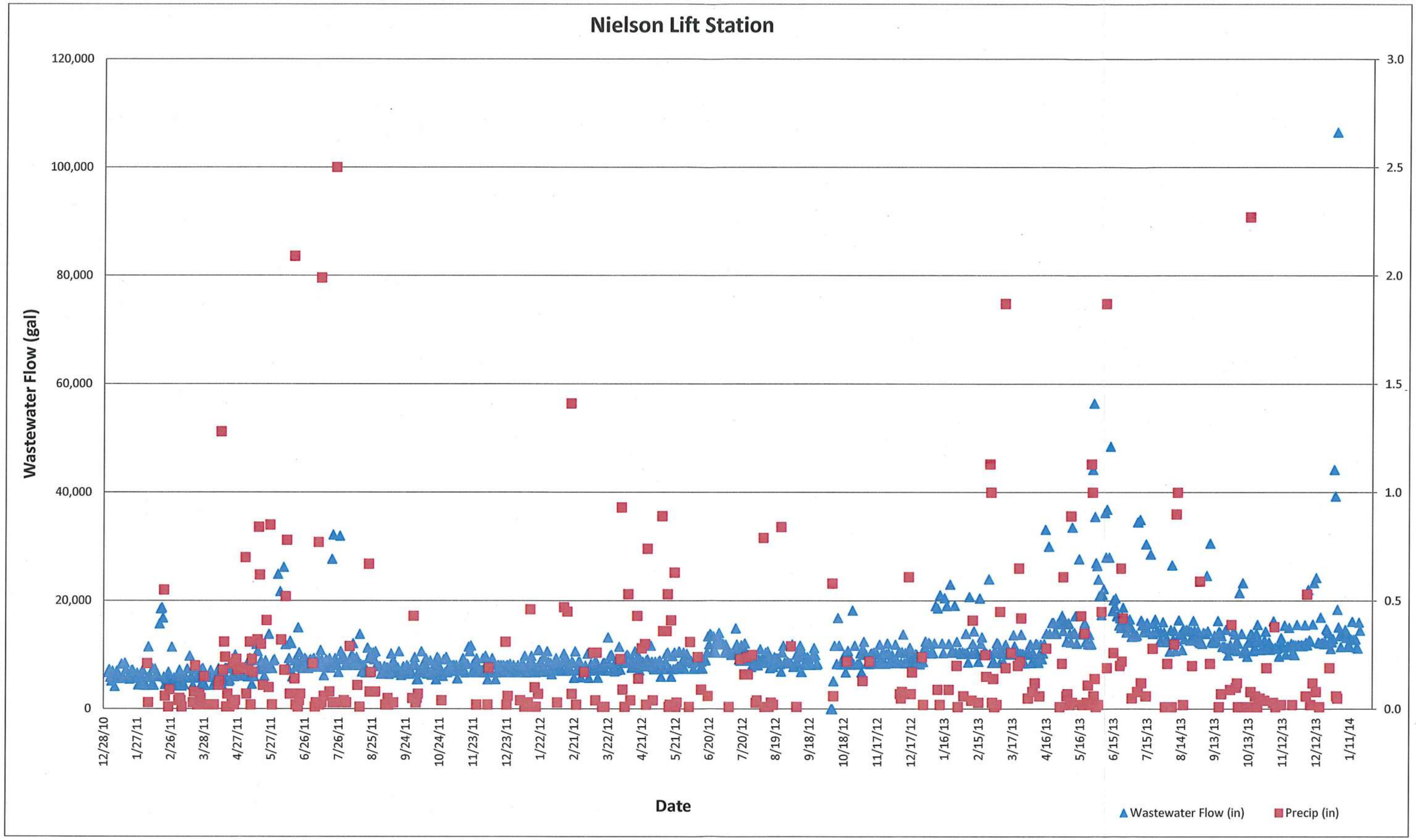
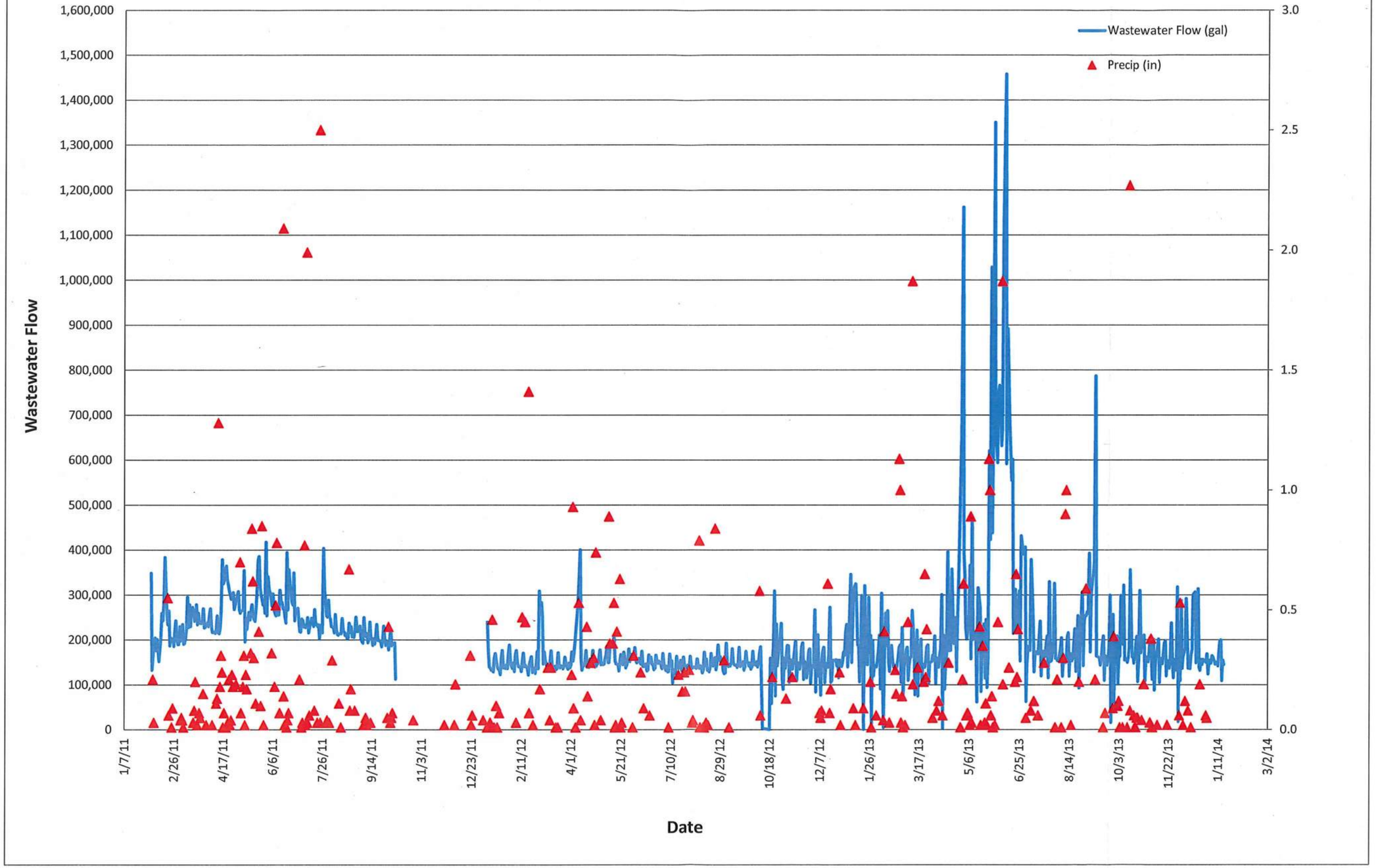
12/2/13
1/1/14
Date
Wastewater Flow (gal)
Precip (in)

Nielson Lift Station



Appendix D
Wastewater Treatment Influent Records

Wastewater Treatment Influent



Appendix E
Comprehensive Plan

Harrisburg

Comprehensive Plan

2005 - 2025

Prepared by the South Eastern Council of Governments at the direction of the Planning Commission and City Council of Harrisburg, South Dakota

ACKNOWLEDGMENTS

This Comprehensive Plan is a compilation of effort by many people, organizations and government entities. This document expresses the great civic pride that exists in the City of Harrisburg. Through the preparation and adoption of this document, the governing officials of Harrisburg have expressed their desire for orderly and efficient growth and development in the community and surrounding area.

City Council

Mayor:	James Aalbers
Council Members:	Steven Becker, Marshall Drexler, James Herbert, Reed Ramstad
Finance Officer:	Mary McClung
Planning Commissioners:	Bruce Bicknas, Verlon Enger, Jon Klemme, Gary Lane, John Loos, Judy Omer

RESOLUTION NO. 2005-2

A RESOLUTION ADOPTING A COMPREHENSIVE PLAN FOR THE CITY OF HARRISBURG, AS PROVIDED FOR IN SDCL 11-6-16

Whereas, Chapter 11-6-14 of South Dakota Codified Law has empowered the Planning Commission and City Council of Harrisburg to prepare a Comprehensive Plan for the development of the City and the surrounding area; and

Whereas, the Harrisburg Planning Commission has developed a Comprehensive Plan for the years 2004-2025, has held the required Public Hearing, and has made a recommendation for adoption of the Plan to the City Council; and

Whereas, the Harrisburg City Council has received the recommendation of the Planning Commission and has held the required Public Hearing; and

Whereas, the adoption of the Comprehensive Plan would enhance the responsible development of Harrisburg and the surrounding area.

Now therefore, be it resolved by Harrisburg City Council, that the Comprehensive Plan for the City of Harrisburg for the years 2004 through 2025 be hereby adopted and effective upon 20 days after publication of this resolution.

ADOPTED THIS 7TH DAY OF FEBRUARY, 2005.

Publication Date: February 16, 2005

Effective Date: March 9, 2005

SIGNED: Mayor
City of Harrisburg

ATTEST: Finance Officer
City of Harrisburg

TABLE OF CONTENTS

I. INTRODUCTION

A. PURPOSE, AUTHORIZATION AND ADOPTION

1. PURPOSE OF THE COMPREHENSIVE PLAN

There are three primary purposes of this document:

(1) To address the planning requirements of state law while also providing a sound and logical basis for city growth management strategies; and

(2) To provide some predictability about the potential land uses and timing of development so that both public and private sectors can make informed decisions in the area of real estate and capital investments; and

(3) To provide the Planning Commission and City Council with policies for future planning decisions and the methods and justification to control land use through the zoning and subdivision ordinance, the capital improvements program, and other enforcement controls.

2. AUTHORIZATION UNDER STATE LAW

Under 11-6-14 of South Dakota Codified Laws, the planning commission of a municipality is directed to *"propose a plan for the physical development of the municipality... [to] include the general location, character, layout and extent of community centers and neighborhood units..."*

3. DEVELOPMENT AND ADOPTION

The Harrisburg City Council has adopted this document in accordance with state law. In developing this Comprehensive Plan, the Harrisburg Planning Commission has used background research, detailed inventories and assessments, and discussion sessions at Planning Commission and City Council meetings and public hearings. It is intended to guide the City in its implementation of zoning regulations, subdivision regulations, capital improvements plans and other related policies.

4. AREA OF PLANNING JURISDICTION

The City of Harrisburg shall, under South Dakota statutes, have the authority to control development within the corporate limits of Harrisburg.

B. INTERGOVERNMENTAL CONSIDERATIONS

A comprehensive plan affects not only those living in the study area, but also (to some extent) those living and working throughout the Harrisburg area. As a result, the City Council has requested input from the Lincoln County Planning Commission, the Harrisburg School District and the Harrisburg Economic Development Corporation.

C. APPROPRIATE USE OF THE COMPREHENSIVE PLAN

South Dakota laws require that zoning districts must be in accordance with the Comprehensive Plan. It is the intent of this document to show the most appropriate use of land within the study area, based on the potential for growth and development of the community.

D. COMMUNITY SURVEY RESULTS

Early in 2001, a community survey was distributed to residents of Harrisburg. The intent of the survey was to better involve citizens in the planning process. What follows is a summary of responses, broken down into strengths, weaknesses and needs for the City of Harrisburg.

Strengths

The size of Harrisburg is a major contributing factor for residents who choose to live in Harrisburg

The growth rate of Harrisburg is acceptable to the majority of survey respondents

Law enforcement, fire protection, ambulance service, snow removal and street maintenance received a favorable rating from responding citizens

Weaknesses

A significant number of respondents felt that the library was poor in quality

Location of the wastewater lagoons is a concern

Maintenance of City parks needs to be enhanced

The issue of poorly maintained streets needs to be addressed

Needs

Commercial and industrial growth is a major need for the Harrisburg community

Better facilities for a library and community center would benefit the City of Harrisburg

Recreational opportunities such as a swimming pool, tennis courts and a bike/walk trail should be explored

More single family, multi family and elderly/assisted living are needed in Harrisburg

II. DEMOGRAPHIC CONDITIONS

A. GENERAL DEMOGRAPHY

Table 1. Population History *(Source: United States Census)*

YEAR	POPULATION	% INCREASE
1960	313	NA
1970	338	7.99%
1980	558	65.09%
1990	727	30.29%
2000	958	31.77%

Table 2. Current Demographic Statistics (Source: State Data Center)

	Harrisburg	Lincoln Co.	S.D.
1990 Population	727	15,427	696,004
2000 Population	958	24,131	754,844
% Change	31.77%	56.42%	8.45%
Median Age	27.9	33.2	32.5
Median Family Income (1990)	NA	NA	$27,602

Table 3. Population by Age (Source: State Data Center)

	Under 18	18-44	45-64	65 & Over	Total
1980	211	238	67	42	558
1990	275	336	79	37	727
2000	319	443	154	42	958

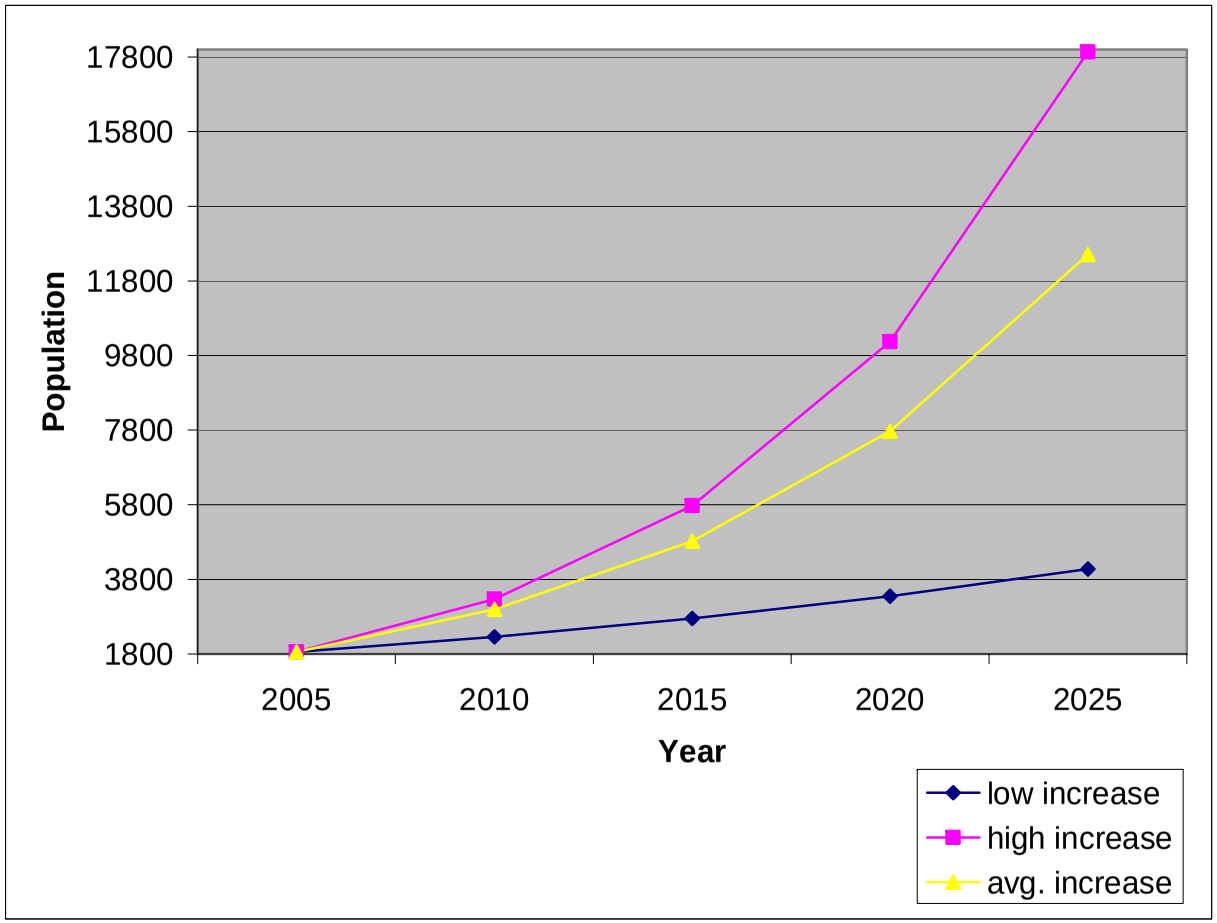
B. POPULATION PROJECTIONS

Based upon current trends, a population projection through the study period indicates that the City of Harrisburg will have a population high of 17,900 and a low of 4,000 with an expected population of around 12,500 by the year 2025. The graph on the following page illustrates the Harrisburg population projection that was attained from building permit data along with information of the growth of surrounding communities to ensure adequate land is reserved and planned for future development.

HARRISBURG: Population Projections, 2005 - 2025:

20-YEAR TREND

CALCULATION OF PROJECTIONS	Statistics
1960 Census Population	**313**
1970 Census Population	**338**
% Change 1960 - 1970	7.99%
1970 Census Population	338
1980 Census Population	**558**
% Change 1970 - 1980	65.09%
1980 Census Population	558
1990 Census Population	**727**
% Change 1980 - 1990	30.29%
1990 Census Population	727
2000 Population	**958**
% Change 1990 - 2000	31.77%
2000 CensusPopulation	958
2005 Projected Population	**1,859**
% Change 2000 - 2005	94.05%
2005 Projected Population	1,859
2010 Projected Population	**2,994**
% Change 2005 - 2010	61.05%
2010 Projected Population	2,994
2015 Projected Population	**4,822**
% Change 2010 - 2015	61.05%
2015 Projected Population	4,822
2020 Projected Population	**7,766**
% Change 2015 - 2020	61.05%
2020 Projected Population	7,766
2025 Projected Population	**12,506**
% Change 2020 - 2025	61.05%



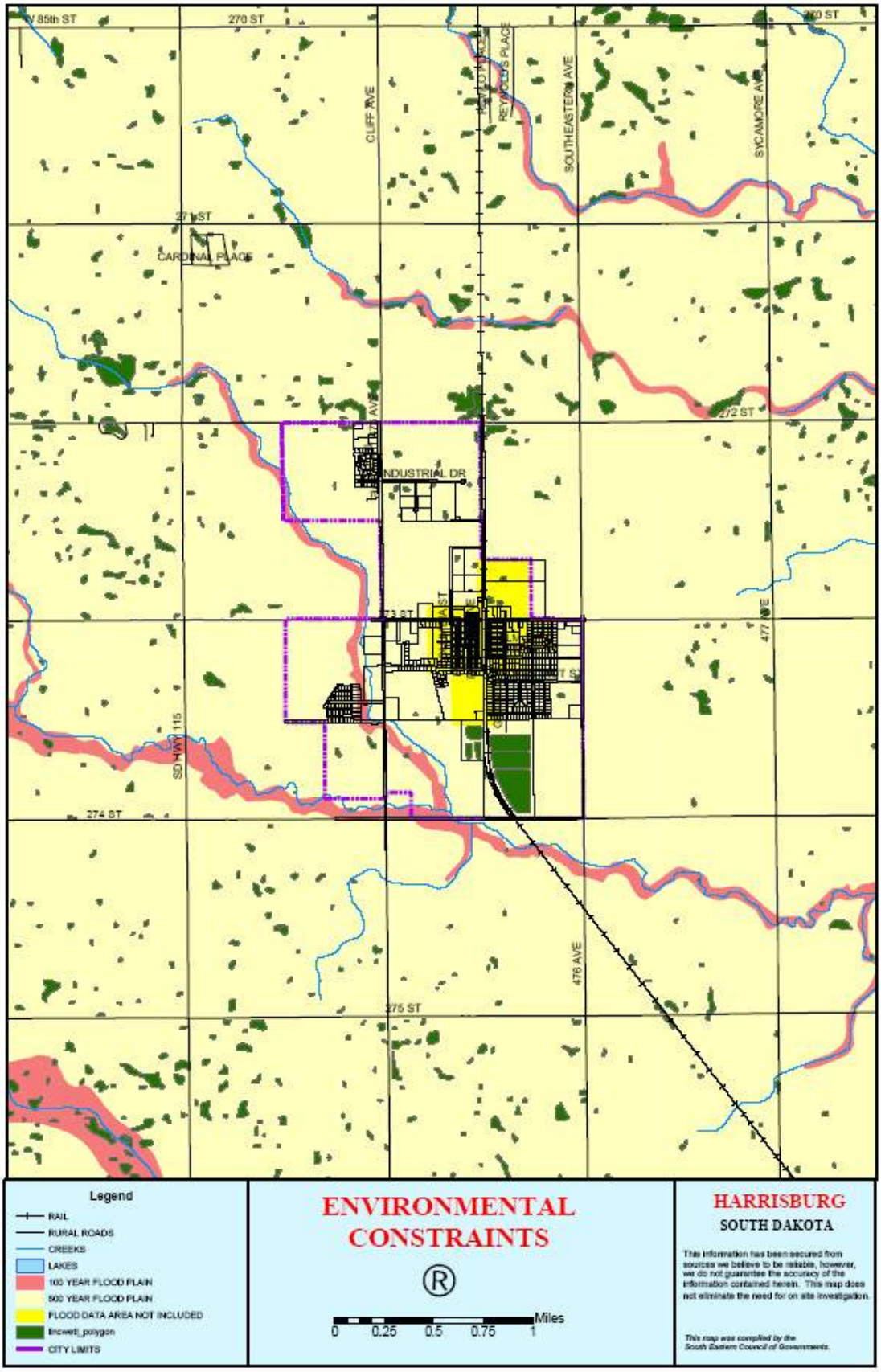
III. ENVIRONMENTAL CONSTRAINTS

A. PHYSICAL GEOGRAPHY

Harrisburg is located in the southeastern portion of South Dakota. The City is roughly three miles west of Lake Alvin. Harrisburg is approximately 4 and ½ miles east of Interstate 29 via Lincoln County Hwy 110. The landscape is primarily flat, with an elevation varying from a low of 1408 feet to a high of 1451 feet.

B. DRAINAGE AND WETLANDS

Some small wetlands and potholes are found in the city's growth areas. Wetlands and water bodies are designated from base maps developed through the National Wetlands Inventory and other data sources. These natural resources provide a number of functions that are important to the health and welfare of the community. They provide storage for storm water, help to control flooding, provide wildlife habitat, improve water quality, and they provide recreational opportunities. The wetlands of the Harrisburg area are shown on **Map 1**.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CLIFF AVE
REYNOLDS PLACE
SOUTHEASTERN AVE
SYCAMORE AVE
271 ST
CARDINAL PLACE
272 ST
INDUSTRIAL DR
273 ST
477 AVE
SD HWY 115
274 ST
476 AVE
275 ST
Legend
RAIL
RURAL ROADS
CREEKS
LAKES
100 YEAR FLOOD PLAIN
500 YEAR FLOOD PLAIN
FLOOD DATA AREA NOT INCLUDED
fncwetl_polygon
CITY LIMITS
ENVIRONMENTAL CONSTRAINTS
Miles
0 0.25 0.5 0.75 1
HARRISBURG
SOUTH DAKOTA
This information has been secured from sources we believe to be reliable, however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for on site investigation.
This map was compiled by the South Eastern Council of Governments.

IV. INFRASTRUCTURE ASSESSMENT

A. TRANSPORTATION

Street and highway improvements are a critical planning consideration because of the interactive relationship between transportation and land use. Location choices for many land uses are frequently made on the basis of access to major streets and highways. Without consideration for adequate capacity or maintenance, the transportation system cannot adequately accommodate development.

Arterial streets are designed to carry a large volume of traffic at higher speeds. Within the city, the function of arterials is to facilitate the movement of goods and people with few obstructions. These streets are generally adjacent to commercial uses.

Collector streets are designed to provide connectivity between arterials. They allow local traffic an access onto the arterial system. Collector streets are normally spaced one-half mile apart and include two lanes of traffic with turn lanes at major intersections, limited on-street parking, and may be adjacent to either residential or commercial uses.

Local streets provide access from low-density residential developments to collector or arterial streets. Because their function is based on development patterns, there are no spacing requirements. Local streets operate at low speeds, with on-street parking and few traffic signals.

A Major Street Plan includes a list of current and future road and street improvement projects for the transportation needs of the City of Harrisburg. The Major Street Plan has been developed as a part of the Comprehensive Plan (**see Map 2**).

B. WATER FACILITIES

As a result of a recent engineering study, several projects enhancing Harrisburg's water facilities were completed. Those projects are as follows:

1) The construction of a 12" water main to strengthen the Lincoln County Rural Water System which serves as the water source for the City of Harrisburg; and

2) The connection to the Lincoln County Rural Water System, providing a new source of water supply for the City of Harrisburg; and

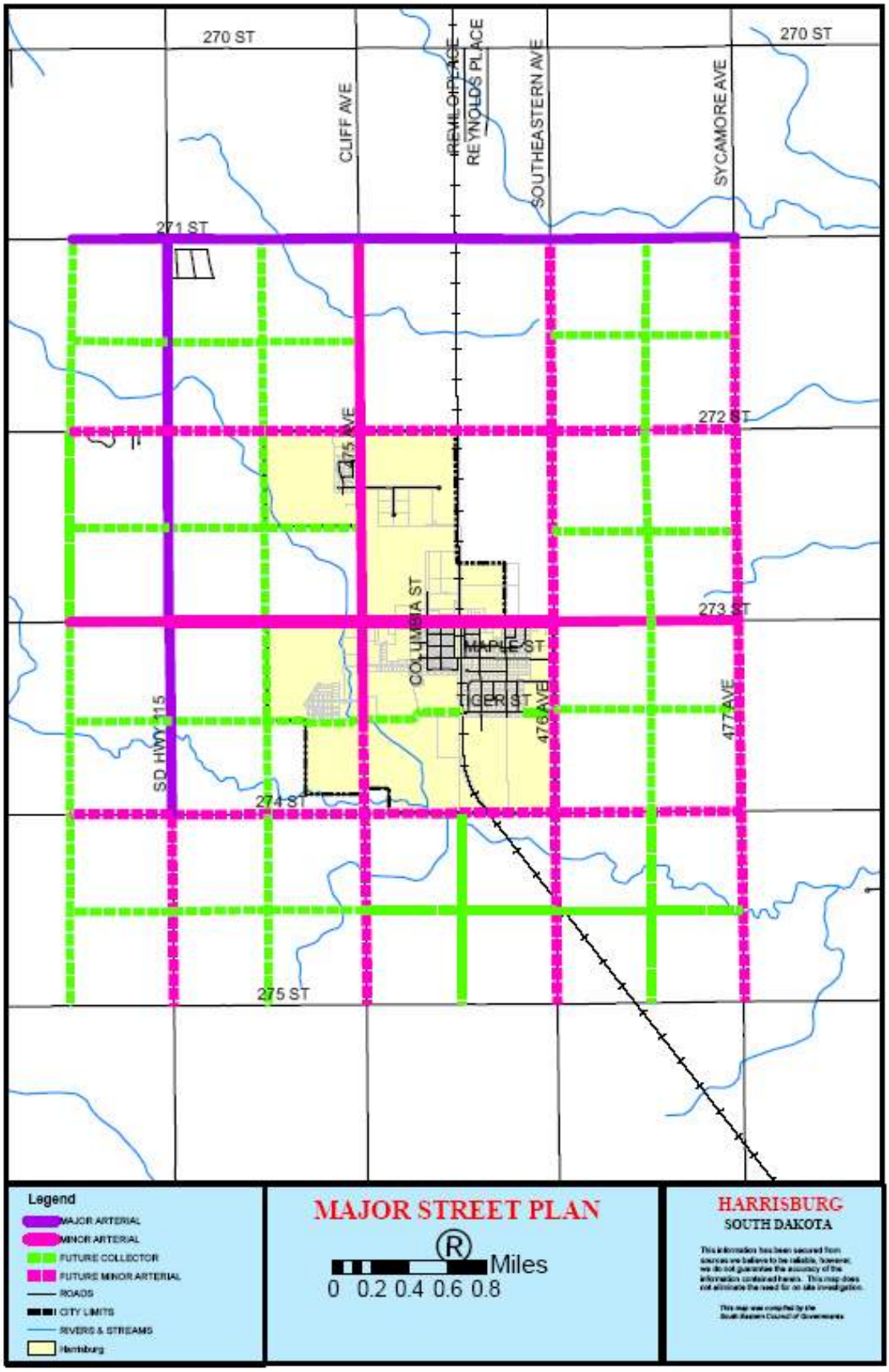
3) The construction of a 300,000 gallon elevated storage tank in the Harrisburg Industrial Park; and

4) The construction of an 8" water main from the existing system to loop with an existing water main at the location of the Industrial Park elevated tank.

The City of Harrisburg is a member of the Lewis and Clark Rural Water System. Presently, the City is seeking a long term water supply for the community, pending organizational funding decisions and construction timelines.

C. WASTEWATER FACILITIES

Several years ago Harrisburg expanded its existing waste water treatment facility into a total retention water stabilization pond. This project required a purchase of sixty four (64) acres in the southern portion of the community. With the rapid population growth the community has recently experienced, the population waste water treatment facility is expected to reach capacity between 2009 and 2012. The community will prepare a facility plan to address future wastewater needs.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270 ST
CLIFF AVE
REVILO PLACE
REYNOLDS PLACE
SOUTHEASTERN AVE
SYCAMORE AVE
271 ST
272 ST
475 AVE
COLUMBIA ST
MAPLE ST
TIGER ST
476 AVE
477 AVE
SD HWY 115
273 ST
274 ST
275 ST
Legend
MAJOR ARTERIAL
MINOR ARTERIAL
FUTURE COLLECTOR
FUTURE MINOR ARTERIAL
ROADS
CITY LIMITS
RIVERS & STREAMS
Harrisburg
MAJOR STREET PLAN
Miles
0 0.2 0.4 0.6 0.8
HARRISBURG
SOUTH DAKOTA

V. SCHOOL PLANS AND PROJECTIONS

A. HARRISBURG PUBLIC SCHOOLS

- In May of 2000, a municipal bond was issued for 7.59 million dollars.
- A new high school (grades 9-12) has been constructed in the southwestern portion of Harrisburg.
    - The new high school includes more than 30 classrooms, a library, computer and science labs, a gym with seating for 1,000, locker rooms, offices, a kitchen and a tiered cafeteria-community room with a stage.
- The date of opening for classes was Fall 2002.
- The former K-12 school has become the district's K-8 facility.
- Harrisburg Public Schools recently approved the construction of an elementary school within Sioux Falls City limits.

VI. PARKS AND OPEN SPACE

A. CURRENT AND FUTURE PARK NEEDS

Neighborhood Parks provide a service area of approximately ¼ mile in radius and are around 0.1-5 acres in size. The amenities in these parks may be specialized to the neighborhood or may be repetitious so that residents do not have to cross town to get a specific recreation opportunity. Specialized amenities include skate parks, ice skating rinks, perennial gardens, community gardens, butterfly gardens, amphitheaters, dog parks, or Frisbee golf.

Community parks are generally between five and twenty acres in size. The effective service area of neighborhood parks is one mile, depending on location, facilities, and accessibility. School/park sites also serve as neighborhood parks and include playground equipment in addition to play fields, parking lots, and multi-use paved areas for court games.

Regional parks, because of their larger size, provide a much wider range of activities and facilities than neighborhood parks. The land area requirements generally range from 21 to 40 acres, and can provide services to an area of approximately 1—2 square miles. Specialized facilities such as swimming pools, picnic areas, and athletic complexes can be accommodated in community parks. Community parks that should be provided include areas for passive uses, nature conservation, pools and aquatic centers, and athletic fields. Each of these four types of uses might include other uses such as neighborhood playground space, but generally larger parks will focus on one major type of activity.

Conservation and nature areas are specialized locations that preserve wildlife habitat, woodlands, and wetlands through open space development. Most commonly developed along the stream corridors and natural drainage ways are linear parks or greenways which provide a variety of recreational opportunities to adjacent neighborhoods. These activities easily accommodate the development of a bike trail system.

The parks and open spaces on the Current and Future Land Use Maps identify existing park facilities and proposed new facilities within the projected growth areas. The specific improvements provided within the park facility should be tailored to meet the needs of the nearby population that it will primarily serve. In addition, potential combinations of detention pond sites and neighborhood parks should be reviewed wherever feasible to allow more efficient land utilization and consolidation of maintenance costs.

If new parks are to be provided at reasonable cost and in proper locations, it is essential that parkland acquisition take place prior to residential development. Integration of park and school sites will likewise be feasible only if land acquisition occurs well ahead of residential development.

The city has prepared a Master Park Plan. This plan may be used as a reference for park improvements.

VII. NEIGHBORHOOD CONSERVATION

Blighted neighborhoods tend to grow into adjacent areas and invite additional deterioration. Visual deterioration gives the impression that nobody cares, creating an atmosphere which may foster crime, antisocial activities and further blight. Declining neighborhoods demand additional health, social and public safety services, weaken the tax base, and make activities to promote new economic development in the city more difficult.

Strategies to strengthen and preserve the older residential neighborhoods will maintain the supply of safe, decent, affordable homes and limit the need for costly increases in public services and avoid the need for dramatic revitalization programs. The goals of affordability, variety, safety, and preservation are emphasized.

A. LAND USE

Zoning changes to allow multifamily or commercial land uses into older neighborhoods should be carefully analyzed. Conservation of single-family homes is encouraged. Commercial uses are ideally limited to businesses which service the neighborhood needs and that have minimal impact on adjacent properties.

B. INFRASTRUCTURE

Streets, utilities, and public facilities should be maintained and improved on an ongoing basis. Schools and parks contribute to neighborhood stability, and should set an example for residential areas in terms of maintenance and appearance.

C. PROPERTY MAINTENANCE

Inspections and enforcement of building and zoning codes, and effective nuisance abatement activities help prevent neighborhood decline. Legal assistance through the City Attorney's office is a key component for the effectiveness of these activities.

VIII. LAND USE PLAN

A. EVALUATION OF LAND USE IN RURAL LINCOLN COUNTY

The rural area of Lincoln County is dominated by agricultural uses. However, a great deal of rural residential structures (hobby farms, rural subdivisions) have been constructed over the past twenty years. Also, a great number of farms have been vacated with a dilapidated structure still standing. A land use dilemma is the rural/urban fringe area along and near the city limits of Harrisburg. A common goal of the Lincoln County Planning Commission and all Lincoln County cities is to cooperate near all city limit boundaries. Therefore, the future land use map specifies the area outside of Harrisburg for land use cooperation with Lincoln County.

B. EVALUATION OF URBAN LAND USE IN HARRISBURG

To simplify preparation of this plan, land uses have been grouped into eight categories for Harrisburg:

(1) Industrial includes light manufacturing, warehouses and other similar uses.

(2) Commercial includes retail businesses, offices, etc.

(3) Single-Family Residential includes single-family, residential, duplexes, and manufactured housing.

(4) Multi-Family Residential includes all apartments.

(5) Institutional & Governmental includes schools, churches, government offices and similar uses.

(6)Transportation & Utility uses include power substations, water / wastewater treatment facilities, etc.

(7) Conservation & Recreation includes parks and athletic fields. Also included are areas that should be protected from development to facilitate movement of flood water and runoff. Some types of development may be appropriate for such areas, as long as the development does not dramatically increase the incidence or severity of flood or drainage problems.

(8) Agricultural includes land not yet developed for one of the other seven uses. Also included are areas that provide farming and agriculturally related uses.

A physical land use inventory was prepared by SECOG in October 2000 and updated in October of 2003. Maps for the current and future land uses (**Maps 3 and 4**) in Harrisburg and the planning area are included. Future land uses were determined by the Harrisburg Planning Commission and SECOG, based on topographic features, compatibility of future and current land uses and existing infrastructure.

C. CURRENT LAND USE CONSUMPTION

Land Use	Acres Consumed
Single Family	**121 acres**
Multi Family	**6 acres**
Commercial	**11 acres**
Agriculture	**334 acres**
Government/Institutional	**83 acres**
Vacant	**448 acres**
Industrial	**37 acres**
Park and Recreation	**1 acre**

D. FUTURE LAND USE ESTIMATES

Households and a projected demand of certain land use categories are listed in the tables below.

City of Harrisburg

Household Projections

	Population	Persons per Household *(assuming number remains constant)*	Households
1980	558	NA	NA
1990	727	NA	NA
2000	958	3.04	318 (actual)
2005	1,859	3.04	612 (projected)
2010	2,994	3.04	985 (projected)
2015	4,822	3.04	1,586 (projected)
2020	7,766	3.04	2,555 (projected)
2025	12,506	3.04	4,114 (projected)

	Households Added 2000 to 2020
New Households	3,796

Land Use Consumption Needs – Housing		
Single-family Residential	3 units per acre (low density) x 3.04 persons per household (pph) = 9.12 persons per acre (ppa) *	9.12 ppa x 7,015 acres = 63,977 additional people
Multi-family Residential	3 units per acre (low density) x 3.04 pph = 9.12 ppa **	9.12 ppa x 505 acres = 4,606 additional people

Based upon the above referenced analysis, the City of Harrisburg will be able to provide adequate housing through the year 2020.

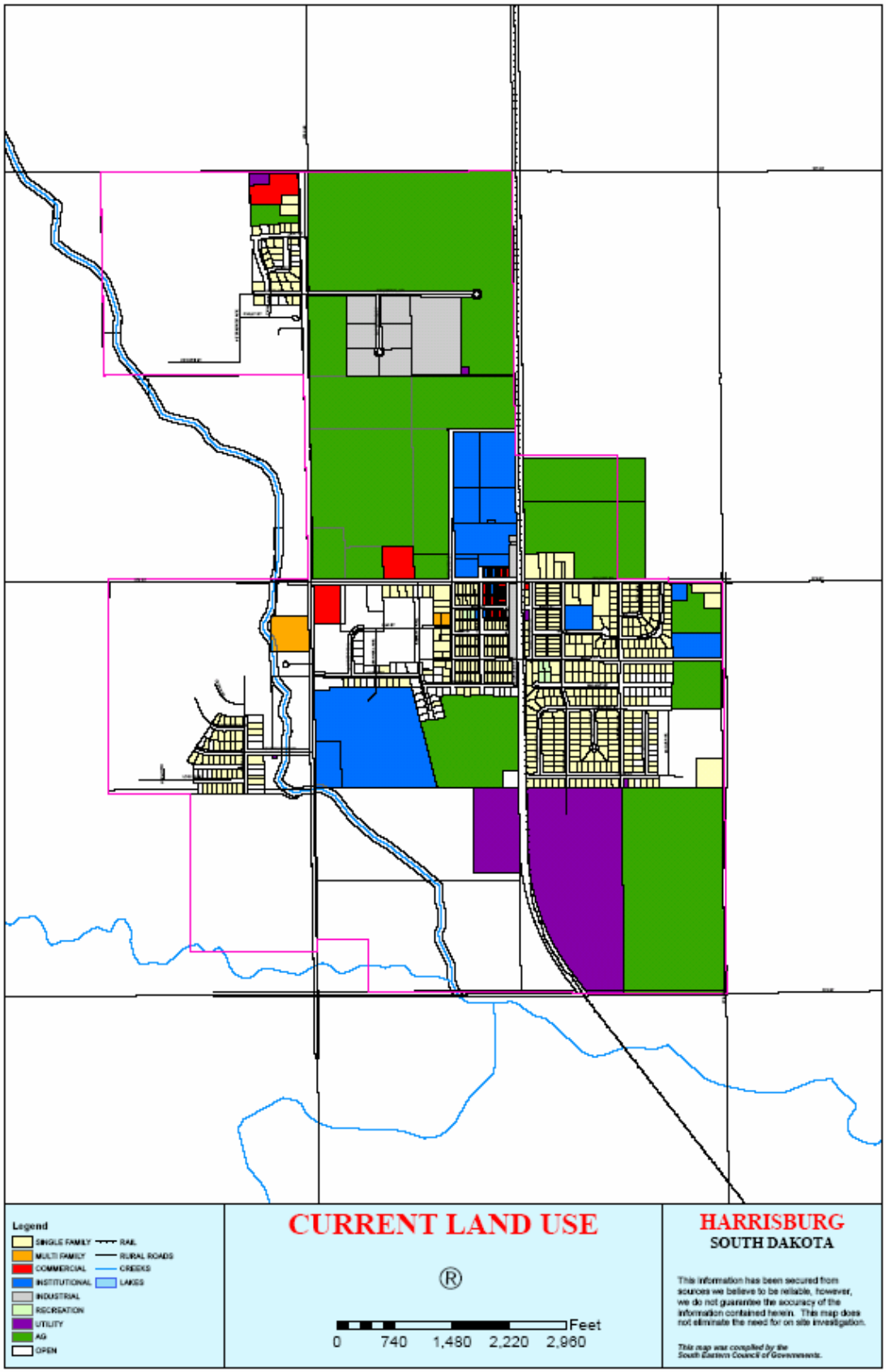
* Projections based upon low density single-family development

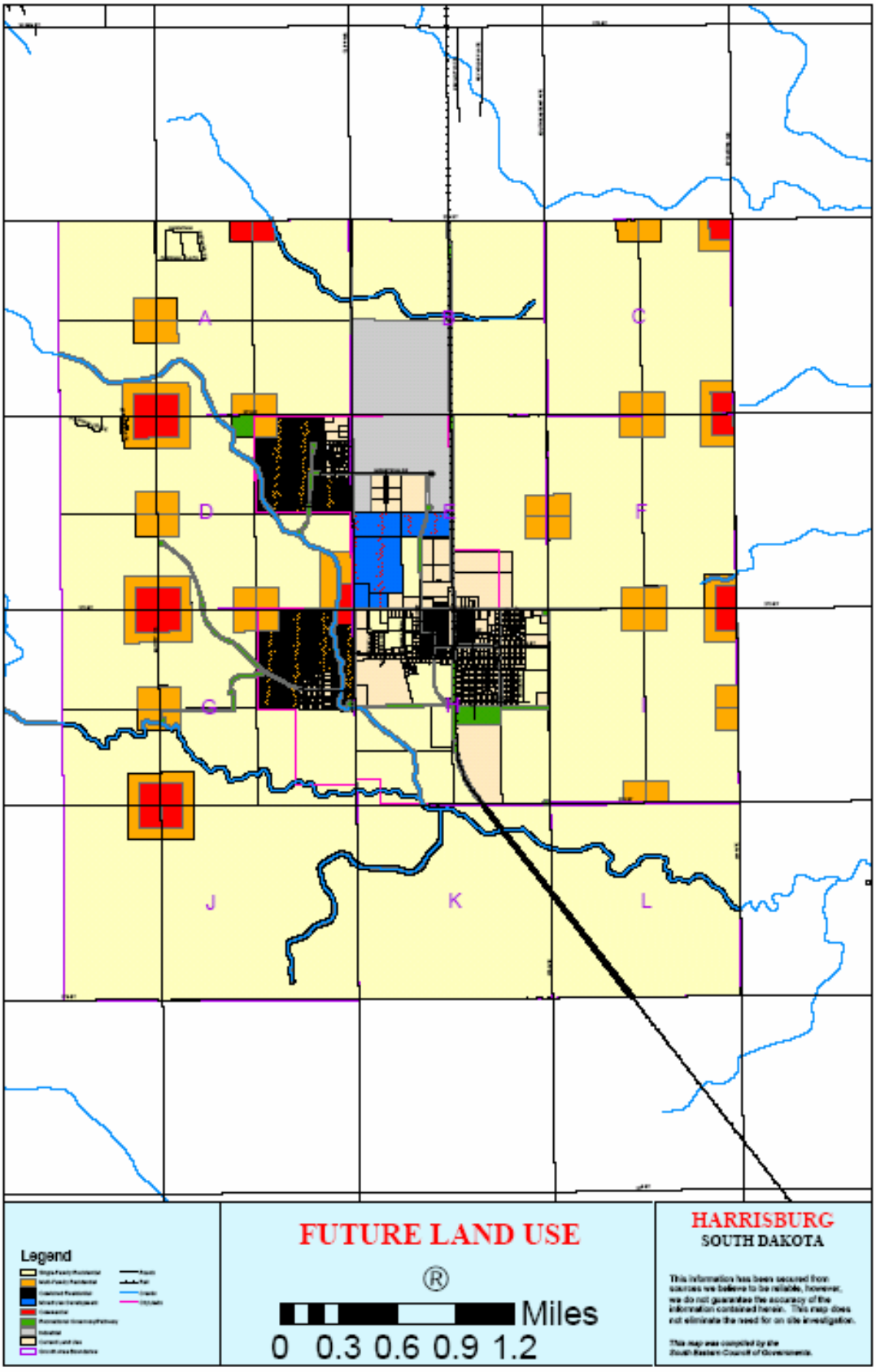
** Projections based upon low density multi-family development

Future Land Use Available

Land Use	Available Acres
Single Family	**7015 acres**
Multi Family	**505 acres**
Combined Residential	**244 acres**
Commercial	**170 acres**
Industrial	**278 acres**
Greenway/Recreational	**330 acres**

A review of the population projections and land use consumption needs should be reviewed every five (5) years to ensure enough land is available for future land use needs.


Legend
SINGLE FAMILY
MULTI FAMILY
COMMERCIAL
INSTITUTIONAL
INDUSTRIAL
RECREATION
UTILITY
AG
OPEN
RAIL
RURAL ROADS
CREEKS
LAKES
CURRENT LAND USE
Feet
0
740
1,480
2,220
2,960
HARRISBURG
SOUTH DAKOTA
This information has been secured from sources we believe to be reliable, however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for on site investigation.
This map was compiled by the South Eastern Council of Governments.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IX. GROWTH AREA ANALYSIS

The costs of extending water and sewer services are the primary considerations in designating future growth. However, other factors must also be considered which includes capacity of the transportation system, environmental suitability, and compatible land uses. The following analysis is intended to provide the City of Harrisburg and Lincoln County with a guide to land use decisions and direct implementation through subdivision and zoning regulations. **Map 4** illustrates all growth areas by the number indicated.

It is appropriate to note that rezoning requests (and other development approvals) for land uses not consistent with the Future Land Use map (**Map 4**), except for previously established and approved land uses, should not be considered until the Comprehensive Plan has been amended, as necessary, to provide for such land uses. In those cases where development requests are not consistent with the Plan but represent a benefit to the community, the City should process such requests and Plan amendments concurrently and in a timely fashion. In addition, **the Future Land Use map is not the community's official zoning map.** It is a guide for future land use patterns. The Future Land Use element and all other aspects of the Comprehensive Plan are implemented primarily through development regulations (e.g., zoning and subdivision regulations). Text of the zoning regulations and its corresponding map determine which specific development requirements apply to a particular property.

Growth Area A

- Specific serviceability plans for this area have not been made; however, this area can be serviced by sanitary sewer.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- Primarily, the growth area will accommodate single-family residential development. Two multi-family nodes are proposed; one at the intersection of SD HWY 115 and a proposed collector and the other located at the intersection of 272nd Street and future collectors. Nodal commercial development, with a multi-family buffer abutting single-family residential development, is proposed at the intersection of 272nd Street and SD 115. There is also commercial development proposed ½ mile between Cliff and SD HWY 115 on 271st Street.
- A portion of the proposed Nine Mile Creek recreational greenway traverses this growth area.

Growth Area B

- Planned growth would encourage development of Growth Area E before Growth Area B. This would allow extension of services to extend continuously outward from Harrisburg.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- The southwest quarter of this section is proposed industrial. The remaining portion is single-family residential with a trail system following the creek and the railroad.

Growth Area C

- This area should be one of the last areas to be developed to promote orderly growth and extension of services.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- Commercial nodes buffered by multi-family are proposed at the southern and northern portions of 477th Street (Sycamore Avenue). Multi-family nodes are also proposed at the half mile intersection of the future collector and 271st and 272nd Streets.

Growth Area D

- Development immediately west of the industrial park is serviceable, yet the serviceability of the remaining growth area is currently unknown.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- Commercial nodes buffered by multi-family are proposed for the northern and southern portions of the growth area along SD HWY 115, as well as, at the intersection of 273rd Street and 475th Street (Cliff Avenue). Multi-family nodes are also proposed at the half mile collector intersections of 272nd Street, SD HWY 115, and 273rd Street. A community park and two neighborhood parks are proposed along the trails systems through this growth area.

Growth Area E

- The area east of 475th Avenue and south of the industrial park is serviceable by utilities on Columbia Avenue.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- Portions of Growth Area B are already within city limits and include the Harrisburg Industrial Park.
- Mixed-use development, which could include commercial, residential, and/or multi-family, is proposed in the southwestern quarter of this section south of the industrial park and west of the elementary school.

Growth Area F

- Services to this growth area will stem from the radial outward growth from the center of Harrisburg. This will provide the most efficient use of infrastructure.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- A substantial amount of land is proposed as single-family residential, with multi-family nodes located at future collector intersections and existing arterial/future collector intersections.
- Commercial nodes buffered by multi-family are proposed at the intersection of 477th Street (Sycamore Avenue) and 271st and 272nd Streets.

Growth Area G

- A portion of this growth area will be serviceable by existing utilities in the current development in the northeast quadrant of the growth area. The serviceability of the remaining area is currently unknown.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- As with growth areas A and D, Growth Area G focuses primarily on single-family residential development. Nodal multi-family development is projected at future collector intersections and existing arterial/future collector intersections. Major commercial nodes, with a multi-family buffer, will be located at the intersection of SD HWY 115 and 273rd and 274th Streets. Three trail systems traverse the growth area and provide areas for neighborhood parks.

Growth Area H

- This area is serviceable by the High School pumping station.
- Capacity of the pumping station needs to be verified prior to future development

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- The majority of this growth area is already in city limits. All of the development in this area is anticipated as single-family residential, with the exception of nodal commercial development in the northwest quadrant of the growth area (intersection of 475th Avenue and Willow Street).
- The primary reason for the considerable amount of single-family residential is due to location of the recently built Harrisburg High School, which is located in the central-west portion of the growth area.
- An opportunity to improve traffic mobility exists by having residential backyards face 476th Avenue (Southeastern Avenue).
- One community park and two neighborhood parks lie along the trail systems that wind through the growth area.

Growth Area I

- This growth area may be one of the next areas to be annexed into by Harrisburg. An update of existing services will need to take place to service this area.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- Primarily single-family residential with multi-family nodes at the intersection of future collectors and minor arterials has been proposed for this area. One commercial node, buffered by multi-family will be located at the intersection of 476th Street (Sycamore Avenue) and Willow (273rd Street).

Growth Area J, K, and L

- As Harrisburg expands south, the community needs to be aware of the floodplains from Ninemile Creek.
- Development of Growth Area's G, H and I should occur before development is extended south to Growth Area's J, K and L.
- Development of L should not occur prior to development of K, to ensure smooth and efficient connections for services.

DEVELOPMENT PATTERNS FOR FUTURE GROWTH

- One commercial node is located at the intersection of 274th Street and SD HWY 115. The remaining land has been proposed single-family. A park trail system has been proposed along Ninemile creek and the railroad.

X. PLANNING POLICY FRAMEWORK

Harrisburg has adopted this Comprehensive Plan to provide a framework for specific future land use and growth management policies and recommendations. It is designed to be a dynamic and flexible process to accommodate the changing needs of a growing population, yet steady enough to allow for reasonable long-term investment strategies by both public and private sectors. To the greatest extent possible, future planning for the City of Harrisburg ought to involve the public, other city agencies and elected officials throughout the planning and implementation phases.

A. GROWTH MANAGEMENT STRATEGY

The following goals and policies are a detailed expression of the community's aspirations for the future and can be considered the heart of the Comprehensive Plan. The goals and policies provide direction for future planning and city activities for the City of Harrisburg and the contiguous planning area.

Goal 1. Focus New Development within Existing City Limits Area

Objective 1 – Allow development within existing sanitary sewer and drainage basins as detailed by the Future Land Use map and prescribed in Chapter IX (Growth Area Analysis)

Policy 1 - Determine growth areas most accessible to sewer hookups

Policy 2 - Discourage growth in areas not suitable for hookups

Objective 2 – Allow compact and contiguous urban growth within city limits

Policy 1 - Maintain the growth area boundary as the division between urban and rural densities and services, and encourage growth and development that will promote an efficient use of present and future public investments in roads, utilities, and other services

Policy 2 - Avoid scattered or strip commercial and industrial development outside the urban service area and direct such uses into existing developed locations where adequate services are available including major street access and proper water/sewer systems

Policy 3 - Require that properties served by public utilities be located within the City

Policy 4 - Establish and maintain an addressing system to create consistency for safety and convenience of businesses, visitors, and local citizens

Policy 5 – Establish an area-wide approach to cooperatively manage future growth including city and county governments, school districts, townships and other public utility providers

Objective 3 – Enhance the character, identity, and historic preservation of the community

Policy 1 – Guide new development with urban design amenities that enhance community aesthetics and local identity

Policy 2 – Protect historic dwellings and other architecturally significant buildings from incompatible development, and encourage rehabilitation and reuse for the redevelopment of historic buildings

Policy 3 – In existing and developing centers, buildings should be set close to each other and to pedestrian ways and main streets to encourage walking and shared parking

Goal 2. Direct New Growth into Designated Future Growth Areas

Objectives 1– Establish development patterns/requirements for each of the described Growth Areas

Policy 1 – Review and revise specific development patterns established under Chapter IX. – Growth Area Analysis

Goal 3. Construct and Upgrade the Major Street System to Handle New Growth

Objective 1 – Enhance the current road system to provide optimum traffic mobility

Policy 1 – Because road reconstructions, resurfacings and other related projects are funded by a limited budget, it is incumbent upon the City Council to evaluate the need for various improvements and appropriate annual funds accordingly

Objective 2 – Minimize ingress and egress onto major roadways

Policy 1 – Utilize driveway access points off of local roads rather than arterials whenever feasible so as to alleviate congestion from heavily traveled roads

Objective 3 – Complete projects to enhance the safety of the transportation system

Policy 1 – Develop sidewalks in all areas of town to create safe neighborhoods by requiring developers to construct or assessing landowners at the directive of the City

Goal 4. Improve Community Services for all Residents of Harrisburg

Objective 1 – Improve Public Services and Buildings

Policy 1 – Community development projects shall be envisioned by the City Council, with assistance from the Planning Commission and public, on an annual basis

Objective 2 – Improve Park and Recreation Opportunities for Citizens

Policy 1 – Consider developing an athletic complex to coincide with the Harrisburg Community.

Policy 2 – Develop a linear greenway along Nine Mile Creek to provide future recreational opportunities for all residents

Goal 5. Preserve the Function and Character of the Rural Area

Objective 1 – Encourage agriculture to remain the dominant land use activity

Policy 1 – *Only* agricultural uses will be allowed in the city's agricultural zones

Objective 2 – Discourage scattered residential, commercial, or industrial development

Policy 1 – Work with Lincoln County to ensure all proposed development within Harrisburg's growth areas are annexed and serviced with municipal utilities

B. CAPITAL IMPROVEMENTS PLANNING

The purpose of capital improvements planning is to provide local government officials with a guide for budgeting major improvements that will benefit the community. Before future development can be considered, the City must review current infrastructure and identify any deficiencies that need to be corrected prior to the development. It is the intention of the City to upgrade a portion of existing utilities and transportation routes on an ongoing basis. Information within the Comprehensive Plan can be utilized in constructing the Harrisburg capital improvement plan.

C. LAND USE PLANNING STRATEGY

The City of Harrisburg has committed to shape the future of the community to enhance economic development and maintain a high quality of life for all citizens of the community. The following goals, objectives, and policies will guide the City Council and are the basis for regulations contained within the City of Harrisburg's zoning and subdivision ordinances.

Goal 1. Ensure the Health and Safety of Citizens

Objective 1- Separate structures for health and safety

Policy 1 – Sideyard setbacks will comply with fire code separation for residential, commercial and industrial structures

Policy 2 - Ensure buildings and structures do not encroach on residential building air space

Objective 2 - Design lots and blocks to emphasize cost efficiency and community values

Policy 1 – Review the lot and block designs based upon subdivision design standards

Policy 2 – Utilize the zoning and subdivision regulations to protect residential neighborhoods from encroachment of incompatible activities or land uses which may have a negative impact upon a residential living environment

Policy 3 – In reviewing development proposals, the City should consider issues of community character, compatibility of land use, residents' security and safety, and efficient service provision, particularly since these are all important qualities of the community

Objective 3 – Provide adequate visibility at intersections and driveways for all streets

Policy 1 – Ensure that structures and fences do not obstruct the view of intersecting traffic

Objective 4 – Design major streets to emphasize mobility and safety

Policy 1 – Preserve adequate right-of-way for future arterial traffic routes and collectors

Policy 2 – Maintain a policy of safe speed limits for all collectors and arterial roads; limit the number of stop signs or stop lights to maintain an even traffic flow

Policy 3 – Ensure single-family developments and other low intensity uses have driveway access off local or collector streets and not off major streets; arterial streets should have limited access

Policy 4 – Require development of a consistent collector street system as indicated by the Major Street Plan

Goal 2. Protect Natural Resources

Objective 1 – Retain runoff with open natural drainage systems

Policy 1 – Any development should be platted to incorporate as much natural drainage as possible

Policy 2 – Utilize open space such as parks or backyards to help naturally drain new developments

Objective 2 – Create greenways and linear open spaces within floodplain areas

Policy 1 – Do not allow residential, commercial or industrial development within floodplain areas

Objective 3 – Design around significant wetlands

Policy 1 – Encourage development to utilize and maintain wetlands as a part of the natural drainage basin

Objective 4 – Limit development in areas with poor soils and high water table

Policy 1 – Require further investigation for new development to occur in areas with soil limitations as identified by the Natural Resource Conservation Service (NRCS)

Goal 3. Enhance the Visual Quality of the City

Objective 1 – Separate industrial and residential uses

Policy 1 – Do not allow industrial development near residential developments

Policy 2 – Encourage siting of industrial uses in incorporated areas

Policy 3 – Require design review requirements in the Harrisburg Industrial Park

Objective 2 – Soften the look of all uses to enhance the community's image as an attractive place

Policy 1 – Front and rear setbacks will provide reasonable separation for residential living

Policy 2 – Encourage development to comply with land use location and design criteria located in Appendix 1

Policy 3 – Use landscaping to establish visual and physical boundaries between parking lots and roads

Objective 3 – Encourage the appropriate siting and concentration of uses and structures that can clutter the landscape

Policy 1 – Allow manufactured homes to be placed in residential areas that are consistent with site-built homes

Policy 2 – Allow manufactured homes to be placed only in parks that are single sections or do not resemble a site-built home

Policy 3 – Home occupations will be allowed as long as there is no substantial change in the residential nature of the home

Objective 4 – Create a transition from commercial to residential areas

Policy 1 – Require the use of berms, fences and additional setbacks as measures to create an appropriate transition to single-family use.

XI. PLAN IMPLEMENTATION

Planning is a continuous process. Completion of the Comprehensive Plan is by no means an end in itself. A comprehensive plan must be constantly scrutinized to ensure that its goals, objectives and policies continue to reflect changing community needs and attitudes. The purpose of this implementation element is to provide direction and recommendations for implementing the Comprehensive Plan and for continuing planning.
Above all, the Plan must be used.

A. THE CONTINUOUS PLANNING PROCESS

Circumstances will continue to change in the future, and the Harrisburg Comprehensive Plan will require modifications and refinements to be kept *up-to-date and current*. Some of its proposals will be found unworkable and other solutions will continue to emerge. Changes that are needed should be carefully noted and thoroughly considered as part of **Annual Plan Updates** and **5-Year Major Plan Revisions**. As change occurs, however, Harrisburg's vision should remain the central theme and provide a unifying element. ***This plan's importance lies in the commitment of citizens to agree on Harrisburg's purpose for the future, and to apply that consensus in continuing efforts that focus on betterment of the community.***

**** Review by the Planning Commission ****

The Planning Commission should review the status of efforts to implement this Comprehensive Plan on an annual basis. Significant actions and accomplishments during the past year should be recognized as well as recommendations for needed actions and programs to be developed in the coming new year.

**** Annual Plan Amendment Process ****

Annual plan amendments, when necessary, will provide opportunity for relatively minor plan updates and revisions such as: changes in future land use designations; implementation actions for identified goals, objectives and policies; and review of plan consistency with ordinances and regulations. A plan amendment should be prepared and distributed in the form of an addendum to the adopted Comprehensive Plan. Identifying potential plan amendments should be an *ongoing process* by the Planning Commission and City Council throughout the year; input from the general public should be solicited for any and all plan amendments. Proposed plan amendments should be reviewed and approved by the Planning Commission with final approval from the City Council, mirroring the initial adoption of this Comprehensive Plan; plan amendments shall be in the form of a resolution.

**** Major Updates of the Comprehensive Plan ****

Major updating of the Comprehensive Plan should occur *every five years*. These updates will ensure renewal and continued utility of the Comprehensive Plan for use by the City Planning Commission and City Council. Annual plan amendments from the previous four years should be incorporated into the next major plan update. Plan updates will be a significant undertaking involving City officials, the Planning Commission, a steering committee and citizens. The result of major plan updates will be a "new" comprehensive plan for the City, including new identification of up-to-date goals, objectives, policies and implementation actions.

B. CITIZEN PARTICIPATION IN CONTINUING PLANNING

All community members of Harrisburg have a vested interest in maintaining a high quality of life within the city. It is only fair that those members be entitled to an opportunity of shaping the community's vibrant future. Citizens should continue to be involved in implementing and maintaining the Comprehensive Plan. The Planning Commission, town meetings, public forums, newsletters and public notices should be utilized to inform and involve citizens in continuing planning. Methods and activities for public participation should be carefully chosen and designed to achieve meaningful and effective involvement.

C. IMPLEMENTATION PROCESS

The Comprehensive Plan is the City's guide for government officials and citizens when making decisions about land use and development. The Comprehensive Plan is *comprehensive* in that it identifies the multitude of factors related to future community growth. The Plan analyzes relationships among these factors, proposes what needs to be done about them, and recommends goals and objectives and actions for using the City's resources in the most efficient and effective ways.

Plan implementation includes using the Future Land Use map as a general guide for decision-making in zoning cases and subdivision plat review. This practice is to ensure that development and redevelopment are consistent with the policies of the City's Comprehensive Plan. Review and revision of City ordinances for updating, strengthening and streamlining the Zoning Ordinance and Subdivision Regulations will be a plan implementation activity. Studies for drainage basins are critical to protection of existing and future development. Water and sewer needs and improvements must be addressed on a yearly basis. Parks development and community facilities improvements will be needed as well.

Perhaps the most important method of implementing Harrisburg's Comprehensive Plan comes through a day-to-day ***commitment*** by elected and appointed officials, City staff members and citizens of the community. The Comprehensive Plan must be perceived as a useful and capable tool in directing the City's future. The Future Land Use map and other key elements of the Comprehensive Plan should be displayed and available for ready reference by public officials and citizens. The Comprehensive Plan should continually be referenced in rezoning public hearings, site plan proposals, variance and conditional use hearings as well as informal discussion situations.

An aggressive, yet realistic program for implementing the Comprehensive Plan should be established by the Mayor, City Council, and the Planning Commission, and then used by the entire community. Implementation tools include the Zoning Ordinance, Subdivision Regulations and annual budget. These tools should be reviewed and updated periodically so that the goals, objectives, and policies of the Comprehensive Plan are put into action. ***In addition, the identified goals, objectives and policies on pages 20-24 of this Plan should be reviewed and implemented continually to ensure maximum effectiveness of the Plan. It is recommended that an Implementation Task Force be established by the City Council to address the identified goals, objectives and policies of this Comprehensive Plan; the Planning Commission should provide oversight and act in a supervisory capacity.***

APPENDIX 1

Land Use Location and Design Criteria

Residential

Low density (3 to 6 units/acre)

*Access to local street system-avoid direct access to arterial streets
*Convenient to neighborhood school, park, and commercial services
*Avoid environmentally sensitive areas such as wetlands and drainage ways

Medium density (6 to 16 units/acre)

*Access to major street system
*Well designed transition to adjacent land uses
*Provision of usable open space based on project size
*Transition between low-density neighborhood and major streets
*Adjacent to neighborhood commercial center

High density (16 to 40 units/acre)

*Adjacent to principal arterials near major commercial, institutional, or employment centers
*Well designed transition to adjacent land use
*Provision of usable open space based on project size

Commercial

Highway oriented and regional centers

*Adjacent to major streets and regional highways
*Controlled access to arterial streets
*Quality architecture and well designed transition to adjacent uses

Community centers

*Intersection of arterial streets and along transit routes
*Mixed-use development including office, institutional, or multifamily residences
*Well designed transition to adjacent uses

Neighborhood retail, office, and convenience services

*Convenient vehicular and pedestrian access to residential areas
*Adjacent to major street intersections
*Design compatible with surrounding uses
*Well designed transition to adjacent uses
*Located within residential, employment, or institutional centers

Downtown area

*Pedestrian orientation
*Quality urban design standards
*Mixed uses including office, retail, institutional, cultural, and entertainment
*Orientation to greenway where feasible
*Consolidate off-street parking areas
*Residential uses within walking distance of CBD

Industrial

General light industrial

*Regional highway access located close to major arterial streets
*Rail access for industrial uses requiring it
*Buffered from residential and other adjacent land uses
*Industrial park setting with building design and landscape amenities
*Include office, warehousing, and limited retail uses

Limited heavy industrial

*Access to major streets
*Well designed buffer to adjacent land uses
*Minimize environmental impacts on surrounding properties

Mixed Use

Institutional, office, and other mixed use development

*Convenient to intended market area
*Vehicular access to major streets
*Minimization of traffic impact on adjacent uses
*Orderly expansion of institutional uses near residential areas
*Design compatibility with adjacent uses
*Include retail, multi-family, and business-technology land uses

RESOLUTION NO. 2011-05

A RESOLUTION AMENDING THE 2005 - 2025 HARRISBURG COMPREHENSIVE PLAN AS PROVIDED FOR IN SDCL CHAPTER 11-6.

WHEREAS, the Harrisburg City Council desires to amend the 2005 - 2025 Harrisburg Comprehensive Plan; and

WHEREAS, the Harrisburg Planning Commission has held the required public hearing and has recommended approval of said proposed amendments; and

WHEREAS, the Harrisburg City Council has received the recommendation of the Harrisburg Planning Commission and has held the required public hearing.

NOW, THEREFORE, BE IT RESOLVED that the Harrisburg City Council hereby adopts the attached addendum which will amend the 2005 - 2025 Harrisburg Comprehensive Plan and that these amendments will take effect upon publication of a notice of adoption and summary (SDCL 11-6-18.2).

Adopted this 4th day of April, 2011.

Mayor

ATTEST:

Finance Officer

(SEAL)

Published · April 14, 2011
Effective · May 4, 2011

Addendum

2005 - 2025 Harrisburg Comprehensive Plan

The 2005 - 2025 Harrisburg Comprehensive Plan is amended as follows:

On page 7 amend "IV. INFRASTRUCTURE ASSESSMENT" to read as follows:

IV. INFRASTRUCTURE ASSESSMENT

Harrisburg's infrastructure has seen significant changes in the past few years, with more improvements needed to allow for continued development. Recently completed and top priority projects for each infrastructure area are described below. The City's greatest challenge during the next comprehensive planning period will be to fund the necessary improvements.

A. TRANSPORTATION

Street and highway improvements are a critical planning consideration because of the interactive relationship between transportation and land use. Location choices for many land uses are frequently made on the basis of access to major streets and highways. Without consideration for adequate capacity or maintenance, the transportation system cannot adequately accommodate development.

The City is currently in the process of completing a Transportation Master Plan. The plan will provide the City with a 25-year planning guide for its transportation needs. The objective of the study is to document and prioritize the transportation improvements needed to serve the current and anticipated (2035) users, including pedestrians and bicyclists. The City intends to use the information for capital improvement planning purposes and to seek funding assistance for select projects, since funding for the projects from the City's general fund is limited. Assessments, loans, grants, and/or earmarks are considered funding options.

The study evaluated several street corridors and key intersections, and determined the top two priority projects. Existing arterials within the City are rural, two-lane highways. Cliff Avenue from 272nd Street to Willow Street is the top priority project, and Willow Street from Minnesota Avenue to Cliff Avenue is the second priority project. Both roadways need to be converted to two-lane urban sections with a center median. The medians will provide access control. Additional turning lanes are needed at several intersections along the corridors.

The Transportation Master Plan also provided the City with an updated Major Street Plan **(see Major Street Plan Map)** that categorizes existing and future streets as arterial, collector, or local. The definitions for each street category can be found in Harrisburg's Engineering Design Standards, which were adopted in April 2010.

B. WATER FACILITIES

Since the last comprehensive plan was prepared, the City of Harrisburg has completed several key improvements to the water system to serve current and anticipated development. Those projects are as follows:

1) A 16" emergency connection to the Lewis and Clark Rural Water System to meet current and anticipated water needs. The connection is being fed with water from the City of Sioux Falls, via

Lincoln County Rural Water lines, until Lewis and Clark's water treatment plant comes on-line; and

2) The construction of a 750,000 gallon elevated storage tank north of the Harrisburg High School; and

3) The construction of a 12" water main from the new elevated storage tank to the southwest corner of the Harrisburg Homesites Addition. The connection improved water quality in the distribution system and provided a redundant connection for the Harrisburg Homesites Addition; and

4) The replacement of aging 4" water main with new 6" water main in the older portions of the city. The City plans to continue to replace and upsize existing, older 4" water main for the next several years; and

5) The upsizing of several new water mains from 8" to 12" to begin to create a trunk water main system for the City. This includes water main in the Greyhawk Addition, the Green Meadows Addition, and the Legendary Estates Addition. The Legendary Estates Addition also includes 12" connections to water main in Willow Street and just north of Liberty Elementary.

During the comprehensive planning period, key projects for the City's water system would be to seek a long-term water supply for the community. The City of Harrisburg is a member of the Lewis and Clark Rural Water System, and their contract limits the amount of water they can purchase. Harrisburg will need to find other sources to meet long-term water needs.

C. WASTEWATER FACILITIES

The City of Harrisburg recently constructed a large lift station and 7 miles of 16" force main to convey the City's wastewater to Sioux Falls for treatment. As part of the project, the existing evaporation ponds now serve as pretreatment and retention facilities. The design, which includes intermediate pumping upgrades, will allow for significant development and is projected to serve a 2029 population of over 20,000.

It is often said that the availability of sanitary sewer drives development. The construction of sanitary sewer interceptors are needed in the City's sewer basins to serve future development. These projects are discussed in more detail in the Growth Area Analysis portion of this Comprehensive Plan Amendment.

D. STORM WATER FACILITIES

In 2007, the City completed a Master Drainage Plan to address the flooding issues currently occurring with the City and to identify the infrastructure needed to manage storm water runoff. The plan identified several areas that need improvements. From this list the City has identified the top priority project as the flooding that occurs east of Liberty Elementary School and the undersized storm water piping that conveys runoff from this area to the Ninemile Creek tributary, south of the Harvest Acres Addition. The City is currently working to obtain funding for this project, and hopes to begin construction in the next few years.

On page 8 replace "MAJOR STREET PLAN MAP" with the attached new map of the same title (attached as Exhibit A).

On pages 12 - 14 amend "VIII. LAND USE PLAN" to read as follows:

VIII. LAND USE PLAN

A. EVALUATION OF URBAN LAND USE IN HARRISBURG

To simplify preparation of this plan, land uses have been grouped into six categories for the City of Harrisburg:

(1) Industrial: Includes light manufacturing, warehouses and other similar uses.

(2) Commercial: Includes retail businesses, offices, etc.

(3) Residential: Includes single-family, two-family, multiple-family and manufactured housing.

(4) Institutional: Includes schools, libraries, churches, government offices and similar uses.

(5) Parks, Recreation and Open Space: Includes parks and athletic fields. Also included are areas that should be protected from development to facilitate movement of flood water and runoff. Some types of development may be appropriate for such areas, as long as the development does not dramatically increase the incidence or severity of flood or drainage problems.

(6) Vacant: Includes land not yet developed for one of the other five uses. Also included are areas that provide farming and agriculturally related uses.

A physical land use inventory was prepared by SECOG in January of 2011. Maps for the current and future land uses in Harrisburg and the planning area are included. Future land uses were determined by the Harrisburg Planning Commission and SECOG, based on topographic features, compatibility with current land uses and existing infrastructure.

B. CURRENT LAND USE CONSUMPTION

Land Use	Acres Consumed
Residential	342
Commercial	47
Institutional	266
Industrial	111
Parks, Recreation & Open Space	57
Vacant	563

C. FUTURE LAND USE ESTIMATES

Households and a projected demand of certain land use categories are listed in the tables below.

City of Harrisburg

Household Projections

	Population	Persons per Household *(assuming number remains constant)*	Households
1980	558	NA	NA
1990	727	NA	NA
2000	958	3.04	318 (actual)
2020	7,766	3.04	2,555 (projected)
2025	12,506	3.04	4,114 (projected)

Households Added 2000-2025
Total New Households 3,796

Land Use Consumption Needs – Housing		
Residential – Urban Density	3 units per acre (low density) x 3.04 pph = 9.12 ppa *	9.12 ppa x 2,307 acres = 21,040 additional people

Based upon the above referenced analysis, the City of Harrisburg will be able to provide adequate housing through the year 2025.

* Projections based upon low density residential development

Future Land Use Available

Land Use	Available Acres
Residential	2,307
Commercial	66
Industrial	276
Mixed Use (Commercial and Residential)	489
Urban Reserve	2,288
Parks, Recreation & Open Space	691

A review of the population projections and land use consumption needs should be reviewed every five (5) years to ensure enough land is available for future land use needs.

On page 15 replace "CURRENT LAND USE MAP" with the attached new map of the same title (attached as Exhibit B).

On page 16 replace "FUTURE LAND USE MAP" with the attached new map of the same title (attached as Exhibit A).

On pages 17 - 19 amend "IX. GROWTH AREAS" to read as follows:

IX. DEVELOPMENT AREA ANALYSIS

Because of the high cost of sanitary sewer infrastructure, the areas that can most economically be provided with sanitary sewer service are anticipated to develop the fastest. For this reason, Harrisburg is expected to expand mostly to the north and west during the 20-year planning period. The need, size, and location of future sanitary sewer interceptors within Harrisburg were first identified in the Water and Wastewater Infrastructure Report prepared in September 2005. The key interceptors to serve the development areas identified in this Plan are discussed in more detail later in this section.

Trunk water main will also need to be extended as the City develops. Currently, the City's Subdivision Regulations, effective May 2010, state that 16" water main should be installed in a one-mile grid pattern and 12" water main should be installed in a one-half mile grid pattern.

The costs of extending water and sewer services are the primary considerations in designating future development. However, other factors must also be considered, including the capacity of the transportation system, environmental suitability, and compatible land uses. The following analysis is intended to provide the City of Harrisburg and Lincoln County with a guide to land use decisions and direct implementation through subdivision and zoning regulations. The Growth Areas Map illustrates all development areas by the number indicated.

The City will need to use creative financing methods because of State mandated debt limits to facilitate the infrastructure improvements needed for development. The City will seek outside funding sources and developers may see an increase in fees. In addition, cost recovery may be used to fund sanitary sewer interceptors. To reduce debt for the City, developers may be required to install the sanitary sewer interceptors as part of a subdivision or other development project, and be reimbursed for the oversize through the cost recovery process.

It is appropriate to note that rezoning requests (and other development approvals) for land uses not consistent with the Future Land Use Map, except for previously established and approved land uses, should not be considered until the Comprehensive Plan has been amended, as necessary, to provide for such land uses. In those cases where development requests are not consistent with the plan, but represent a benefit to the community, the City should process such requests and plan amendments concurrently and in a timely fashion. In addition, **the Future Land Use Map is not the community's official zoning map.** It is a guide for future land use patterns. The Future Land Use element and all other aspects of the Comprehensive Plan are implemented primarily through development regulations (e.g., zoning and subdivision regulations). Text of the zoning regulations and its corresponding map determine which specific development requirements apply to a particular property.

The City has identified three development areas within the 25-year planning period. Development in these areas is anticipated to occur from the southeast areas to the northwest over the indicated time period. An additional urban reserve area has been set aside for development during subsequent years (2035+). The following improvements will be needed for development to occur within the development areas:

2012 - 2020 Development Area

- **Sanitary Sewer** – An interceptor is needed from the intersection of Tiger Street and Columbia Street to north of the Industrial Park. This work is tentatively scheduled for 2012. Land to the east of the Burlington Northern Railroad tracks is served by an existing lift station in the Legendary Estates Addition.
- **Water Service** – The City's development plans will require 12" water main to be installed within developments in a half-mile grid pattern. In addition, 12" to 16" water main will be required in:
    - Willow Street from one-half mile east of the railroad tracks to Cliff Avenue
    - Cliff Avenue from Willow Street to one-half mile north of 272nd Street
    - 272nd Street from the Southeastern Avenue to one-half mile west of Cliff Avenue
- **Streets** – The following streets need to be reconstructed as urban sections with turning lanes:
    - Cliff Avenue from Willow Street to one-half mile north of 272nd Street
    - Willow Street from one-half mile east of the railroad tracks to Cliff Avenue
    - 272nd Street from Southeastern Avenue to one-half mile west of Cliff Avenue
- **Storm Sewer** – A regional detention basin is needed north of Willow Street on the west side of Liberty Elementary School. Storm water piping will need to be extended south from the basin to the Ninemile Creek tributary. Piping to handle storm drainage will be part of the street improvements. On-site drainage and retention will also be addressed for each area as it develops.

2015 - 2030 Development Area

- **Sanitary Sewer** - Sewer interceptors will need to be extended from outside the growth area, from the lift station at the wastewater treatment ponds and along the Ninemile Creek tributary, through the Green Meadows Addition, toward Willow Street. From this point, the interceptor will split. One interceptor is needed along and north of Willow Street, extending west past Minnesota Avenue. A second interceptor will be needed along the Ninemile Creek tributary from Willow Street to the northwest, past 272nd Street and Minnesota Avenue.
- **Water Service** – The City's development plans will require 12" water main to be installed within developments in a half-mile grid pattern. In addition, 12" to 16" water main will be required in:
    - Willow Street from Cliff Avenue to Minnesota Avenue
    - 272nd Street from one-half mile east of Minnesota Avenue to Western Avenue
    - Cliff Avenue from the South Cliff Falls Apartments to 274th Street
    - 274th Street from one-half mile east of Cliff Avenue to one-quarter mile west of Cliff Avenue
    - County Road 106 from Western Avenue to three-quarters of a mile east
    - Minnesota Avenue from one-quarter mile south of County Road 106 to Willow Street
- **Streets** – The following streets will need to be reconstructed as urban sections with turning lanes:
    - Willow Street from Cliff Avenue to Minnesota Avenue
    - 272nd Street from one-half mile east of Minnesota Avenue to Western Avenue
    - Cliff Avenue from the South Cliff Falls Apartments to 274th Street
    - 274th Street from one-half mile east of Cliff Avenue to one-quarter mile west of Cliff Avenue
    - County Road 106 will be expanded as part of a County project from Western Avenue to three-quarters of a mile east
    - Minnesota Avenue will be expanded to four lanes with a center median as part of a future State DOT project
- **Storm Sewer** – A regional detention basin will be constructed on property to the east of the high school. Piping to handle storm drainage will be part of the street improvements. This will include the planned culvert replacement in Cliff Avenue. On-site drainage and retention will also be addressed for each area as it develops.

2025 - 2035 Development Area

- **Sanitary Sewer** - Sewer interceptors will need to be extended from the lift station at the wastewater treatment ponds and along Ninemile Creek, with several smaller interceptors extending into areas as they develop.
- **Water Service** – The City's development plans will require 12" water main to be installed within developments in a half-mile grid pattern. In addition, 12" to 16" water main will be required in:
    - Cliff Avenue from 274th Street to 275th Street
    - 274th Street from one-quarter mile west of Cliff Avenue to one-half mile west of Minnesota Avenue
    - 275th Street from one-half mile east of Cliff Avenue to one-half mile west of Cliff Avenue
    - Willow Street from Minnesota Avenue to one-half mile west of Minnesota Avenue
    - Minnesota Avenue from 274th Street to Willow Street
- **Streets** – The following streets need to be reconstructed as urban sections with turning lanes:
    - Cliff Avenue from 274th Street to 275th Street
    - 274th Street from one-quarter mile west of Cliff Avenue to one-half mile west of Minnesota Avenue
    - 275th Street from one-half mile east of Cliff Avenue to one-half mile west of Cliff Avenue
    - Willow Street from Minnesota Avenue to one-half mile west of Minnesota Avenue
    - Minnesota Avenue will be expanded to four lanes with a center median as part of a future State DOT project
- **Storm Sewer** – The Master Drainage Plan will need to be updated to include this area. Regional detention basins will likely be required along Ninemile Creek and its tributaries. Channel reconstruction to create a meandering low flow channel with high flow floodplain areas and offline wetland pools may also be needed along Ninemile Creek and its tributaries. Piping to handle

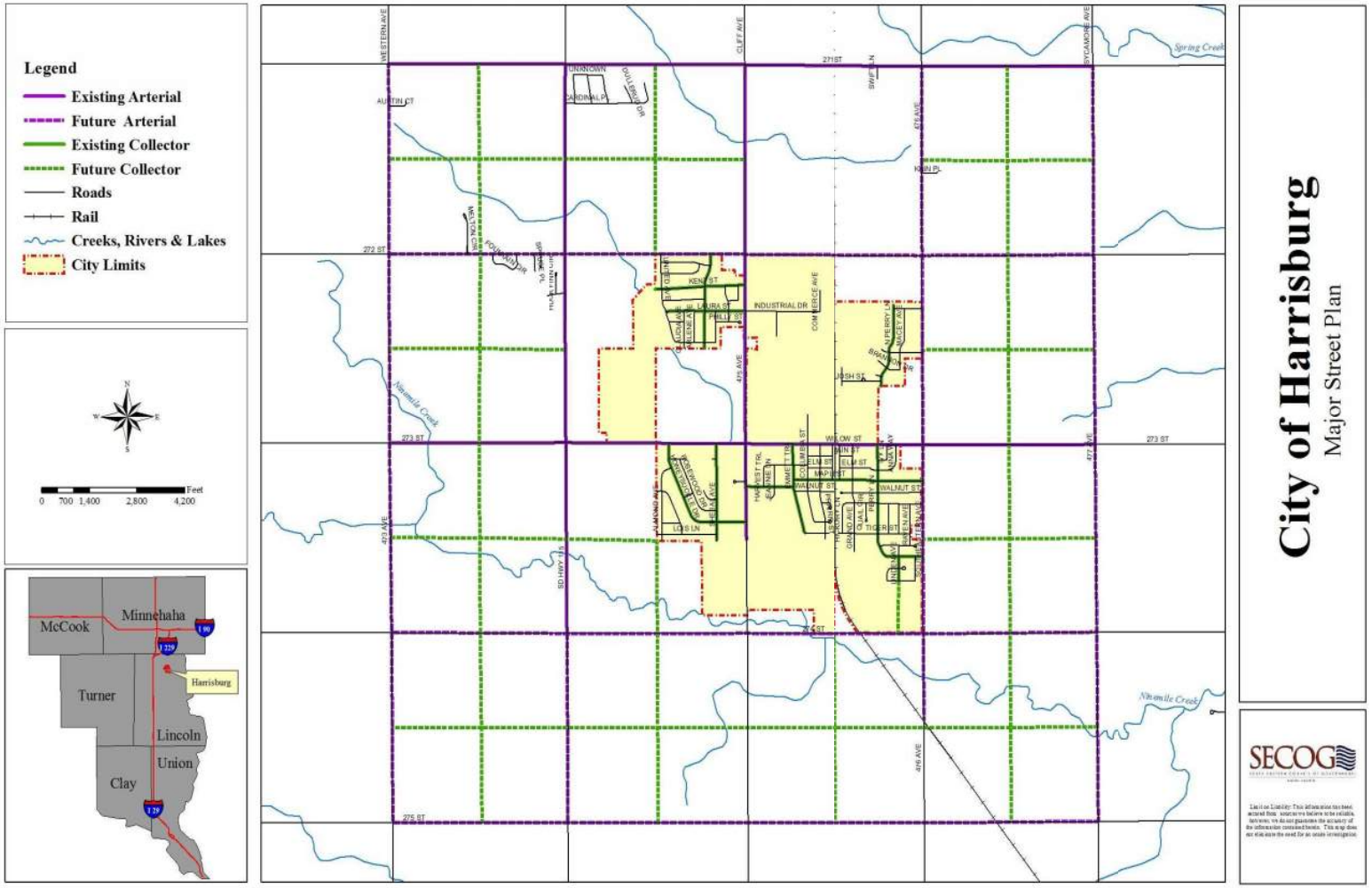
storm drainage will be part of the street improvements. On-site drainage and retention will also be addressed for each area as it develops.

2035+ Urban Reserve Development Area

- **Sanitary Sewer** – Two large lift stations will be required to serve this area. The first will be located just north of Willow Street, approximately one-half mile east of Southeastern Avenue. Sewer interceptors will be extended north and then to the west, ending near the intersection of County Road 106 and Minnesota Avenue. Flow from the lift station will be pumped to a gravity interceptor south of Willow Street that will convey the sewage to another lift station near Ninemile Creek and Sycamore Avenue. This lift station will also collect flow from an interceptor located along Ninemile Creek from the railroad track to Sycamore Avenue. The lift station will pump to the City's main lift station at the wastewater treatment ponds. Sewer service for the development area southwest of Harrisburg will require a sanitary sewer interceptor extension and possible lift station.
- **Water Service** – The City's development plans will require 12" water main to be installed within developments in a half-mile grid pattern. In addition, 12" to 16" water main will be required in:
    - Southeastern Avenue from one-quarter mile south of County Road 106 to 275th Street
    - Sycamore Avenue from one-half mile south of County Road 106 to 275th Street
    - Cliff Avenue from County Road 106 to one-half mile south
    - Minnesota Avenue from one-quarter mile south of County Road 106 to one-quarter mile north of County Road 106, and from 274th Street to 275th Street
    - 274th Street from one-half mile west of Southeastern Avenue to Sycamore Avenue
    - 275th Street from one-half mile east of Minnesota Avenue to one-half mile west of Minnesota Avenue, and from one-half mile west of Southeastern Avenue to Sycamore Avenue
    - Willow Street from Southeastern Avenue to Sycamore Avenue
    - 272nd Street from Southeastern Avenue to Sycamore Avenue
    - County Road 106 from Southeastern Avenue to one-quarter mile west of Minnesota Avenue
- **Streets** – The following streets need to be reconstructed as urban sections with turning lanes:
    - Southeastern Avenue from one-quarter mile south of County Road 106 to 275th Street
    - Sycamore Avenue from one-half mile south of County Road 106 to 275th Street
    - Cliff Avenue from County Road 106 to one-half mile south
    - 274th Street from one-half mile west of Southeastern Avenue to Sycamore Avenue
    - 275th Street from one-half mile east of Minnesota Avenue to one-half mile west of Minnesota Avenue, and from one-half mile west of Southeastern Avenue to Sycamore Avenue
    - Willow Street from Southeastern Avenue to Sycamore Avenue
    - 272nd Street from Southeastern Avenue to Sycamore Avenue
    - County Road 106 will be expanded as part of a County project from Southeastern Avenue to one-quarter mile west of Minnesota Avenue
    - Minnesota Avenue will be expanded to four lanes with a center median as part of a future State DOT project from one-quarter mile south of County Road 106 to one-quarter mile north of County Road 106, and from 274th Street to 275th Street
- **Storm Sewer** – The Master Drainage Plan will need to be updated to include this area. Regional detention basins will likely be required along Ninemile Creek and its tributaries. Channel reconstruction to create a meandering low flow channel with high flow floodplain areas and offline wetland pools may also be needed along Ninemile Creek and its tributaries. Piping to handle storm drainage will be part of the street improvements. On-site drainage and retention will also be addressed for each area as it develops.

Add "GROWTH AREAS MAP" to page 29 (attached as Exhibit D).

EXHIBIT A



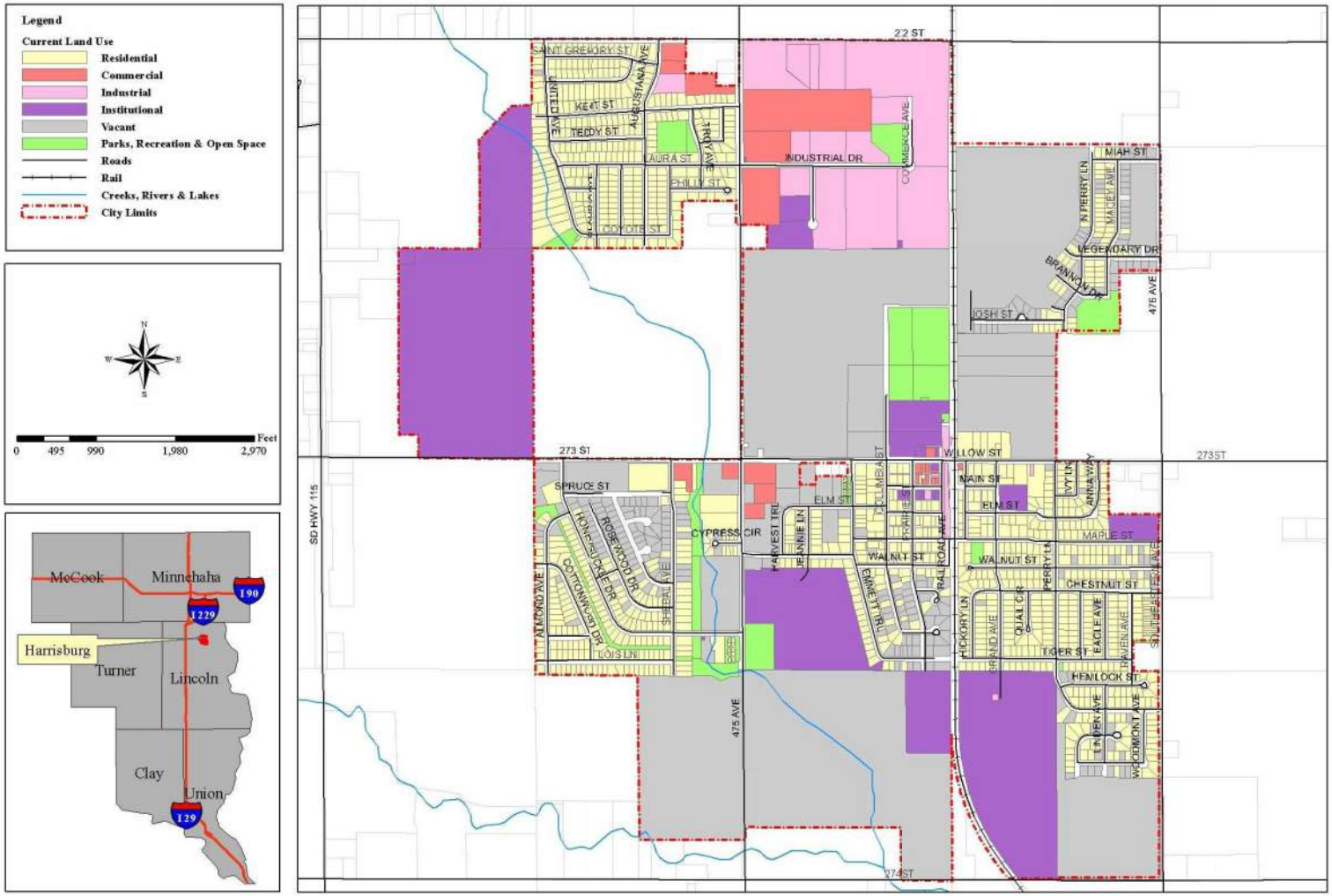
City of Harrisburg

Major Street Plan

SECOG

Limit on Liability: This information has been secured from sources we believe to be reliable, however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for an onsite investigation.

EXHIBIT B



City of Harrisburg

Current Land Use

SECOG

Limit on Liability: This information has been secured from sources we believe to be reliable, however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for on-site investigation.

EXHIBIT C

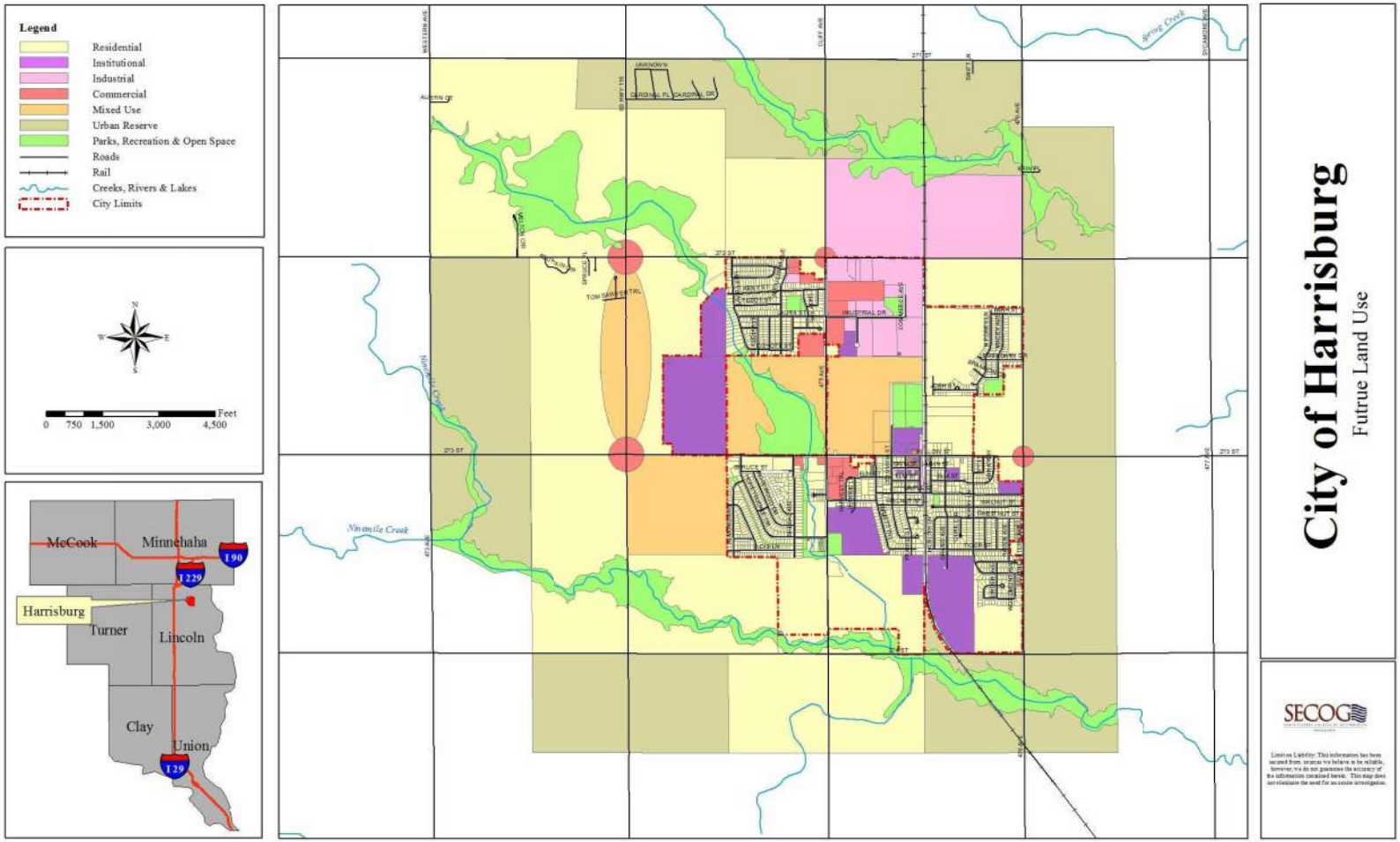
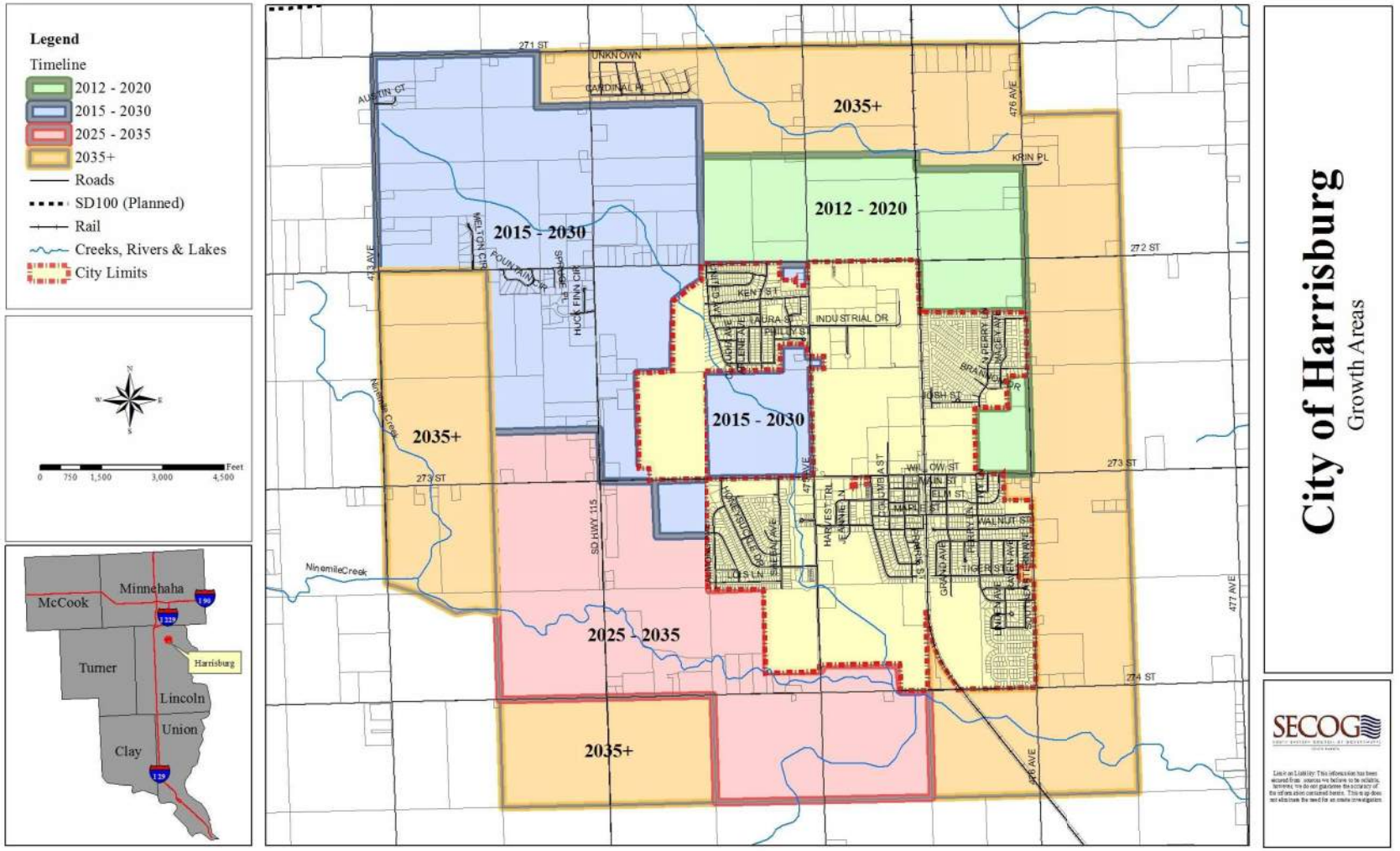

Legend
Residential
Institutional
Industrial
Commercial
Mixed Use
Urban Reserve
Parks, Recreation & Open Space
Roads
Rail
Creeks, Rivers & Lakes
City Limits
N
W
E
S
0 750 1,500 3,000 4,500
Feet
McCook
Minnehaha
I 90
I 229
Harrisburg
Turner
Lincoln
Clay
Union
I 29
Spring Creek
Nine mile Creek
City of Harrisburg
Futrue Land Use
SECOG

EXHIBIT D



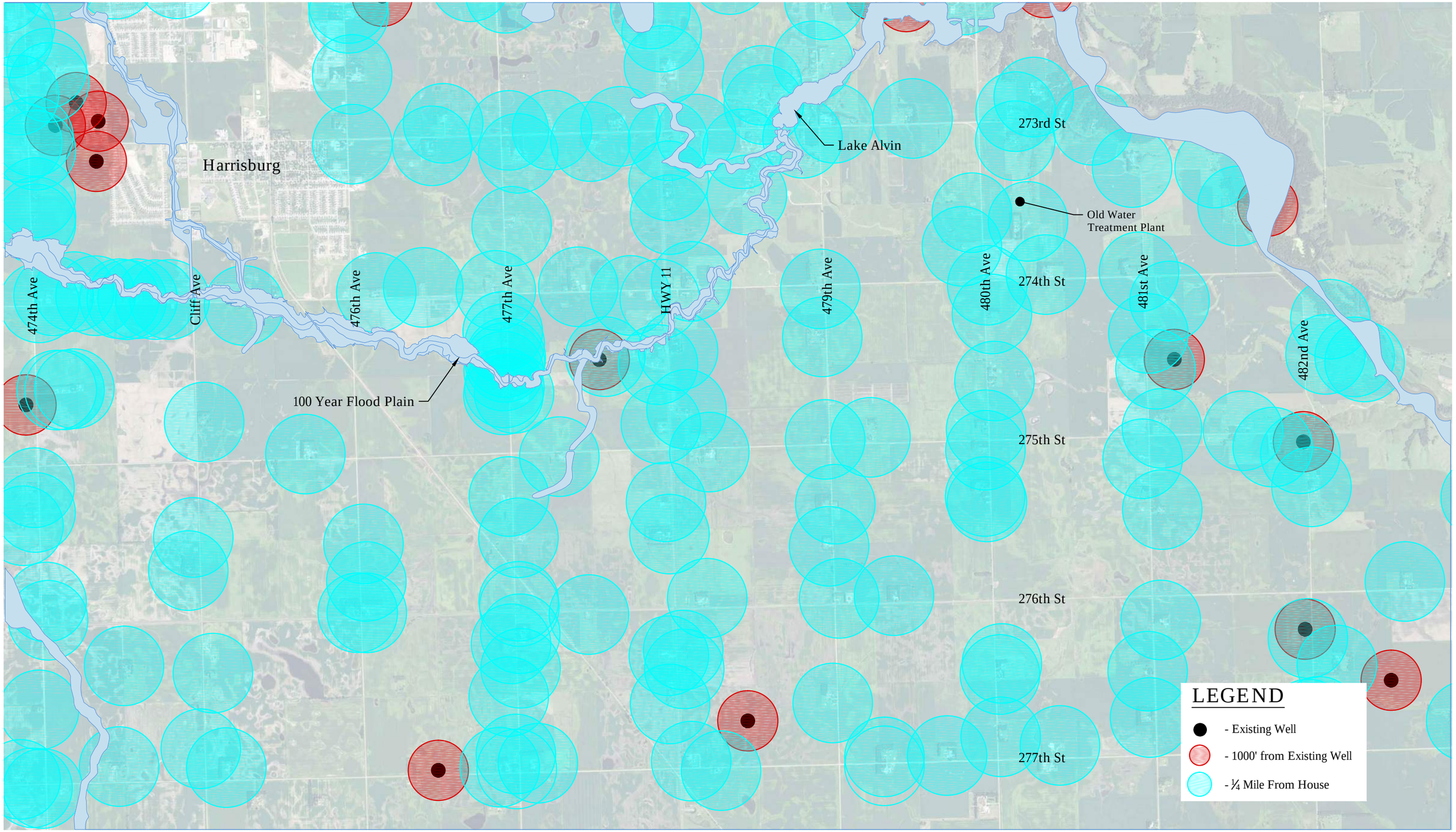
City of Harrisburg

Growth Areas

SECOG

Limit on Liability: This information has been secured from sources we believe to be reliable, however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for an onsite investigation.

Appendix F
Potential Treatment Sites



Potential WWT Sites ≀ Harrisburg, South Dakota

STOCKWELL ENGINEERS

Appendix G
Rose Wind Charts

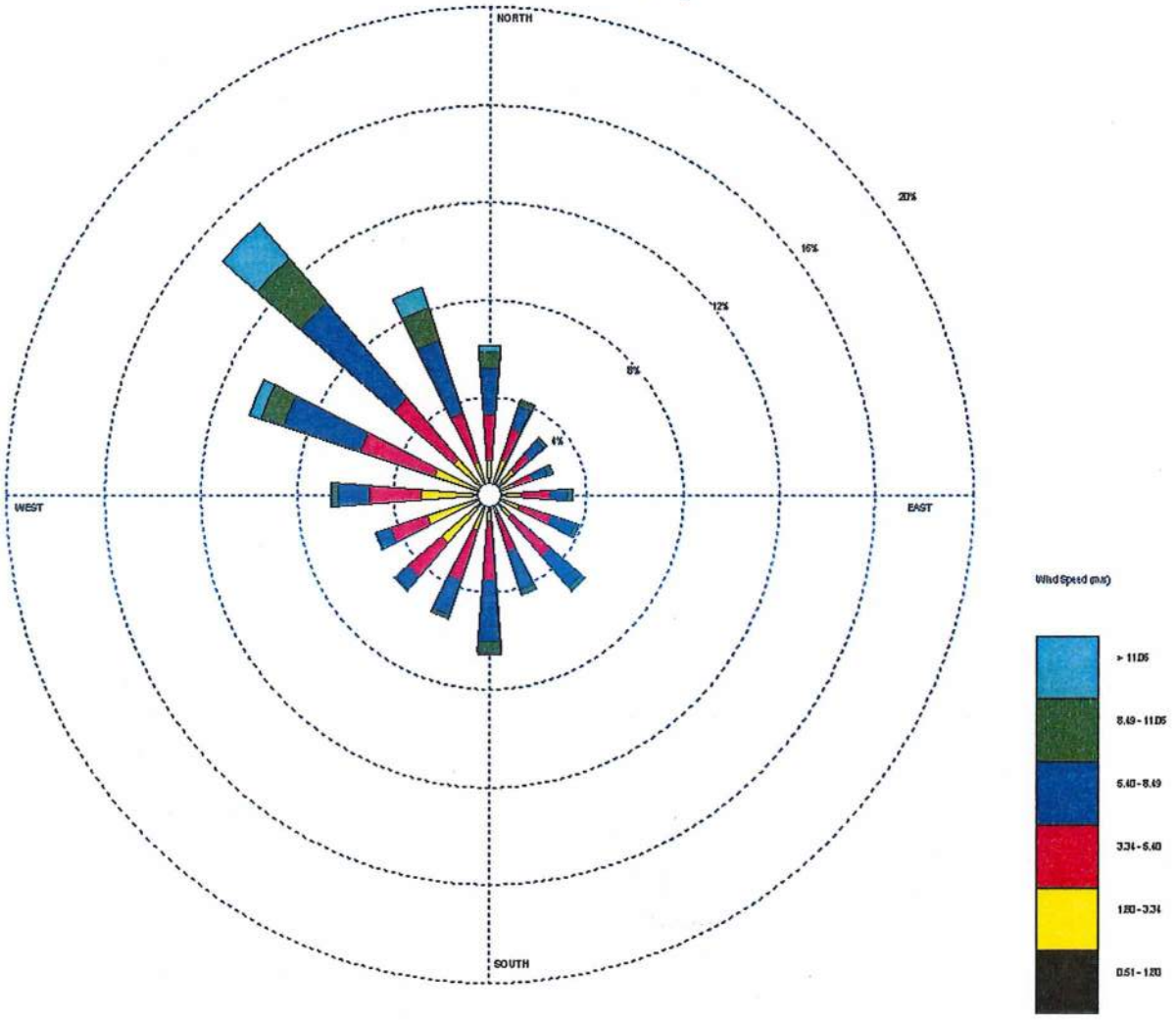
SOUTH DAKOTA STATE UNIVERSITY

SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: January :: Go ::
(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
January



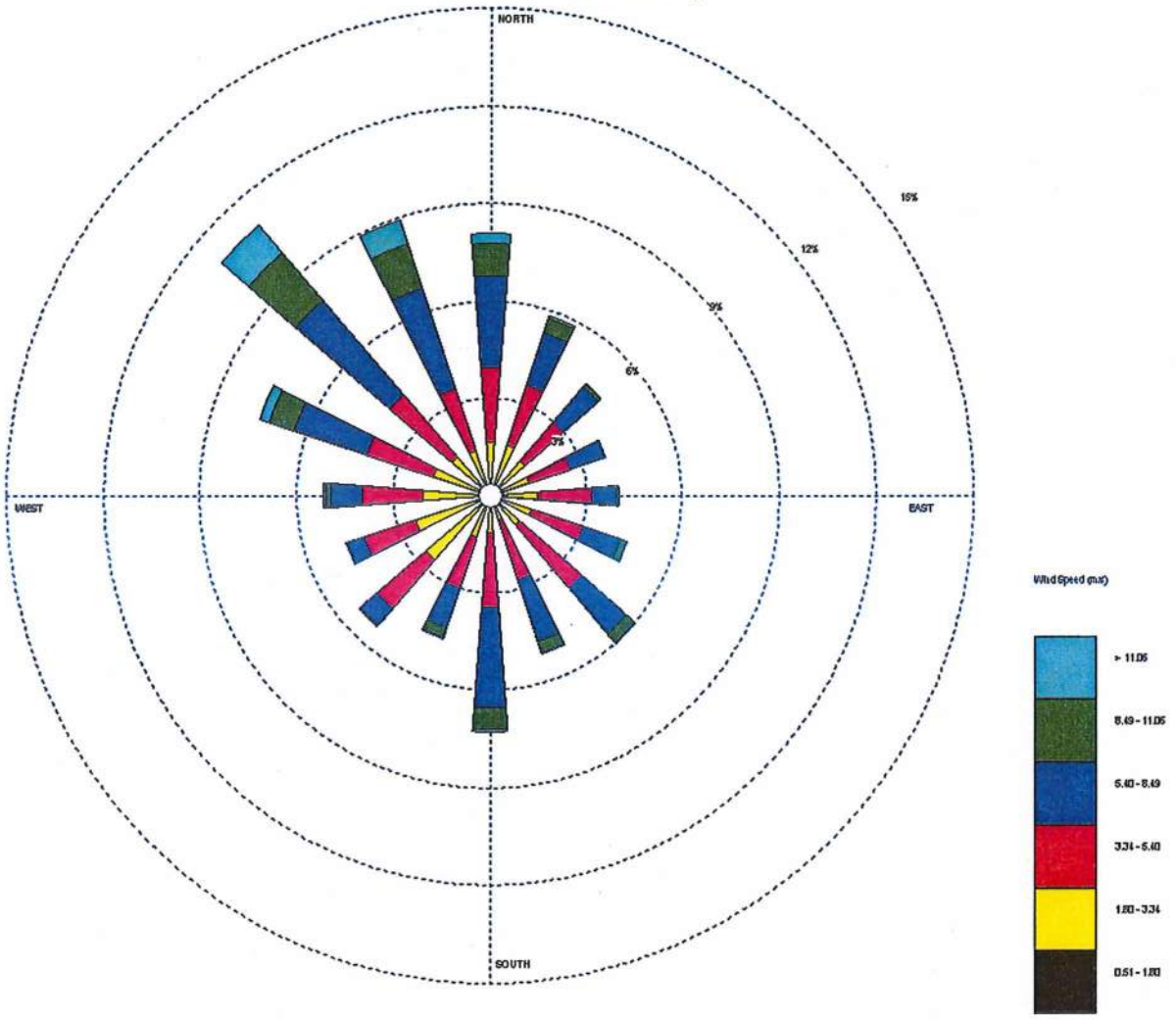
SOUTH DAKOTA STATE UNIVERSITY

SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: February :: Go ::
(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
February



SOUTH DAKOTA STATE UNIVERSITY

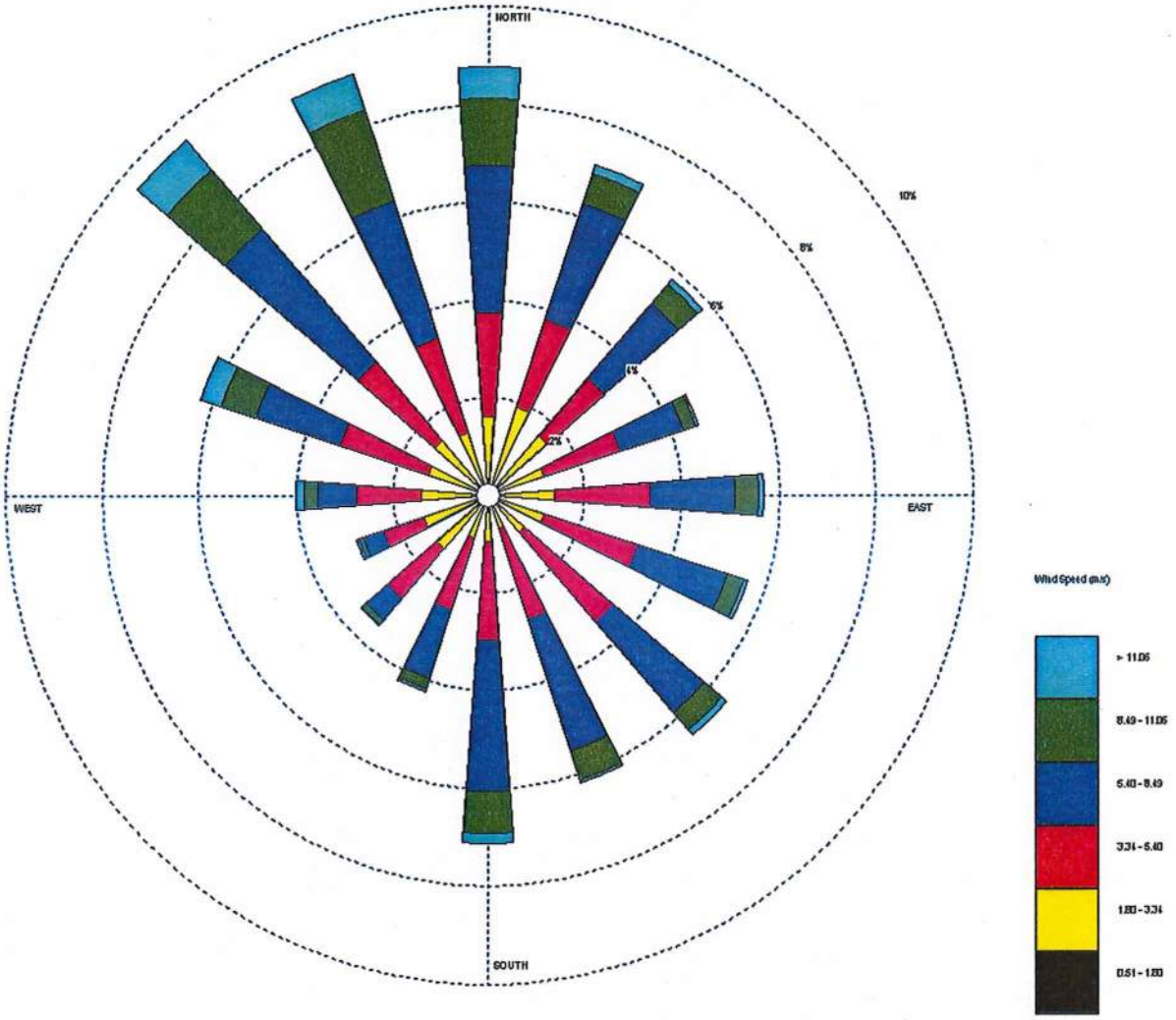
SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: March :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
March



SOUTH DAKOTA STATE UNIVERSITY

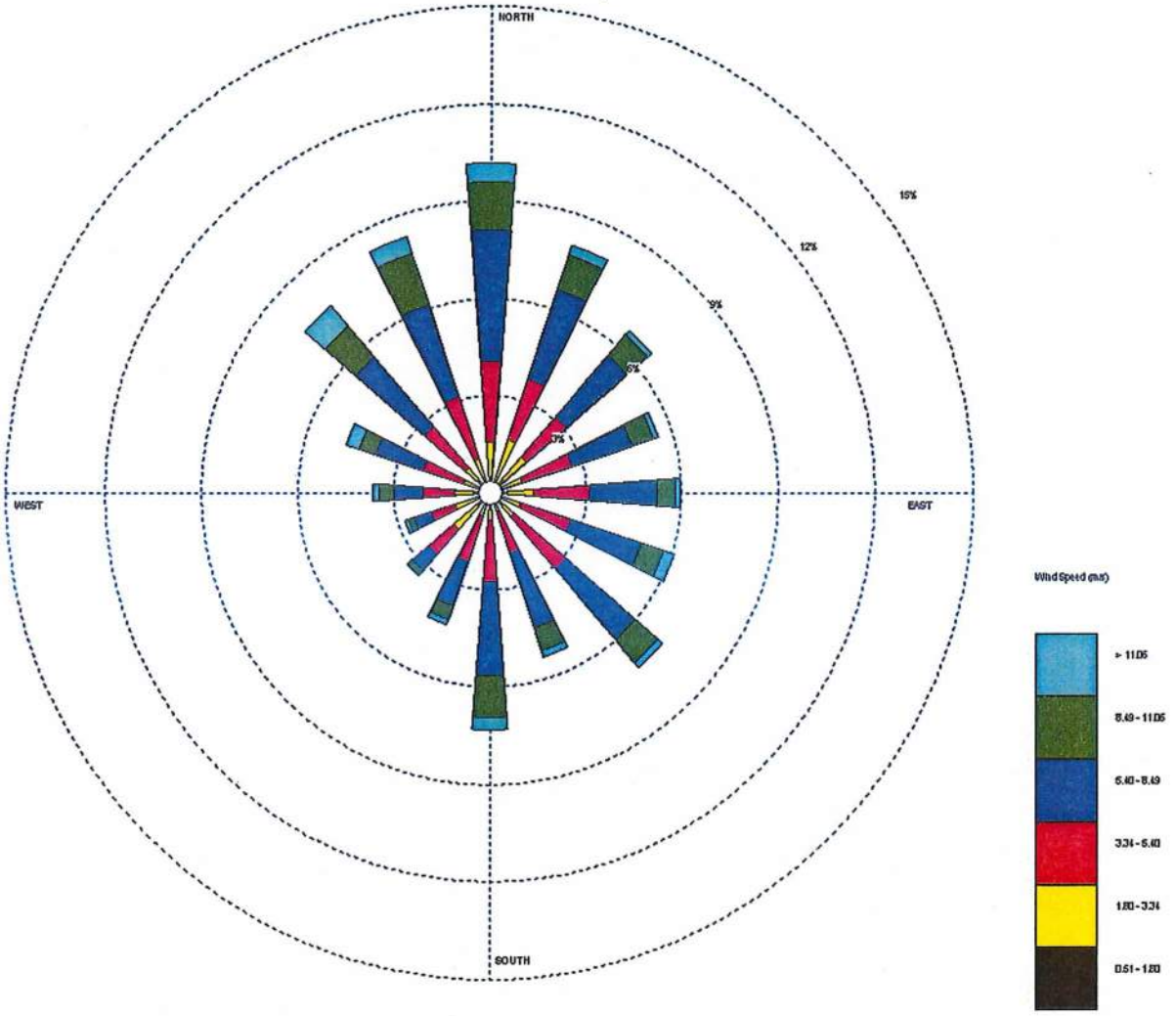
SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: April :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
April



South Dakota State University

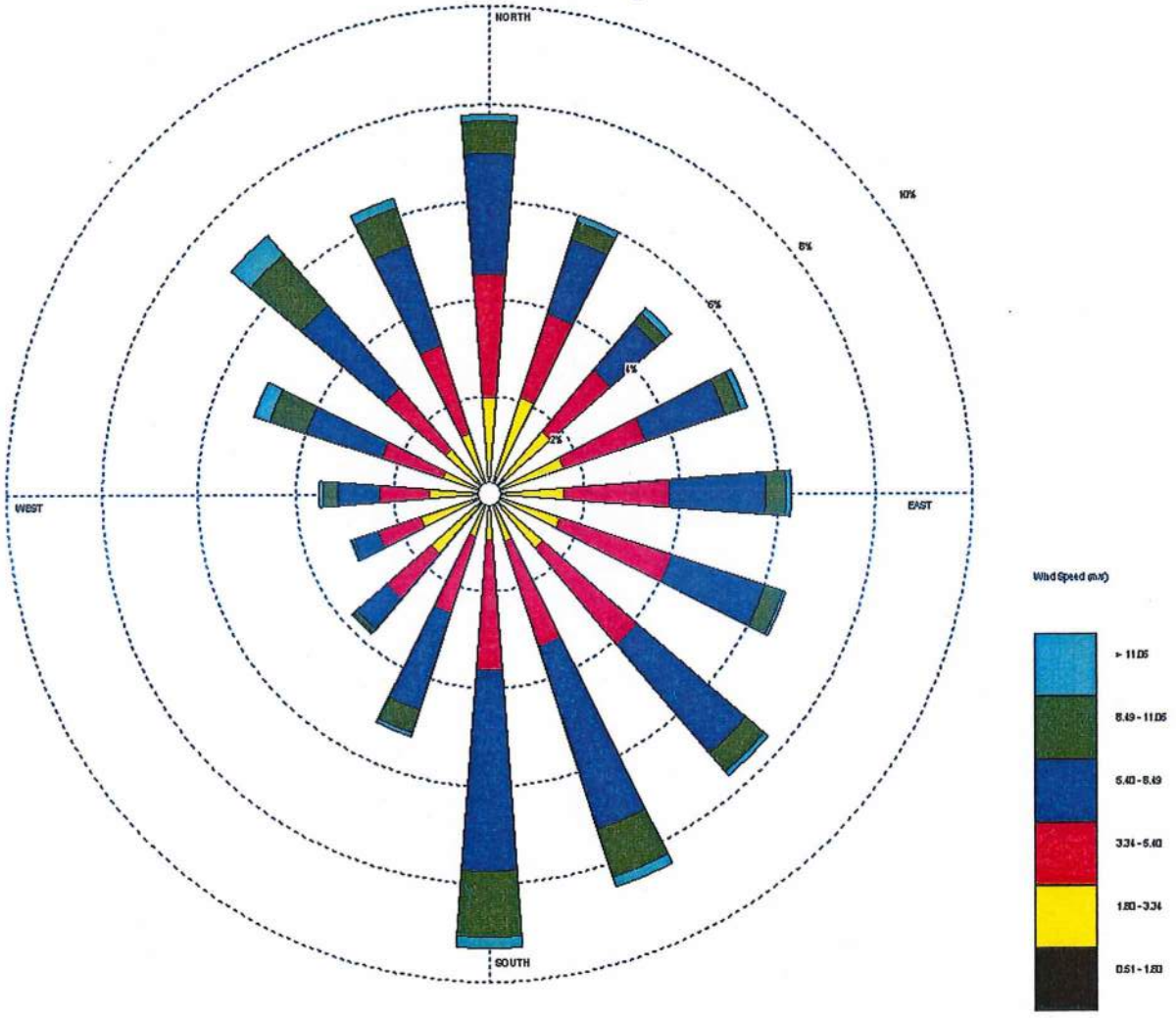
South Dakota Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: May :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
May



SOUTH DAKOTA STATE UNIVERSITY

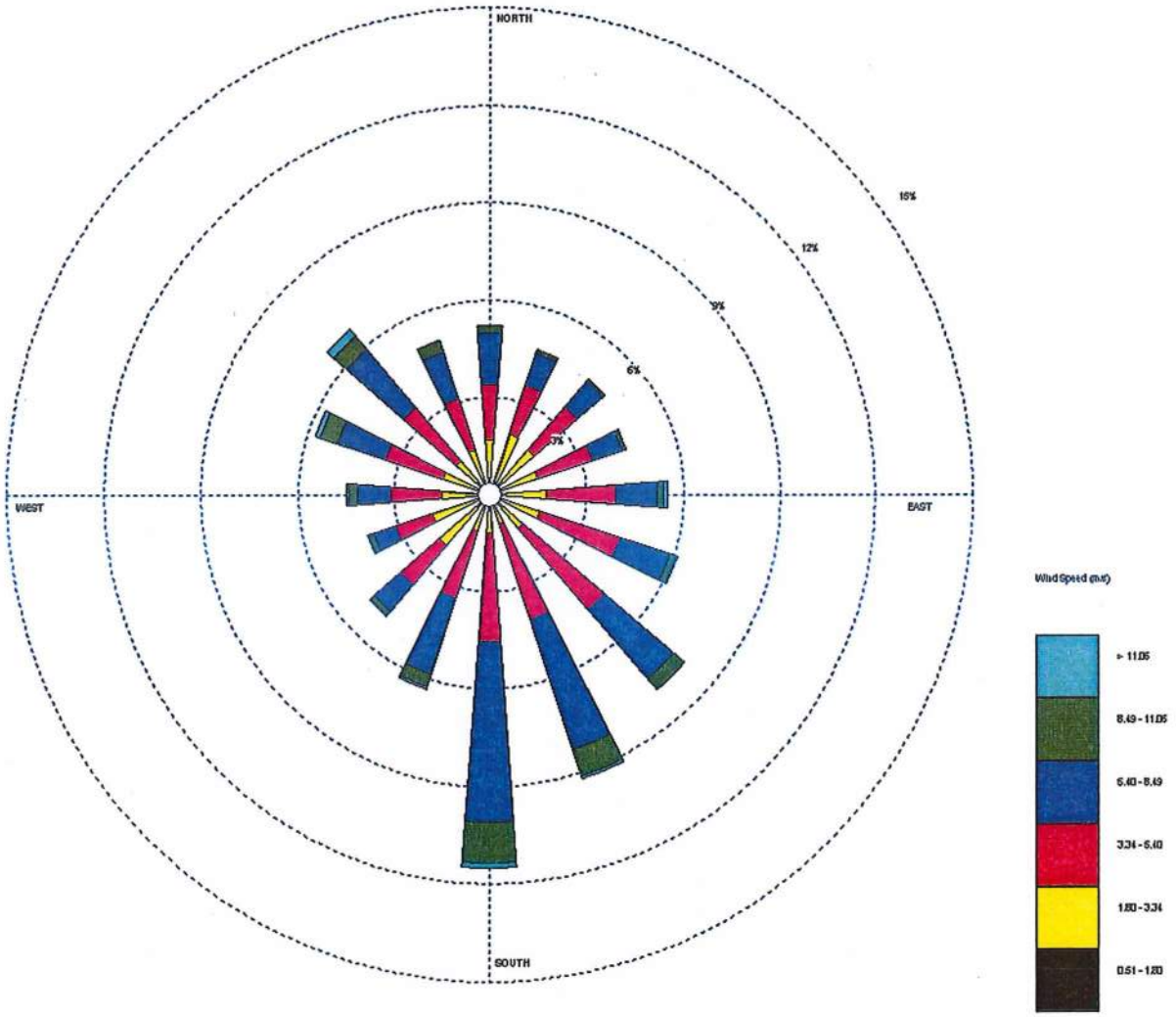
SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: June :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
June



SOUTH DAKOTA STATE UNIVERSITY

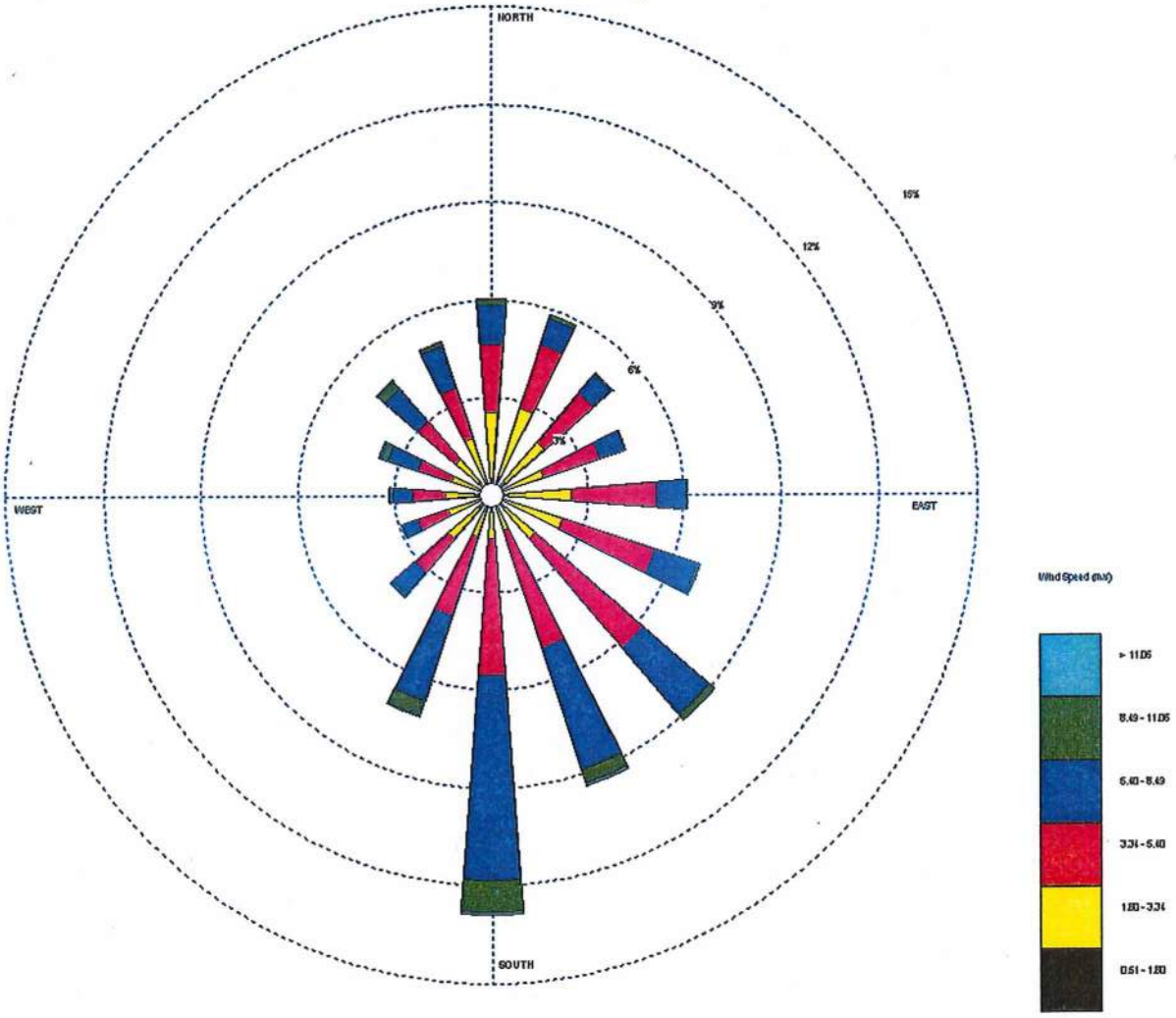
Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: July :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
July



South Dakota State University

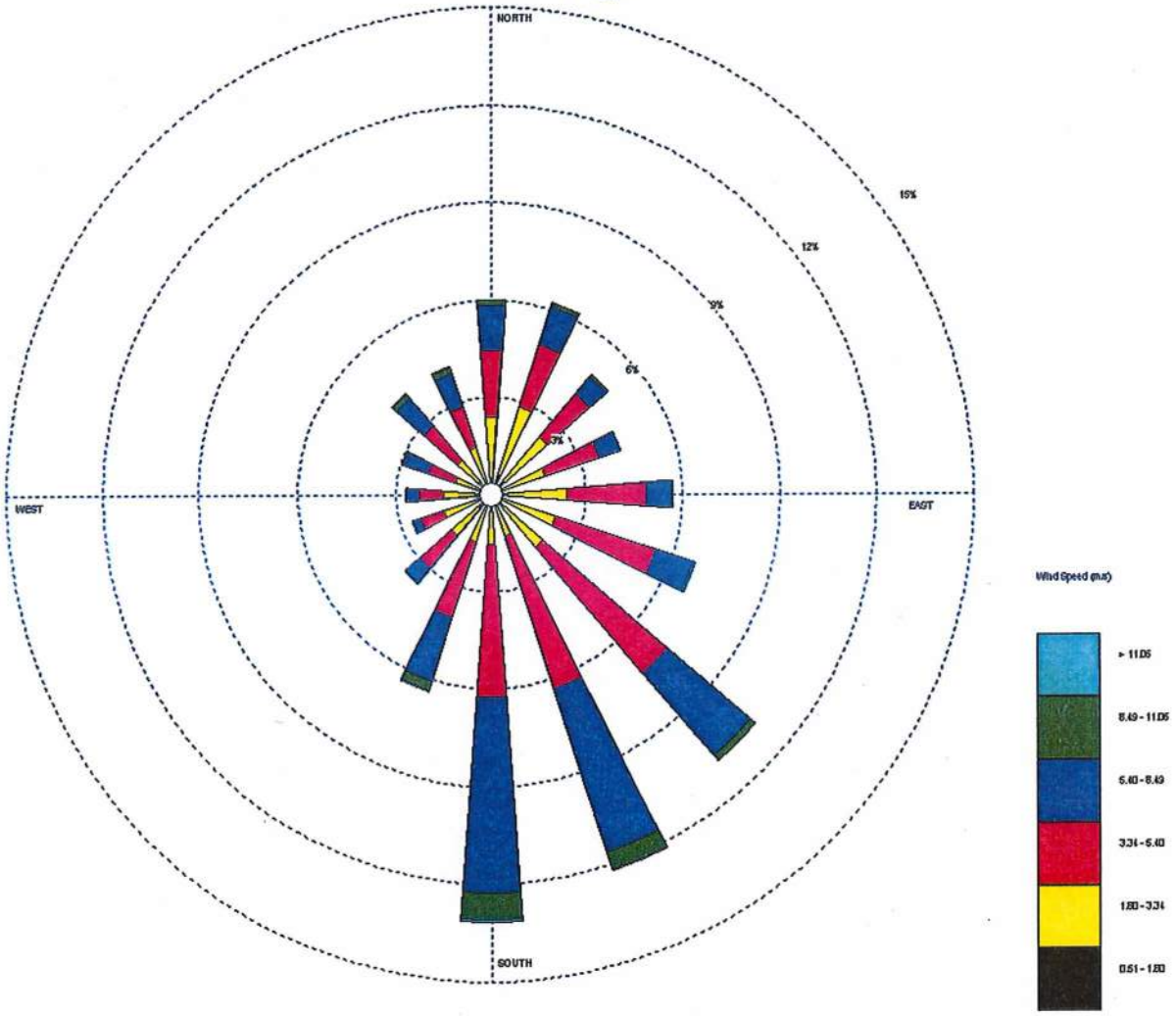
South Dakota Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: August :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
August



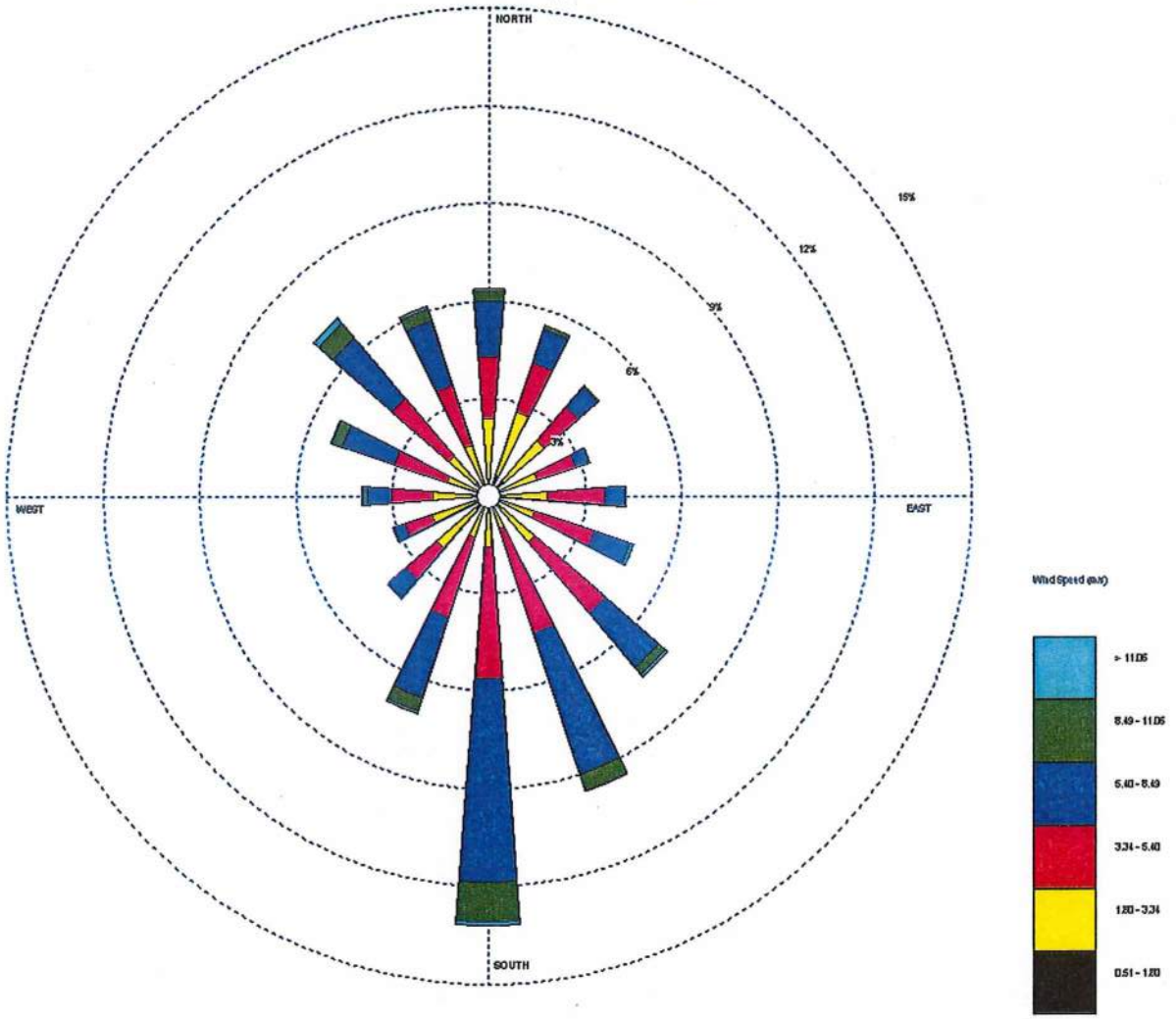
SOUTH DAKOTA STATE UNIVERSITY

SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: September :: Go ::
(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
September



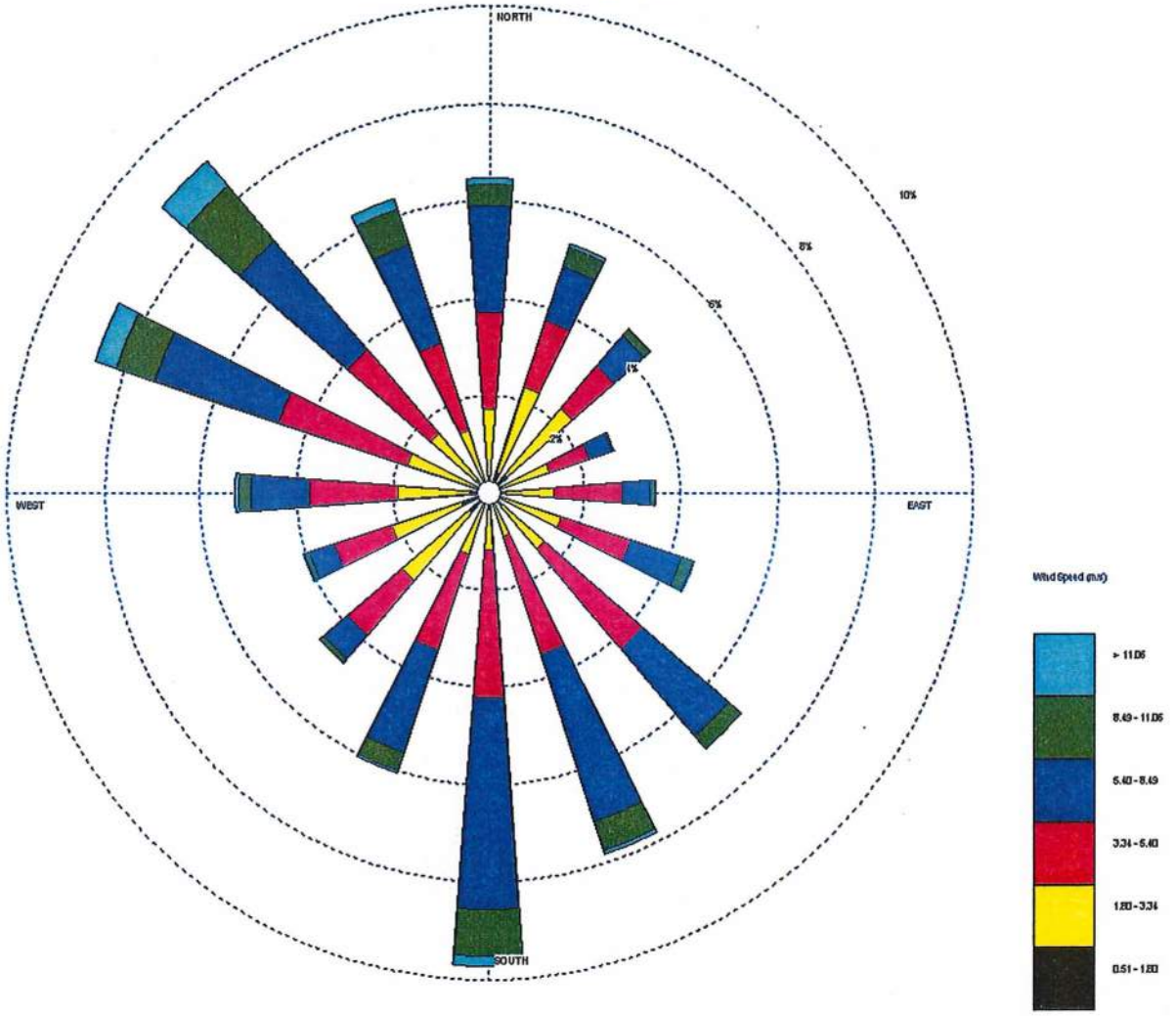
SOUTH DAKOTA STATE UNIVERSITY

SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: October :: Go ::
(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
October



SOUTH DAKOTA STATE UNIVERSITY

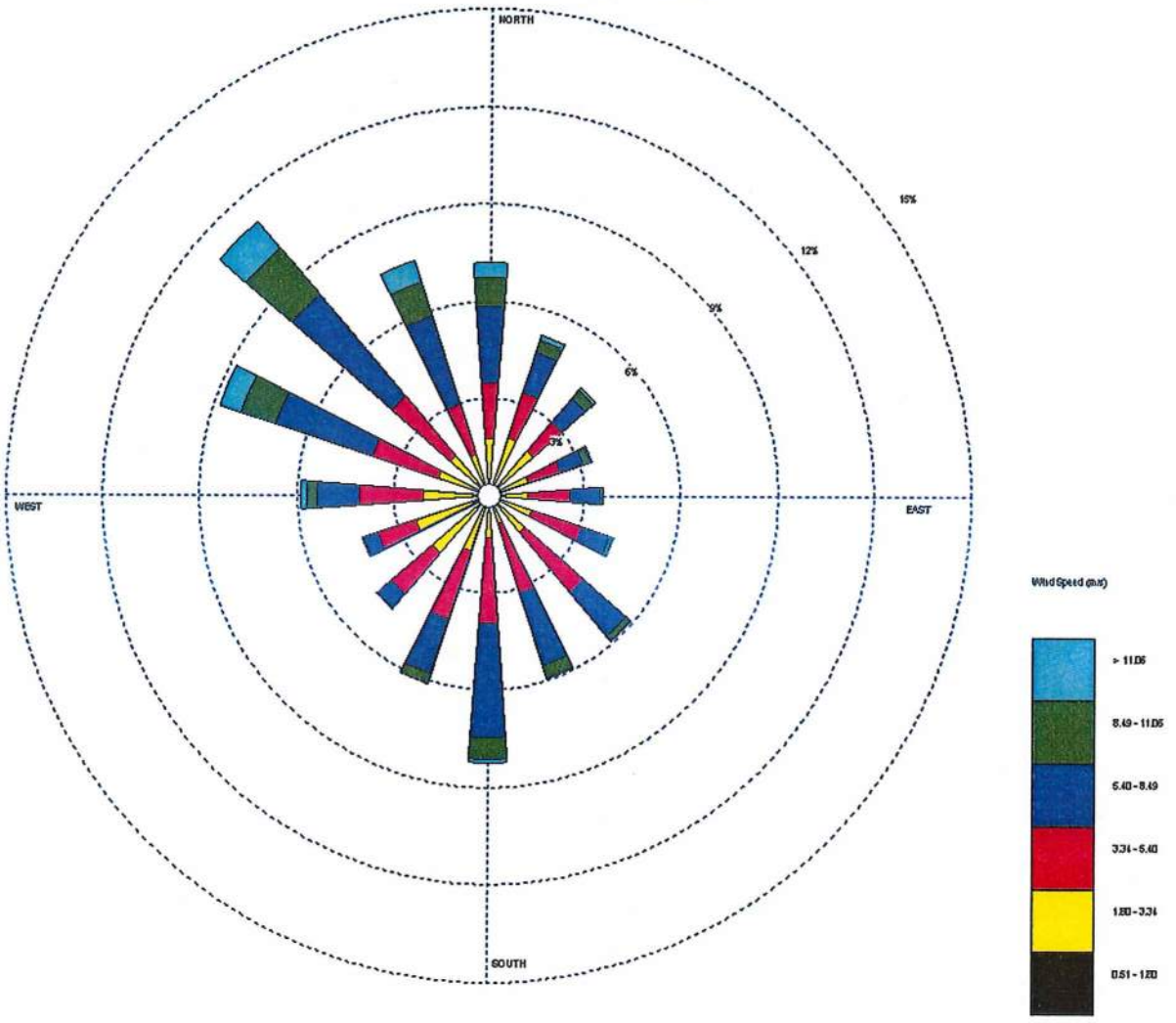
SOUTH DAKOTA Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: November :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
November



South Dakota State University

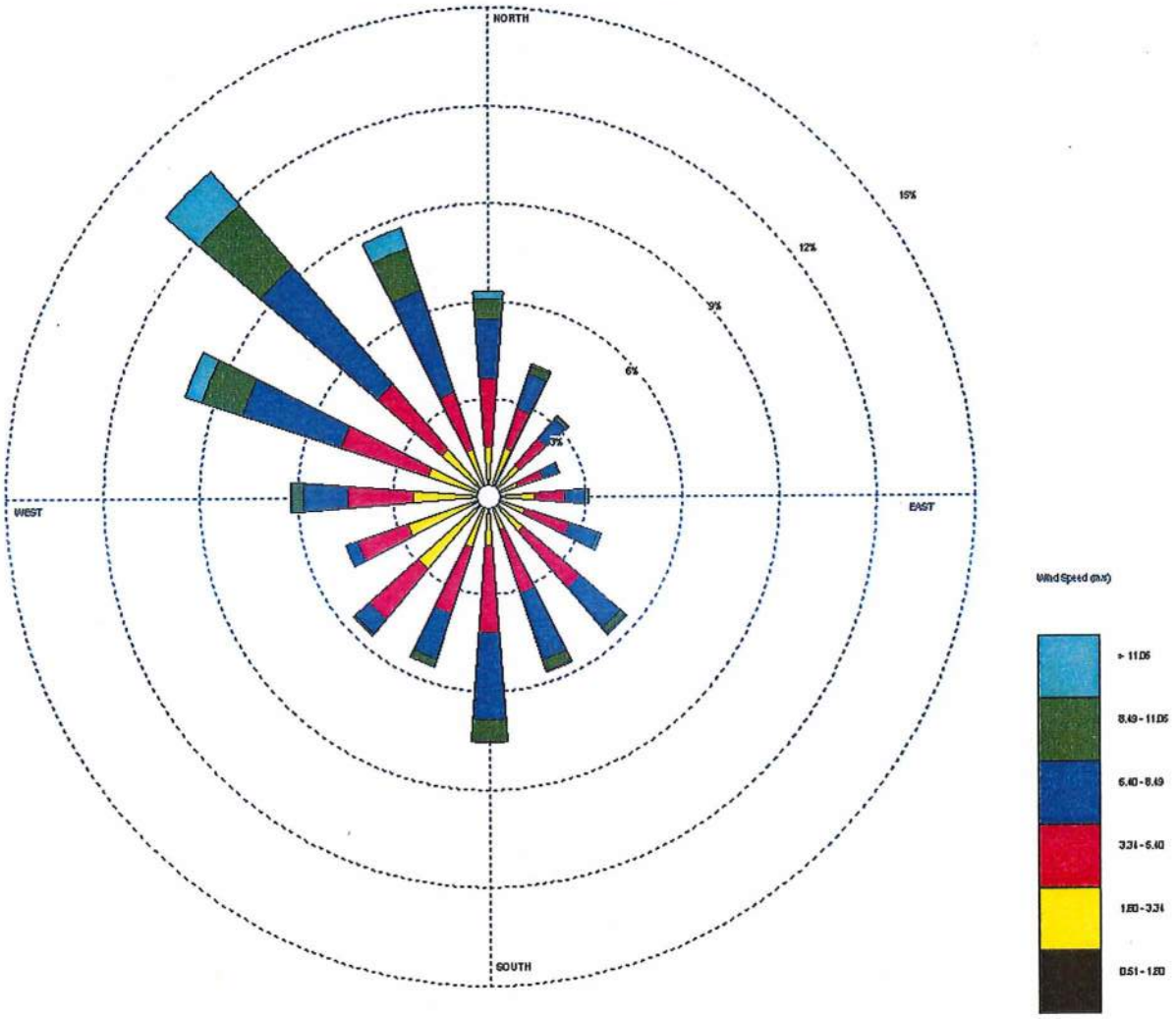
South Dakota Climate and Weather

Wind Rose charts (m/s)

For: Sioux Falls Month of: December :: Go ::

(click here to view hourly average wind/temperature charts)

Sioux Falls Foss Field (726510): 1973-2002
December



Appendix H
Ninemile Creek Discharge

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

August 3, 2016

Ryan Truax
Stockwell Engineers
600 N. Main Ave, Suite 100
Sioux Falls, SD 57104

RE: City of Harrisburg (SDG823728), Nine Mile Creek Discharge Location

Dear Mr. Truax:

This letter is to confirm that South Dakota Department of Environment and Natural Resources will not permit the city of Harrisburg's wastewater treatment facility to discharge to Nine Mile Creek, because of its location upstream of Lake Alvin.

At the wastewater treatment facility, Nine Mile Creek is classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Sections 74:51:03:01 and 74:51:03:07 for the following beneficial uses:

(9) Fish and wildlife propagation, recreation, and stock watering waters; and
(10) Irrigation waters.

Nine Mile Creek flows approximately 6 miles to Lake Alvin, which is classified by the SDSWQS, ARSD Sections 74:51:02:01, 74:51:02:02, and 74:51:02:04 for the following beneficial uses:

(4) Warmwater permanent fish life propagation waters;
(7) Immersion recreation waters;
(8) Limited contact recreation waters; and
(9) Fish and wildlife propagation, recreation, and stock watering waters.

SDSWQS, ARSD Section 74:51:01:27 states: "No discharge of pollutants is allowed which reaches a lake classified for the beneficial use of coldwater permanent, coldwater marginal, warmwater permanent, warmwater semipermanent, or warmwater marginal fish life propagation or causes impairment of an assigned beneficial use." Therefore, discharge from the city of Harrisburg's WWTF to Nine Mile Creek above Lake Alvin will not be permitted.

Thank you for protecting the environment and natural resources of South Dakota. Please contact me at (605) 773-3351 if you have any questions, or would like to discuss this issue further.

Sincerely,

Kathleen Grigg
Engineer II
Surface Water Quality Program

cc: Al Spangler, SDDENR SWD File – Pierre

Appendix I
Big Sioux River Discharge

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

November 9, 2015

Tanya Miller and Joe Munson
Banner Associates, Inc.
2307 W. 57th Street
Suite 102
Sioux Falls, SD 57108

RE: Regional Wastewater Treatment Facility for Harrisburg, Tea, and Worthing

Dear Ms. Miller and Mr. Munson:

I am writing to respond to your request for the predicted effluent limits for a Harrisburg-Tea-Worthing regional wastewater treatment facility at two potential discharge locations. The findings at each site for the 2015-2040 effluent flows are summarized in the attached tables.

Because the regional facility would be considered a new discharger to either site, antidegradation was considered in developing the 2015 limits. See the attached map for discharge site, water quality monitoring and gage locations.

- Antidegradation calculations and water quality based effluent limits for Site 1, Big Sioux River east of Harrisburg, were developed using ambient water quality monitoring data from WQM 65 (Big Sioux River near Canton) and receiving stream flow data from USGS gage 06482020 (Big Sioux River at North Cliff Avenue at Sioux Falls SD). Calculations using WQM 31 (Big Sioux River near Brandon) were also considered and were comparable; WQM 65 was selected due to its proximity to Site 1.
- Antidegradation calculations and water quality based effluent limits for Site 2, Beaver Creek north of Worthing, were developed using ambient water quality monitoring data from WQM 65 (Big Sioux River near Canton) and receiving stream flow data from USGS gage 06482848 (Beaver Creek at Canton SD). Because there were not enough water quality data available from Beaver Creek directly, additional instream monitoring for limits development is recommended if this discharge location is selected.

The ammonia antidegradation and 2015 limit calculations were based on the current ammonia standards. Limits for 2020-2040 were based on the proposed ammonia standards, which are predicted to be adopted after the surface water quality standards 2017 triennial review. As for phosphorous and nitrate limits, a date has not been set for those standards to be adopted, but SDDENR has started to include nutrient monitoring with permit renewals and recommends that facilities build in the capacity for future nutrient removal.

In addition to effluent limits, sampling frequency and operator certification should be considered because they can vary depending on the type of treatment and the discharge frequency, as well as other factors. A continuous discharger would require more frequent sampling than a seasonal one, and a mechanical system may require higher operator certification than a stabilization pond system depending on the processes incorporated.

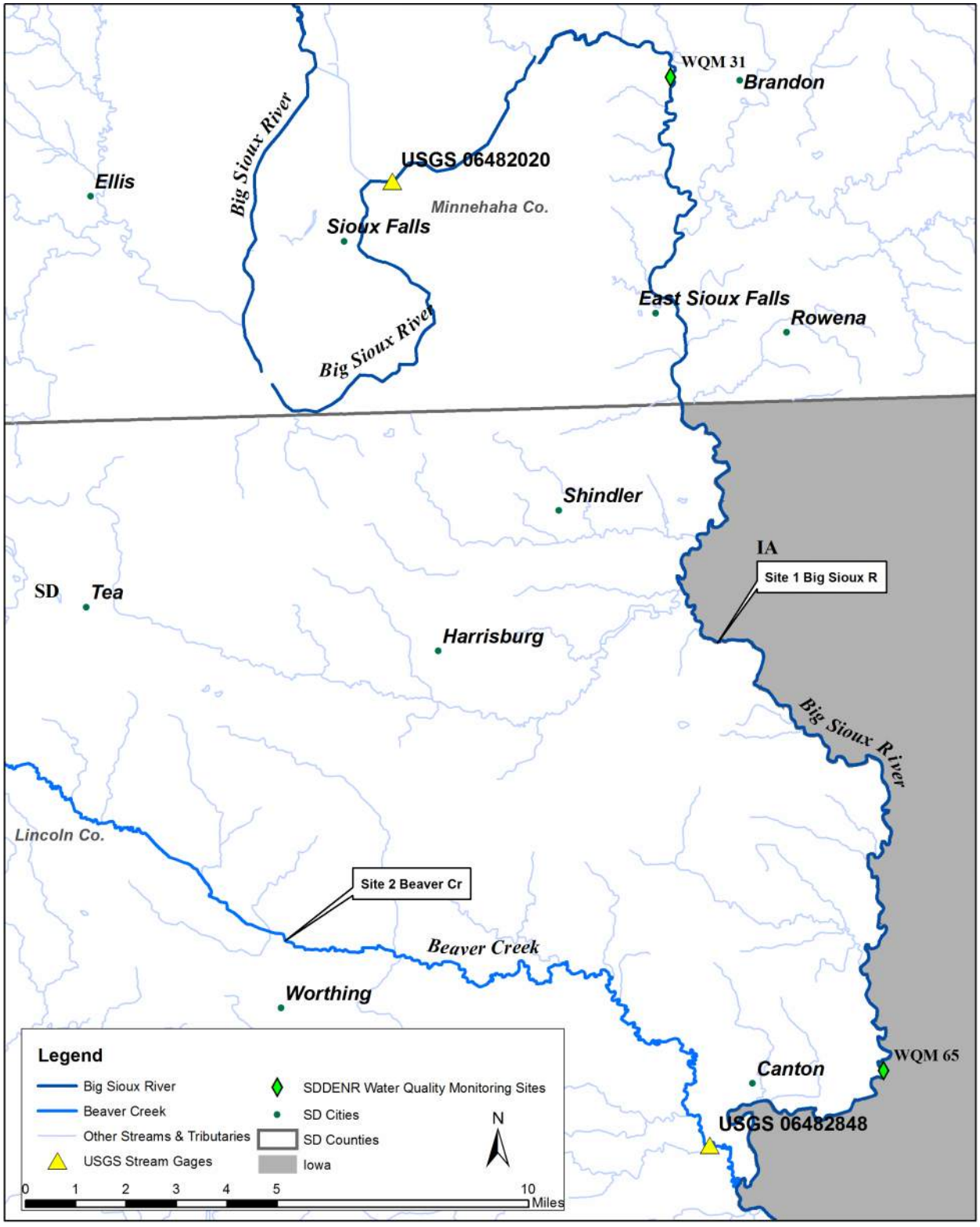
Thank you for your letter. Please let me know if you have any questions, or find any more scenarios to consider.

Sincerely,
Kathleen Grigg

Kathleen Grigg
Engineer II
Surface Water Quality Program

cc: SWD File for City of Harrisburg – SDG823728
SWD File for City of Tea – SD0021784
SWD File for City of Worthing – SD0021474

Harrisburg Tea Worthing Regional Wastewater Treatment Facility



Site 1: Big Sioux River east of Harrisburg

Predicted Effluent Flows		**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
gpd		1,277,336	1,615,672	2,026,298	2,488,490	3,013,578	3,613,695
cfs		1.98	2.50	3.14	3.85	4.66	5.59
Predicted Effluent Limits		**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Ammonia (mg/L)	Daily Max	6.6	2.5	2.2	2.1	2.5	2.2
	30-Day Av	1.0	0.5	0.4	0.5	0.6	0.5
TSS (mg/L)	Max 7-Day Av	45	Based on Secondary Treatment Standards.				
	30-Day Av	30	Based on Secondary Treatment Standards.				
BOD_5 (mg/L)	Max 7-Day Av	45	Based on Secondary Treatment Standards.				
	30-Day Av	30	Based on Secondary Treatment Standards.				
pH (su)	Daily Max	9.0	Based on (5) classification.				
	Daily Min	6.5	Based on (5) classification.				
E. coli (#/100mL)	Daily Max	235	Effective May-September, limit based on (7) classification.				
	30-day Geo Mean	117	Effective May-September; limit based on antidegradation.				
DO (mg/L)	Daily Min	5.0	Based on (5) classification.				
Temp. (°C)	Daily Max	32.2	Based on (5) classification.				
	30-Day Av	Monitor					
Nitrate (mg/L)	Daily Max	Monitor					
	30-Day Av	Monitor					
Total P (mg/L)	Daily Max	Monitor					
	30-Day Av	Monitor					

- According to SDSWQS 74:51:03:07, Big Sioux River is classified for the following beneficial uses at the proposed discharge site: (5) Warmwater semipermanent fish life propagation waters; (7) Immersion recreation waters; (8) Limited contact recreation waters; (9) Fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters.
- The Secondary Treatment Standards for municipal wastewater treatment listed in SDSWQS 74:52:06 are applicable.
- Ammonia limits were calculated monthly. Presented in the table above are the most stringent monthly limits for the given year. The 2015 30-day average is based on annual antidegradation; all other 30-day averages are based on the new proposed ammonia standards. The 2015 daily maximum is based on the current ammonia standards; all other daily maximums are based on the new proposed ammonia standards. Note that the 2035-2040 limits are greater than those before; this is due to simplified mixing assumptions for dilution based on the effluent to receiving stream ratio. Mixing modeling of the effluent and Big Sioux River would be incorporated in the final effluent limits development for this scenario.

Site 2: Beaver Creek North of Worthing

Predicted Effluent Flows		2015	2020	2025	2030	2035	2040
gpd		1,277,336	1,615,672	2,026,298	2,488,490	3,013,578	3,613,695
cfs		1.98	2.50	3.14	3.85	4.66	5.59
Predicted Effluent Limits		**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Ammonia (mg/L)	Daily Max	4.5	1.4	1.3	1.2	1.2	1.2
	30-Day Av	0.7	0.3	0.3	0.3	0.3	0.3
TSS (mg/L)	Max 7-Day Av	45	Based on Secondary Treatment Standards.				
	30-Day Av	30	Based on Secondary Treatment Standards.				
BOD_5 (mg/L)	Max 7-Day Av	45	Based on Secondary Treatment Standards.				
	30-Day Av	30	Based on Secondary Treatment Standards.				
pH (su)	Daily Max	9.0	Based on (6) classification.				
	Daily Min	6.0	Based on (6) classification.				
E. coli (#/100mL)	Daily Max	1178	Effective May-September, limit based on (8) classification.				
	30-day Geo Mean	392	Effective May-September; limit based on antidegradation.				
DO (mg/L)	Daily Min	5.0	Effective May-September; limit based on (6) classification.				
	Daily Min	4.0	Effective October-April; limit based on (6) classification.				
Temp. (°C)	Daily Max	32.2	Based on (6) classification.				
	30-Day Av	Monitor					
Nitrate (mg/L)	Daily Max	Monitor					
	30-Day Av	Monitor					
Total P (mg/L)	Daily Max	Monitor					
	30-Day Av	Monitor					

- According to SDSWQS 74:51:03:07, Beaver Creek is classified for the following beneficial uses at the proposed discharge site: (6) Warmwater marginal fish life propagation waters; (8) Limited contact recreation waters; (9) Fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters.
- The Secondary Treatment Standards for municipal wastewater treatment listed in SDSWQS 74:52:06 are applicable.
- Ammonia limits were calculated monthly. Presented in the table above are the most stringent monthly limits for the given year. The 2015 30-day average is based on annual antidegradation; all other 30-day averages are based on the new proposed ammonia standards. The 2015 daily maximum is based on the current ammonia standards; all other daily maximums are based on the new proposed ammonia standards.