Regular Meeting of the City Council

February 3, 2020 – 7:00 p.m.
City Hall

PROPOSED AGENDA

A. Call to Order
B. Roll Call
C. Pledge of Allegiance
D. Approval of Agenda
E. Approval of Minutes: January 21, 2020 Regular Meeting
F. Agenda Items
   1. Gary Roan Agreement.
   2. 2nd Reading of Ordinance 2020-01 Amending the North Sioux City cod of ordinances Title 17 Land Use and Developments in section 17.88.
   3. 2nd Reading of Ordinance 2020-02 Amending the North Sioux City cod of ordinances Title 17 Land Use and Developments in section 17.92.
   4. 2nd Reading of Ordinance 2020-03 Amending the North Sioux City cod of ordinances Title 17 Land Use and Developments in section 17.96.
   5. 1st reading of Ordinance 2020-04 Amending the North Sioux City Code of Ordinances Title 17 Land Use and Development by Adding and/or Altering Language in 17.96.
   6. Surplus property.
   7. Sewer Study from JEO for discussion.
   8. JEO project status report discussion.
   9. Amendment No. 1 for Stockwell Project No: 19273 Water Supply Improvements.
   10. Petition for vehicles to stop driving on said lot. Declare as a nuisance.
   11. Handbook discussion.
G. Community and Council Input
   1. Information on the Equalization meeting.
H. Executive Session – Legal, Contractual, Personnel
I. Approval of Bills
J. Adjournment

UNAPPROVED
North Sioux City, South Dakota
City Council Regular Meeting Minutes
January 21, 2020

Meeting called to order at 7:00 p.m. by Mayor Fredericksen. Benson, Berg, Carpenter, Cropley, Green, and Parks, were present. Blaeser and Slater were absent. Also, in attendance was City Finance Officer Mike Hamm.

Mayor Fredericksen led the Pledge of Allegiance.

Motion by Cropley, second by Berg, to approve the amended agenda, adding personnel and contractual to executive session. All members present voted aye.

Motion by Cropley, second by Parks, to approve the minutes from the January 6, 2020 meeting with the following corrections: Strike the complete list of officers and employee's salaries from the minutes. All members present voted aye.

Mayor Fredericksen opened the Public Hearing at 7:06pm for the Convention Hall 2020 Special Events Alcohol Licenses.

No public input.

Motion by Cropley, second by Benson, to close the hearing at 7:07pm.

Motion by Cropley, second by Carpenter, to approve the following dates as presented for the 2020 special events alcohol licenses for the Convention Hall. All members present voted aye.

February 29
March 7, 14, 21, 28
April 4, 11, 25
May 1, 2, 8, 9, 15, 16, 23, 30
June 6, 13, 20, 27
July 3, 4, 10, 11, 18, 25, 31
Aug 1, 8, 15, 22, 29
Sept 5, 12, 19, 26
Oct 3, 10, 17, 24, 31
Nov 7, 14, 21, 28
Dec 5, 12, 19

A discussion was held on the Gary Roan Agreement. Cropley said she would like more information on item 8 showing that the city would pay $125 per month for a liability insurance premium.

Motion by Cropley, second by Berg, to table the Gary Roan agreement until the February 3rd, 2020 Council Meeting. All members present voted aye.

Motion by Parks, second by Benson, to approve Resolution 2020-01 – Appointment of Applicant Agent for the Hazard Mitigation Grant Program to authorize City Finance Office Mike Hamm and Mayor Randy Fredericksen as signers.

RESOLUTION
APPOINTMENT OF APPLICANT AGENT
For the
Hazard Mitigation Grant Program

WHEREAS, the City of North Sioux City is submitting a Hazard Mitigation Grant project to the Federal Emergency Management Agency and the State of South Dakota; and
WHEREAS, the City of North Sioux City is required to appoint an Applicant Agent for the purpose of signing documents and assuring the completion of all application documents;
NOW THEREFORE BE IT RESOLVED that the City of North Sioux City appoints Mayor Randy Fredericksen as the authorized Applicant Agent. Dated this 21 day of January, 2020.

Appointing Authority
Name: Randy Fredericksen
Title: Mayor

Signed: _____ Date:01/22/2020

Appointed Agent
Name: Randy Fredericksen
Title: Mayor

Signed: _____ Date: 01/22/2020

Motion by Berg, second by Green, to approve the NLC Service Line Agreement. All members present voted aye.

Motion by Benson, second by Carpenter, to approve the 2020 Transportation Agreement with the City of Sioux City in the amount of $25,328.00. All members present voted aye.

Rusty Montagne received a quote for a new maintenance truck in the estimated amount $31,618.00. The original budget was $30,000.00. Cropley asked if Rusty had looked at the 2019 models. Rusty said he would take a look at that option.

Motion by Cropley, second by Parks, to approve the purchase of a maintenance truck in the amount of $31,618.00 after looking into the 2019 models first. All members present voted aye.

There was a discussion on the contract for HueLife for the City Administrator search. City Finance Officer Hamm stated that he spoke with City Attorney Darrell Jesse and Jesse recommended a Hold Harmless Agreement be added to the contract. Hamm said that Jesse also wanted to make the Council aware that this contract does not guarantee that the city will find a City Administrator. Berg asked if any ads had been placed. Hamm stated he was not aware that any ads were placed but would check on that. Cropley suggested that the Council put together a board to go through the hiring process.

Motion by Parks, second by Cropley, to table the HueLife Contract. All members present voted aye.

Greg Meyer was on hand to discuss the wastewater treatment agreement with Sioux City. Parks thanked Meyer for helping out during this transition period. Meyer said his number one issue is the proposed flow rate. This contract would have a maximum flow rate of 700,000 gallons per day. Meyer said Montagne stated they can hit 600,000 gallons per day right now with a retrigger clause at 630,000 gallons per day. Under the current agreement MIU's users are sampled by Sioux City and are billed by Sioux City. Under the new agreement Sioux City will still sample the MIU's but will make North Sioux City bill those customers. It would also require a sampling monitor station be put in by North Sioux City. Sioux City will also increase sewer rates by 10%, then 14%, then 12% until 2024. There is also language about odor control. They are going to want to move this responsibility over to North Sioux City. As of November, Sioux City sent a termination agreement to North Sioux City. North Sioux City now has four years to complete a new agreement with Sioux City. Ethan Joy from JEO said that they will have the sewer study competed soon and

will show the Council three options, one is the continue the current way of doing things, two is to build a new treatment plant, and option three would be going to South Sioux City but Joy stated the third option would be too expensive. Parks asked if they could give Meyer direction in sending a letter to the Sioux City Council with a higher gallons per day request.

Meyers proposed that the city adopt the SUDAS design and specifications documents. Meyer said these documents use the same specifications as Iowa. Cropley asked if the Council has to adopt these. Meyer said the Council would be adopting these indirectly with Ordinance 2020-02. Meyer stated these would be the go-to documents when someone wanted to construct a subdivision. Benson asked if they got updated copies of the ordinances. Hamm stated they were sent via email but not hard copies. Benson said that he was not comfortable with these without looking at the hard copy versions. Hamm stated there were only modifications to Ordinances 2020-01 and 2020-03 and not 2020-02.

Motion by Parks, second by Cropley, to take a 10 minutes recess at 8:23pm for City Finance Officer Hamm to print out copies of the revised Ordinances 2020-01 and 2020-03 for the Councils review. All members present vote aye.

Meeting resumed at 8:37pm.

Greg Meyer reviewed the Ordinance 2020-01 – Amending the North Sioux City code of ordinances Title 17 Land Use and Developments in section 17.88. The Council discussed what to charge for the submission of a plat. Meyer said that he does not think charging $2,500 is too much and noted that it might not be enough. Benson asked if this fee would be charged for all plats even single ones. Cropley stated this would be for a development not a single plat. Berg stated that the informal submission would be free and the first official submission would be $2,500. Meyer reviewed the other changes in the Ordinance.

Motion by Benson, second by Cropley, to approve Ordinance 2020-01 – Amending the North Sioux City code of ordinances Title 17 Land Use and Developments in section 17.88 with the informal submission being free and any preliminary and any subsidiaries having a fee of $2,500 along with the final and any subsidiaries after being $2,500. All members present voted aye.

Motion by Cropley, second by Berg, to approve Ordinance 2020-02 – Amending the North Sioux City code of ordinances Title 17 Land Use and Developments in section 17.92 along with the supplement 2020 addition to Iowa SUDAS design manual. All members present voted aye.

Motion by Parks, second by Cropley, to approve Ordinance 2020-03 – Amending the North Sioux City code of ordinances Title 17 Land Use and Developments in section 17.96. All members present voted aye.

Greg Meyer discussed the Lakeshore Phase 2 Preliminary Plat with the Council. Meyer stated this plat does not show the existing dirt that is currently out there. Meyer said that his recommendation would be that if they are going to build up the houses like the one that's out there that they also build up the road. Cropley asked if the City has any ordinance about the slope of the driveway. Meyer said he did not think the City current has an ordinance that addresses that. Cropley said that the Council needs to look at a maximum slope for driveways. Police Chief Richard Headid asked if they are going to raise the fire hydrant. Cropley stated that her concern about the plat was the right of way. Meyer said there should be an easement in lot 22 for future development.

The Mayor said he would like to have 2 or 3 council members to sit down to discuss the handbook. Cropley, Carpenter, and Benson said they would be willing to sit down and discuss the handbook.

Motion by Benson, second by Parks, to table the Handbook Revisions – January 2020 and to put together a small group to discuss it.

The Mayor went over quotes from Gill Construction for the installation of sidewalks around the city. The total of these quotes was $244,075.28. Mayor said some of these sidewalks have already put in. Cropley asked if we have to bid these out. The Mayor said you would have to bid it out.

Community Input:

1.) Parks said he spoke to Beth Fennel during the break and the wages were already published and if there are any corrections those will get published.
2.) Rusty Montagne said that all the cameras were installed at all the stoplights except for the DOT one by the interstate.
3.) The Mayor stated that Rusty Montagne's 6-month probation period is completed.

Motion by Parks, second by Benson, to move into executive session at 9:58pm for contractual and personnel to include Greg Meyer. All members present voted aye.

Regular session resumed at 10:32pm.

Motion by Parks, second by Benson, to approve the bills as presented. All members present voted aye.

AFLAC	1582.89	JAN2020 PREM
BNFT ADMNSTRTN SELF EM	102.00	2020 HRA FEE
C. W. SUTER SVCS	24900.00	CH-RPLCD BLRS
CNTR POINT LGE PRINT	29.21	BOOK
CHERRY, TED	7.56	EXP REIMB-MTG 1/8
CITY OF SIOUX CITY IOWA	17658.00	1QTR2020 WOODBURY CTY COMM CTR
CITY OF SIOUX CITY	31185.00	DEC2019 SWR CHGS USAGE 13125
CITY OF SIOUX FALLS	159.50	4QTR2019 BCTR WTR TESTS
CRARY, HUFF, INKSTER, SHEEHAN	4740.00	MID AMRCN FRNCHS AGRMNT
DATAMAXX APPLIED TECH, INC.	2976.00	PD-SCR CLOUD (8)
DAKOTA DUNES/NSC TIMES	1153.15	DEC2019 PUBLISHING FEES
DEMCO, INC	279.02	LIB SUPP
DCMNT DEPOT & DSTRCTN	45.00	SHREDDING (1 BIN)
THMPSN INNVTN	66.00	PD ALARM MNTRNG AGRMNT
ELCTRCL ENGNRNG & EQUIP	346.80	REP GNRTR-LAKE PLANT
GNRL TRFFC CNTRLS, INC.	29676.00	VIDEO DTCTN EQUIP
GILL HAULING	12235.47	RSDNTL WST
H2O 4 U	90.50	PD-BOTTLED WTR
H2O 4 U	24.50	LIB-BOTTLED WTR
HAMM, MIKE	221.40	CELL REIMB-NOV2019
HAWKEYE RIFLE & PISTOL CLUB	750.00	2020 MEMBRSHP DUES
HAWKINS, INC	2327.48	POTASSIUM PRMNGNTE
HNKNSCHLTZ	120.00	2020 WEBSITE PAGES
INGRM LIB SVCS	555.68	BOOKS (73)
JACK'S UNFRMS & EQPMNT	684.60	CLTHNG ALLWNC
KEVIN ODELL ELECTRIC, INC.	6666.26	ST LIGHTS, TRAFFIC CMR
LOCAL NO. 749	227.00	JAN2020 DUES
LONG LINES	832.73	PHN & INT CHGS
MERCY BUSINESS HEALTH SVCS	53.33	JAN2020 EAP
MIDAMERICAN ENERGY	12561.16	UTLTY CHGS
MIDAMERICA BOOKS	233.40	BOOKS (12)
MIDWEST TAPE	34.99	AUDIO BOOK
MITCHELL ELECTRIC, LLC	22262.28	FLOOD PUMPS
MBL AUTGLASS SLTNS LLC	210.00	PD-2018 DODGE CHRGR WINDSHIELD
NSC AUTO REP	39.95	UNIT 1-OIL CHANGE
O'REILLY ATMTVE, INC.	520.71	BRK CLNG (16), DSL TREAT (12),
OFFICE ELMNTS	205.50	CH-COPY PAPER (6 BX)
LOFFLER COMPANIES	274.63	COPY & LEASE EXP
ONE OFFICE SLTN	162.51	PD-FOLDERS (4 BX), LABELS,
QLFD PRESRT SVC, LLC	766.06	PSTG UTLTY BILLS
RICK HNSN PLMBNG INC.	249.92	PD-RPLCD WALL HUNG STOOL
GARY ROAN	270.00	DEC2019 INSPCTNS
SD DEPT OF ENV & NAT'L RES	350.00	2020 WSTWTR DSCHRG FEE
SD DEPT OF PBLC SFTY	2340.00	TELETYPE SVC
SD ONE CALL	24.64	DEC2019 LCTS (22)
SD POLICE CHIEFS' ASSCTN	123.54	2020 MEMBRHP DUES
SDML WRKRS COMP FUND	18200.00	2020 WRKRS CMPNSTN
SEC OF STATE	30.00	NOTARY APP-ROUPE

SIOUX CITY FENCE	492.56	REP FENCE-SUNCST LIFT ST
SXLND HMN SCTY	37.00	DEC2019 SVCS
THE SXLND INTV	5000.00	2020 CNTRBTN
SNOOZY SURVEYING	900.00	SURVEYING/LEVEE
SPARKLE & SHINE CLNG SVCS	1451.25	2019 CLNG
STATE FARM INS	50.00	NOTARY BOND RNWL-ROUPE
STOCKWELL ENGINEERS, INC	48354.00	WTR SUPPLY IMPRVMNTS
USABLUEBOOK	1029.95	PUMP
WELLMARK BLUE CROSS	16340.58	INSUR PREM
WOODHOUSE	52.54	UNIT 1 & 4 REP
SD MNCPL STREET MTNC ASSOC	35.00	2020 MBRSHP DUES-MONTAGNE
SD DEPT OF HEALTH	405.00	10/16-12/13 BOD, COLI, SOLIDS
SOUTH EAST CNCL OF GOV	3535.00	2020 SECOG DUES
SENSAPHONE, INC.	480.00	RMT MNTRNG SYSTEM-FLYNN
STEVE'S ROOFING CO	1194.77	BUILDING-MILLER LIFT
STREETER, DONALD	200.00	4QTR2019 P&Z MTG
UNION CO. RGSTR OF DEEDS	30.00	FEE
USABLUEBOOK	3656.72	LAGOON-BLOWER
VERIZON WIRELESS	975.93	CELL CHGS (21 LINES)
WOODBURY CTY EMERG SVCS	1464.45	JAN-MAR2020 STARCOMM

Motion by Parks, second by Benson, to adjourn at 10:32pm. All members present voted aye.

Approved

_____

Randy Fredericksen, Mayor

Attested

_____

Mike Hamm, City Finance Officer

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Mike Hamm, City Finance Officer
Date: 02/03/2020
Re: Gary Roan Agreement

Background: The Council had asked for a new updated agreement to be in place with Gary Roan. City Attorney Darrell Jesse has reviewed this contract. The amounts are the same as the 2009 agreement. At the 01/21/2020 Council Meeting the Council had a question in regards to item number 8 Insurance. City Attorney Darrell Jesse said he understood that this was negotiated several years ago. I also spoke with Gary and he has this item in other contracts he has with other cities. Gary will be on hand to answer any questions that the Council may have.

Financial Consideration: None

Recommendation: The administration would recommend approval.

INDEPENDENT CONTRACTOR AGREEMENT

THIS Independent Contractor Agreement made and entered into this ____ day of _____, 2020, with an effective date of _____, 2020 by and between the CITY OF NORTH SIOUX CITY, a South Dakota municipal corporation, hereinafter referred to as "CITY" and Gary Roan d/b/a GARY ROAN CONSTRUCTION, INC., hereinafter referred to as "ROAN CONSTRUCTION".

W I T N E S S E T H:

WHEREAS, CITY has a need for professional building inspection services for residential and commercial structures to be performed within the boundaries of the CITY;

WHEREAS, Gary Roan d/b/a ROAN CONSTRUCTION, INC. has expertise and experience in the contracting, building construction and building inspection areas and are able to perform the duties under this contract independently, and free from control or direction, and

WHEREAS, the parties hereto desire to enter into an independent contractor arrangement;

NOW, THEREFORE, FOR AND IN CONSIDERATION of their mutual promises and covenants, the sufficiency of which is acknowledged, it is hereby agreed as follows:

1. Independent Contractor Relationship. CITY will not exercise any independent dominion or control over ROAN CONSTRUCTION'S services and ROAN CONSTRUCTION acknowledges that by accepting this arrangement, it is obligated and responsible independently to accomplish the building code inspection services for residential and commercial buildings within the boundaries of the CITY on an as needed basis.

2. Compensation. CITY agrees to pay ROAN CONSTRUCTION a sum of Forty Dollars ($40.00) per inspection, defined as footing, framing or finish inspections. Further CITY agrees to pay ROAN CONSTRUCTION Fifty Dollars ($50.00) for attendance at Planning and Zoning Commission meetings. Said payments shall be payable by the CITY on a quarterly basis upon receipt of an itemized invoice from ROAN CONSTRUCTION.

   ROAN CONSTRUCTION and Gary Roan individually specifically acknowledges that this is 1099 income and no withholding is required, and Gary Roan individually or through ROAN CONSTRUCTION will report independently on their income tax return earnings paid under the terms of this Independent Contractor Agreement and pay any all taxes associated therewith.

3. Performance. ROAN CONSTRUCTION agrees to perform inspection services upon request for new and remodeled, residential and commercial buildings located within the boundaries of the CITY, to include at a minimum footing, framing and final inspections, the timing of which are to be determined in ROAN CONSTRUCTION'S discretion. Said inspections are to ensure the construction complies with the International Building Code and any related codes as adopted by the CITY via ordinance.

4. Supplies/Costs. ROAN CONSTRUCTION acknowledges that any vehicle, and all supplies, equipment or other out-of-pocket expenses necessary to perform the services outlined herein will be provided solely by ROAN CONSTRUCTION at its expense.

5. Termination. Either party may terminate this agreement in their sole discretion and without cause upon thirty (30) days written notice.

6. Other Contracts. CITY acknowledges that ROAN CONSTRUCTION is in no way restricted by this agreement to provide the same or similar services to the general public, other municipalities or other public bodies.

7. Indemnification/Hold Harmless. ROAN CONSTRUCTION and Gary Roan individually agree to indemnify and hold CITY harmless for any and all liabilities arising out of the performance of this Agreement relating to all employee matters, employee payroll taxes, and the payment of all applicable federal, state and local taxes, including but not limited to workers compensation claims, unemployment insurance claims or mandated benefits related to any alleged employment, federal, state or local taxes, interest and any and all fines.

8. Insurance. The CITY hereby agrees to pay the sum of One Hundred Twenty Five Dollars ($125.00) per month to ROAN CONSTRUCTION for purposes of paying premiums for a liability insurance policy. This premium reimbursement may be adjusted annually by mutual agreement of the parties. The CITY shall not carry ROAN CONSTRUCTION on its insurance policy.

   Further, in January of each year this Agreement is in effect ROAN CONSTRUCTION shall provide a copy of an ACORD insurance binder to CITY reflecting proof of said insurance insuring the services provided under this Agreement by ROAN CONSTRUCTION.

9. Benefits. ROAN CONSTRUCTION acknowledges that no benefits will be provided under this contract, including but not limited to health insurance, life insurance, disability insurance, or other statutory benefits required to be provided by an employer, such as workers' compensation insurance and unemployment insurance.

Dated this _____ day of January, 2020.

CITY OF NORTH SIOUX CITY

BY: _____ ATTEST:_____
Randy Fredericksen, Mayor Michael Hamm, Finance Officer

GARY ROAN CONSTRUCTION, INC.

BY: _____ _____
Gary Roan, President Gary Roan, Individually

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Greg Meyer
Date: 02/03/2020
Re: Revisions to City Ordinances

Background:
I am requesting City Council consideration of revisions to the three City Ordinances which address subdivision development within the City of North Sioux City. I have made modifications to the Ordinances which were provided to Darrell Jesse for incorporation into the existing Ordinances for your consideration. Herein, I will provide a general summary of the proposed changes.

Ordinance 2020-01 – Amending the North Sioux City Code of Ordinances Title 17 land use and deveoplements by adding and/or altering language in 17.88

Chapter 17.88 SUBDIVISION APPROVAL PROCEDURE

1.) Establishes a review fee for each submittal of a Preliminary Plat and Final Plat. The Council must set the fee amount or I would recommend $2,500 for each submittal. At the last Council Meeting this was set to the following; the informal submission being free and any preliminary and any subsidiaries having a fee of $2,500 along with the final and any subsidiaries after being $2,500. All members present voted aye.
2.) Provides a new extended period for review of documents.
3.) Submittals that fail to provide all of the provisions of the Ordinance will be returned without review by the Planning Commission or City Council. A new review fee will apply to the resubmittal.
4.) The last complete submittal must be received 10 days before the Planning Commission or Council Meeting to consider the submittal.
5.) Requires the posting of a cash deposit to cover the cost of completing components of the subdivision that are not completed at the time the sub-divider is requesting acceptance of a Final Plat.

Included in the packet are both the redline and clean versions.

Financial Consideration:

Recommendation:

PROPOSED ORDINANCE 2020-01

AN ORDINANCE AMENDING THE NORTH SIOUX CITY CODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.88.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.88 be amended as set forth below.

17.88.030 Preliminary plat approval.

After meeting informally with the city planning commission, the subdivider shall cause to be prepared a preliminary plat prior to the making of any street or utility drawings or construction.~~improvements or the installation of any utilities. (Ord. 386 § 1903, 2002)~~

17.88.040 Preliminary plat data.

The preliminary plat shall meet the standard design as set forth in Chapter 17.92 and shall show the following information:

A. Scale of two hundred (200) feet to one inch or larger;

B. Name of subdivision, names and addresses of the owners, the engineer, or surveyor, and the owner of the adjacent property;

C. A vicinity sketch at a scale of four hundred (400) feet or less to one inch;

D. Date, approximate magnetic and true north point, and graphic scale;

E. Acreage of land to be subdivided;

F. Contours at an interval of not greater than ~~five feet~~one foot or at a lesser interval if deemed necessary by the city council;

G. Boundary lines of area to be subdivided and their bearings and distances;

H. Existing and proposed easements and their locations, widths and distances;

I. Streets on and adjacent to the tract and their names, widths, approximate grades, and other dimensions as may be required;

J. All streets to be platted showing the natural and finished grade drawn to scale, and when applicable connection to existing City Streets.~~;~~

K. Utilities on and adjacent to the tract showing proposed connections to existing utility system and ~~rear~~ easements ~~for utility poles and wires~~as required by the City;

L. Lot lines and lot numbers;

M. Sites, and their acreages, if any, to be reserved or dedicated for parks, playgrounds, schools or other public uses; sites, if any, for semi-public, commercial or multifamily uses;

N. Minimum building setback lines;

O. Copies of proposed deed restrictions, if any. (Ord. 386 § 1904, 2002)

17.88.050 Preliminary plat procedures.

A. Eleven (11) copies of the preliminary plat and the required supplementary material, shall be filed with the city finance officer, who shall transmit three copies to the chairperson of the city planning commission. Such filing shall take place at least ten (10) days prior to the meeting of the city planning commission at which time it is to be considered.

Included with the Preliminary Plat submittal shall be a nonrefundable review fee of $2,500.00. If the proposed subdivision requests a variance or waiver of a requirement of the City Ordinance provisions, the reason for the requested variance or waiver shall be included with the first Preliminary Plat submittal. Preliminary Plat submittals which do not address all of the provisions required by the City Ordinances shall not be considered by the City Planning Commission. Each resubmittal of the Preliminary Plat shall include a nonrefundable review fee of $2,500.00. Resubmittal Preliminary Plats shall be received by the City Finance Officer at least ten (10) days prior to the requested meeting with the City Planning Commission.

B. The city planning commission shall study the preliminary plat to see if it conforms with the minimum standards and requirements as outlined in Chapters 17.92 and 17.96. Following a public hearing before and due consideration by the city planning commission, the commission shall transmit all copies of the preliminary plat to the city council together with its recommendations at least ~~forty-five~~sixty (60~~45~~) days after receipt thereof. Such recommendations shall include approval, disapproval or suggestions for modification and the reasons thereof, and a discussion of the ~~ca~~ffect of the plat on the modification and the reasons thereof, and a discussion of the ~~ca~~ffect of the plat on the comprehensive plan. The recommendations shall be of an advisory nature only. If the city planning commission does not act within ~~forty-five~~sixty (60~~45~~) days, the preliminary plat shall be deemed to have received a favorable recommendation in all respects, and shall receive due consideration by the city council.

C. Following a public hearing and due consideration of the preliminary plat, the city council shall approve, disapprove or modify the recommendations of the city planning commission and may impose those requirements or grant those variances in conformance with this title deemed necessary and appropriate by the city council for final approval. One copy shall be returned to the subdivider and the others shall be retained by the finance officer.

D. Approval of the preliminary plat by the city council shall not constitute acceptance of the final plat. The approval of the preliminary plat shall lapse unless a final plat based thereon is submitted within one year from the date of such approval. An extension of time may be applied for by the subdivider and granted by the city council. (Ord. 386 § 1905, 2002)

17.88.080 Final plat data.

The final plat shall give the following information:

A. The plat shall be at a scale of one hundred (100) feet to one inch or larger;

B. Date, title, name and location of subdivision, graphic scale, and magnetic and true north line;

C. All dimensions, angles, bearings and similar date on the plat shall be tied to primary control points. Locations and control points shall be given. Except where deemed clearly unreasonable or infeasible by the city council, these control points shall be the located section corners of the coordinate system of the state of South Dakota;

D. Tract boundary lines, right-of-way lines of streets, easements and other right-of-way, and property lines of residential lots and other sides with accurate dimensions to the nearest one-hundredths of a foot; bearings of deflection angles, radii, arcs, and central angles of all curves with dimensions to the nearest minute;

E. Name and right-of-way width of each street, easement, or other right-of-way;

F. Lot numbers, lot lines, and frontage dimensions;

G. Purpose for which sites other than residential lots are dedicated or reserved;

H. Minimum building setback lines;

I. Location and description of monuments;

J. Names and locations of adjoining subdivisions and streets, the location of adjoining unplatted properties, and the name and addresses of the owners of adjoining unplatted properties;

K. Certification on plat of title showing that the applicant is the owner, that the making of the plat receives his or her consent and is in accordance with his or her desires, and a statement by such owner dedicating streets, rights-of-way and any other sites for public use;

L. Certification on plat by registered ~~engineer~~ surveyor as to the accuracy of survey and plat;

M. Certification of approval by the land use administrator, when individual sewerage disposal or water systems are to be installed;

N. If applicable, certification that the subdivider has compiled with one of the following alternatives: all the improvements have been installed in accordance with the requirements of this title, or; a surety amount to assure such completion of all required improvements;

~~O. Cross-sections, profiles and grades of streets, curbs, gutters and sidewalks showing locations of in-street utilities, and drawn to city standard scales and elevations shall be attached to the final plat;~~

~~P~~O. Protective covenants shall either be placed directly on the final plat or attached thereto in form for recording;

~~Q~~P. Certification on plat by the mayor and city finance officer that the plat has been approved for recording in the office of the register of deeds. (Ord. 386 § 1908, 2002)

17.88.090 Final plat procedure.

A. Six copies of the final plat and the required supplementary material shall be filed with the city finance officer who shall transmit them to the chairperson of the city planning commission. Such filing shall take place at least ten (10) days prior to the meeting of the city planning commission at which it is to be considered.

Included with the Final Plat submittal shall be a nonrefundable review fee of $2,500.00. If the proposed subdivision requests a variance or waiver of a requirement of the City Ordinance provisions, the reason for the requested variance or waiver shall be included with the first Final Plat submittal. Final Plat submittals which do not address all of the provisions required by the City Ordinances shall not be considered by the City Planning Commission. Each resubmittal of the Final Plat shall include a nonrefundable review fee of $2,500.00. Resubmittal Final Plats shall be received by the City Finance Officer at least ten (10) days prior to the requested meeting with the City Planning Commission.

B. One copy of the final plat may be transmitted to a registered engineer to be selected by the city council who may check the plat as to computations, certifications, monuments, etc., and that all the required improvements have been completed to the satisfaction of the city officials having jurisdiction, or in the case a improvements be completed a ~~surety bond~~cash deposit has been posted, such is sufficient to cover the cost of the required improvements. If found satisfactory, he or she will return the copy of the final plat to the city planning commission with his or her approval certified thereon within ten (10) days of receipt thereof.

~~C. One copy shall be transmitted to the land use administrator when individual sewage disposal or water supply facilities are to be installed. If the plat meets the approval of the land use administrator, he or she shall return the copy with his or her approval certified thereon within ten (10) days of receipt thereof.~~

~~D~~C. The city planning commission shall study the final plat to see if it conforms with the minimum standards and requirements as provided in this chapter and Chapters 17.92 and 17.96 as required by the city council. Following a public hearing before and due consideration by the city planning commission, the commission shall transmit all copies of the final plat to the city council, together with its recommendations at least sixty~~thirty~~ (60~~30~~) days after receipt thereof. The recommendations shall include approval, disapproval or suggestions for modifications and reasons thereof, and a discussion of the effect of the plat on the comprehensive plan. The ~~-~~recommendations shall be of an advisory nature only. If the city planning commission does not act within sixty~~thirty~~ (60~~30~~) days, the final plat shall be deemed to have received a favorable recommendation in all respects, and shall then receive due consideration by the city council.

~~E~~D. The final plat shall be approved or disapproved within one hundred twenty~~sixty~~ (~~60~~120) days after submission thereof to the city finance officer; otherwise such plat shall be deemed to have been approved and a certificate to that effect shall be issued by the city council on demand; provided, however, that the applicant for the approval may waive this requirement and consent to the extension of such period. The ground of disapproval of any plat shall be stated upon the records of the city council. Any plat submitted for approval shall contain the name and address of a person to whom notice of hearing may be sent; and no plat shall be acted upon by the city council without affording a hearing thereon, notice of the time and place of which shall be sent by mail to the address not less than five days before the date fixed therefore. The approval of the final plat by the city council shall not be deemed to constitute or ~~ca~~effect on acceptance by the municipality or public of the dedication of any street or other ground shown on the final plat.[1]

F. When the final plat has been approved by the city council one copy shall be returned to the subdivider with the approval of the city council certified thereon, for filing with the county register of deeds as an official plat of record.

Another copy certified by the city council, shall be transmitted to the city finance officer for his or her records. With the exception of those improvements required by Chapter 17.92, no work shall be done on the subdivision and no lots shall be sold before the final plat is accepted and recorded. (Ord. 386 § 1909, 2002)

Dated at North Sioux City, South Dakota this ___ day of January, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

PROPOSED ORDINANCE 2020-01

AN ORDINANCE AMENDING THE NORTH SIOUX CITY CODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.88.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.88 be amended as set forth below.

17.88.030 Preliminary plat approval.

After meeting informally with the city planning commission, the subdivider shall cause to be prepared a preliminary plat prior to the making of any street or utility drawings or construction.

17.88.040 Preliminary plat data.

The preliminary plat shall meet the standard design as set forth in Chapter 17.92 and shall show the following information:

A. Scale of two hundred (200) feet to one inch or larger;

B. Name of subdivision, names and addresses of the owners, the engineer, or surveyor, and the owner of the adjacent property;

C. A vicinity sketch at a scale of four hundred (400) feet or less to one inch;

D. Date, approximate magnetic and true north point, and graphic scale;

E. Acreage of land to be subdivided;

F. Contours at an interval of not greater than one foot or at a lesser interval if deemed necessary by the city council;

G. Boundary lines of area to be subdivided and their bearings and distances;

H. Existing and proposed easements and their locations, widths and distances;

I. Streets on and adjacent to the tract and their names, widths, approximate grades, and other dimensions as may be required;

J. All streets to be platted showing the natural and finished grade drawn to scale, and when applicable connection to existing City Streets.

K. Utilities on and adjacent to the tract showing proposed connections to existing utility system and easements as required by the City;

L. Lot lines and lot numbers;

M. Sites, and their acreages, if any, to be reserved or dedicated for parks, playgrounds, schools or other public uses; sites, if any, for semi-public, commercial or multifamily uses;

N. Minimum building setback lines;

O. Copies of proposed deed restrictions, if any. (Ord. 386 § 1904, 2002)

17.88.050 Preliminary plat procedures.

A. Eleven (11) copies of the preliminary plat and the required supplementary material, shall be filed with the city finance officer, who shall transmit three copies to the chairperson of the city planning commission. Such filing shall take place at least ten (10) days prior to the meeting of the city planning commission at which time it is to be considered.

Included with the Preliminary Plat submittal shall be a nonrefundable review fee of $2,500.00. If the proposed subdivision requests a variance or waiver of a requirement of the City Ordinance provisions, the reason for the requested variance or waiver shall be included with the first Preliminary Plat submittal. Preliminary Plat submittals which do not address all of the provisions required by the City Ordinances shall not be considered by the City Planning Commission. Each resubmittal of the Preliminary Plat shall include a nonrefundable review fee of $2,500.00. Resubmittal Preliminary Plats shall be received by the City Finance Officer at least ten (10) days prior to the requested meeting with the City Planning Commission.

B. The city planning commission shall study the preliminary plat to see if it conforms with the minimum standards and requirements as outlined in Chapters 17.92 and 17.96. Following a public hearing before and due consideration by the city planning commission, the commission shall transmit all copies of the preliminary plat to the city council together with its recommendations at least sixty (60) days after receipt thereof. Such recommendations shall include approval, disapproval or suggestions for modification and the reasons thereof, and a discussion of the effect of the plat on the modification and the reasons thereof, and a discussion of the effect of the plat on the comprehensive plan. The recommendations shall be of an advisory nature only. If the city planning commission does not act within sixty (60) days, the preliminary plat shall be deemed to have received a favorable recommendation in all respects, and shall receive due consideration by the city council.

C. Following a public hearing and due consideration of the preliminary plat, the city council shall approve, disapprove or modify the recommendations of the city planning commission and may impose those requirements or grant those variances in conformance with this title deemed necessary and appropriate by the city council for final approval. One copy shall be returned to the subdivider and the others shall be retained by the finance officer.

D. Approval of the preliminary plat by the city council shall not constitute acceptance of the final plat. The approval of the preliminary plat shall lapse unless a final plat based thereon is submitted within one year from the date of such approval. An extension of time may be applied for by the subdivider and granted by the city council. (Ord. 386 § 1905, 2002)

17.88.080 Final plat data.

The final plat shall give the following information:

A. The plat shall be at a scale of one hundred (100) feet to one inch or larger;

B. Date, title, name and location of subdivision, graphic scale, and magnetic and true north line;

C. All dimensions, angles, bearings and similar date on the plat shall be tied to primary control points. Locations and control points shall be given. Except where deemed clearly unreasonable or infeasible by the city council, these control points shall be the located section corners of the coordinate system of the state of South Dakota;

D. Tract boundary lines, right-of-way lines of streets, easements and other right-of-way, and property lines of residential lots and other sides with accurate dimensions to the nearest one-hundredths of a foot; bearings of deflection angles, radii, arcs, and central angles of all curves with dimensions to the nearest minute;

E. Name and right-of-way width of each street, easement, or other right-of-way;

F. Lot numbers, lot lines, and frontage dimensions;

G. Purpose for which sites other than residential lots are dedicated or reserved;

H. Minimum building setback lines;

I. Location and description of monuments;

J. Names and locations of adjoining subdivisions and streets, the location of adjoining unplatted properties, and the name and addresses of the owners of adjoining unplatted properties;

K. Certification on plat of title showing that the applicant is the owner, that the making of the plat receives his or her consent and is in accordance with his or her desires, and a statement by such owner dedicating streets, rights-of-way and any other sites for public use;

L. Certification on plat by registered surveyor as to the accuracy of survey and plat;

M. Certification of approval by the land use administrator, when individual sewerage disposal or water systems are to be installed;

N. If applicable, certification that the subdivider has compiled with one of the following alternatives: all the improvements have been installed in accordance with the requirements of this title, or; a surety amount to assure such completion of all required improvements;

O. Protective covenants shall either be placed directly on the final plat or attached thereto in form for recording;

P. Certification on plat by the mayor and city finance officer that the plat has been approved for recording in the office of the register of deeds. (Ord. 386 § 1908, 2002)

17.88.090 Final plat procedure.

A. Six copies of the final plat and the required supplementary material shall be filed with the city finance officer who shall transmit them to the chairperson of the city planning commission. Such filing shall take place at least ten (10) days prior to the meeting of the city planning commission at which it is to be considered.

Included with the Final Plat submittal shall be a nonrefundable review fee of $2,500.00. If the proposed subdivision requests a variance or waiver of a requirement of the City Ordinance provisions, the reason for the requested variance or waiver shall be included with the first Final Plat submittal. Final Plat submittals which do not address all of the provisions required by the City Ordinances shall not be considered by the City Planning Commission. Each resubmittal of the Final Plat shall include a nonrefundable review fee of $2,500.00. Resubmittal Final Plats shall be received by the City Finance Officer at least ten (10) days prior to the requested meeting with the City Planning Commission.

B. One copy of the final plat may be transmitted to a registered engineer to be selected by the city council who may check the plat as to computations, certifications, monuments, etc., and that all the required improvements have been completed to the satisfaction of the city officials having jurisdiction, or in the case a improvements be completed a cash deposit has been posted, such is sufficient to cover the cost of the required improvements. If found satisfactory, he or she will return the copy of the final plat to the city planning commission with his or her approval certified thereon within ten (10) days of receipt thereof.

C. The city planning commission shall study the final plat to see if it conforms with the minimum standards and requirements as provided in this chapter and Chapters 17.92 and 17.96 as required by the city council. Following a public hearing before and due consideration by the city planning commission, the commission shall transmit all copies of the final plat to the city council, together with its recommendations at least sixty (60) days after receipt thereof. The recommendations shall include approval, disapproval or suggestions for modifications and reasons thereof, and a discussion of the effect of the plat on the comprehensive plan. The recommendations shall be of an advisory nature only. If the city planning commission does not act within sixty (60) days, the final plat shall be deemed to have received a favorable recommendation in all respects, and shall then receive due consideration by the city council.

D. The final plat shall be approved or disapproved within one hundred twenty (120) days after submission thereof to the city finance officer; otherwise such plat shall be deemed to have been approved and a certificate to that effect shall be issued by the city council on demand; provided, however, that the applicant for the approval may waive this requirement and consent to the extension of such period. The ground of disapproval of any plat shall be stated upon the records of the city council. Any plat submitted for approval shall contain the name and address of a person to whom notice of hearing may be sent; and no plat shall be acted upon by the city council without affording a hearing thereon, notice of the time and place of which shall be sent by mail to the address not less than five days before the date fixed therefore. The approval of the final plat by the city council shall not be deemed to constitute or effect on acceptance by the municipality or public of the dedication of any street or other ground shown on the final plat.

F. When the final plat has been approved by the city council one copy shall be returned to the subdivider with the approval of the city council certified thereon, for filing with the county register of deeds as an official plat of record. Another copy certified by the city council, shall be transmitted to the city finance officer for his or her records. With the exception of those improvements required by Chapter 17.92, no work shall be done on the subdivision and no lots shall be sold before the final plat is accepted and recorded. (Ord. 386 § 1909, 2002)

Dated at North Sioux City, South Dakota this ___ day of January, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Greg Meyer
Date: 02/03/2020
Re: Revisions to City Ordinances

Background:
I am requesting City Council consideration of revisions to the three City Ordinances which address subdivision development within the City of North Sioux City. I have made modifications to the Ordinances which were provided to Darrell Jesse for incorporation into the existing Ordinances for your consideration. Herein, I will provide a general summary of the proposed changes.

Ordinance 2020-02 – Amending the North Sioux City Code of Ordinances Title 17 land use and deveoplements by adding and/or altering language in 17.92

Chapter 17.92 SUBDIVISION DESIGN STANDARDS

1.) The City of North Sioux City adopts the Iowa Statewide Urban Specifications (SUDAS) and Design Manual with North Sioux City Supplements as the City Specifications and Design Guidelines. These documents rely on Iowa DOT and Environmental Regulations. The new Ordinance requires conflicts between SUDAS versus South Dakota and Federal Agencies to control.

Financial Consideration:

Recommendation:

PROPOSED ORDINANCE 2020-02

AN ORDINANCE AMENDING THE NORTH SIOUX CITYCODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.92.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.92 be amended as set forth below.

17.92.010 General.

Land to be subdivided shall be of such character that it can be used safely for building purposes without danger to health or peril from fire, flood, erosion or other menace. If, following adequate investigation, conducted by all public agencies concerned, it is determined that land to be subdivided cannot be used without endangering the health, safety, welfare or prosperity of the community, or would necessitate an excessive expenditure of public financial resources for sewage and water facilities, other public facilities and streets, than the subdivision plat shall not be approved unless the subdivider formulates adequate methods for meeting such problems.

Subdivisions shall be in harmony with the comprehensive plan.

All required improvements shall be constructed or installed to conform to the provisions of this title and city specifications.

The City specifications for construction shall be the latest version of the Iowa Statewide Urban Specifications (hereinafter referred to as SUSDAS) as modified by the City Supplement to the specifications. The City design methods shall conform with the latest version of the Iowa Statewide Urban Design manual, as modified by the City Supplement to the Design manual. Where the City adopted SUDAS documents conflict with the provisions of the City Ordinances, South Dakota Department of Environment and Natural Resources (SD-DENR), the South Dakota Department of Transportation (SD-DOT), and federal or state funding agencies; the aforementioned agency provisions shall govern. The SUDAS documents are subject to modification to fit the conditions of each project, and the City reserves the right to modify its specifications as required for the benefit of the City without expense to the City.

~~(Ord. 386 § 1601, 2002)~~

17.92.070 Easements.

Easements across lots or centered on rear or side lot lines shall be provided for utilities where necessary and shall be at least twenty~~twelve~~ (20~~12~~) feet wide, or as required by the City.

Where a subdivision is traversed by a water course, drainage way, channel or stream there shall be provided a storm water easement or drainage right-of-way conforming substantially with the lines of such water course, and such further width or construction, or both, as will be adequate for the purpose. Parallel streets or parkways may be required in connection therewith. (Ord. 386 § 1607, 2002)

Dated at North Sioux City, South Dakota this ___ day of January, 2020.

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

PROPOSED ORDINANCE 2020-02

AN ORDINANCE AMENDING THE NORTH SIOUX CITYCODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.92.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.92 be amended as set forth below.

17.92.010 General.

Land to be subdivided shall be of such character that it can be used safely for building purposes without danger to health or peril from fire, flood, erosion or other menace. If, following adequate investigation, conducted by all public agencies concerned, it is determined that land to be subdivided cannot be used without endangering the health, safety, welfare or prosperity of the community, or would necessitate an excessive expenditure of public financial resources for sewage and water facilities, other public facilities and streets, than the subdivision plat shall not be approved unless the subdivider formulates adequate methods for meeting such problems.

Subdivisions shall be in harmony with the comprehensive plan.

All required improvements shall be constructed or installed to conform to the provisions of this title and city specifications.

The City specifications for construction shall be the latest version of the Iowa Statewide Urban Specifications (hereinafter referred to as SUSDAS) as modified by the City Supplement to the specifications. The City design methods shall conform with the latest version of the Iowa Statewide Urban Design manual, as modified by the City Supplement to the Design manual. Where the City adopted SUDAS documents conflict with the provisions of the City Ordinances, South Dakota Department of Environment and Natural Resources (SD-DENR), the South Dakota Department of Transportation (SD-DOT), and federal or state funding agencies; the aforementioned agency provisions shall govern. The SUDAS documents are subject to modification to fit the conditions of each project, and the City reserves the right to modify its specifications as required for the benefit of the City without expense to the City.

17.92.070 Easements.

Easements across lots or centered on rear or side lot lines shall be provided for utilities where necessary and shall be at least twenty (20) feet wide, or as required by the City.

Where a subdivision is traversed by a water course, drainage way, channel or stream there shall be provided a storm water easement or drainage right-of-way conforming substantially with the lines of such water course, and such further width or construction, or both, as will be adequate for the purpose. Parallel streets or parkways may be required in connection therewith. (Ord. 386 § 1607, 2002)

Dated at North Sioux City, South Dakota this ___ day of January, 2020.

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Greg Meyer
Date: 02/03/2020
Re: Revisions to City Ordinances

Background:
I am requesting City Council consideration of revisions to the three City Ordinances which address subdivision development within the City of North Sioux City. I have made modifications to the Ordinances which were provided to Darrell Jesse for incorporation into the existing Ordinances for your consideration. Herein, I will provide a general summary of the proposed changes.

Ordinance 2020-02 – Amending the North Sioux City Code of Ordinances Title 17 land use and deveoplements by adding and/or altering language in 17.96

Chapter 17.96 SUBDIVISION IMPROVEMENTS REQUIRED PRIOR TO FINAL PLAT APPROVAL

1.) Changes minimum pavement widths to reflect the City construction practices. All City streets are 31 ft. from back of curb to back of curb not the 28 ft. in the Ordinance.
2.) Pavement thickness for streets other than residential to be determined by the City. Minimum concrete pavement thickness is increased from 6" to 7".

3.) Deletes subbase construction requirements which are now in the North Sioux City Supplement to SUDAS. City water main size of 12" and other material requirements are in the North Sioux City Supplement.
4.) The existing requirement for sidewalks on both sides of the street may be waived by the City Council.
5.) Requires a City Representative to be on site and observe the construction at the Sub-divider's expense. Work performed without the City review shall be exposed at no cost to the City. The acceptance of the work as Substantially Completed in accordance with the approved drawings and specifications is required prior to acceptance of the Final Plat. There is not a means for the City Representative to control the project. Can the City provide a means to control the work? If City money is included in the project can the funds be withheld until approval?
6.) Requires extension of utilities to the edge of the subdivision or as required by the City at no cost to the City.
7.) Requires looping of water lines.
8.) All drainage shall be included in pipes unless the City Council approves a ditch or detention basin. The NSC Supplement to SUDAS requires a maintenance agreement for detention basins.
9.) Requires the completion of previous subdivisions, to the satisfaction of the City prior to starting another subdivision.

Financial Consideration:

Recommendation:

PROPOSED ORDINANCE 2020-03

AN ORDINANCE AMENDING THE NORTH SIOUX CITYCODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.96.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.96 be amended as set forth below.

17.96.010 Monuments.

~~Concrete monuments at least thirty-six (36) inches long and four inches square with a suitable center point shall be set at each street intersection on the street right-of-way line and at all corners on the plat. Except in cases where it is deemed clearly unreasonable or infeasible by the city council, these monuments shall be described in relation to the located section corners of the coordinate system of the state of South Dakota.~~ Solid iron pin monuments three-fourths inch in diameter and twenty-four (24) inches long or suitable concrete markers shall be placed at all points on boundary lines where there is a change of direction and at all lot corners. ~~(Ord. 386 § 1701, 2002)~~

17.96.020 Streets.

A. Grading Specifications. All streets, roads and alleys shall be graded to their full widths by the subdivider so that street pavements and sidewalks can be constructed on the same level plan. Deviation from this standard due to special topographical conditions will be allowed only with the approval of the city council. ~~Before grading is started, the entire right-of-way area shall be first cleared of all tree stumps, roots, brush and other objectionable materials and of all trees not intended for preservation. The subgrade shall be properly shaped, rolled, and uniformly compacted to conform with the accepted cross-section and grades. In cuts, all tree stumps, boulders organic material, soft clay, spongy material, and other objectionable materials shall be removed to a depth of at least two feet below the graded surface. Rock, when encountered, shall be scarified to a depth of at least twelve (12) inches below the graded surface. In fills, all tree stumps, boulders, organic material, soft clay, spongy material and other objectionable material shall be removed to a depth of at least two feet below the natural ground surface. This objectionable matter, as well as similar matter from cuts shall be removed from the right-of-way area and disposed of in such a manner that it will not become incorporated in fills or hinder proper operation of the drainage system.~~

B. Minimum Pavement Widths. Pavement widths shall be measured ~~between~~ behind curbs. Minimum pavement widths to be provided are:

Parkways	12 feet for each lane
Arterials	~~11~~ 12 feet for each lane
Collector streets	40 feet
Minor streets	~~27~~ 31 feet
Marginal access streets	27~~18~~ feet
Alleys, industrial and commercial streets	12 feet

C. Street Pavement--Minimum Street Design. The minimum street design shall consist of ~~six~~ seven inches of concrete paving (four thousand (4,000) psi compressive strength) supported on a subgrade ~~prepared as follows~~:

~~1. Option One - Fly Ash Stabilization. Fly ash stabilized subgrade to a depth of eighteen (18) inches. Fly ash to be uniformly incorporated into the subsoil at the rate of twenty (20) percent fly ash by weight per volume of fly ash and soil mixture. Fly ash shall meet ASTM Specification C-618, Section 3.2, Class "C" designation containing a minimum of twenty-five (25) percent CaO. Subgrade shall be pulverized, Class "C" fly ash added, mixed, and compaction of the mixed materials. The initial compaction shall be achieved using a vibratory pad foot roller with a minimum operation weight of twelve (12) tons and a minimum centrifugal force of twenty-four (24) tons. Rubber tire or smooth-wheel rollers shall be used for final compaction of the stabilized section. Recompaction of the mixture after cure shall not be allowed. This option shall not be permitted when the soil temperature is less than forty-five (45) degrees Fahrenheit for a twenty-four (24) hour period after the fly ash is incorporated.~~

~~2. Option Two - Granular Base. Compacted nine-inch base of clean well graded gravel meeting SD DOT Standard Specifications for Roads and Bridges, Section 882 for gravel cushion adjusted to reduce the maximum percent of material passing the No. 200 sieve shall not exceed five percent. The nine inch base shall be sloped to and hydraulically connected to a longitudinal drain (four inches minimum diameter) and a surface outfall protected from stormwater backflow. The base shall be compacted to ninety-eight (98) percent of Relative Laboratory Density as determined by ASTM D-698. The natural soils under the granular base shall be firm, unyielding, and compacted to ninety-eight (98) percent of the Relative Laboratory Density as determined by ASTM D-698.~~

~~No topsoil, vegetation, or other deleterious materials shall be contained under pavements. All streets shall be constructed in accordance with the latest edition of the South Dakota Department of Transportation Standard Specifications for Roads and Bridges.~~

Commercial Streets shall be concrete paving (4,000 psi) with a thickness greater than six (6) inches to be determined by the City. Collector and arterial streets shall be concrete or asphalt streets with thickness and subgrade to be determined by the City.

D. Curb and Gutter. Curb and gutter shall be provided in all subdivisions. Curbs shall not be less than six (6) inches in height and shall be constructed of Portland concrete cement~~ or bioluminous concrete~~. Back fill shall be higher than the curb and shall slope toward the curb in order to insure that surface water drains into the storm drainage system.

E. Sidewalks. For the safety of pedestrians in residential and commercial subdivisions, sidewalks constructed of Portland concrete cement shall be constructed on each lot one foot from the lot line on both sides of the street to meet the following specifications unless waived by the City Council:

1. Single-family or duplex housing developments: four feet wide and four inches thick;

2. Multi-family or group housing developments: five feet wide and four inches thick;

3. Commercial developments: eight to ten (10) feet wide and six (6)~~four~~ inches thick. (Ord. 386 § 1702, 2002)

17.96.030 Utility and drainage facilities.

A. General. Sanitary sewer, storm sewer, water distribution, electrical gas, telephone and communications, cable, and all other utility lines shall be installed in rear lot easements ~~wherever practical. Where it is impractical to install such utility lines in rear lot easements,~~, or they shall be installed within the unpaved portions of the street right-of-way except

for sanitary ~~and storm~~ sewer lines which may be installed in the paved portion of the street right-of-way~~ if it is impossible to install them in the unpaved portion~~.

~~When it is impossible to install sanitary and storm sewer lines in the unpaved portion of the street right-of-way all such~~All utility lines, including service connections shall be completely installed, and inspected and approved by the ~~land use administrator~~City representative, ~~following the~~prior to grading of the street and prior to the application of any pavement base.

Extend utility lines to the perimeter of the subdivision as required for future development at no cost to the City.

~~Where sanitary and storm sewer lines are to be installed in the unpaved portion of the street right-of-way, the installation of service connections may be delayed, provided, that at such time as these service connections are installed, they may be installed without breaking or weakening the existing pavement. Where rock is known to exist beneath the pavement area at such depth as to interfere with the installation of service connections, the complete installation of service connections shall be required prior to the application of any pavement base.~~

B. Water Supply Improvements. Where the public water supply is reasonably accessible or available to the proposed subdivision, as determined by the city council, a complete water distribution system that shall adequately serve all lots, which shall include appropriately spaced fire hydrants, and which shall be properly connected with the public water supply system, shall be installed. ~~Where a public water supply system is not reasonably accessible to the subdivision, alternate water supply facilities approved by the city council shall be installed. Where individual lot wells are to be installed, lot dimensions shall meet the approval of the city council. In any case water~~Water supply facilities shall be installed as required by standards and specifications as approved by the city council and looped onto the City water system at no cost to the City.~~.~~

C. Sanitary Sewer Improvements. ~~Where the public water supply is reasonably accessible or available to the proposed subdivision, as determined by the city council, a complete sanitary sewer system which shall adequately serve all lots and which shall be properly connected to the public sanitary sewer system is not reasonably accessible to the subdivision, alternate sanitary sewer facilities, which shall be approved by the city council, shall be installed. In any case, sanitary~~Sanitary sewer facilities shall be installed as required by standards and specifications as approved by the C~~c~~ity ~~c~~Council and extended to the perimeter of the development at no cost to the City.~~.~~

D. Storm Drainage. An adequate drainage system, including necessary open ditches, pipes, culverts, intersectional drains, drop inlets, and bridges for the proper drainage of all surface water, shall be installed. Cross drains shall be provided to accommodate all natural water flow, and they shall be of sufficient length to permit full width roadways and the required slopes. All drainage shall be contained in pipes unless open ditches and detention ponds are approved by the City Council. ~~(Ord. 386 § 1703, 2002)~~

17.96.040 Street name signs.

The city council shall require the installation of durable street name signs at all intersections. (Ord. 386 § 1704, 2002)

17.96.050 Requirements for approval of final plat.

No final plat of any subdivision shall be approved unless:

A. Easements in the form acceptable to the City shall be signed and delivered to the City for filing.

B. Covenants in the form acceptable to the City shall be signed and delivered to the City for filing.

C. All public right of way shall be dedicated to the City at no cost to the City.

D. Previous sub-divisions performed by the sub-divider are completed in a manner acceptable to the City.

~~A~~E. The improvements ~~listed above~~required by the City have been made and satisfactorily installed and approved by the city council prior to such final plat approval;

F. The City shall provide field review (using an agent selected by the City) of all construction of improvements requested by the City for the subdivision. The sub-divider or its agents shall not perform construction work on the subdivision when the City Agent is not present. Work performed by the sub-divider or its agent without the observation of the City Agent shall be exposed for review by the City Agent, at no cost to the City or its Agent, prior to proceeding. The cost of the City field review of the subdivision construction, shall be paid in advance by the sub-divider. The sub-divider shall deposit with the City the amount estimated by the City to be required for all of the expenses incurred by the City for the field review of the subdivision construction. Should the expense of the field review of the subdivision construction exceed the amount estimated by the City; the construction work shall stop until sufficient funds exist in the construction field work account to allow performance of additional field review. In the event the cost of the City field review is less than estimated by the City, the City shall reimburse the sub-divider the unused funds. The City Agent shall determine if the improvements constructed by the subdivider are substantially in compliance with the construction drawings and specifications approved by the City for the improvements of the subdivision.

~~B~~G. The subdivider shall enter into a contract with the city in insure completion of the improvements listed in Sections 17.96.020 and 17.96.030 by the subdivider within one year. The performance of the contract shall be secured by the subdivider filing with the city a ~~performance surety bond~~ cash deposit in an amount equal to one and one-quarter times the cost of making such improvements, as estimated by the city, conditioned upon the payment of all construction costs incurred in making such improvements by the subdivider, and all expense incurred by the city for engineering and legal fees and other expense in connection with the making of such improvements in order to insure construction of the improvements in a satisfactory manner;

H~~C~~. The subdivider agrees with the city and the city may construct those improvements listed in Sections 17.96.020 and 17.96.030, and assess the cost thereof against the property benefited.~~; or~~

~~D. A tax incremental district pursuant to SDCL 11-9 has been created for the land area which the subdivider desires to plat and the subdivider has entered into a contract for private development, on terms and conditions acceptable to the city to insure completion of the improvements listed in Sections 17.96.020 and 17.96.030. (Ord. 386 § 1705, 2002)~~

Dated at North Sioux City, South Dakota this ___ day of January, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

PROPOSED ORDINANCE 2020-03

AN ORDINANCE AMENDING THE NORTH SIOUX CITYCODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.96.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.96 be amended as set forth below.

17.96.010 Monuments.

Solid iron pin monuments three-fourths inch in diameter and twenty-four (24) inches long or suitable concrete markers shall be placed at all points on boundary lines where there is a change of direction and at all lot corners.

17.96.020 Streets.

A. Grading Specifications. All streets, roads and alleys shall be graded to their full widths by the subdivider so that street pavements and sidewalks can be constructed on the same level plan. Deviation from this standard due to special topographical conditions will be allowed only with the approval of the city council.

B. Minimum Pavement Widths. Pavement widths shall be measured behind curbs. Minimum pavement widths to be provided are:

Parkways	12 feet for each lane
Arterials	12 feet for each lane
Collector streets	40 feet
Minor streets	31 feet
Marginal access streets	27 feet
Alleys, industrial and commercial streets	12 feet

C. Street Pavement--Minimum Street Design. The minimum street design shall consist of seven inches of concrete paving (four thousand (4,000) psi compressive strength) supported on a subgrade:

Commercial Streets shall be concrete paving (4,000 psi) with a thickness greater than six (6) inches to be determined by the City. Collector and arterial streets shall be concrete or asphalt streets with thickness and subgrade to be determined by the City.

D. Curb and Gutter. Curb and gutter shall be provided in all subdivisions. Curbs shall not be less than six (6) inches in height and shall be constructed of Portland concrete cement. Back fill shall be higher than the curb and shall slope toward the curb in order to insure that surface water drains into the storm drainage system.

E. Sidewalks. For the safety of pedestrians in residential and commercial subdivisions, sidewalks constructed of Portland concrete cement shall be constructed on each lot one foot from the lot line on both sides of the street to meet the following specifications unless waived by the City Council:

1. Single-family or duplex housing developments: four feet wide and four inches thick;

2. Multi-family or group housing developments: five feet wide and four inches thick;

3. Commercial developments: eight to ten (10) feet wide and six (6) inches thick. (Ord. 386 § 1702, 2002)

17.96.030 Utility and drainage facilities.

A. General. Sanitary sewer, storm sewer, water distribution, electrical gas, telephone and communications, cable, and all other utility lines shall be installed in rear lot easements , or they shall be installed within the unpaved portions of the street right-of-way except for sanitary sewer lines which may be installed in the paved portion of the street right-of-way.

All utility lines, including service connections shall be completely installed, and inspected and approved by the City representative, prior to grading of the street and prior to the application of any pavement base.

Extend utility lines to the perimeter of the subdivision as required for future development at no cost to the City.

B. Water Supply Improvements. Where the public water supply is reasonably accessible or available to the proposed subdivision, as determined by the city council, a complete water distribution system that shall adequately serve all lots, which shall include appropriately spaced fire hydrants, and which shall be properly connected with the public water supply system, shall be installed. Water supply facilities shall be installed as required by standards and specifications as approved by the city council and looped onto the City water system at no cost to the City.

C. Sanitary Sewer Improvements. Sanitary sewer facilities shall be installed as required by standards and specifications as approved by the City Council and extended to the perimeter of the development at no cost to the City.

D. Storm Drainage. An adequate drainage system, including necessary open ditches, pipes, culverts, intersectional drains, drop inlets, and bridges for the proper drainage of all surface water, shall be installed. Cross drains shall be provided to accommodate all natural water flow, and they shall be of sufficient length to permit full width roadways and the required slopes. All drainage shall be contained in pipes unless open ditches and detention ponds are approved by the City Council.

17.96.040 Street name signs.

The city council shall require the installation of durable street name signs at all intersections. (Ord. 386 § 1704, 2002)

17.96.050 Requirements for approval of final plat.

No final plat of any subdivision shall be approved unless:

A. Easements in the form acceptable to the City shall be signed and delivered to the City for filing.

B. Covenants in the form acceptable to the City shall be signed and delivered to the City for filing.

C. All public right of way shall be dedicated to the City at no cost to the City.

D. Previous sub-divisions performed by the sub-divider are completed in a manner acceptable to the City.

E. The improvements required by the City have been made and satisfactorily installed and approved by the city council prior to such final plat approval;

F. The City shall provide field review (using an agent selected by the City) of all construction of improvements requested by the City for the subdivision. The sub-divider or its agents shall not perform construction work on the subdivision when the City Agent is not present. Work performed by the sub-divider or its agent without the observation of the City Agent shall be exposed for review by the City Agent, at no cost to the City or its Agent, prior to proceeding. The cost of the City field review of the subdivision construction, shall be paid in advance by the sub-divider. The sub-divider shall deposit with the City the amount estimated by the City to be required for all of the expenses incurred by the City for the field review of the subdivision construction. Should the expense of the field review of the subdivision construction exceed the amount estimated by the City; the construction work shall stop until sufficient funds exist in the construction field work account to allow performance of additional field review. In the event the cost of the City field review is less than estimated by the City, the City shall reimburse the sub-divider the unused funds. The City Agent shall determine if the improvements constructed by the subdivider are substantially in compliance with the construction drawings and specifications approved by the City for the improvements of the subdivision.

G. The subdivider shall enter into a contract with the city in insure completion of the improvements listed in Sections 17.96.020 and 17.96.030 by the subdivider within one year. The performance of the contract shall be secured by the subdivider filing with the city a cash deposit in an amount equal to one and one-quarter times the cost of making such improvements, as estimated by the city, conditioned upon the payment of all construction costs incurred in making such improvements by the subdivider, and all expense incurred by the city for engineering and legal fees and other expense in connection with the making of such improvements in order to insure construction of the improvements in a satisfactory manner;

H. The subdivider agrees with the city and the city may construct those improvements listed in Sections 17.96.020 and 17.96.030, and assess the cost thereof against the property benefited.

Dated at North Sioux City, South Dakota this ___ day of January, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Greg Meyer
Date: 02/03/2020
Re: Ordinance change to limit lot fill

Background: Mayor Fredericksen, Gary Roan, Rusty Montagne, and I met on January 24, 2020 to discuss a recommendation for lot fill and building elevation relative to the top of concrete street curb. As Rusty had previously worked as a house builder, he recalled typical elevations relative to the top of curb. The typical garage floor was two (2) feet above the curb and the floor of the house four (4) feet above the curb. Gary Roan agreed with the above typical house and garage reference elevations.

Further discussion revealed the above standards would limit house construction, which may be too restrictive. An alternative approach was developed based on the height of lot fill. The proposed language for incorporation into an Ordinance would be as follows:

1.) The maximum driveway slope shall not exceed three (3) percent from the street right of way line to the front building set back line. Drawings submitted for a building permit shall show the distance from the top of the garage footing to the top of the garage footing wall. If the dimension is omitted from the drawings, the distance will be assumed to be eight (8) inches. (This will result in a garage floor that is approximately 2 ft. above top of curb at the building set back distance.)

2.) Top of dirt shall not be higher than two (2) feet above the top of curb within the building set back area.

The above allows the home builder to construct a home at a higher elevation using retaining walls and fill but not within the building set back area. This will hopefully eliminate the construction of retaining walls at the property line as is proposed for the house under construction in Lakeshore Estates (905 Lakeshore Circle). There is also the opportunity for the home builder to set the home back farther into the lot than the required set back, to allow the driveway elevation to increase beyond the set-back line. Is the City willing to accept housing with variable set back locations as may be observed at Dakota Dunes, Wynstone, and Deer Run?

Attached are two drawings that Gary Roan received from someone at Connelly Development. I wrote on the drawings some of the dimensions that are hard to read. Someone else wrote the slopes in "%" grade. I am not able to verify the grades shown. I did survey the existing home (905 Lakeshore Circle) and the garage floor is estimated to be approximately 5'-10" above the top of curb. I have attempted to illustrate the proposed 3 ft. high retaining wall on the drawing. I would recommend a formal submittal to amend the building permit if this is acceptable to the Council.

I am not able to verify the '%' grade written on the drawings. Using the 5.5% grade from the garage west yields an estimated retaining wall of 4.2 ft. not 3 ft. as labeled on the drawing. The slope in the curved driveway is estimated to exceed 8% grade not the 4.5% or 5.5% grade written on the drawings.

For your reference, the slope of the east approach ramp to exit 4 overpass from Military Road to the west is approximately 4% grade.

I would like to add to the above ordinance provisions 1 and 2 the following:

3.) Slope from back of curb to sidewalk shall be to the top of curb to allow drainage but shall not exceed 2%. (The ADA regulations limit the sidewalk ramp longitudinal slope to 2% unless there is a stop sign on the street where the sidewalk intersects the street. If a stop sign is provided, the slope can be increased to 5%. As all of the stop sign locations are not determined ahead of construction and the locations may change, I recommend the City follow the more conservative slope.)

4.) The cross slope on the sidewalk is limited to 2% maximum with a recommended slope of 1.5%. Driveways must have a deviation from the allowable 3% slope within the City right of way to provide for the sidewalk.

Financial Consideration:

Recommendation:

PROPOSED ORDINANCE 2020-04

AN ORDINANCE AMENDING THE NORTH SIOUX CITY CODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.96.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.96 be amended as set forth below.

17.96.020 Streets.

A. Grading Specifications. All streets, roads and alleys shall be graded to their full widths by the subdivider so that street pavements and sidewalks can be constructed on the same level plan. Slope from the back of curb to the proposed sidewalk shall be installed to the top of curb to facilitate drainage but shall not exceed two percent (2%). The cross slope on the sidewalk is limited to two percent (2%) maximum with a recommended slope of one and a half percent (1.5%). The right of way grading from the back of curb to the property line shall not exceed two percent (2%) slope.

Lot grading shall be subject to approval by the Council. Completed lot grading shall provide for a maximum driveway slope and shall not exceed three percent (3%) from the street right of way line to the front building set back line. Drawings submitted for a building permit shall reflect the distance from the top of the garage floor to the top of the garage footing wall. If the dimension is omitted from the drawings, the distance will be assumed to be eight (8) inches. The top of dirt shall not be higher than two (2) feet above the top of curb within the building set back area.

Deviation from this standard due to special topographical conditions will be allowed only with the approval of the city council. ~~Before grading is started, the entire right-of-way area shall be first cleared of all tree stumps, roots, brush and other objectionable materials and of all trees not intended for preservation. The subgrade shall be properly shaped, rolled, and uniformly compacted to conform with the accepted cross-section and grades. In cuts, all tree stumps, boulders organic material, soft clay, spongy material, and other objectionable materials shall be removed to a depth of at least two feet below the graded surface. Rock, when encountered, shall be scarified to a depth of at least twelve (12) inches below the graded surface. In fills, all tree stumps, boulders, organic material, soft clay, spongy material and other objectionable material shall be removed to a depth of at least two feet below the natural ground surface. This objectionable matter, as well as similar matter from cuts shall be removed from the right-of-way area and disposed of in such a manner that it will not become incorporated in fills or hinder proper operation of the drainage system.~~

~~D. A tax incremental district pursuant to SDCL 11-9 has been created for the land area which the subdivider desires to plat and the subdivider has entered into a contract for private development, on terms and conditions acceptable to the city to insure completion of the improvements listed in Sections 17.96.020 and 17.96.030. (Ord. 386 § 1705, 2002)~~

Dated at North Sioux City, South Dakota this ___ day of February~~January~~, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

PROPOSED ORDINANCE 2020-04

AN ORDINANCE AMENDING THE NORTH SIOUX CITY CODE OF ORDINANCES TITLE 17 LAND USE AND DEVELOPMENTS BY ADDING AND/OR ALTERING LANGUAGE IN 17.96.

BE IT ORDAINED, by the Governing Body of the City of North Sioux City, South Dakota and it is hereby ordained by authority of the same that Title 17, Chapter 17.96 be amended as set forth below.

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Lot grading shall be subject to approval by the Council. Completed lot grading shall provide for a maximum driveway slope and shall not exceed three percent (3%) from the street right of way line to the front building set back line. Drawings submitted for a building permit shall reflect the distance from the top of the garage floor to the top of the garage footing wall. If the dimension is omitted from the drawings, the distance will be assumed to be eight (8) inches. The top of dirt shall not be higher than two (2) feet above the top of curb within the building set back area.

Deviation from this standard due to special topographical conditions will be allowed only with the approval of the city council.

Dated at North Sioux City, South Dakota this ___ day of February, 2020

THE GOVERNING BODY OF THE CITY
OF NORTH SIOUX CITY, SOUTH DAKOTA

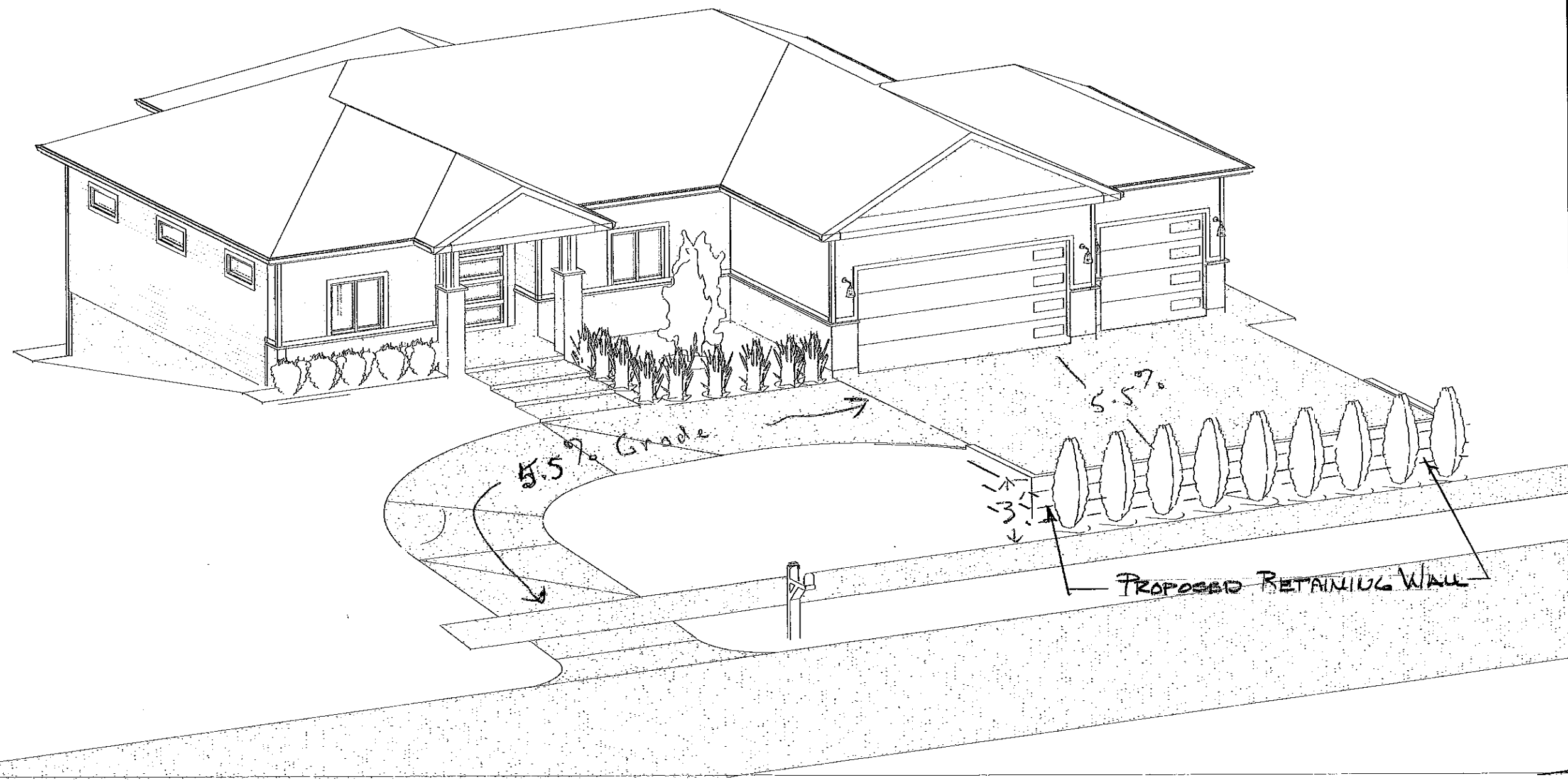
By: _____
Randy Fredericksen, Mayor

ATTEST;

By: _____
Mike Hamm, Finance Officer

First Reading:
Second Reading:
Publish:
Effective Date:

REC'D 1-24-2020
GCM



CONNE
DEVELOPMEN
Dakota Dunes,
www.CTSBuilders.co

No.	Description	Date

905 LAKESHORE CIRCLE

NORTH SIOUX CITY, SD

Exterior - Axon

Drawn by CPA

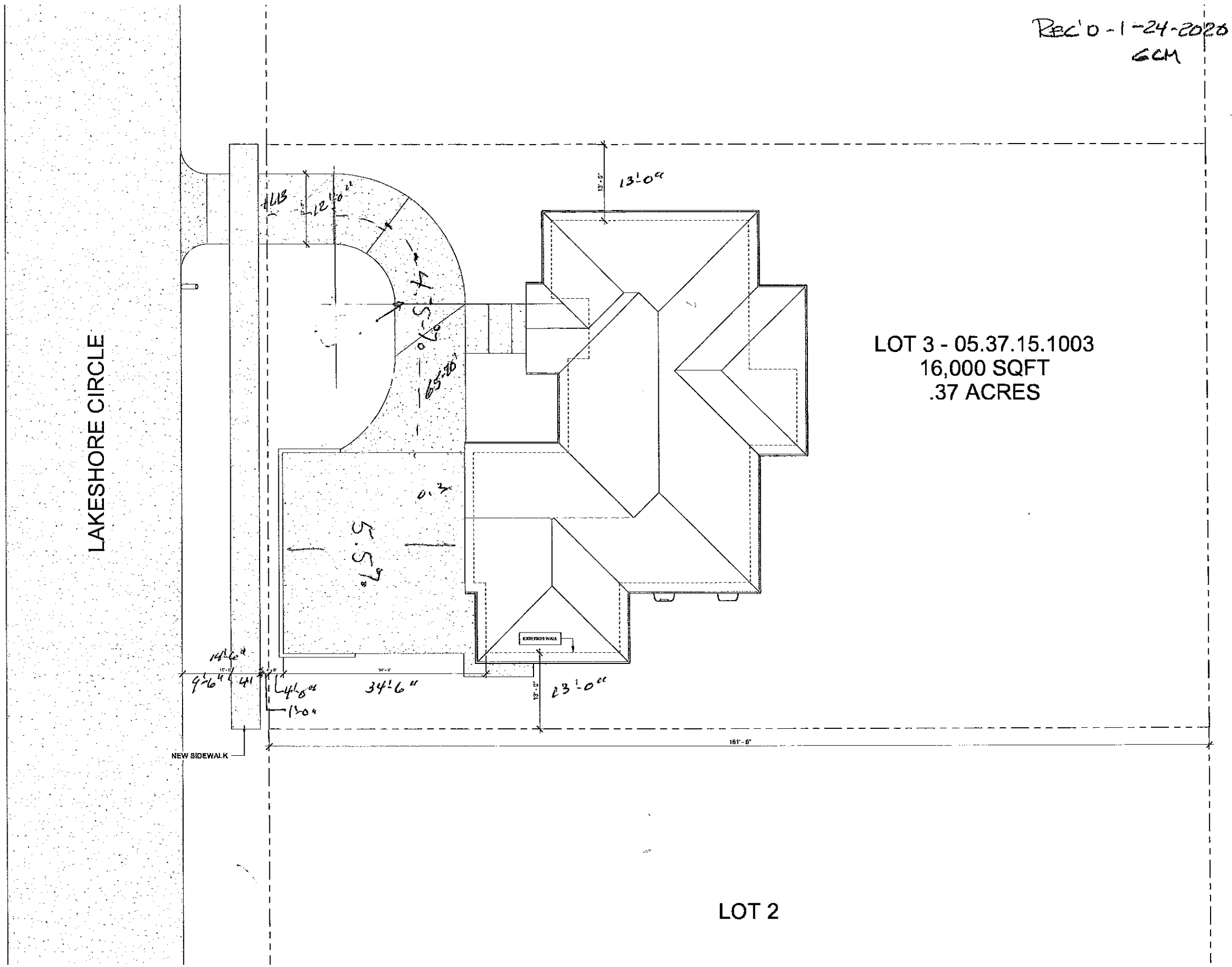
Scale

1/17/2020 1:50:19 PM

R.101

905 Lakeshore Circle

Rec'd 1-24-2020
GCM



5 - 1.13 - .3 = 3.57 / 65 = 5.5%

① SITE
1/8" = 1'-0"

CONNELL DEVELOPMENT
Dakota Dunes, SD
www.CTSBuilders.com

No.	Description	Date

905 LAKESHORE CIRCLE

NORTH SIOUX CITY, SD

SITE PLAN

Scale: As Indicated
Drawn by: CPA
1/17/2020 1:49:56 PM

A.002

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Police Chief Rich Headid
Date: 02/03/2020
Re: Surplus items

Background: Police Chief Rich Headid has requested the following as surplus.

1. Glock 22 Serial # VSF897
2. Glock 22 Serial # ABFY739
3. Glock 22 Serial # VSF899
4. Glock 22 Serial # VSF903
5. Glock 22 Serial # VSF902
6. Glock 22 Serial # VSF898
7. Glock 22 Serial # VSF900
8. Glock 22 Serial # VSF901

Financial Consideration:

Recommendation: Administration would recommend approval.

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Mike Hamm
Date: 02/03/2020
Re: Sewer Study

Background: Ethan Joy from JEO has provided the Sewer Study. Below is Ethan's email and the study is included in the packet for discussion.

All:

Attached is the draft study amendment prepared for North Sioux City evaluating the sanitary sewer system. This study builds upon the work Greg did with the 2013 and 2017 studies. The end goal is to compare the existing arrangement of pumping part of the wastewater to Sioux City vs. constructing an entirely new wastewater plant to treat all of the waste from the West Shore Collection Basin and the Sioux City Collection Basin.

This report is fairly comprehensive with the goal of being the necessary document to obtain funding, should a project go forward.

The key considerations for the City as per our analysis:

- Flow from the Sioux City Collection Basin has been increasing steadily over the past few years. Average flows are approaching 0.600 MGD (million gallons per day). With the proposed Sioux City agreement cap of 0.700 MGD, this leaves little room for future growth.
- The West Shore Treatment System (lagoons) are overloaded right now based upon SD DENR design standards. If growth occurs on the west side of the interstate (i.e. north of the school), the lagoon system will see more frequent discharge violations.
- The report reviews three discharge locations for a new wastewater plant; Mud Lake, Big Sioux River, & Missouri River. We are still waiting for a formal response from SD DENR on discharge limits for each location. We do expect that discharge to all locations will be possible, but the best (i.e. easiest to meet) limits will be for the Missouri River Discharge. We are concerned that increased flow discharges to Mud Lake could not be allowed in the future as regulations do not allow discharge to a permanent body of water (i.e. pond or lake). NSC gets by now as SD DENR considers Mud Lake to be "dry" but that could easily change in the future.
- Opinions of cost are developed for three different treatment systems. These cost opinion are still in a little bit of flux as we receive more information from outside sources, but we hope these values are somewhat conservative for the study phase. Each of the treatment alternatives were selected for their ability to handle higher strength wastes, yet be more operator friendly.
- The summary Table 8-1 on Page 104 compares the cost estimates. This will require some discussion to understand how we went about putting these numbers together, but it essentially states that constructing a new wastewater plant with discharge to the Missouri River (Alternative 3) is very close in costs to keeping the status quo as Sioux City's rates increase over the next 5 years.

Following this review, we will finish the rate study which will give solid scenarios showing what a typical residential commercial rate payer would see in rates over the next five years. We also will break down each of the 5 industrial users to show specifically what they would expect for rates.

If anyone needs it, I can print a hard copy and provide it directly to you.

I would anticipate that small meetings would be a good idea with staff and select Council Members/Mayor over the next few weeks.

JEO appreciates the opportunity to serve the City in this important part of the City's potential growth going forward.

Please feel free to email or call me to answer any questions you might have.

Thank you.

ETHAN JOY, PE, LEED AP | Branch Manager
JEO CONSULTING GROUP INC
1909 Dakota Avenue | South Sioux City, Nebraska 68776-2737
o: 402.494.7019 | m: 402.241.7409 | f: 402.494.1702
ejoy@jeo.com

Financial Consideration: None.

Recommendation: For discussion only.

North Sioux City, South Dakota 2020 Amendment to Wastewater Facility Plan Report

Prepared by:

Ethan Joy, PE:
ejoy@jeo.com
402.494.7019

Aaron Burke, PE:
aburke@jeo.com
515.964.5310

JEO Consulting Group, Inc.
1909 Dakota Avenue
South Sioux City, Nebraska 68776-2737
402.494.7019; Fax 402.494.1702

Offices in:
Nebraska and Iowa

JEO Project No. 190926.00

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WASTEWATER FACILITY PLAN
FOR THE
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA

SECTION 1

1 General

1.1 Introduction

The following report is an amendment to previously completed wastewater system studies prepared by Buell Winter Mousel and Associates, P.C. (BWMA) in May 2013 and October 2017. The May 2013 study provided an evaluation of North Sioux City's wastewater collection lift station infrastructure. It provided analysis of existing station capacity and estimates on future potential flows based on build-out of collection system areas. The October 2017 report discusses alternatives for wastewater treatment West of I-29. This amendment briefly reviews the infrastructure proposed by these systems and develops new flow projections for the entire City of North Sioux City. It also establishes several wastewater treatment alternatives that may be constructed by the city at several possible sites in the future. Each of these alternatives are provided with opinions of probable construction cost, opinions of added operational and maintenance (O&M) costs, and summaries of anticipated life cycle costs to assist the city in planning and budgeting.

Recommendations for sewer system improvements will meet the city's projected sewer needs for a 20-year planning period through the year 2040.

1.2 Elements of a Municipal Sanitary System

A municipal sanitary sewer system consists of numerous components, which are combined to transport and treat the sewage generated by the city. These components may include gravity flow collection mains, lift stations, force mains, manholes, treatment facilities, and other appurtenances.

Sanitary sewer collection systems are designed to carry wastewater from homes and businesses to a treatment facility, where it can be processed and discharged. Gravity sewer systems use the slope of the service and main lines to carry wastewater to the treatment facility. In applications where it is necessary, due to the topography or community layout, a lift station can be used to pump wastewater to a treatment facility or another gravity flow sewer main. In these cases, the wastewater flows into manholes or structures called lift stations, where the pumps are located. When the lift stations fill to a certain elevation, the pump is activated and pumps the wastewater through a force main to the desired destination. Check valves located between the lift station and the force main prevent the flow from returning, causing a sewer backup.

There is no such thing as a typical system. Each sewer system has some unique characteristics due to the sewage flows, area topography, history of the system, etc. The sewer mains can be made of clay tile, concrete, plastic, etc. and may be connected in an almost limitless number of configurations.

At routine intervals along the route of the collection system sewer mains and at the intersection of most mains, a manhole is placed to service the mains. A manhole will extend up from the intersections of the pipes to the surface and is covered by a manhole cover. Manholes allow access to the mains for

inspection and maintenance purposes. Manholes can be made of precast concrete, bricks & mortar, concrete block, etc.

The raw wastewater ultimately ends up at a wastewater treatment facility (WWTF). The purpose of treatment facilities is to remove contaminants from the raw wastewater. A WWTF includes physical, chemical, and biological processes to remove these contaminants. The main objective is to provide a safe discharge to the environment. Many different types of treatment facilities exist, but the two most common types in this area of the country are mechanical plants and lagoon systems. There are variations of both; however, the overall objective of providing a clean effluent remains the same.

1.3 Geographical Location

North Sioux City is located in the southern tip of Union County, South Dakota. The city was incorporated in 1951 and is located in the southeastern-most part of South Dakota at the junction of the Big Sioux River and the Missouri River. Interstate 29 traverses north and northwest through the center of North Sioux City. The City is located on the northern region of the Sioux City Metropolitan Statistical Area which includes Sioux City, IA, South Sioux City, NE, and North Sioux City, SD. The region outside the city boundaries is largely agricultural although there are several technology and industrial businesses in the city.

The West Shore WWTF is the city's only wastewater treatment facility, and it is located northwest of the city. The legal description for this facility is the SE ¼ NE ¼, Section 8, Township 89 North, Range 48 West, Union County, South Dakota. The wastewater plant's latitude and longitude are 42° 32' 28.8" N (42.541333) and 96° 31' 42.7" W (-96.528528) respectively. The facility itself is not in the flood plain; however, it discharges to Mud Lake which is part of the flood plain of the Missouri River.

The general topography of the land around the City is flat. The City is located on the northwest corner of the confluence of the Big Sioux River and the Missouri River. Images of the U.S.G.S. Topographic Maps in **Figure 1-1** and **Figure 1-2** show the general topography and drainage in the immediate vicinity of North Sioux City. The aerial photograph in **Figure 1-3** that shows the area directly around the WWTF.

Figure 1-1: USGS Topoquad of North Sioux City, South Dakota and Surrounding Metropolitan Area

Figure 1-2: USGS Topoquad of North Sioux City, South Dakota

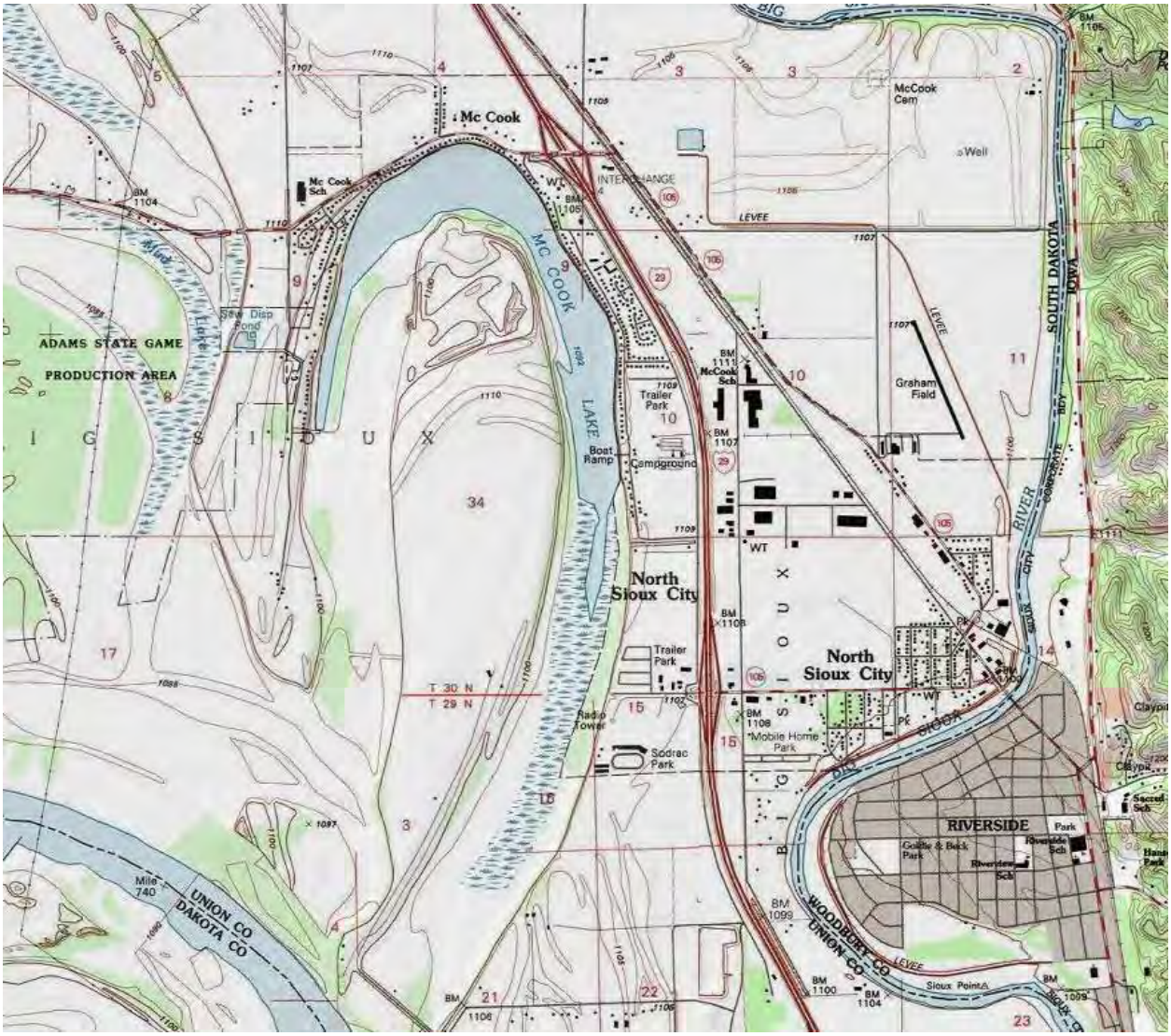
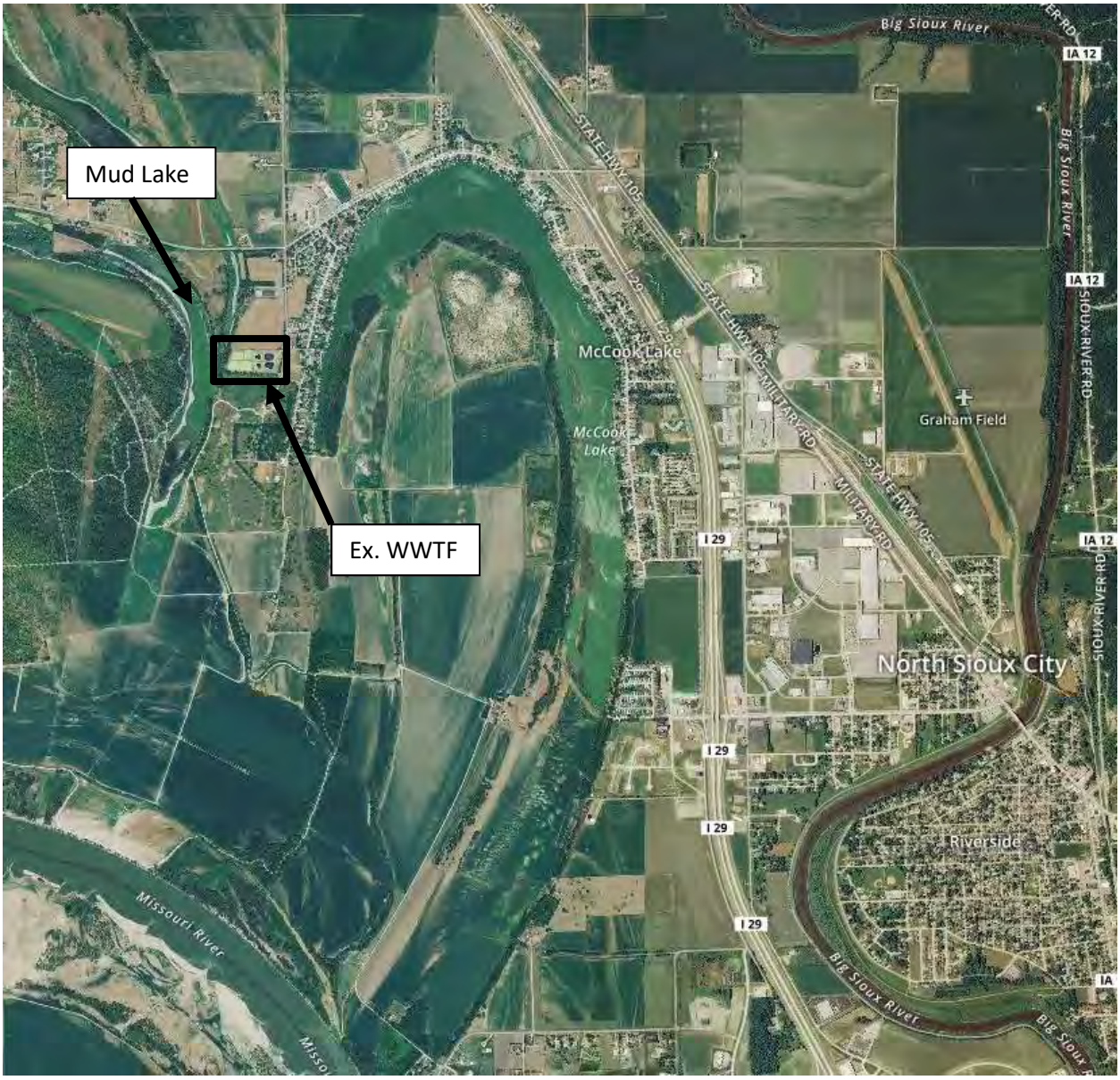


Figure 1-3: Aerial Photograph of North Sioux City, South Dakota is also provided for visual reference of the area. The city is located in a predominantly agricultural area; however, the city is the home to a commercial bakery, several biotechnology companies, and other industrial related firms.

Figure 1-3: Aerial Photograph of North Sioux City, South Dakota



1.4 Environmental Resources Present & Environmentally Sensitive Areas

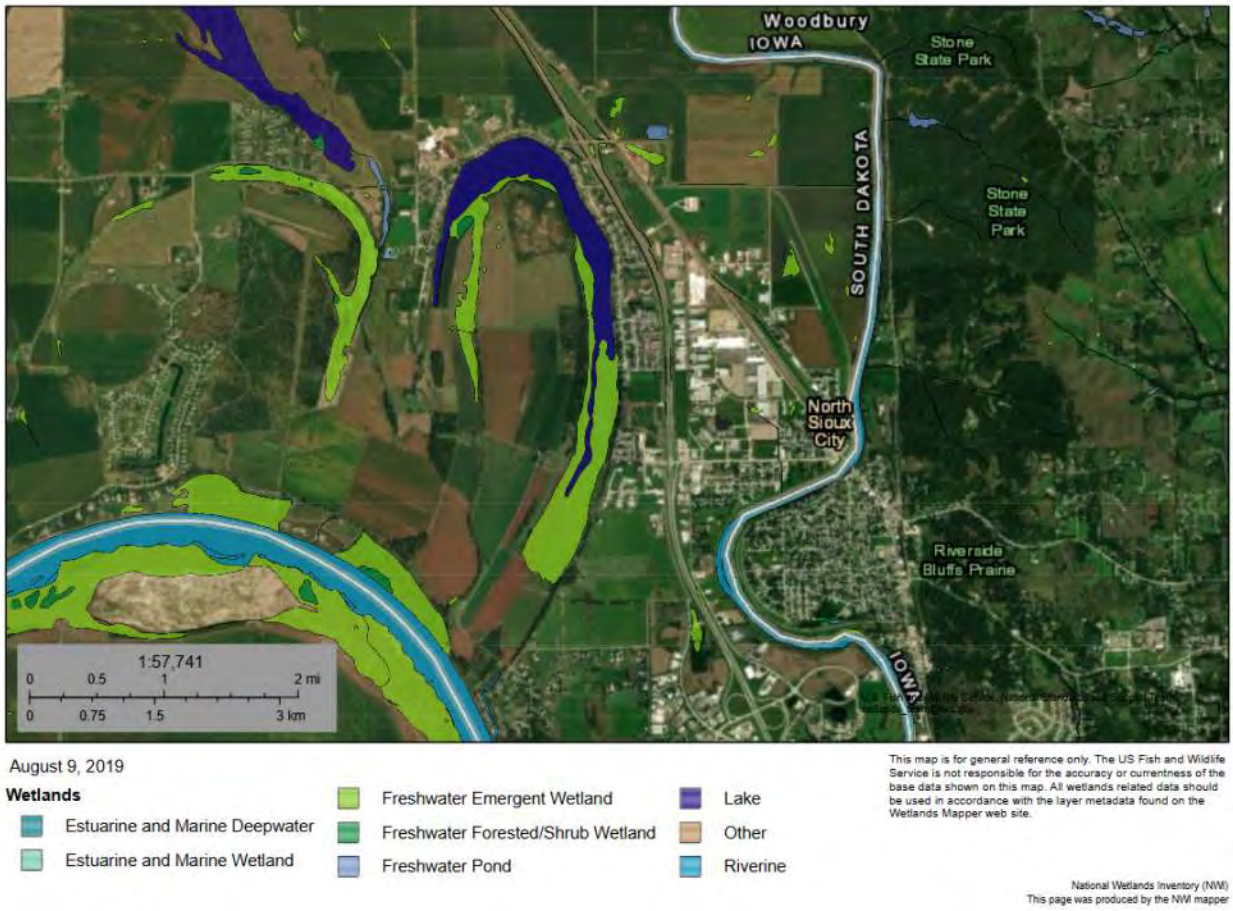
The majority of the surrounding area around the city is agricultural farmland. While a formal environmental review has not been completed at the time of this report, it is believed that no significant environmental resources exist within the planning area, which consists of the corporate limits of the city and areas immediately to the south and west.

1.4.1 Wetlands

There are some wetlands in areas on the north and west portions of the city. Parts of McCook lake and all of Mud Lake are considered freshwater emergent wetlands. There are also small pockets of freshwater emergent wetlands inside the incorporated areas on the north side of the city. A

National Wetland Inventory, as provided by the U.S. Fish and Wildlife Service is shown in **Figure 1-4: Wetlands Map of North Sioux City, South Dakota** and presents the locations of the mapped wetlands in the area for informational purposes.

Figure 1-4: Wetlands Map of North Sioux City, South Dakota



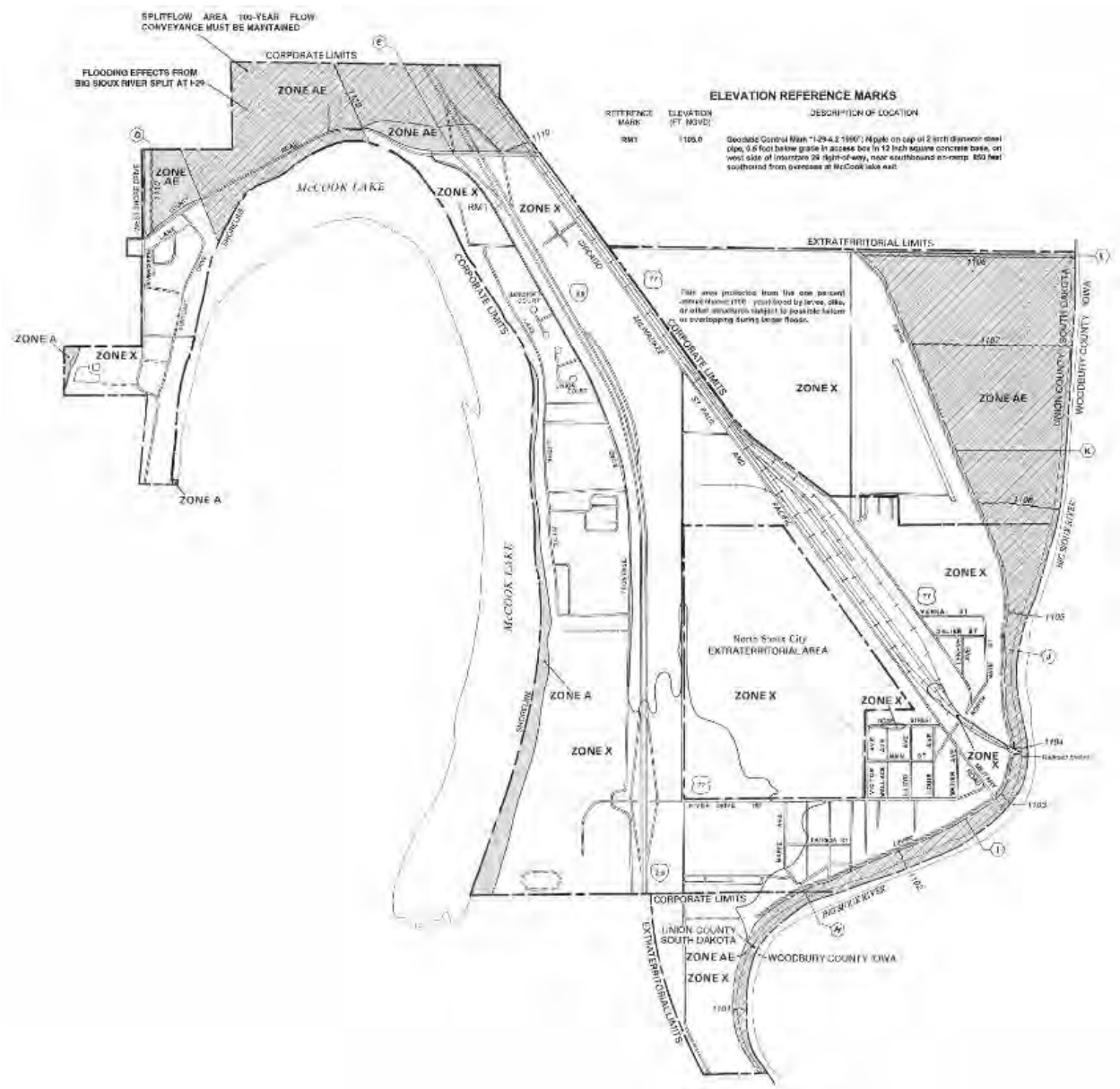
1.4.2 Flood Plain Considerations

North Sioux City is located in an area that is considered the bottomlands of the Missouri River. The city does participate in National Flood Insurance Program (NFIP). The NFIP is a national organization that assists communities to reduce flood losses and disaster relief costs by guiding future development away from flood hazard areas where practical; by requiring flood resistant design and construction practices; and by transferring the costs of flood losses to the residents of floodplains through flood insurance premiums. In return for availability of federally backed flood insurance, communities applying to join the NFIP must agree to adopt and enforce minimum flood loss reduction standards to regulate proposed development in special flood hazard areas as defined by the Federal Emergency Management Agency's (FEMA) flood maps.

The current FEMA designated floodplain map for the community is included below in **Figure 1-5: Current North Sioux City FIRM**.

If any structures are developed in an existing floodplain or floodway, they shall meet the South Dakota Department of Environment & Natural Resources (SD DENR) floodplain management requirements. If the construction of structures within the existing floodway is performed, it will not be permitted without showing that there will be no increase in water surface elevations along the floodway profile during the occurrence of a base flood.

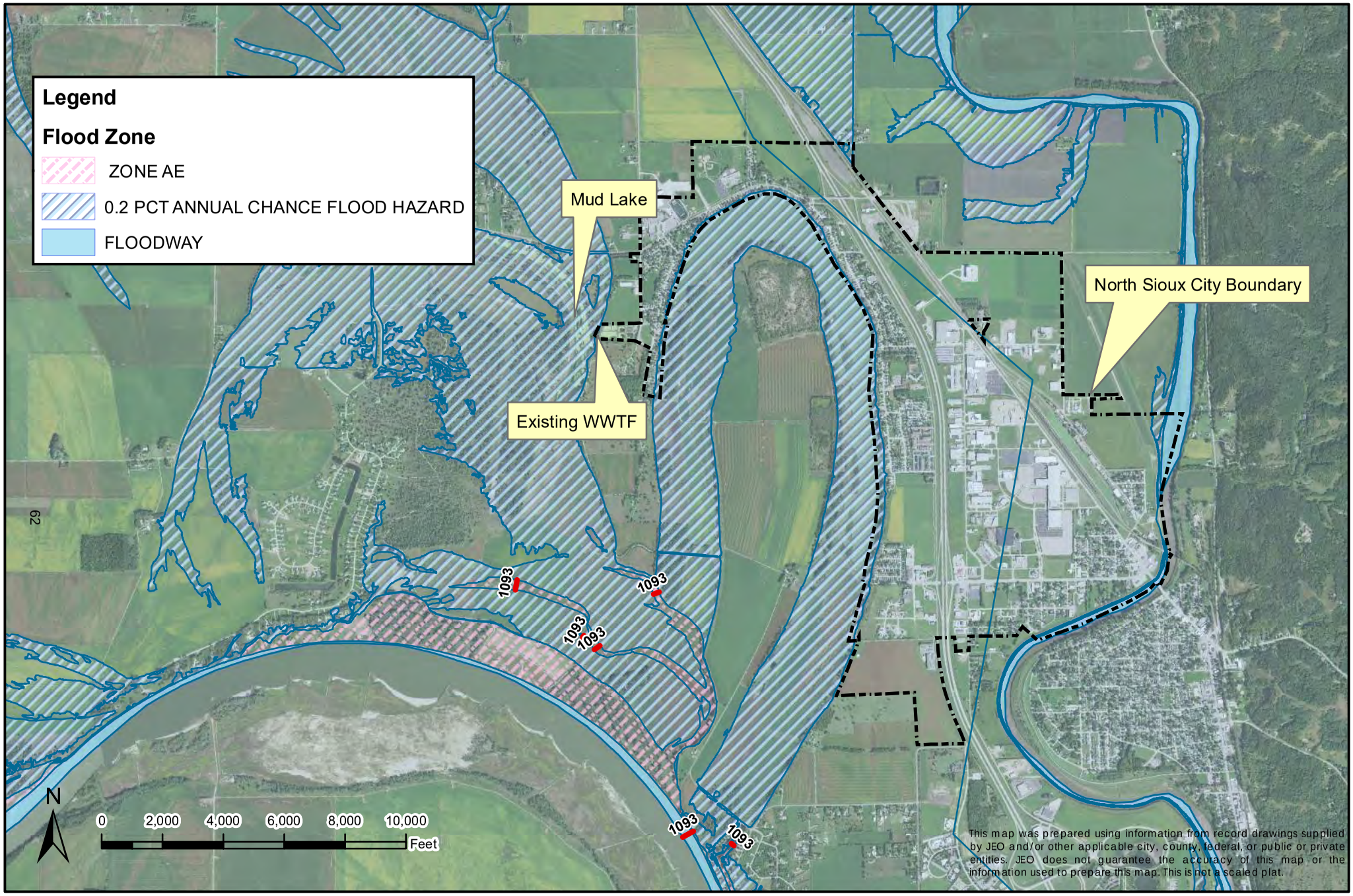
Figure 1-5: Current North Sioux City FIRM



1.4.3 Existing Site Considerations

The location of the existing wastewater treatment facility is just inside the corporate limits of the City and directly adjacent to Mud Lake on the west side of the city. **Figure 1-6** is an aerial image showing the existing WWTF location with the proposed FEMA Flood Insurance Rate Map's (FIRM) floodplain boundaries overlain in a blue hatch. Note that the shapes of the floodplain on this map are preliminary, but are based on the most recent FEMA information. It is evident from the Figure

that the existing WWTF does not exist within the 100 year flood plain, but it does discharge to a 'Zone X' 500 year floodplain region of the Missouri River. This map also shows preliminary base flood elevations where known, however, these should be verified prior to design of major infrastructure projects.



PRELIMINARY FLOOD PLAIN LOCATION

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 1-6

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1.4.4 Historic Places and Archaeological Review

There are no locations within North Sioux City that are listed in the National Register of Historic Places. In addition, there are no known significant archaeological properties within the city.

1.4.5 Groundwater

Groundwater is principally available in the area in alluvial deposits adjacent to the major streams or rivers and in Dakota sand stone layers at deeper depths. Quality and quantity of these shallow alluvial-deposit wells is typical of shallow wells along the Missouri River, which contains elevated levels of iron and manganese with good to high well yields.

1.4.6 Surface Water

Two major rivers exist in the area; the Missouri River located south of the city, and the Big Sioux River located east of the city. Water quality of these streams/tributaries is typical of that found in rural South Dakota, with elevated levels of nitrate contamination due to the agricultural practices within the area.

1.4.7 Soils

The soils in the area are principally of the silty clay type. This soil consists of mostly poorly drained, minimally permeable soils on flood plains and river valleys, such as the Onawa silty clay observed in the Norwest regions of the city. These soils are formed in silty alluvium with locations of clayey alluvium over silty alluvium. The soil is typically silty clay loam, or silty loam. The soils are regularly flooded. Groundwater depths are typically shallow.

However, some parts of the city are settled on a strips of Haynie and Modale silt loam and Salix silty clay loam which are moderately well drained with a moderate to high capacity to drain water.

1.4.8 Plant and Animal Communities

A review of the Threatened and Endangered Species list showed several endangered and threatened species in Union County, South Dakota which may exist near North Sioux City.

Table 1-1: Union County, South Dakota, Endangered and Threatened Species

Group	Scientific Name	Common Name	Status
Birds	Calidris canutus rufa	Red knot	Threatened
Birds	Charadrius melodus	Piping Plover	Threatened
Birds	Sterna antillarum	Least tern	Endangered
Clams	Leptodea leptodon	Scaleshell mussel	Endangered
Fishes	Notropis topeka (=tristis)	Topeka shiner	Endangered
Fishes	Scaphirhynchus albus	Pallid sturgeon	Endangered
Flowering Plants	Platanthera praeclara	Western prairie fringed Orchid	Threatened
Mammals	Myotis septentrionalis	Northern Long-Eared Bat	Threatened

1.4.9 Agricultural Areas

The area surrounding the city is primarily used as agricultural farmland. Much of the surrounding land is currently farmed and designated as "Prime Farmlands" adjacent to the existing wastewater treatment facility. There is also a large section of Forney silty clay designated "Farmland of statewide importance" in the northeast region of the city.

1.5 Population Trends

1.5.1 Historical City Population

Reviewing historical populations for a community is completed to identify population trends and help aid in projecting future growth or decline. For this report, projected populations are also used to estimate future sewer loads, which will then help to determine whether the City will be prepared to receive and treat those loads properly. This will be discussed more in depth in a later section.

Gathered from a combination of both the city's currently adopted comprehensive plan and U.S. Census American Community Survey, the historical populations for the City are shown in **Table 1-2: North Sioux City and Union County Population History (1980-2010)** below by the decade.

Table 1-2: North Sioux City and Union County Population History (1980-2010)

	NORTH SIOUX CITY			UNION COUNTY		
Year	Population	Change	Annual Percent Change	Population	Change	Annual Percent Change
1980	1,992	-	-	10,938	-	-
1990	2,019	27	0.1%	10,189	-749	-0.7%
2000	2,288	269	1.3%	12,584	2,395	2.4%
2010	2,530	242	1.1%	14,399	1,815	1.4%
2017[1]	2,693	163	0.9%	15,247	848	0.8%

1: ACS estimate

Reviewing the historical populations for the city and county indicates that the population has been growing steadily since 1990. The city's population for the year 2017 was determined to be 2,693 based on American Community Survey estimates. For the purposes of analyzing the wastewater data that has been provided by the city, the 2017 estimated population will be used to determine per capita wastewater generation. The total number of users are assumed to be 1116:

- 917 Residential
- 185 Commercial (Low Use)
- 9 Commercial (High Use)
- 5 Industrial

1.5.2 Projected Population

Accurately projecting the future population of a community can be fairly difficult; however, using the basis of past population data, proposed developments along with input from city officials, the future population can be projected. One consideration is that by planning for growth, sewer infrastructure improvements minimize the negative impacts from unforeseen residential developments. As was seen previously, the city's historical population has generally increased in recent decades.

For the purpose of establishing design data, we have made some assumptions concerning the potential growth or decline of the community. Please note that these are only some of many scenarios that could occur.

Included for this report are three separate population projections for the city. Each projection is based on the population history for the city and a geometric growth or decline averaged over a period of time. **Table 1-3: North Sioux City Population Projections Summary**, presents three different possible population projections for the city based on historical trends.

Table 1-3: North Sioux City Population Projections Summary

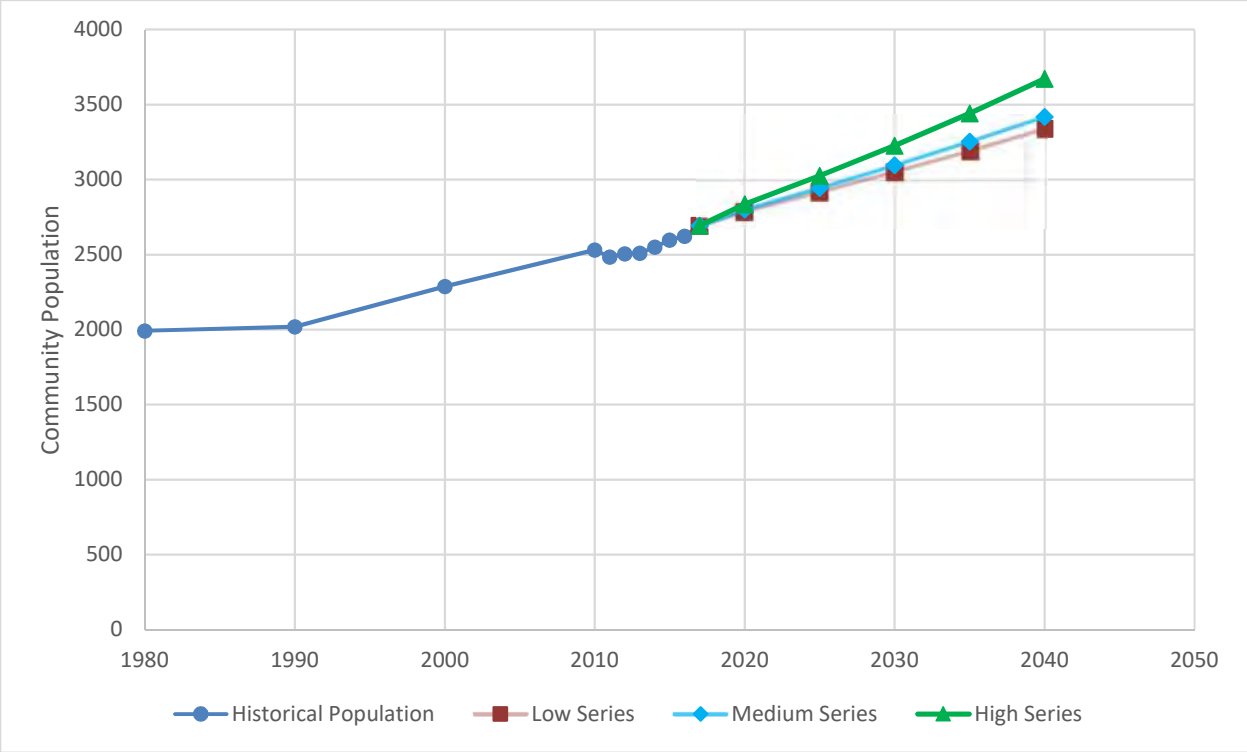
Year	Low Series 0.90%	Medium Series 1.00%	High Series 1.3%
2020	2,791	2,802	2,836
2025	2,919	2,945	3,025
2030	3,053	3,096	3,227
2035	3,193	3,253	3,442
2040	3,339	3,419	3,672

These projections are developed using historical Census data as well as American Community Survey (ACS) results for interim years between Census events. The values are projected based on various constant percentage average annual growth rates starting from 2017 ACS results.

This approach was calculated using three different growth trends based on historical population fluctuations experienced by the city. First, a growth rate for the period between 1980 and 2010

was derived, then for the period between 2010 and the 2017 ACS results, and finally for the period between 1990 and 2010. **Figure 1-7: North Sioux City Population History and Projections** shows the three trending projections graphically.

Figure 1-7: North Sioux City Population History and Projections



Due to the geographical position in South Dakota and its socioeconomic status, North Sioux City is expected to have a moderate to strong increase in population over the next few decades. This is further reinforced by the current comprehensive plan, developed in 2017, which suggests a future 2035 population of 3,135 using a 10-year historical trend growth rate. For the purpose of this engineering evaluation, we will conservatively assume that North Sioux City will experience growth similar to that of the high series in **Table 1-3**, which is intentionally greater than that predicted by the comprehensive plan.

The previous projections are based on normal growth of the community. At this time, there are several potential development areas in various stages of planning and construction in North Sioux City. This includes a single family subdivision located north of Casey's Lift Station, a potential mixed use development south of Casey's Lift Station, and future growth in areas north of Dakota Valley school. There are also several industrial properties located east of I-29 that are prepared for development. If the population projections discussed above are realized, these are the likely locations for growth.

Although overestimating the population can result in unnecessary cost impacts for future infrastructure, this level of conservatism allows for greater flexibility when considering new, potentially significant users. It also allows greater planning time to develop new strategies for

accommodating unplanned growth, particularly when considering the long lead times necessary to plan for, design, and build major treatment works.

Given the assumptions listed above, we will use a future population of 3,672 people in North Sioux City in the year 2040. Relevant wastewater usage projections will utilize this value.

1.6 Community Engagement

The City Council has openly discussed the need to plan for the wastewater system's needs and deficiencies. The Council has hired this firm to explore options available to the community and present these to the Council for review, discussion and approval. Council meetings are open to the public and members of the community are allowed to comment at these meetings.

WASTEWATER FACILITY PLAN
FOR THE
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA

SECTION 2

2 Existing Facilities and Conditions

The purpose of this section of the report is to conduct an engineering evaluation of the number of users, wastewater flows and the components of the sewer system.

The design criteria, materials and equipment evaluated in this report and included in the final project design shall meet the requirements of State and Federal laws and regulations, including:

- South Dakota Department of Environmental and Natural Resources: Recommended Design Criteria Manual, Wastewater Collection and Treatment Facilities,
- Great Lakes Upper Mississippi River Board of State Health and Environmental Managers Recommended Standards for Wastewater Facilities (Ten State Standards).

2.1 Existing Facilities Overview

North Sioux City currently utilizes a combination of gravity sewers and lift stations to convey raw wastewater to one of two locations: 1) to the West Shore Wastewater Treatment System which discharges to Mud Lake, and 2) to the River Drive Lift Station which pumps to the wastewater collection system in Sioux City, Iowa for ultimate treatment and disposal.

Raw wastewater is collected throughout the city via a series of 6” to 18” sewer mains. The collection system drains toward the city’s lift stations. The lift stations then pump the raw wastewater to the destination for treatment. In the case of the West Shore WWTF, treated effluent is discharged to Mud Lake. In the case of River Dr. Lift Station, the wastewater is sent to Sioux City, Iowa WWTF for treatment. **Figure 2-1** depicts the entire collection and treatment system. Discharge from the lagoon system occurs year round and will be discussed later in this report.

Much of the collection system discussion included in this addendum summarizes, and in some cases adds to, data included the previous collection system reports by Buell Winter Mousel and Associates, P.C. (BWMA) in May 2013 and October 2017.

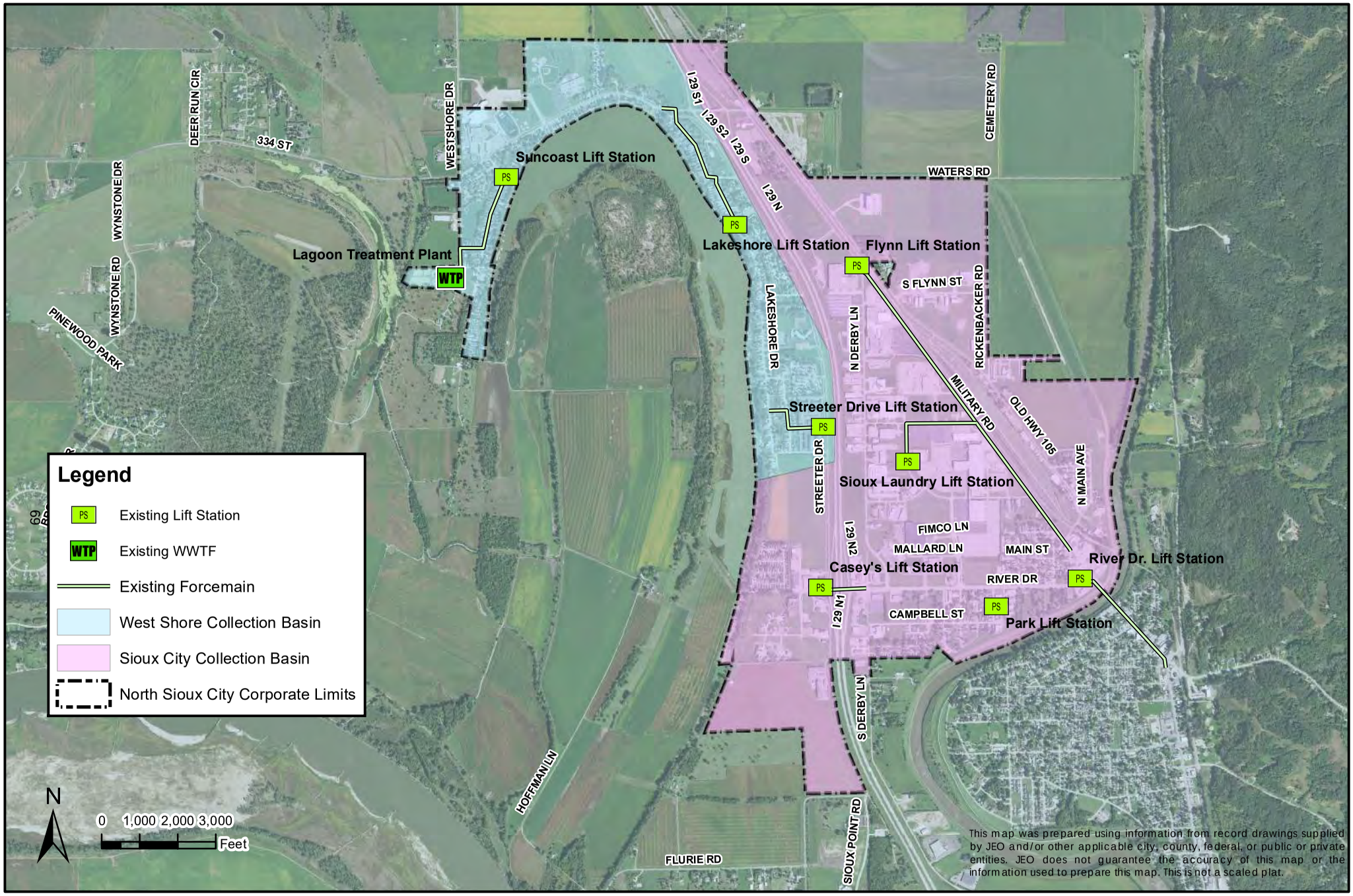
2.1.1 Collection System

The North Sioux City sewer collection system is split into two separate regions collectively known as:

- The West Shore Collection Basin
- The Sioux City Collection Basin

The West Shore Collection Basin includes gravity sewer collection systems and three lift stations:

- Streeter Lift Station which discharges into the Lakeshore Lift Station tributary area,
- Lakeshore Lift Station which discharges into the Suncoast Lift Station tributary area,
- Suncoast Lift Station which discharges to the West Shore WWTF.



EXISTING INFRASTRUCTURE

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 2-1

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The Sioux City Collection Basin includes gravity sewer collection systems and five lift stations:

- Casey's Lift Station which discharges into the River Dr. Lift Station tributary area,
- Park Lift Station which discharges into the River Dr. Lift Station Tributary area,
- Sioux Laundry Lift Station which discharges into the Flynn Lift Station forcemain,
- Flynn Lift Station which discharges into the River Dr. Lift Station Tributary area,
- River Dr. Lift Station which discharges into the Sioux City, Iowa collection system.

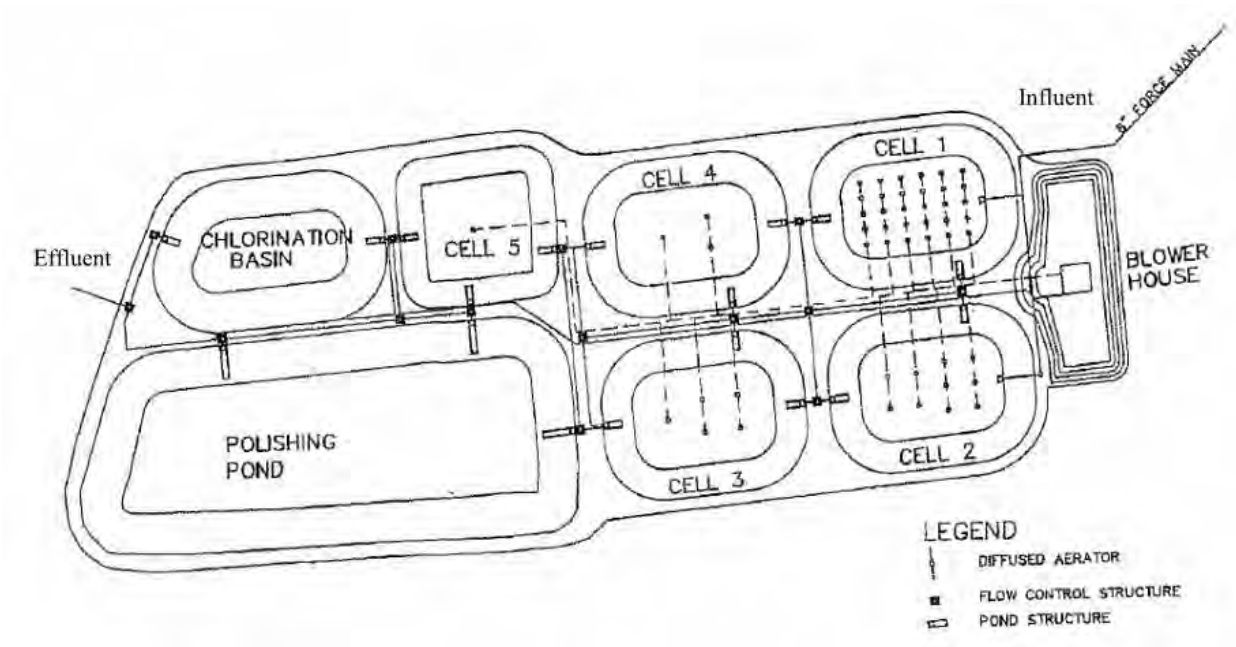
2.1.2 Wastewater Treatment Facilities

North Sioux City owns and operates a five cell aerated lagoon treatment system with a polishing pond that treats water collected from the West Shore Collection basin:

- Cells 1 through 4: aerated lagoons (0.92 MG each)
- Cell 5: non-aerated lagoon (0.65 MG)
- Polishing pond (1.495 MG)
- Disinfection reactor (0.54 MG)
- (3) aeration blowers in blower building

Figure 2-2 illustrates the general layout and flow schematic for the existing plant. **Figure 2-3** is an aerial photo of the existing treatment facility.

Figure 2-2: General Wastewater Treatment Facilities Layout and Schematic



Source: SD DENR 2014 Statement of Basis

Figure 2-3: Wastewater Treatment Facility Aerial Photo

Influent wastewater enters the wastewater treatment system by force main from the northeast (Suncoast Lift Station). The flow immediately splits to either Cell 1 or Cell 2 without passing through screening or flow measurement. Cells 1 and 2 flow forward to cells 3 and 4; in other words, cells 1 and 4 generally operate in parallel to cells 2 and 3. Each cell can be individually isolated.

Flow can then be split into either cell 5, which is currently not being aerated, or the polishing pond. After those treatment steps the flow is directed into the chlorination basin where chlorine is dosed for pathogen reduction. At the end of the chlorine basin sodium bisulfite is dosed to neutralize the chlorine prior to discharge to Mud Lake.

2.2 Wastewater Flows

Wastewater Flows have been extensively documented in the 2013 facility report by Buell Winter Mousel and Associates, P.C. and are summarized below. Additional discussion is offered in the BWMA report from 2017.

2.2.1 Lift Station Pump Records

Lift station pump records can be used to estimate the amount of flow a lift station pumps daily by comparing the run-hour meters of each pump to the flow capacity of the pump. The number of hours per day multiplied by the pump capacity equals the amount of flow pumped by the pump each day. This method has a few shortcomings. It assumes the pump run-hour meter values are recorded at the same time every day, and it assumes that there are few operational problems with the system that would impede the flow such as clogged pumps or stuck valves. Unless the pump capacity is regularly estimated, it also assumes that the pump capacity does not change over time.

For this analysis the run hour meters for Suncoast Lift Station are analyzed for the historical time period from January 2016 through June 2019. These records provide the most current flow estimates for the collection system in the West Shore collection Basin.

River Drive Lift Station flows are monitored by a flow meter. These data points were inferred from Sioux City billing documents to establish average daily flows.

Flow meter data is generally the most accurate method of establishing lift station flows. It is recommended that suitable metering equipment be installed at each lift station in the collection system.

2.2.2 Historical Wastewater Flows

Each of the lift stations was evaluated in the 2013 study pursuant to this report. **Table 2-1** documents the findings of these reports for each lift station, by collection basin.

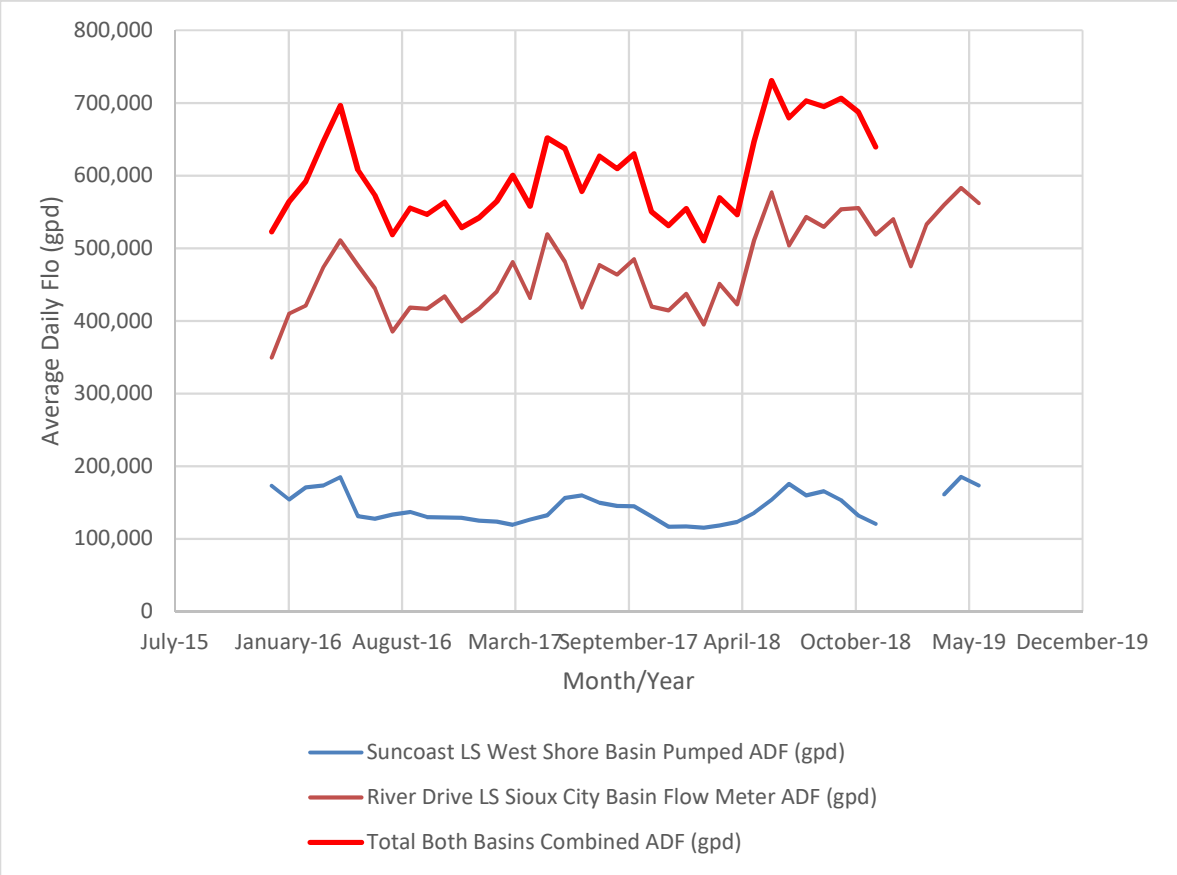
Table 2-1: Average Monthly Wastewater Produced

Year / Month		Suncoast LS		River Drive LS		Total	
		West Shore Basin		Sioux City Basin		Both Basins	Trend
		Pumped ADF (gpd)	% Monthly Change	Flow Meter ADF (gpd)	% Monthly Change	Combined ADF (gpd)	% Monthly Change
2016	January	173,100		349,500		522,600	
	February	154,100	-12.3%	410,000	14.8%	564,100	7.4%
	March	171,100	9.9%	421,000	2.6%	592,100	4.7%
	April	173,400	1.3%	473,800	11.1%	647,200	8.5%
	May	185,000	6.3%	511,100	7.3%	696,100	7.0%
	June	131,400	-40.8%	476,600	-7.2%	608,000	-14.5%
	July	127,900	-2.7%	444,900	-7.1%	572,800	-6.1%
	August	133,400	4.1%	385,200	-15.5%	518,600	-10.5%
	September	137,000	2.6%	418,400	7.9%	555,400	6.6%
	October	130,000	-5.4%	416,700	-0.4%	546,700	-1.6%
	November	129,300	-0.5%	433,900	4.0%	563,200	2.9%
	December	129,000	-0.2%	399,500	-8.6%	528,500	-6.6%
2017	January	125,100	-3.1%	417,200	4.2%	542,300	2.5%
	February	123,900	-1.0%	440,600	5.3%	564,500	3.9%
	March	119,300	-3.9%	481,100	8.4%	600,400	6.0%
	April	126,600	5.8%	431,400	-11.5%	558,000	-7.6%
	May	132,600	4.5%	519,400	16.9%	652,000	14.4%
	June	156,300	15.2%	481,200	-7.9%	637,500	-2.3%
	July	159,800	2.2%	418,300	-15.0%	578,100	-10.3%
	August	149,600	-6.8%	477,100	12.3%	626,700	7.8%

Year / Month		Suncoast LS		River Drive LS		Total	
		West Shore Basin		Sioux City Basin		Both Basins	Trend
		Pumped ADF (gpd)	% Monthly Change	Flow Meter ADF (gpd)	% Monthly Change	Combined ADF (gpd)	% Monthly Change
	September	145,500	-2.8%	463,900	-2.8%	609,400	-2.8%
	October	145,100	-0.3%	484,800	4.3%	629,900	3.3%
	November	130,600	-11.1%	419,600	-15.5%	550,200	-14.5%
	December	116,500	-12.1%	414,500	-1.2%	531,000	-3.6%
2018	January	117,100	0.5%	437,400	5.2%	554,500	4.2%
	February	115,400	-1.5%	394,900	-10.8%	510,300	-8.7%
	March	118,400	2.5%	451,200	12.5%	569,600	10.4%
	April	123,200	3.9%	422,900	-6.7%	546,100	-4.3%
	May	135,800	9.3%	511,000	17.2%	646,800	15.6%
	June	153,800	11.7%	576,900	11.4%	730,700	11.5%
	July	175,900	12.6%	503,800	-14.5%	679,700	-7.5%
	August	159,700	-10.1%	543,000	7.2%	702,700	3.3%
	September	165,500	3.5%	529,400	-2.6%	694,900	-1.1%
	October	153,100	-8.1%	553,500	4.4%	706,600	1.7%
	November	132,200	-15.8%	555,500	0.4%	687,700	-2.7%
	December	120,600	-9.6%	518,700	-7.1%	639,300	-7.6%
2019	January			540,100	4.0%		
	February			475,400	-13.6%		
	March			532,800	10.8%		
	April	161,200		559,600	4.8%		
	May	185,400	13.1%	583,100	4.0%		
	June	173,467	-6.9%	562,000	-3.8%		
Annual Total (gallons)	2016	54,200,000		156,800,000		211,000,000	
	2017	49,700,000	-9.1%	165,800,000	5.4%	215,500,000	2.1%
	2018	50,900,000	2.4%	182,700,000	9.3%	233,600,000	7.7%
Average Daily Flow Summary (gpd)	2016	147,900		428,383		576,283	
	2017	136,000	-8.8%	454,092	5.7%	590,092	2.3%
	2018	139,300	2.4%	499,850	9.2%	639,150	7.7%
	2019	**173,356**	19.6%	**542,167**	7.8%	**715,522**	10.7%

These flows are shown graphically in **Figure 2-4**.

Figure 2-4: Collection System Historical Flows



In addition, three recent months of data from April 2019 through June 2019 were available at the time of this report. This information is summarized in **Table 2-2**, which shows daily peaking information as well as recent daily averages.

Table 2-2: Selected 2019 Flows

		Suncoast LS		River Drive LS
		West Shore Basin		Sioux City Basin
		P1	P2	Flow Meter
Pump Capacity (gpm)		500	500	-
April 2019	Run Time (hr)	79.1	76.6	-
	Pump ADF (gpd)	81,900	79,300	-
	Station ADF (gpd)	161,200		559,533
	Max Day (gpd)	205,000		757,000
	Max Day Peak Factor	1.27		1.35
May 2019	Run Time (hr)	90.7	87.1	-
	Pump ADF (gpd)	87,800	84,300	-

		Suncoast LS		River Drive LS
		West Shore Basin		Sioux City Basin
		P1	P2	Flow Meter
	Station ADF (gpd)	172,100		586,290
	Max Day (gpd)	264,100		806,000
	Max Day Peak Factor	1.53		1.37
June 2019	Run Time (hr)	95.2	90.2	-
	Pump ADF (gpd)	95,200	90,200	-
	Station ADF (gpd)	185,400		562,000
	Max Day (gpd)	258,500		698,000
	Max Day Peak Factor	1.39		1.24
Period April - June 2019	Run Time (hr)	265.0	253.9	-
	Pump ADF (gpd)	88,400	84,700	-
	Station ADF (gpd)	173,467		569,462
	Max Day (gpd)	264,000		806,000
	Period Daily Peak Factor	1.52		1.42

A considerable amount of flow in the Sioux Laundry L.S. and Flynn L.S. basins is sourced from significant industrial users. The flow history of these users is noted in **Table 2-3**.

Table 2-3: Significant Industrial User Average Daily Flows

		Flynn Lift Station				Sioux Laundry Lift Station	Sum All Industrial
Year	Flow Type[1,2]	Royal Canin	Hepar Bioscience	Nutraferma	Interbake	Sioux Laundry	
2012	ADF	98,900			57,300		156,200
	Max Mo.	192,200			136,700		328,900
2013	ADF	79,000			62,900		141,900
	Max Mo.	159,000			143,100		302,100
2014	ADF	90,000			50,500		140,500
	Max Mo.	198,000			136,000		334,000
2015	ADF	73,600			55,000		128,600
	Max Mo.	132,400			114,600		247,000
2016	ADF	55,900			45,700		101,600
	Max Mo.	125,700			132,100		257,800

		Flynn Lift Station				Sioux Laundry Lift Station	Sum All Industrial
Year	Flow Type[1,2]	Royal Canin	Hepar Bioscience	Nutraferma	Interbake	Sioux Laundry	
2017	ADF	55,800	65,300		35,300	28,100	184,500
	Max Mo.	120,700	262,600		95,100	55,600	534,000
2018	ADF	81,500	60,000	39,300	44,200	19,200	244,200
	Max Mo.	160,900	125,900	55,600	127,100	36,100	505,600
2019	ADF	86,900	78,600	5,400	18,600	20,000	209,500
	Max Mo.	138,800	86,300	6,400	37,800	27,000	296,300
Average All Data		77,700	67,967	22,350	46,188	22,433	236,638
Average Prev. 3 Years		74,733	67,967	22,350	32,700	22,433	220,183
Max All Data		198,000	262,600	55,600	143,100	55,600	714,900
Max Prev. 3 Years		160,900	262,600	55,600	127,100	55,600	661,800

[1] Average Daily values based on flow averages over the 7-day work week
[2] Max Month Daily values based on monthly totals with weekends and federal holidays removed

The industrial flow data suggests that the daily peak:average flow ratio is approximately 3:1.

2.2.3 Well Pumping Records

Generally, the amount of wastewater flow is less, sometimes substantially, than the amount of fresh water pumped for drinking water. This difference can be caused by a number of different factors, including:

- Water losses in the water distribution system,
- Exfiltration (outflow) from the sewer mains,
- General water use that does not result in a discharge to the sanitary sewer system (i.e. lawn watering).

Depending on the system, approximately 60-80% of the water pumped from the supply wells during winter months will typically be discharged to the wastewater treatment facility. An analysis of winter water usage (non-irrigation months) is normally most relevant because this season tends to reflect a period where the highest percentage of water used is likely reach the wastewater treatment facility.

However, extensive review of water usage statistics is beyond the scope of this study. Fortunately, since industrial users represent a relatively large portion of the total flow, separating industrial wastewater flows from water production data can provide a snapshot of per-capita water usage, and therefore approximate wastewater flows. Also, as stated above, these per-capita estimates are relatively conservative because they include leakage and other unaccounted for water that may not reach the sewer collection system.

Table 2-4 shows water consumption, industrial flows, and estimated wastewater production on a per-capita basis.

Table 2-4: Water Consumption and Per-Capita Usage

Year	Average Day (gpd)	Est. Population	Water Consumption per Capita (gpcd)	Industrial Flows (gpd)	Average Day Non-Industrial Water Consumption (gpd)	Average Consumption per Capita, Non-Industrial (gpcd)
2012	786280	2505	314	156200	630080	252
2013	776872	2509	310	141900	634972	253
2014	731198	2551	287	140500	590698	232
2015	766822	2597	295	128600	638222	246
2016	825654	2623	315	101600	724054	276
2017	897569	2693	333	184500	713069	265
		Average	309		Average	254

By extracting industrial flow data out of the water consumption values for the years 2012 through 2017, a pattern of high water usage is apparent. The average per-capita wastewater value is about 254 gallons per capita per day (gpcd), which is significantly higher than a typical value of 80 to 100 gpcd. According to the February 2019 Water Supply Improvements report by BWMA, this high consumption may be attributable to "unavoidable leakage, public use, and unaccounted-for water." Although unusually high, this value has remained relatively consistent over the observed timeline.

2.2.4 Peaking Factors

Peaking factors have been previously discussed in the 2013 and 2017 reports by BWMA. As such, these factors are adopted in this report. There is no reason to believe that peaking factors have changed dramatically over the last several years, and since the city continues to deploy inflow and infiltration reduction projects to manage wet weather peak flows we can assume that future peaking factors will remain similar to those observed today.

The average daily flow is based on the simple average of the run-hour meter flows observed by the lift stations in the collection system.

The minimum flow factor is determined to be 0.5 as required by the SD DENR design criteria manual.

The maximum daily peak factor is simply the maximum daily flow divided by the average daily flow. It represents the ratio of the average daily flow compared to the maximum daily flow. The SD DENR design manual requires a peaking ratio between 2.0 and 2.5. Since current data suggests that the actual daily peaking factor is around 1.5, this report assumes a value of 2.0 in future calculations. However, for current-day values the factor 1.5 is used.

A peak hourly flow factor is calculated based on taking the maximum hourly flow and dividing it by the average daily flow. Since existing lift stations collect fluctuating sewer flows, the peak flows in the collection system are not measured by the City. According to Great Lakes-Upper Missouri River Board Recommended Standards for Wastewater Facilities (Ten State Standards), if no hourly flow

data is available, the peak hour flow is to be calculated by a relation to the city population. This same standard is adopted by SD DENR design requirements. At a current population of 2,693, the North Sioux City is estimated to have an hourly wastewater peak flow of 3.48 times the average day flow (peak hour factor). This translates into a peak hourly flow of approximately 2.5 MGD, or 1,750 gallons per minute (gpm).

Table 2-5: Existing Wastewater Peaking Factors and Flows

	Factor	West Shore Collection Basin	Sioux City Collection Basin	Total Collection System
		Flow (gpd)	Flow (gpd)	Flow (gpd)
Minimum Daily	0.5	87,500	275,000	362,500
Average Daily	-	**175,000**	**550,000**	**725,000**
Peak Daily	1.5	262,500	825,000	1,087,500
Peak Hourly	3.48	609,000	1,914,000	2,523,000
		423 (gpm)	1329 (gpm)	1751 (gpm)

2.2.5 Wastewater Flow Conclusions

The previous sections all provide comparable information regarding the existing wastewater flows in the community. The estimated existing average daily wastewater flow in the city of North Sioux City is approximately 725,000 gpd. This volume of wastewater generated per person in the community is approximately 270 gpcpd, which is generally above typical design values, and is attributable to significant industrial usage within the collection system. The amount of water consumption in the community is also generally high as compared to similar communities, but is consistent year over year. The estimated typical maximum daily flows and peak hourly flows are consistent with those measured and experienced by the city and as required by South Dakota design standards.

2.3 Influent Wastewater Strengths

The city is not required by their NPDES permit to collect composite influent samples. Since influent samples are not currently being obtained, this report assumes the default values for organic loading based on regulatory requirements as stipulated by SD DENR. These values are noted to be 0.22 lb/day/capita for Biochemical Oxygen Demand (BOD_5) and 0.25 lb/day/capita for Total Suspended Solids (TSS) per the "Recommended Standards for Wastewater Facilities (10 States Standards)" and SD DENR design criteria. A value of 0.046 lb/day/cap is assumed for TKN loads per 10 States Standards.

Flow data and industrial sampling data has been broken down by sub-basin provide estimates of the organic loading that is currently present in the collection system, shown in **Table 2-6**.

Table 2-6: Current Organic Loading

	West Shore Collection Basin		Sioux City Collection Basin		Total
	R & LC/I[1,2]	HI[3]	R & LC/I	HI	
Flow (gpd)	175,000	0	313,000	237,000	725,000
Approximate Population[4]	1,218	-	1,475	-	2,693
BOD Load (lb/day)	268	0	324	2,022	2,614
TSS Load (lb/day)	305	0	369	850	1,523
TKN Load (lb/day)	56	0	68	198	322

1: R = Residential (Class I sewer rate)
2: LC/I = Light Commercial/Industrial (Class II sewer rate)
3: HI = Industrial (Class III sewer rate)
4: Basin population approximation based on proportional flow split per basin

The industrial wastewater component of the collection system provides significant organic loading to the collection system**.** **Table 2-7** summarizes the previous four years of available industrial sampling data. This data was provided by the industrial pretreatment coordinator in Sioux City, IA.

Table 2-7: Industrial Organic Loading

Year	Load Type	BOD	TSS	TKN
2016	ADF (gpd)	101,600		
	Load (lb/d)	1,223	367	-
2017	ADF (mg/L)	184,500		
	Load (lb/d)	2,651	782	200
2018	ADF (mg/L)	244,200		
	Load (lb/d)	2,818	939	184
2019	ADF (mg/L)	209,500		
	Load (lb/d)	1,396	1,311	212
Average Concentration (mg/L)		1,337	538	114
Average Load (lb/d)		2,022	850	198
Population Equivalent		9,190	3,398	4,314

The data exposes the high amount of organic loading due to the presence of significant industrial users. The Carbon:Nitrogen ratio of this waste is approximately 10:1, which should be adequate for most

biological treatment processes. However, due to nutrient-limited industrial discharges, the Carbon:Phosphorus ratio is likely below 100:1. Additional data collection on industrial phosphorus discharges is warranted to verify macro nutrient levels.

It is recommended that if the city desires to construct a new WWTF, samples for TSS, $CBOD_5$, TKN, and TP be performed to better define the anticipated strength of the influent entering the WWTF and prior to discharge to Sioux City.

2.4 Existing Permit Limitations and Compliance

2.4.1 NPDES Permit Overview

North Sioux City owns and operates a lagoon wastewater treatment facility that treats flows from the West Shore collection basin. A National Pollutant Discharge Elimination System (NPDES) Permit (No. SD0020567) was issued to the city effective on November 1, 2019 and will expire on September 30, 2024. The permit requires operators to report the following effluent parameters:

- Concentration loading limitations for BOD_5 and TSS.
- Limitation of pH.
- Residual chlorine.
- Seasonal concentration limits for E. coli.
- Flow rate and total flow

The system discharges to Mud Lake, an oxbow lake tributary to the Missouri River which flows from West to East along the south edge of the City.

2.4.2 NPDES Permit Limitations

A summary of the limits contained in the NPDES permit is included in **Table 2-8**. A copy of the urrent NPDES permit and Statement of Basis is included in **Appendix A**.

Table 2-8: Year-Round Effluent Limits

Parameter	Units	Limits			Monitoring Frequency	Sample Type
		30-Day Ave.	7-Day Ave.	Max.		
Flow Rate	MGD	Report	-	Report	Weekly	Instantaneous
Total Flow	MG	Report	-	Report	Weekly	Calculated
Biochemical Oxygen Demand, $CBOD_5$	mg/L	30.0	45.0	-	Weekly	Grab
Total Suspended Solids, TSS	mg/L	30.0	45.0	-	Monthly	Grab
Total Residual Chlorine, TRC	mg/L	-	-	0.019	5 x Week	Instantaneous
Escherichia coli (E. coli) May 1 – Sept 30	Geo. Mean	630 per 100 mL		1,178 per 100 mL	Weekly	Instantaneous
pH	S.U.	Range of 6.5 to 9.0			Weekly	Instantaneous
Water Temperature	^oC	Report		Report	Weekly	Instantaneous
Total Nitrogen (as N)	mg/L			Report	Monthly	Grab
Total Phosphorus (as P)	mg/L			Report	Monthly	Grab

2.4.3 Comparison of Discharged Effluent to NPDES Permit Limits

The design capacity of the continuous discharge lagoon is stated to be 0.176 MGD based on the Statement of Basis (SoB) prepared by SD DENR in 2019. Note that actual flows for the collection system feeding this facility are currently approximately 200,000 gpd. Also, the SoB notes several violations of effluent TSS and E. Coli.

The existing WWTF is generally overloaded by design, and complete analysis of this existing facility is beyond the scope of this document. It is unlikely to be sufficient in the coming years, particularly regarding future growth in the corridor north of the Dakota Valley schools and south of I-29.

2.4.4 Sludge Regulations

The disposal of the settled and digested sludge from the WWTF is subject to federal regulations. The domestic sewage sludge regulations, 40 CFR Part 503 are in effect for this permit. These regulations outline the allowable quality of sludge and methods of sludge disposal.

The 2019 Statement of Basis suggests that sludge is not likely to be removed from the lagoon basins during the span of the next (sic current) permit cycle. If the WWTF is scheduled to be decommissioned, the existing lagoons will need to be closed and the waste sludge disposed of accordingly.

2.5 Collection System

Many communities in the state of South Dakota have sanitary sewer collection systems that date back 50 to 75 years and sometimes more. These and even more recent sanitary sewer systems can be expected to need repairs, replacement, or improvements over time. Because they are located underground, signs of accelerated deterioration, capacity limitations, improper connection of services, or improper abandonment of old services are not readily apparent until there is a major failure in the system. Often times, sewer pipe failures start with cracking, lateral deflection, crown sag, and offset joints. Hydrogen sulfide (H_2S) corrosion further deteriorates mortar and exposes reinforcing. Communities mainly see the above ground effects of these failures, such as cracked pavement, collapsed streets, backed-up sewers in basements, or local flooding of manholes. Proper sewer evaluation and maintenance schedules help communities identify the condition of their sanitary sewer system infrastructure. Appropriate monitoring, rehabilitation, or replacement of failed sanitary sewer infrastructure is essential for environmental protection and complete wastewater treatment.

2.5.1 Collection System Construction and Condition

2.5.1.1 Existing Construction

The condition of the existing system has been discussed extensively in the previously submitted technical documents.

2.5.1.2 Smoke Testing

Smoke testing is an investigative method to evaluate the condition of sewer main and their ability to receive or release water into or out of the system. A nontoxic smoke is used in smoke testing by introducing it into the top of a manhole by means of a powered fan. Smoke travels down the manhole and into the sewer mains. The effective distance of testing is usually limited to two to three blocks in each direction from the manhole. Smoke will migrate through leaks in the sewer pipes and usually surface if the soil is not saturated. Smoke testing is good for locating sources where rain water or inflow may directly enter the sewer main. Typically, items such as large sewer main cracks, cross connected storm sewers, house gutters and uncapped lines, and other miscellaneous problems may be identified.

No smoke testing was performed within the evaluation of this system. If the city wishes to further pursue this method of investigation, JEO can provide this service.

2.5.1.3 Televising

The television inspection utilizes a closed-circuit television camera to observe the conditions in the sewer lines. The television cameras used are specially designed to detect the sewer main conditions. The camera travels through the sewer via cables or self-propulsion. The camera is equipped with a light source for illumination purposes. The footage is then recorded on a DVD and still photos can be also be made from the monitor display.

The typical inspection process involves three (3) different steps: sewer line cleaning, televised inspection, and written documentation of the evaluation. For an accurate internal television inspection of sewer mains, the sanitary sewer lines are required to be clean. Debris at sewer inverts, grease accumulation, and heavy root infestations not only obstruct visual or video inspection, but they also may hide actual infiltration sources and pipe cracks. The cleaning procedure is done to clean the majority of the sludge, mud, sand, gravel, grease, and roots from the sewer pipes and manholes to be inspected.

The documentation of the inspection includes the videotape, photographs, and a written report. The report includes documentation of the conditions found in the sewer lines and manholes. Documentation includes severity and location of roots, cracks, broken pipes, low areas, and offset joints. The location of each of these is also recorded, along with the location and condition of all service connections.

The city continues to effectively manage the televising and maintenance of their collection system, therefore extensive review of CCTV data was not performed with this study.

2.5.1.4 Condition of Collection System

Cracked pipes, protruding roots, and offset joints all represent potential points of entry for infiltration. When a crack spans the entire thickness of the pipe, a direct path for groundwater to enter the main has been created. When water continuously infiltrates through these cracks, a large sum of water eventually makes it into the system. Cracks in the sewer mains can cause the sewer line to collapse and a partial or complete stoppage could occur. Cracking found in sewer lines can be attributed to deteriorated or weak pipe structure, excessive loads placed on top of the pipe, lack of subgrade preparation when the sewer line was installed, or improper techniques used for tapping the sewer main. Offset joints and protruding roots often represent easy pathways for water to enter the collection system. When the water table is high enough, water can easily enter areas that are large enough for roots to enter. Offset joints often mean a gap has been created, which also allows water to enter the system.

Root intrusion can also cause sewer backups and structural defects to the collection system. Old sewer mains that are constructed of vitrified clay pipe (VCP) are very susceptible to root intrusion. Sewer lines provide an ideal environment for root growth. With the presence of water and nutrients in the sewer, roots continue to grow and prosper in the line. Roots can enter the system between the pipe joints or at bad taps and expand in the system. If the roots are allowed to grow, they will eventually fill the void of the pipe and stop the conveyance of wastewater. Since pipes are laid in 4 to 5 foot sections in VCP and up to 20-foot sections in PVC pipe, there are many places that roots may enter. One method of handling root intrusion is to remove the penetrated portions of the line and replace them with long sections of PVC pipe. This process would minimize the number of joints in a system and provide very secure joints; however, this process can be very expensive. A less aggressive and less expensive option is to remove the roots and then chemically treat the sewer main to kill and inhibit root growth in the sewer mains. This is not a permanent solution and requires that the process be repeated to keep roots out. A typical inhibitor will last between 5 and 10 years before additional treatment is recommended. This root inhibitor only kills the protruding roots which prevents larger amounts of roots to enter the system, but does nothing to seal the gap already created. Water still has the potential to enter these areas.

The capacity of a sewer main can be defined as the amount of wastewater that a sewer main is capable of conveying at a given diameter and slope. Smaller diameter pipes, rougher pipe material, and flatter grades are all items that can limit pipe capacity. The capacity of a sewer line should be capable of transporting peak wastewater flows plus any acceptable infiltration and inflow that occurs. Wastewater capacity flows greater than the pipe capacity will cause water to back up in the collection system and ultimately, the basements of the individual users.

Sewer lines with flatter grades than desired can also encourage solids deposition and production of hydrogen sulfide and methane gases. Hydrogen sulfide gas (H_2S) is odorous and can cause serious pipe corrosion. Methane gas (CH_4) is very flammable and can cause an explosive environment. Most states specify minimum slopes for sanitary sewer lines. These slopes are such that a velocity of 2 feet per second (ft/sec) is reached if the pipe is flowing full. An achieved velocity of 2 ft/sec is the main criteria to be a "self-cleaning" sewer line. Slopes less than these recommended minimums may require extra maintenance. The following is the recommend minimum slopes within the state of South Dakota for various pipe diameters:

Table 2-9: Minimum Sewer Slopes

Sewer Main Size	Minimum Slope Feet per 100 Feet (%)
6-inch	0.60
8-inch	0.40
10-inch	0.28
12-inch	0.22
15-inch	0.15
16-inch	0.14
18-inch	0.12
21-inch	0.10
24-inch	0.08

It is noted that information on length of lines and invert elevations of the city's collection system are not readily available for determining the value of slopes on the existing system. It would be suspected that lines were constructed at or above minimum slope, though over time, settlement around the sewer lines may cause unwanted sags in the lines.

If build ups do develop due to slopes at less than minimum, the only solution to this problem without substantial reconstruction is to routinely clean and flush the sewers to help remove any debris. This can be done through the use of jet flushing equipment for a thorough flushing; or in the absence of specialized equipment, one can flush with a fire hose from a pump truck.

Sewer service connections can also be a source of infiltration for collection systems. Faulty connections, broken services, or other defects can allow unwanted water to enter the collection system.

2.5.2 Lift Stations Construction and Condition

2.5.2.1 Existing Construction

The existing collection system lift stations have been discussed in detail in other technical documents. Each station is a submersible wet-well type lift station, and most of them have had recent improvements, including backup power devices, installed.

Each of the lift stations meets the current needs of the collection system. However, there are several known bottlenecks that are worth noting.

The 12" to 18" gravity sewer pipe traveling from West to East, towards River Drive Lift Station, along River Drive, is known to be operating regularly at full capacity. Some collection system alternatives discuss rerouting Casey's Lift Station flow from discharging into this pipe, which will greatly alleviate these hydraulic surges.

The existing 6" forcemain from Suncoast Lift Station to the WWTF is undersized given the 500 gpm station capacity and length of the main. The most recent station improvements installed high head and high-speed submersible pumps that are correctly sized, however, if future growth occurs retrofitting this station with larger pumps will be challenging.

The existing systems operate at the approximate design points shown in **Table 2-10**:

Table 2-10: Existing Lift Station Details

	Station Name	Type	Configuration	Design Capacity of Each Pump (gpm)	Condition	Forcemain Size (in)	Forcemain Length (ft)
West Shore Collection Basin	Streeter	Submersible	Duplex	500	Good	4	1,330
	Lakeshore	Submersible	Duplex	430	Good	6	2,920
	Suncoast	Submersible	Triplex	500	Excellent	6	2,650
Sioux City Collection Basin	Sioux Laundry	Submersible	Duplex	400	Good	8	2,100
	Flynn	Submersible	Duplex	350	Like New	10	6,910
	Casey's	Submersible	Duplex	400	Like New	4	900
	Park	Submersible	Duplex	100	New	4	120
	River Drive	Submersible	Quadruplex	600	Excellent	8[1] / 10	650 / 350

1: 8" pipe on Military Rd. Bridge, 10" discharge main

2.5.2.2 Condition of Lift Stations

The city has recently rehabilitated several of these lift stations with new pumps and backup generators. The condition of these systems is good to excellent. The city's infrastructure is generally well maintained.

River Drive Lift Station is the only system with an electronic flow meter. Future lift station improvements should include magnetic flow metering provisions.

2.6 Wastewater Treatment System

As noted previously, the city owns and operates a lagoon wastewater treatment facility which collects flow from the West Shore Collection Basin and discharges to Mud Lake. The plant was constructed by McCook Lake Sanitary District in 1967 and was later upgraded in 1992. The plant has a design capacity of approximately 176,000 gallons/day. The following are the major components of the treatment plant:

- (4) extended aeration lagoon cells (0.92 MG each)
- (1) non-aerated lagoon cell (0.65 MG)
- (1) chlorination pond (0.54 MG)
- (1) polishing pond (1.495 MG)
- Blower building with three blowers

This report assumes that this facility will eventually be decommissioned and flows from the West Shore collection basin will be re-routed to a new, centralized wastewater treatment facility owned and operated by the city, or to an adjacent municipality for final treatment.

2.7 Financial Status

2.7.1 Sewer System Users and Rates

The existing sewer rates for North Sioux City are based on a monthly base charge plus consumption based on user classification as noted in **Table 2-11**.

Table 2-11: User Rates

Class	Base Monthly	Usage Rate	No. Users[1]
I: Residential, Single Family	$29.46	+ $4.14 per 1,000 gal over 3,000	919
II: Light Commercial/Industrial < 400 gpd and multi-family units	$35.12	+ $4.14 per 1,000 gal over 3,000	181
III: Industrial > 400 gpd	$50.98	+ $6.04 per 1,000 gal	5

[1] As of June 2019

There are no user rates specified for users outside city limits, however, there is a 10% discount for residents over 65 or older in Class I Residential units.

2.7.2 Existing Operations and Maintenance Costs

The City's sewer system operating revenues and expenses for three (3) fiscal years are presented below in **Table 2-12**.

The sewer system averaged a net financial gain of approximately $418,098 per year over the fiscal years 2016-2018 with average expenses totaling approximately $689,725 per year (excluding depreciation expenses).

It is also noted that the city has no existing debt service and has no immediate plans for taking on new debt.

Table 2-12: O&M Costs (Previous 3 Years)

Revenue	Fiscal Year		
	2016	**2017**	**2018**
NSF Fees	$0.00	$0.00	$0.00
Interest Earned	$7,667.13	$13,549.95	$19,757.45
Late Fees & Interest	$7,498.60	$8,479.46	$6,555.52
Principal Collected by City	$0.00	$0.00	$0.00
Interest Collected by City	$0.00	$0.00	$0.00
Recovery of Prior Year Expense	$0.00	$0.00	$0.00
Other Water Revenue	$51.35	$44.00	$0.00
Sewer Charges	$959,372.57	$1,109,515.04	$1,140,818.70
Tap Fees	$0.00	$0.00	$0.00
Other Sewer Charges	$500.00	$1,397.00	$0.00
Operating Transfers In	$0.00	$48,263.04	$0.00
Sale of General Fixed Assets	$0.00	$0.00	$0.00
Total Revenues	**$975,089.65**	**$1,181,248.49**	**$1,167,131.67**
Expenses	**2016**	**2017**	**2018**
Salaries and Wages	$81,339.92	$76,958.37	$116,450.70
Part-Time Wages	$0.00	$0.00	$0.00
Salaries-Overtime	$4,538.95	$4,637.72	$7,095.07
Longevity Pay Salaries	$0.00	$0.00	$0.00
Salaries-Disaster	$0.00	$0.00	$0.00
OASI	$5,537.09	$5,634.73	$9,751.66
Retirement	$4,733.90	$4,635.17	$7,412.67
Workmen's Compensation	$1,457.75	$1,212.85	$1,333.00
Group Insurance	$24,895.94	$18,982.96	$44,326.45
Health Savings	$0.00	$7,045.12	$11,125.20
HRA-Employer	$0.00	$0.00	$0.00
Unemployment Compensation	$0.00	$0.00	$0.00
Insurance - General & PRP	$1,987.85	$2,214.53	$0.00
Professional Service & Fee	$20,050.95	$58,391.74	$24,580.02
Membership Dues	$30.00	$40.00	$50.00
Repairs and Maintenance	$2,154.84	$145,899.53	$140,421.73
Tools & Parts	$7,085.15	$11,025.96	$0.00
Supplies	$1,030.17	$2,224.44	$1,222.31
Chemicals	$14,050.67	$14,721.73	$20,087.64

Gas/Oil	$3,154.08	$2,781.41	$2,627.32
Postage	$3,395.66	$2,897.17	$2,739.13
Clothing Allowance	$348.48	$0.00	$0.00
Utilities	$28,139.06	$28,553.91	$28,420.88
Telephone	$866.31	$1,317.84	$1,208.24
Sewer Charges-Sioux City	$338,506.14	$358,099.43	$359,745.84
SC Monitoring Program	$0.00	$0.00	$0.00
Other Expense	$0.00	$0.00	$0.00
Sanitary Sewer Clean & Televise	$0.00	$0.00	$0.00
Sanitary Sewer Repair	$0.00	$0.00	$0.00
Total O&M Expenses	**$543,302.91**	**$747,274.61**	**$778,597.86**
Net Operating Revenue	**$431,786.74**	**$433,973.88**	**$388,533.81**

2.7.3 Financial Status Conclusion

The information presented in **Table 2-12** shows that the City's historical income is typically more than enough to cover expenses. However, future treatment rate increases imposed by Sioux City may jeopardize this positive cash flow.

WASTEWATER FACILITY PLAN
FOR THE
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA

SECTION 3

3 Need for a Project

3.1 Health, Sanitation & Security

Public health is a major component of any wastewater treatment facility. Ensuring the WWTF that serves North Sioux City lasts into the future is a priority of this community. However, the existing facility only treats a portion of the city's wastewater flows, and it is regularly operated above capacity. The WWTF has been unable to meet all effluent limitations on a regular basis. In addition, future growth in the West Shore Collection Basin will further impact the lagoon system's ability to treat waste flows. Proactively engaging SD DENR through this report and subsequent improvements before the NPDES permit renewal cycle occurs will help the city plan for future wastewater treatment needs.

3.2 Aging Infrastructure

The existing WWTF and collection system have been in service for decades. Although the WWTF has not been regularly updated, the collection system has been well maintained and in recent years has experienced significant rework to improve capacity and resiliency. As time continues to pass and this infrastructure continues to age, more and more maintenance will be required over time. Initiating a project proactively ensures proper wastewater treatment, thus mitigating a potential emergency situation and permit violation.

3.3 Regionalization Agreement

North Sioux City currently pumps all flows collected in the Sioux City Collection Basin to a discharge point along Riverside Blvd. in Sioux City, Iowa. The city administrators in Sioux City, Iowa have noted future rate increases are planned, and the city of North Sioux City wishes to prepare for these anticipated increases by investigating improvements to their wastewater systems with the goal of becoming self-sufficient. North Sioux City would like to explore terminating the regional treatment agreement and operate a single wastewater collection and treatment system with a single NPDES discharge permit, if this alternative makes social and economic sense.

3.4 Projected Growth

3.4.1 Projected Hydraulic Flows

North Sioux City is poised for significant future growth in the next 20 years. To prepare for this growth, the projection of future domestic wastewater flow needs is based on estimated current flows, projected population growth, and proposed development.

As presented previously, based on historical data, the city pumps approximately 175,000 gallons per day through the West Shore Collection Basin and approximately 550,000 gallons per day through the Sioux City Collection Basin, for a total of about 725,000 gallons per day. Wastewater production is about 270 gpcd; however, industrial flows make up a considerable amount of flow in the Sioux City Collection Basin.

Furthermore, some of the existing collection systems are near to their natural capacity as a result of geography and collection system arrangement, whereas other systems may experience significant new flows as the city grows into undeveloped areas of the region.

Minimal growth is expected in these areas:

- Streeter Dr. Lift Station sub-basin.
- Lakeshore Lift Station sub-basin.
- Suncoast Lift Station sub-basin.
- Park Lift Station sub-basin.

This is not to say that growth can not happen in these regions, just that they are reasonably built out and their collection systems will likely experience minimal growth.

The anticipated growth areas include:

- The Casey's Lift Station sub-basin and the southern region of North Sioux City. This development is expected to be residential and light commercial/industrial in nature.
- The area north of the Dakota Valley schools and southwest of Interstate 29. Much of this development is expected to be residential and light commercial/ industrial.
- The existing industrial zone served by Flynn Lift Station and the region north and east of Interstate 29 in North Sioux City. This development is expected to remain industrial in the projected future.

Table 3-1 relates existing flows to their service areas, and projects these flows to the 20-year horizon by adding flows due to residential and light commercial/industrial growth as well as a 20% total flow increase due to industrial growth.

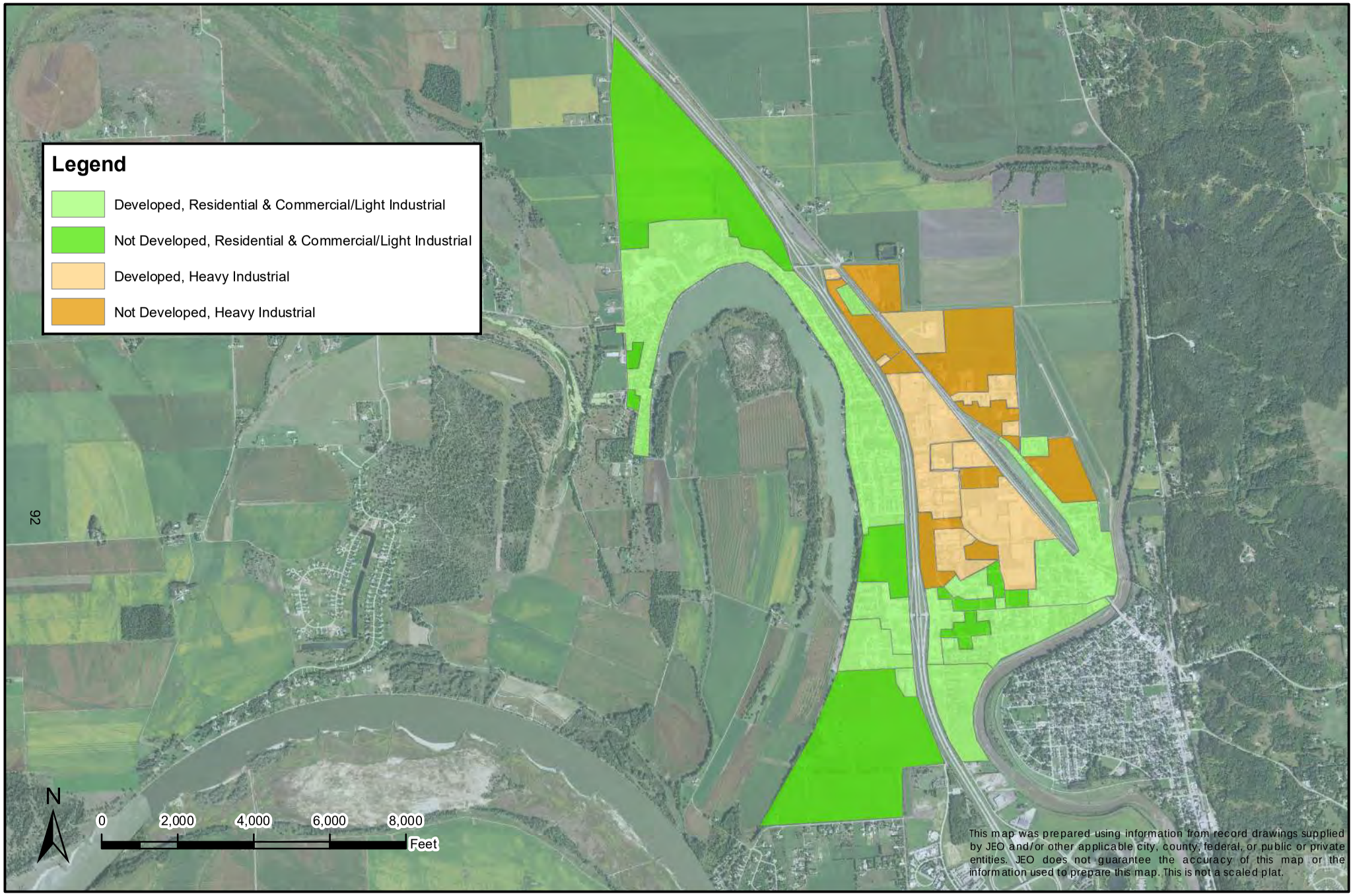
Table 3-1: Projected Future Flows

	Flow by Population Growth	Flow by Industrial Growth	Totals
Approximate Population[1]	2,693	-	2,693
Predominant Area Type	R & LC/I	HI	-
Sub-Basin Flow (gpd)	488,000	237,000	725,000
Flow per Capita (gpcd)	181	N/A	-
Anticipated Growth Allowance	36%	20%	31%
Population Increase	979	-	979
Potential Future Additional Flow gpd)	177,405	47,400	224,805
Total Future Average Daily Flow (gpd)	665,405	284,400	949,805

1: The developed area types are:
Class 1: Residential

Class 2: Commercial/Light Industrial (industrial <400 gpd)
Class 3: Heavy Industrial (industrial > 400 gpd)

The proposed growth areas are shown in **Figure 3-1**.



POTENTIAL DEVELOPABLE AREAS

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 3-1

JEO CONSULTING GROUP INC

3.4.2 Projected Organic Loads

To project organic loads to the 20-year horizon, this report assumes that the organic loading per gallon does not change. Given the high proportion of heavy industrial flows and the uncertain nature of future heavy industrial usage and discharge concentration, these values are conservatively adjusted upward by 25% to allow capacity for future non-linear organic wasteload growth.

Table 3-2: Projected Future Organic Loading

Parameter	BOD		TSS		TKN	
Use Type	R & LC/I	HI	R & LC/I	HI	R & LC/I	HI
Existing Load (lb/d)	592	2,022	673	850	124	198
Existing Poplation Equivalent (P.E.)	2,693	9,191	2,693	3,400	2,693	4,304
Proportional Flow Increase by Growth (%)	36%	20%	36%	20%	36%	20%
Future Organic Load (lb/d)	808	2,426	918	1,020	169	238
	3,234		1,938		407	
Future Population Equivalent (P.E.)	14,701		7,752		8,837	

3.4.3 Projected Phosphorous Loads

Unfortunately, there is limited sampling data to indicate the availability of phosphorus in the water discharged to the collection system. It is reasonably safe to assume that phosphorus levels in the Residential and Commercial/Light Industrial wastes are adequate for biological growth. However, industrial waste discharges are often nutrient limited. In the case of North Sioux City, these industries are suspected to have low phosphorus levels in their discharged water, and additional investigation is warranted to establish these baseline levels and establish if macro-nutrient supplements are required for biological growth. The balance of this report assumes macro-nutrient levels are sufficient for activated sludge treatment.

3.5 Projected Changes to NPDES Permit

The existing NPDES Permit will expire in 2024. This report assumes that the city will continue to keep this facility in operation as long as SD DENR will permit the discharge into Mud Lake, unless alternative treatment systems are selected in later chapters.

A wasteload allocation (included in **Appendix B**) has been requested to be performed by SD DENR to establish effluent limitations for new discharges to Mud Lake, the Missouri River, and the Big Sioux River. Until the Total Maximum Daily Loads can be established for these locations, SD DENR has recommended “typical“ effluent loads for Mud Lake and the Missouri River, and suggested ammonia impairment for the Big Sioux River.

This report assumes the most stringent effluent limits of the three options regarding treatment system capital, operation, and maintenance costs to simplify the analysis. These assumed effluent levels are 10 mg/L BOD_5, 10 mg/L TSS, and 1 mg/L NH-3 ammonia. The added benefit of assuming more stringent effluent requirements is that if tighter limits are imposed on an otherwise lenient permit, the system will likely be configurable to meet new limits without significant capital improvements.

WASTEWATER FACILITY PLAN
FOR THE
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA

SECTION 4

4 Improvement Alternatives Considered

4.1 Design Criteria Summary

Table 4-1: Summary of Future Wastewater Flows

	Flow		
	gpd	gpm	MGD
Current Average Daily Flow	725,000	510	0.725
Future Average Daily Flow	950,000	660	0.95
Future Population (capita)	3,672		
End-of-Period Remaining Capacity	10%		
Design Average Daily Flow	1,045,000	730	1.05
Starting Capacity Utilization	69%		
Daily Peak Factor[1]	2.0		
Design Peak Daily Flow	2,100,000	1460	2.10
Hourly Peak Factor[2]	3.48		
Design Peak Hourly Flow	3,700,000	2570	3.70

1: Typical peaks are 1.5 x ADF, however, part I.C.3.c of the SD DENR design standard requires a minimum daily peaking factor of 2.0.
2: Ratio of Q_{PHF} to Q_{ADF} based on Figure 1 in Chapter 1 of the SD DENR design standard.

Table 4-2: Summary of Future Wastewater Loads

		Load (lb/d)	Concentration @ ADF (mg/L)
BOD_5	Current	2,614	432
	Future	3,234	369
TSS	Current	1,523	252
	Future	1,938	221
TKN	Current	322	53
	Future	407	46

4.2 Summary of Alternatives

There are many different types of wastewater treatment methods to consider when developing a new wastewater treatment facility to reliably meet the city's needs. The two major treatment types in this geographical area are lagoons and mechanical treatment. However, due to factors such as property requirements, high influent organic loads from industrial sources, anticipated effluent water quality, and potential future growth, lagoon systems are not considered in this analysis.

As previously discussed, North Sioux City operates a wastewater collection system that transports water to one of two locations: to the existing lagoon treatment system or to the collection system in Sioux City, Iowa. However, the city has an opportunity to terminate its contractual obligations to send wastewater to Sioux City, IA for treatment. The alternatives presented herein include major collection system improvements, including reusing as much of the existing system as possible, to transport wastewater to one of four potential treatment sites.

These potential treatment sites include an empty field adjacent to the existing WWTF (Site A), two new-terrain treatment sites to the southwest and northeast (Sites B and C, respectively), and transportation to South Sioux City, NE (Site D).

Each of the wastewater treatment technology alternatives includes review of mechanical treatment parameters to obtain the effluent water quality anticipated by SD DENR.

A summary of the collection and treatment alternatives is presented below.

- **Collection System Alternatives**
  - Alternative 1: No Action
  - Alternative 2: New Collection Infrastructure for West Shore Treatment Site
  - Alternative 3: New Collection Infrastructure for New SW Treatment Site
  - Alternative 4: New Collection Infrastructure for New NE Treatment Site
  - Alternatives 5A and 5B: New Collection Infrastructure for South Sioux City, Nebraska Regionalization
- **Wastewater Treatment Facility Site Locations**
  - Site A: West Shore Treatment Site (discharge to Mud Lake)
  - Site B: Southwest Treatment Site (discharge to Missouri River)
  - Site C: Northeast Treatment Site (discharge to Big Sioux River)
  - Site D: Transportation to South Sioux City receiving location
- **Wastewater Treatment Facility Alternatives**
  - Alternative 6: Sequencing Batch Reactor (SBR)
  - Alternative 7: AeroMod™
  - Alternative 8: Oxidation Ditch
  - Alternative 9: Treatment by South Sioux City

Alternative 1 is considered the No Action or Optimum Operation alternative. The city takes no action and does not transport and treat any flow from River Drive Lift Station. The city will continue to treat West Shore Collection Basin flows at the existing lagoon facility and Sioux City Collection Basin flows will continue to pump to Sioux City, IA for treatment.

Alternative 2 captures all of the Sioux City Collection Basin flows that go to River Drive Lift Station and transports them to the existing lagoon treatment facility (Treatment Site A). To simplify the operational requirements of the proposed treatment system, this report assumes that the existing lagoons will be decommissioned and that the new facility constructed adjacent to the lagoons will treat all flows from North Sioux City.

Alternative 3 establishes infrastructure designed to transport all North Sioux City flows to a site in the southwest part of the region (Treatment Site B). This new treatment facility will discharge to the Missouri River and will require a new NPDES permit. The existing WWTF is proposed to be decommissioned.

Alternative 4 is similar to Alternative 3 except the proposed infrastructure transports all flows to the new WWTF which will be built in the northeast part of the region (Treatment Site C). The proposed new facility which will discharge to the Big Sioux River. A new NPDES permit will be required for this facility and the existing lagoon system will be decommissioned. Note that the NPDES permits for Alternative 3 and Alternative 4 could have different effluent water quality limits due to having different receiving bodies of water, however, this report assumes that the treatment technologies will conservatively meet discharge limits to the Big Sioux River.

Alternative 5 establishes an agreement between North Sioux City and South Sioux City, NE, whereby South Sioux City will accept the wastewater flows from the east side of North Sioux City. This requires a new wastewater interceptor to a new lift station on the south side of the city, and a new forcemain to a discharge location in South Sioux City. Two discharge locations are discussed based on preliminary conversations with South Sioux City administrators.

Alternatives 6, 7 and 8 address how waste flows will be treated, and each of these alternatives could be deployed at treatment site A, B, or C. It includes a brief calculation set for each alternative and discussion of the unit operations needed to meet the anticipated treatment objectives.

Alternative 9 is similar to Alternative 1, except the treatment costs are based on estimates of treatment fees by South Sioux City, NE.

Discussion regarding Operations and Maintenance Costs:

This analysis assumes that current sewer treatment flow costs do not change for Alternatives 1, 2, 3, 4, and 5A/5B. However, Alternative 1 includes the additional treatment costs anticipated due to forthcoming changes in the treatment agreement. However, the treatment alternatives (Alts 6, 7, 8, and 9) include recovering the current flow fees to Sioux City. This creates a true apples-to-apples comparison for alternatives that do not include Sioux City, and it also adjusts the anticipated sewer rate change appropriately to reflect the change in annual cash flow. Note that these costs vary by year due to increased flow due to anticipated growth, and therefore are discounted as Non-Annual O&M Expenses. These non-annual expenses are then annualized to an equivalent present worth for comparison purposes.

Alternative 1 does not incorporate current or proposed industrial surcharge costs as that cash flow does not go through North Sioux City; it is directly billed from Sioux City to the industries. However, Alternatives 6, 7, 8, and 9 include an annual “Surcharge Fee Recovery” O&M earning that accounts for

North Sioux City collecting surcharge fees based on the current average of the last three years of estimated fees.

To simplify Operations and Maintenance cost analyses, collection system alternatives analyses assume that reusing and/or repurposing existing lift station equipment will have a net zero effect on O&M costs since the same volume will still be pumped each day. However, increases in pipe lengths will have an O&M adjustment cost due to the additional energy required to move water to the new destination.

This report assumes that the major lift stations for each sewer basin will be designed for their respective sewer basin future flows as shown in **Table 4-3**.

Table 4-3: Projected Basin Flows

	West Shore Basin		Sioux City Basin	
	gpd	gpm	gpd	gpm
Current Average Flow	175,000	122	550,000	382
Flow Proportion	24.1%		75.9%	
Future Average Flow	252,000	175	793,000	551
Future Peak Hourly Flow	893,000	**620**	2,807,000	**1,949**

4.3 Project Alternatives

4.3.1 Alternative No. 1 – No Action (Optimum Operation)

This alternative is effectively a No Action alternative: the current situation persists for the foreseeable future. This means that West Shore Collection Basin flows will continue to be treated at the exiting lagoon facility, and Sioux City Collection Basin flows will be pumped from River Drive Lift Station to Sioux City, IA for treatment.

North Sioux City personnel will continue to operate and maintain the existing collection system infrastructure and the existing lagoon treatment system. New collection system infrastructure, gravity feeders and lift stations, will be built to accommodate future flows which will be treated at either the existing lagoon WWTF (for West Shore Collection Basin growth) or at Sioux City (for Sioux City Collection Basin growth).

This alternative assumes North Sioux City will raise sewer rates to accommodate future wastewater treatment rate increases anticipated from Sioux City, Iowa.

Preliminary documents from Sioux City indicate that future agreements will require North Sioux City implements the following changes, and the cost of these shall be borne by North Sioux City.:

- Build a monitoring and sampling structure at or near River Drive Lift Station, and pay for regular wasteload sampling and testing,
- Pay for an odor control system at River Drive (there is currently an existing hydrogen peroxide dosing system), and regular chemical costs as needed,

- Develop and administer an Oil & Grease control program for commercial and industrial users.

This alternative does not consider the current sewer rate in its analysis, however future rate increases anticipated by third-party treatment alternatives are tabulated as non-annual additional Operation & Maintenance (O&M) costs to establish a baseline to compare other alternatives.

It is noted that the existing lagoon treatment system is generally fully loaded and occasionally overloaded. If additional growth occurs, more violations of the existing permit can be expected, which may force action by SD DENR to mitigate these violations. It is not known when this may occur, and thus represents an unknown risk to the community.

Table 4-4 includes the cost of maintaining the regional connection to Sioux City, IA and paying the anticipated increased user rates for the 20 year term of this analysis.

Table 4-4: Opinion of Budgetary Cost for Alternative 1

Cost Type	Opinion of Budgetary Cost
Capital Cost	$ 480,700
Equivalent Annual O&M Cost	$ 491,000

1: Total Opinion of Project Cost includes all construction costs, contingencies, and soft costs, Group X costs do not include these additional soft costs.
2: Opinion of Equivalent Annual O&M Cost includes regular annual O&M costs as well as annualized non-regular O&M costs such as short lived assets and other costs that vary from year to year.

4.3.2 Alternative No. 2 – New Collection Infrastructure for West Shore Treatment Site A

Alternative 2 includes the following infrastructure components:

- New wastewater treatment facility located adjacent to the existing lagoon WWTF. This plant will discharge directly into Mud Lake. Treatment details are summarized in Alternatives 6 through 8.
- New forcemain from River Dr. Lift Station to a new Casey's Lift Station located near the existing Casey's Lift Station.
- Decommission the existing Casey's L.S. forcemain, construct a new higher capacity Casey's Lift Station, install a new forcemain from Casey's Lift Station to the new WWTF near Mud Lake.

ADVANTAGES:

- Addresses known hydraulic bottleneck at River Drive gravity sewer.
- Lowest capital cost of the collection system alternatives.

DISADVANTAGES:

- Does not include additional infrastructure for growth in the south region.
- Highest risk regarding effluent water quality and future discharge permits renewals.

SUMMARY:

This alternative collects all flows that would normally go to Sioux City, and instead pumps them to a new treatment location (Site A) that discharges to Mud Lake. The existing lagoon wastewater treatment facility will be decommissioned and a new facility to properly treat all flows will be constructed on a nearby parcel of land for discharge into Mud Lake. These treatment options are discussed in Alternatives 6, 7 and 8.

Group A – New River Drive Lift Station Forcemain to New Casey's Lift Station

This alternative will install a new forcemain from River Drive Lift Station to Casey's Lift Station, and will eliminate Casey's Lift Station discharge into the overcapacity pipe along River Drive. The new forcemain will be 12" in diameter and approximately 5,250 LF long, and will discharge to the new Casey's Lift Station. A new 20" diameter steel casing will be installed beneath Interstate 29. Observed head conditions for the existing pumps at River Dr. Lift Station are anticipated to be less than those observed under current operating conditions, and no changes to River Dr. L.S. are proposed.

Group B – New Casey's Lift Station and Forcemain to West Shore Treatment Site A

Casey's Lift Station forcemain will be decommissioned and all flows from River Drive Lift Station and the Casey's sewer sub-basin will be pumped along a new route South and West of McCook Lake. This also eliminates Casey's Lift Station discharges to the gravity sewer along River Drive, thereby reducing the hydraulic bottleneck in that main. This new lift station will be designed for a flow rate of approximately 1,950 gpm, and the forcemain will be 16" diameter and approximately 13,500 LF long. The new lift station will be installed adjacent to the existing lift station and will include a larger wet well, a below-grade valve vault, and a small building to house control systems and spare parts. The system should be set up as a triplex design with three identical pumps and a firm capacity of 1,950 gpm with one pump out of service, and therefore each pump should have a firm capacity of 975 gpm with two pumps running at approximately 75' TDH. The pump motor size for these conditions is approximately 50 Hp.

Group C – New Gravity Outfall Pipe to Mud Lake

700 LF of gravity effluent pipeline is included to connect to the existing outfall pipe and location at Mud Lake. This pipe is proposed to be 24" in diameter and will be installed at minimum slope of 0.08% to where it will connect with the current outfall pipe. The existing NPDES discharge outfall location will not change.

Group D – Miscellaneous Support Infrastructure

A 6" water line will be installed from the local distribution system located on the east side of West Shore Drive. A short gravel drive from West Shore Drive to the proposed WWTF is included.

Lift station details are discussed in **Table 4-5**.

Table 4-5: Alternative 2 Lift Stations Summary

Lift Station	Existing Conditions				Proposed Conditions				Proposed Action
	Pump Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Est. TDH (ft)	L.S. Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Approx. TDH (ft)	
River Drive	600 per pump	8 / 10	650 / 350	90	1,800	12	5,250	55	Reuse Existing Pump Station, New Forcemain
Casey's	400 per pump	4	900	110	1,950	16	13,500	75	New Lift Station, New Forcemain

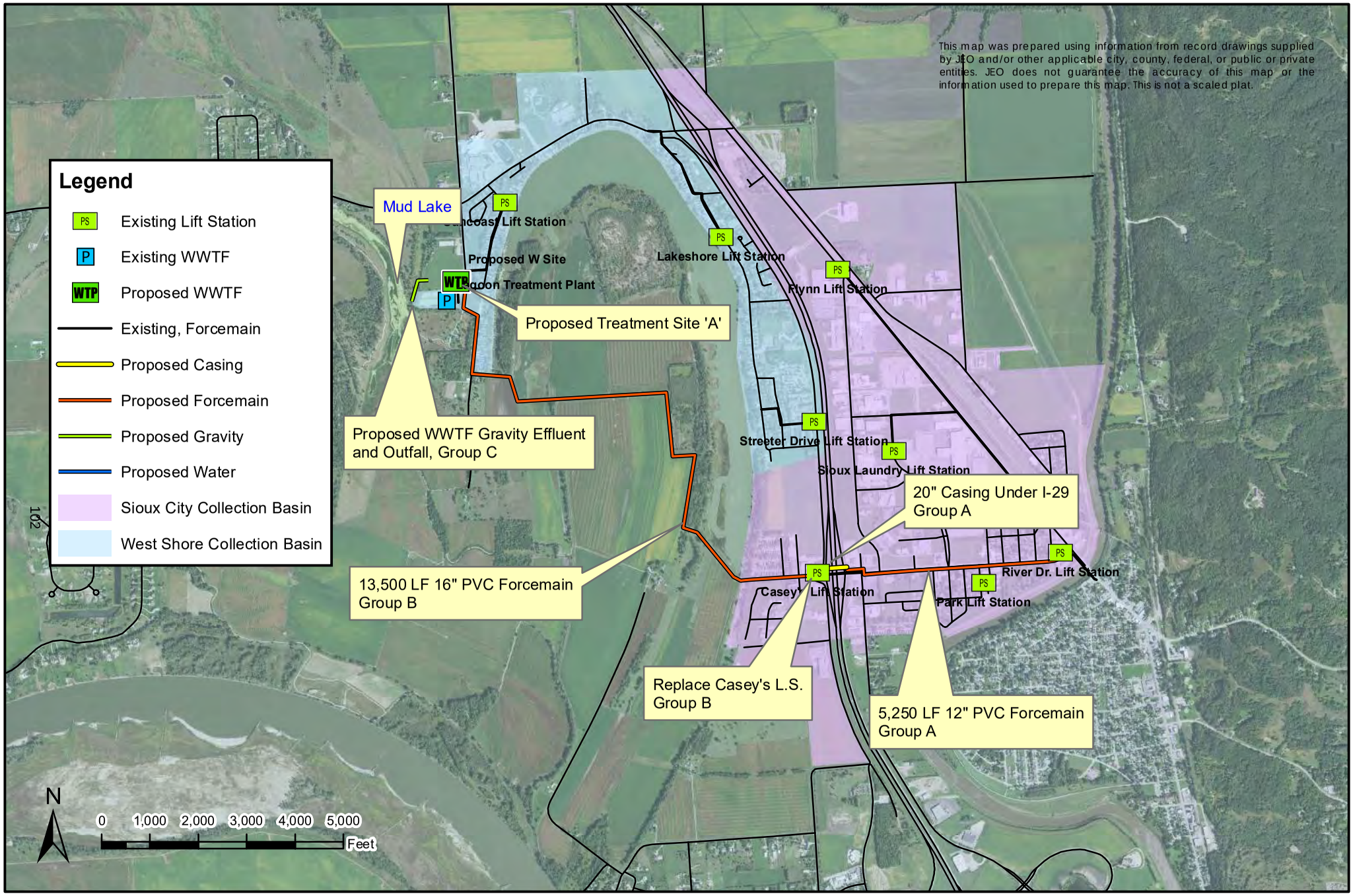
O&M costs on these lift station and forcemain revisions are expected to increase; River Dr. Lift Station will theoretically flow little less by an amount equal to Casey's lift station, however, Casey's Lift Station will now include River Drive Lift Station flows, and will pump significantly more flow than the existing condition.

The total cost of these improvements is listed in **Table 4-6**. Additional detail can be found in **Appendix C**.

Table 4-6: Opinion of Budgetary Cost for Alternative 2

Cost Type	Cost Detail	Opinion of Budgetary Cost
Capital Cost	Group A: New River Dr. Forcemain to New Casey's L.S.	$ 1,051,000
	Group B: New Casey's L.S. to West Shore Treatment Site A	$ 3,130,000
	Group C: New Gravity Outfall Pipe to Mud Lake	$ 216,000
	Group D: Miscellaneous Support Infrastructure	$32,000
	Total Project Cost[1]	**$ 5,360,000**
Operation and Maintenance	**Equivalent Annual O&M Cost[2]**	**$ 20,000**

1: Total Opinion of Project Cost includes all construction costs, contingencies, and soft costs, Group X costs do not include these additional soft costs.
2: Opinion of Equivalent Annual O&M Cost includes regular annual O&M costs as well as annualized non-regular O&M costs such as short lived assets and other costs that vary from year to year.



ALTERNATIVE 2
PROPOSED COLLECTION SYSTEM
INFRASTRUCTURE

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-1

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4.3.3 Alternative No. 3 – New Collection Infrastructure for Southwest Treatment Site B

This project alternative includes the following components:

- New wastewater treatment facility located in the southwest corner of the region. This plant will discharge directly into the Missouri River. Treatment details are summarized in Alternatives 6 through 8.
- New forcemain from the existing Suncoast Lift Station to the proposed wastewater treatment Site B.
- New forcemain from Streeter Dr. Lift Station to the gravity collection system North of Casey's Lift Station.
- New forcemain from River Dr. Lift Station to the new Casey's Lift Station.
- New Casey's Lift Station at current site and new forcemain to the proposed wastewater treatment Site B.

ADVANTAGES:

- Placement of the WWTF to the southwest allows for discharge into the Missouri River which will have less stringent effluent water quality requirements than Alternative 4 which discharges into the Big Sioux River.
- This location is relatively close to one of the two anticipated future growth locations in the city and it allows for favorable topography to install gravity sewers to the treatment site.
- The proposed alignment mitigates hydraulic capacity issues in the main gravity sewer along River Dr. by re-routing flows from Casey's Lift Station to the south.

DISADVANTAGES:

- The region southwest of North Sioux City resides largely between oxbow lakes and the Missouri River which is prone to flooding in some locations.
- The selected site is on the windward side of potential development, and a new facility will need to consider transient odors that may affect property values to the east of the site.
- Long anaerobic residence times in the collection system forcemains will lead to acidic conditions, hydrogen sulfide generation, and odor issues in the collection system, particularly at the discharge locations.
- The proposed treatment site is currently privately owned and will require property owner participation to implement.

SUMMARY:

This alternative shares common parts with Alternative 2 regarding River Drive Lift Station, and replacing Casey's Lift Station with a higher capacity system. However, there are some significant differences as well. Both Streeter Dr. and Suncoast Lift Station forcemains are re-routed towards the south, and the proposed WWTF is located on a high parcel of property within proximity of the Missouri River.

Group A – New River Drive Lift Station Forcemain to New Casey's Lift Station

Similar to Alternative 2, the River Dr. Lift Station forcemain will be rerouted to the west along River Dr. It will cross beneath Interstate 29 in a new 20" steel casing and connect to the new Casey's Lift Station. This line includes approximately 5,250 LF of 12" PVC forcemain. The head conditions of this new forcemain are expected to be significantly less than existing conditions, therefore no changes are anticipated for the existing River Drive Lift Station.

Group B – New Streeter Drive Lift Station Forcemain to South Gravity Sewer

Streeter Drive Lift Station will be rerouted into a new gravity collector running along Streeter Dr. south towards the Casey's gravity pipe. This includes approximately 2,200 LF of new 6" PVC forcemain which will discharge into the new gravity sewer currently being constructed in the development directly south of the lift station along Streeter Dr. The head conditions of this proposed forcemain are less than that of the existing forcemain, and the existing lift station equipment is expected to be suitable with this new alignment. This gravity sewer that collects this forcemain discharge will ultimately flow into Casey's Lift Station.

Group C - New Casey's Lift Station and Forcemain to SW Treatment Site B

Similar to Alternative 2, the existing Casey's Lift Station will be decommissioned after constructing a new, higher capacity lift station on the same site. Unlike Alternative 2, these flows will be pumped through 7,300 LF of 16" PVC forcemain to the west towards the proposed southwest WWTF at Site B. This new main is considerably larger and longer than the existing 4" forcemain, and the capacity of Casey's lift station will need to be increased to 1,950 gpm. A new lift station with submersible pumps will be constructed to pump all flows from the Sioux City sewer basin, Streeter Dr. sewer basin, and Casey's sewer basin. The station should be designed to be a triplex configuration with three identical pumps: two pumps for firm capacity and one on-line of equivalent capacity. The pumps will be approximately 975 gpm at 60' TDH, and will require approximately 40 Hp motors.

Group D – New Suncoast Lift Station Forcemain to SW Treatment Site B

The new Suncoast forcemain line is a new PVC pipe sized to accommodate the flows from the existing Lakeshore Drive and Suncoast Lift Stations. It will also include sizing provisions for potential development that may occur North of the community. This line is estimated to be a 10" diameter PVC pipe with a total length of approximately 14,250 LF that starts at the existing Suncoast Lift Station and ends at the Headworks of the proposed southwest WWTF. The proposed forcemain is expected to have less minor losses than the existing forcemain, and the total static head of the proposed alignment is expected to be less than what is pumped currently, therefore, the existing pumps will remain in place without modification.

Group E – New Gravity Outfall Pipe to Missouri River

This alternative includes approximately 4,000 LF of 24" gravity effluent sewer and outfall along Hoffman Rd. to the Missouri River. This includes new gravel surface along the road. Approximately 3,000 LF of public right-of-way will need to be obtained for a road to the currently proposed site along Hoffman Rd. which is currently privately owned.

Group F – Miscellaneous Support Infrastructure

4,250 LF of 6" potable water main is included from the existing water tower on Quiniela Dr. to the proposed WWTF site. A short gravel drive is also included from Hoffmann Rd to the main treatment site.

Table 4-7: Alternative 3 Lift Stations Summary

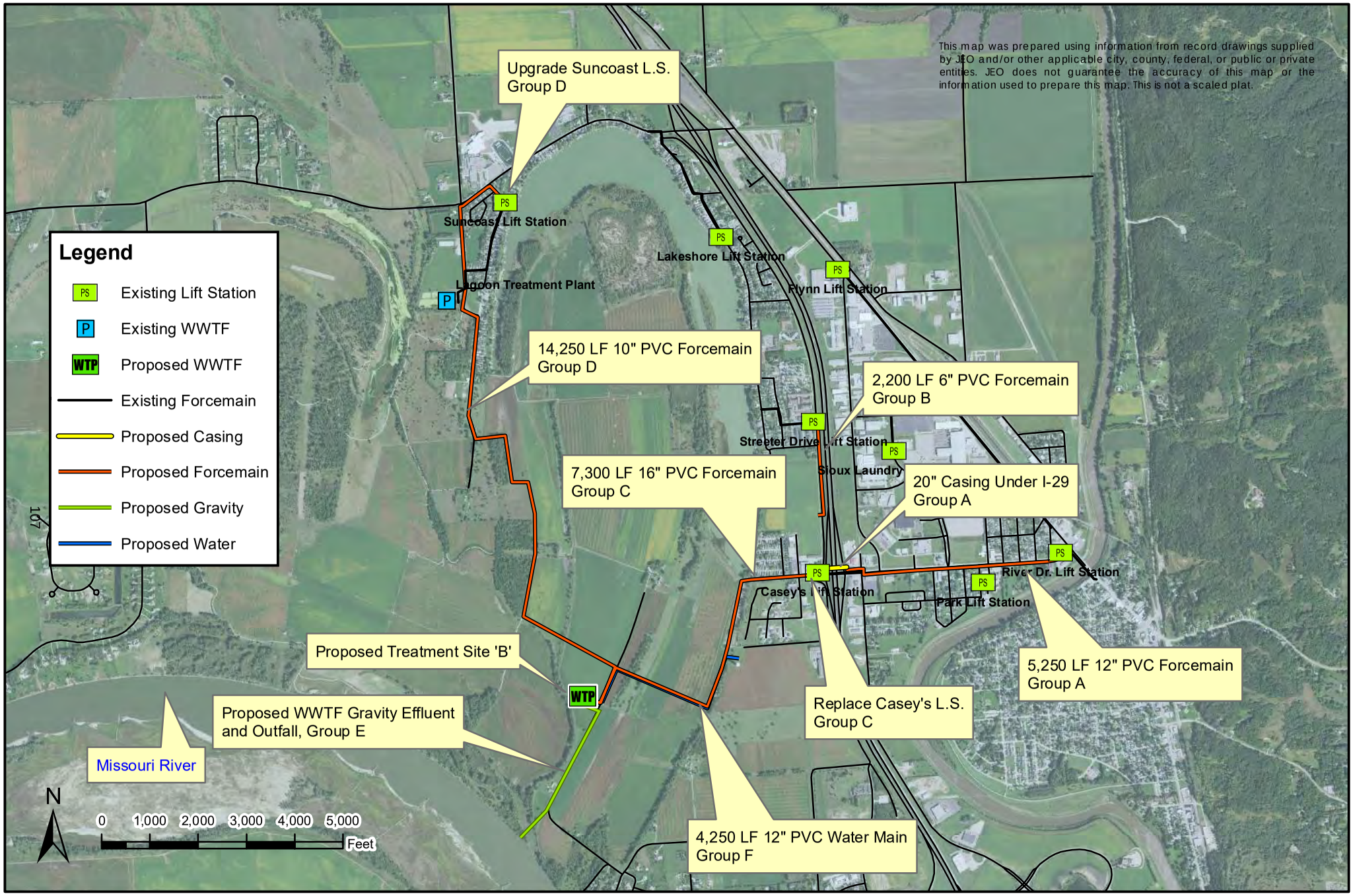
Lift Station	Existing Conditions				Proposed Conditions				Proposed Action
	Pump Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Est. TDH (ft)	L.S. Min. Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Approx. TDH (ft)	
Suncoast	500 per pump	6	2,650	85	620	10	14,250	70	Reuse Existing Lift Station, New Forcemain
River Drive	600 per pump	8 / 10	650 / 350	90	1,800	12	5,250	55	Reuse Existing Lift Station, New Forcemain
Streeter Drive	500 per pump	4	1,330	-	500	6	2,200	65	Reuse Existing Lift Station, New forcemain
Casey's	400 per pump	4	900	110	1,950	16	7,300	60	New Lift Station, New Forcemain

Table 4-8 shows a summary of the opinion of budgetary cost, annual O&M cost increase, and life cycle cost for these infrastructure improvements. Additional detail can be found in **Appendix C**.

Table 4-8: Opinion of Budgetary Cost for Alternative 3

Cost Type	Cost Detail	Opinion of Budgetary Cost
Capital	Group A: New Forcemain from River Dr. L.S. to New Casey's L.S.	$ 1,051,000
	Group B: New Streeter Dr. Forcemain	$ 122,000
	Group C: New Casey's L.S. and Forcemain to New WWTF Site B	$ 1,910,000
	Group D: New Forcemain from Suncoast L.S. to New WWTF Site B	$ 1,090,000
	Group E: New Gravity Outfall Pipe to Missouri River	$ 1,070,000
	Group F: Miscellaneous Support Infrastructure	$ 330,000
	Total Project Cost[1]	**$ 6,800,000**
Operation and Maintenance	**Equivalent Annual O&M Cost[2]**	**$ 35,000**

1: Total Opinion of Project Cost includes all construction costs, contingencies, and soft costs, Group X costs do not include these additional soft costs.
2: Opinion of Equivalent Annual O&M Cost includes regular annual O&M costs as well as annualized non-regular O&M costs such as short lived assets and other costs that vary from year to year.



ALTERNATIVE 3
PROPOSED COLLECTION SYSTEM
INFRASTRUCTURE

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-2

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4.3.4 Alternative No. 4 – New Collection Infrastructure for Northeast Treatment Site C

Similar to Alternative 3, this alternative includes several major collection system revisions to transport flows to the proposed treatment site:

- New mechanical wastewater treatment facility located in the northeast corner of the region. This plant will discharge directly into the Big Sioux River. These details are summarized in Alternatives 6 through 8.
- Reroute River Dr. L.S. forcemain north to Flynn L.S. along the existing forcemain alignment.
- New forcemain from Flynn L.S. to the new forcemain control vault East of I-29.
- New forcemain from Suncoast Dr. Lift Station the new forcemain control vault east of I-29.
- Connect Lakeshore Dr. L.S. forcemain to the new forcemain from Suncoast.
- New primary forcemain from the new forcemain control vault east of I-29 (at SR 105 and Waters Rd.) to the new WWTF.

ADVANTAGES:

- Opens the north and east regions for future growth.
- This site is located generally downwind of the prevailing winds in the region, which will help mitigate nuisance odors typically associated with wastewater treatment facilities. However, Iowa residences on the east side of the Big Sioux River will be down-wind of the new facility.

DISADVANTAGES:

- Parts of the region near the proposed wastewater treatment site are susceptible to flooding, although forthcoming FEMA FIRM maps indicate that this may not be as significant of an issue as previously believed.
- The proposed Suncoast Lift Station forcemain will be particularly challenging segment of new pipeline to construct.
- Discharge to the Big Sioux River will have the most stringent effluent water quality permit requirements.
- Does not resolve gravity sewer flow capacity issues along River Drive.

SUMMARY:

In general, all flows from the city will be rerouted to the northwest part of the region. This involves re-routing some forcemains, upgrading several lift stations, and constructing a new primary forcemain to wastewater treatment Site C. This alternative requires complex evaluation of lift station interactions, and if this alternative is selected, a detailed flow analysis is warranted to confirm the assumptions included in this report.

Group A – River Drive Lift Station Forcemain Reroute to Flynn Lift Station

The existing 10” Flynn L.S. forcemain is too small to accommodate the proposed 1,800 gpd firm capacity of River Drive Lift Station. Therefore, the new River Dr. forcemain will be routed north along Watier Ave. where it will then follow the existing Flynn forcemain alignment back to Flynn Lift Station. The new forcemain will be constructed of 7,775 LF of 12” diameter PVC. Preliminary

hydraulic calculations suggest that this new forcemain alignment will have slightly higher minor losses than existing conditions, not including extra head induced by Sioux Laundry Lift Station, and therefore the River Drive Lift Station pumps are planned to be replaced. Accordingly, Sioux Laundry Lift Station pumps will also need to be upgraded, as the total head at PHF from River Dr. Lift Station is expected to be higher than existing conditions.

Group B – Flynn Lift Station Upgrades and New Forcemain to Waters Rd. Flow Control Structure:

The existing Flynn Lift Station will be upgraded with new, higher capacity pumps, and a new forcemain will be installed from the existing lift station to a location at the corner of SR 105 and Waters Rd., where it will connect to a new forcemain from Suncoast L.S. This segment of forcemain will be approximately 2,100 LF of 16 inch PVC pipe to the forcemain control vault. A steel casing will be installed beneath the two railroad tracks adjacent to the line. The two new lift station pumps will be sized for 1,950 gpm each and a TDH of approximately 62 ft. Note that these losses include minor losses for the forcemain segment to the proposed WWTF site as well. It is assumed that the backup genset at the lift station will need to be upgraded, and that all electrical and control systems will need to be replaced to accommodate the larger pumps.

Group C – Suncoast Lift Station Forcemain to Waters Rd. Flow Control Structure

A new forcemain from Suncoast Lift Station to the proposed valve vault at SR 105 and Waters Rd. will be constructed. This includes approximately 9,100 LF of new 10” PVC forcemain. The new 10” line will cross beneath Interstate 29 in a new 18” steel casing. The existing 6” forcemain from Lakeshore Lift Station will be tied into the new Suncoast forcemain. The pumping equipment in Suncoast L.S. will need larger impellers, but the existing pumps and motors should be sufficient to pump against the anticipated hydraulic heads. However, Lakeshore L.S. will require upgraded pumping equipment to support the higher heads associated with the new forcemain alignment. The new Lakeshore Lift Station pumps will require a head capacity of approximately 125’ TDH to pump all the way to the proposed WWTF site.

Group D – New Forcemain from Waters Rd. Flow Control Structure to NE WWTF Site C

A new forcemain flow control vault will be installed at the intersection of SR 105 and Waters Rd. This vault will manifold new forcemains from Suncoast L.S. and Flynn L.S. with suitable isolation valves, and will transport all North Sioux City flows to the proposed WWTF at Site C. This proposed segment of forcemain will be 16” in diameter and approximately 8,400 LF. At the future PHF of 1,950 gpm, the total dynamic head for this segment is approximately 55’, which includes 15’ static head at the proposed WWTF. This head is added to the operating conditions of each affected forcemain to establish the total dynamic heads of each respective lift station that connects to the primary forcemain network. These energy head impacts are discussed further in **Table 4-9**.

Group E – New Gravity Outfall Pipe to Big Sioux River

This alternative includes approximately 400 LF of gravity effluent sewer and outfall to the Big Sioux River.

Group F – Miscellaneous Support Infrastructure

A water line will be extended from the intersection of Waters Rd. and Rickenbacker Rd. and will be installed north along Cemetery Rd. where it will eventually turn east towards the proposed WWTF site. A new gravel drive will be installed along this easterly alignment to the new facility.

Table 4-9: Alternative 4 Lift Stations Summary

Lift Station	Existing Conditions				Proposed Conditions				Proposed Action
	Pump Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Est. TDH (ft)	L.S. Min. Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Approx. TDH (ft)	
Suncoast	500 per pump	6	2,650	85	620	10	9,100	103[1]	Reuse Existing Lift Station, New Forcemain
Lakeshore	430 per pump	6	2,920	55	430	6	2,640	125[2]	Replace Existing Pumps, Reuse Forcemain
Sioux Laundry	400 per pump	8	2,100	37	400	8	2,100	72[3]	Replace Pumps, Reuse Existing Forcemain
River Drive	600 per pump	8 / 10	650 / 350	90	1,800	12	7,775	95	Reuse Existing Lift Station, New Forcemain
Flynn	350 per pump	10	6,910	32	1,950	16	2,100	82[1]	Upgrade Existing Lift Station, New Forcemain

1: Suncoast, and Flynn Lift Stations' proposed TDH includes an additional 55' encountered by the forcemain run from the flow control structure to the proposed WWTF.
2: Lakeshore Lift Station includes an additional 70' TDH to overcome heads from combining with Suncoast, Flynn, and flow control structure forcemain runs.
3: Sioux Laundry Lift Station includes an additional 35' TDH to overcome head from the new River Dr. Lift Station Forcemain to Flynn Lift Station.

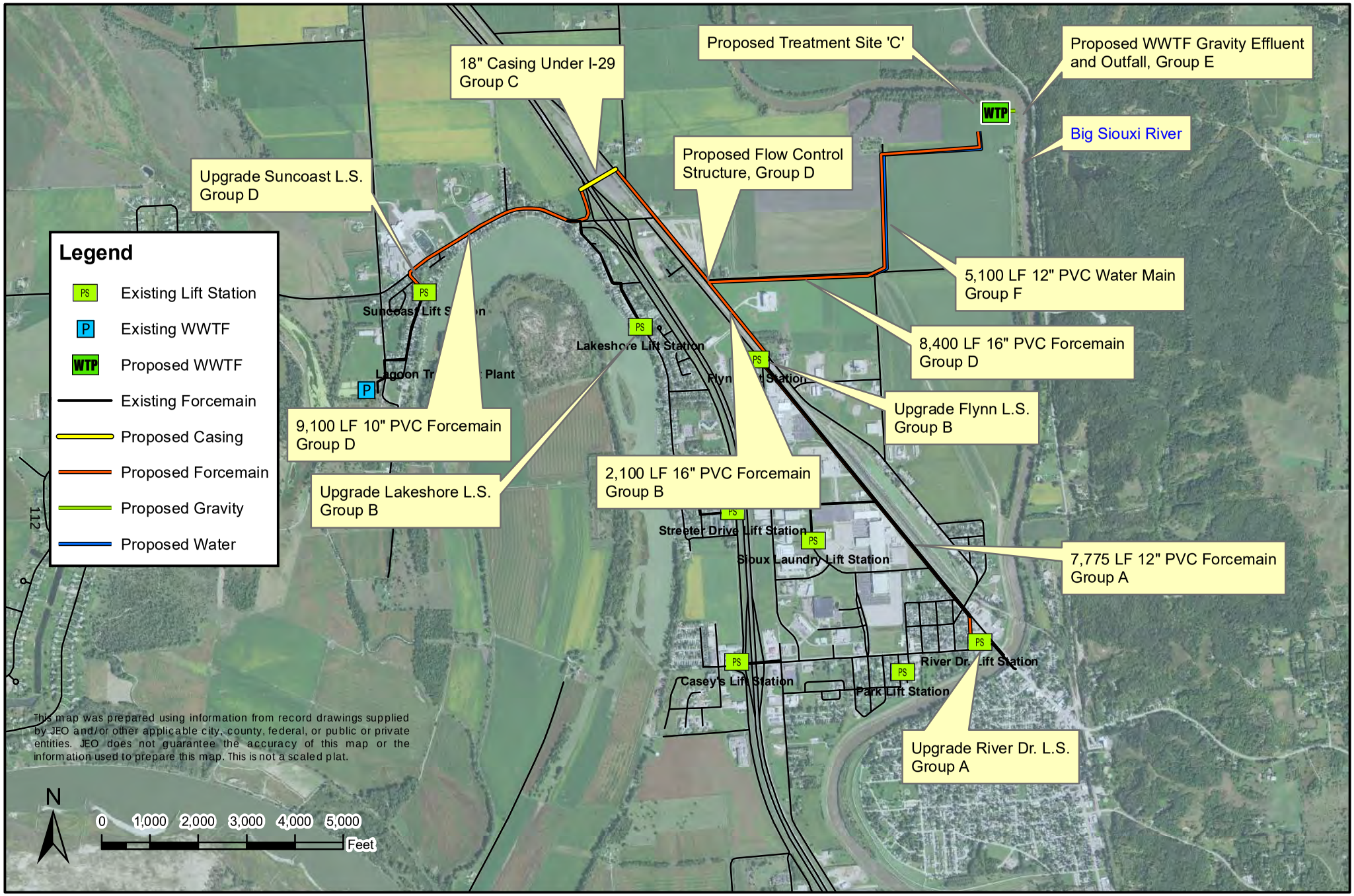
Table 4-10 shows a summary of the opinion of budgetary cost, annual O&M cost increase, and life cycle cost for these infrastructure improvements. Additional detail can be found in **Appendix C**.

Table 4-10: Opinion of Budgetary Cost for Alternative 4

Cost Type	Cost Detail	Opinion of Budgetary Cost
Capital Cost	Group A: New River Dr. Forcemain to Ex. Forcemain on Military Rd.	$ 1,470,000
	Group B: Flynn L.S. Upgrades and New Forcemain to Flow Control Structure	$ 833,000
	Group C: New Suncoast Forcemain to Flow Control Structure	$ 1,630,000
	Group D: New Forcemain from Flow Control Structure to New WWTF Site C	$ 1,140,000
	Group E: New Gravity Outfall Pipe to Big Sioux River	$ 181,000
	Group F: Miscellaneous Support Infrastructure	$ 557,000
	Total Project Cost[1]	**$ 7,000,000**
Operation and Maintenance	**Equivalent Annual O&M Cost[2]**	**$ 14,000**

1: Total Opinion of Project Cost includes all construction costs, contingencies, and soft costs, Group X costs do not include these additional soft costs.

2: Opinion of Equivalent Annual O&M Cost includes regular annual O&M costs as well as annualized non-regular O&M costs such as short lived assets and other costs that vary from year to year.



ALTERNATIVE 4
PROPOSED COLLECTION SYSTEM
INFRASTRUCTURE

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-3

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4.3.5 Alternatives No. 5A and 5B – New Collection Infrastructure for South Sioux City Regionalization Site D

The North Sioux City collection system infrastructure in this Alternative is very similar to Alternative 3 because all of the North Sioux City flow is transported to one location on the south side of North Sioux City. However, once the flows reach the new N. Shay Rd. Lift Station, one of two new forcemain alignments (referred to as Alternatives 5A and 5B) will transport all North Sioux City flows to South Sioux City, Nebraska. South Sioux City will treat these flows and discharge them under their current NPDES permit. This alternative includes the following infrastructure projects:

- New forcemain from River Dr. Lift Station to the new East Trunk line.
- New forcemain from Streeter Dr. Lift Station to the gravity collection system North of Casey's Lift Station.
- New gravity trunk sewer (referred to as the East Trunk) from Casey's lift station (to be decommissioned) to a new lift station at N. Shay Rd.
- New forcemain from Suncoast Lift Station to the gravity trunk sewer upstream of the proposed lift station on N. Shay Rd.
- New lift station on N. Shay Rd. and new forcemain to one of two locations in South Sioux City, Nebraska.

ADVANTAGES:

- Eliminates the burden of operating and maintaining a wastewater treatment facility. This also means that North Sioux City will be able to close their existing NPDES permit and decommission the existing lagoon system
- Displaces the burden of nuisance odors to a neighboring community.

DISADVANTAGES:

- North Sioux City will need to enter into an agreement with South Sioux City for wastewater treatment services, leaving the North Sioux City with minimal negotiating leverage regarding future rate increases, and possibly resulting in North Sioux City being an unknowing or unwilling participant to additional costs due to circumstances beyond their control.
- Long term operations and maintenance risks associates with future river dredging and other activities along the waterway.

SUMMARY:

The new Suncoast Lift Station forcemain is very similar to the alignment presented in Alternative 3, except that flows from this line will travel slightly farther to discharge at the proposed N. Shay Rd. Lift Station. The new N. Shay Rd. Lift Station will pump all flows beneath the Missouri River to one of two destinations in South Sioux City: the Alternative 5A destination is at the River Lift Station on the north side of South Sioux City, and the Alternative 5B destination is at the Roth Lift Station on the south side of South Sioux City.

Group A – New River Drive Lift Station Forcemain to New Casey's Lift Station

The River Dr. Lift Station and forcemain improvements are identical to those presented in Alternative 3.

Group B – New Streeter Drive Lift Station Forcemain to South Gravity Sewer

Streeter Drive Lift Station improvements are identical to those proposed in Alternative 3.

Group C – Decommission Casey's Lift Station and New Gravity Trunk Sewer to N. Shay Rd. Lift Station

Group C costs differ from Alternative 3 by completely eliminating Casey's Lift Station and installing a new gravity trunk sewer that flows south to the new N. Shay Rd. Lift Station. This gravity sewer will open up the southern region of North Sioux City for future growth, and eliminating the lift station will save energy costs. The proposed trunk line is approximately 4,500 LF long and is comprised of the following segments:

- Segment 1: 3,200 LF 21" diameter PVC @ 0.10% slope, flow capacity 2,050 gpm at 75% full, 3.2 ft elevation drop.
- Segment 2: 1,300 LF 24" diameter PVC @ 0.08% slope, flow capacity 2,610 gpm at 75% full, 1.04 ft elevation drop. The new Suncoast Lift Station forcemain will discharge into this gravity sewer segment.
- Approximately 13 new manholes are required, spaced no less than 400 LF apart.

Group D – New Suncoast Lift Station Forcemain to New Gravity Trunk Sewer

This forcemain is similar to that proposed in Alternative 3, however, it discharges to the new 24" trunk gravity sewer that transports flows from the Sioux City sub-basin. The proposed forcemain is 10" PVC, approximately 19,500 LF long. The total dynamic head of this forcemain is not expected to exceed the existing observed by the current lift station, and no structural or equipment modifications are recommended for the Suncoast Lift Station.

Group E – New Lift Station at N. Shay Rd. and Forcemain to South Sioux City

A new lift station on N. Shay Rd. will transport all North Sioux City flows to South Sioux City. These flows will be pumped through a 30" diameter DR9/11 HDPE forcemain along one of two alignments:

- Alternative 5A is 36,900 LF and discharges at the River Lift Station on the north side of South Sioux City.
- Alternative 5B is 42,250 LF and discharges at the Roth Lift Station on the south side of South Sioux City.
- Each lift station will be quadruplex configuration, with 3 pumps providing firm flow capacity of 2,600 gpm (870 gpm each), and will operate between 50 and 55 FT TDH. The motors will be approximately 30 Hp each.

Both forcemain alignments will discharge at a location where the ground elevation is lower than the source. Static heads will vary between 10' and 20' based on wet well elevations and discharge elevations, however, this report assumes a conservative value of 20'. Since each forcemain has a

significant portion total head from minor losses, careful selection of friction factors is required during final design.

Table 4-11: Alternative 4 Lift Stations Summary

Lift Station	Existing Conditions				Proposed Conditions				Proposed Action
	Pump Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Est. TDH (ft)	L.S. Min. Firm Capacity (gpm)	FM Size (in)	FM Length (ft)	Approx. TDH (ft)	
Suncoast	500 per pump	6	2,650	85	620	10	19,500	80	Reuse Existing Lift Station, New Forcemain
River Drive	600 per pump	8 / 10	650 / 350	90	1,800	12	5,250	55	Reuse Existing Lift Station, New Forcemain
Streeter Drive	500 per pump	4	1,330	-	500	6	2,200	65	Reuse Existing Lift Station, New forcemain
Casey's	400 per pump	4	900	110	-	-	-	-	Demolish Lift Station
N. Shay Rd. Alignment 5A	-	-	-	-	875 gpm per pump @ peak	30	36,900	50	New Lift Station and Forcemain
N. Shay Rd. Alignment 5B	-	-	-	-	875 gpm per pump @ peak	30	42,250	55	New Lift Station and Forcemain

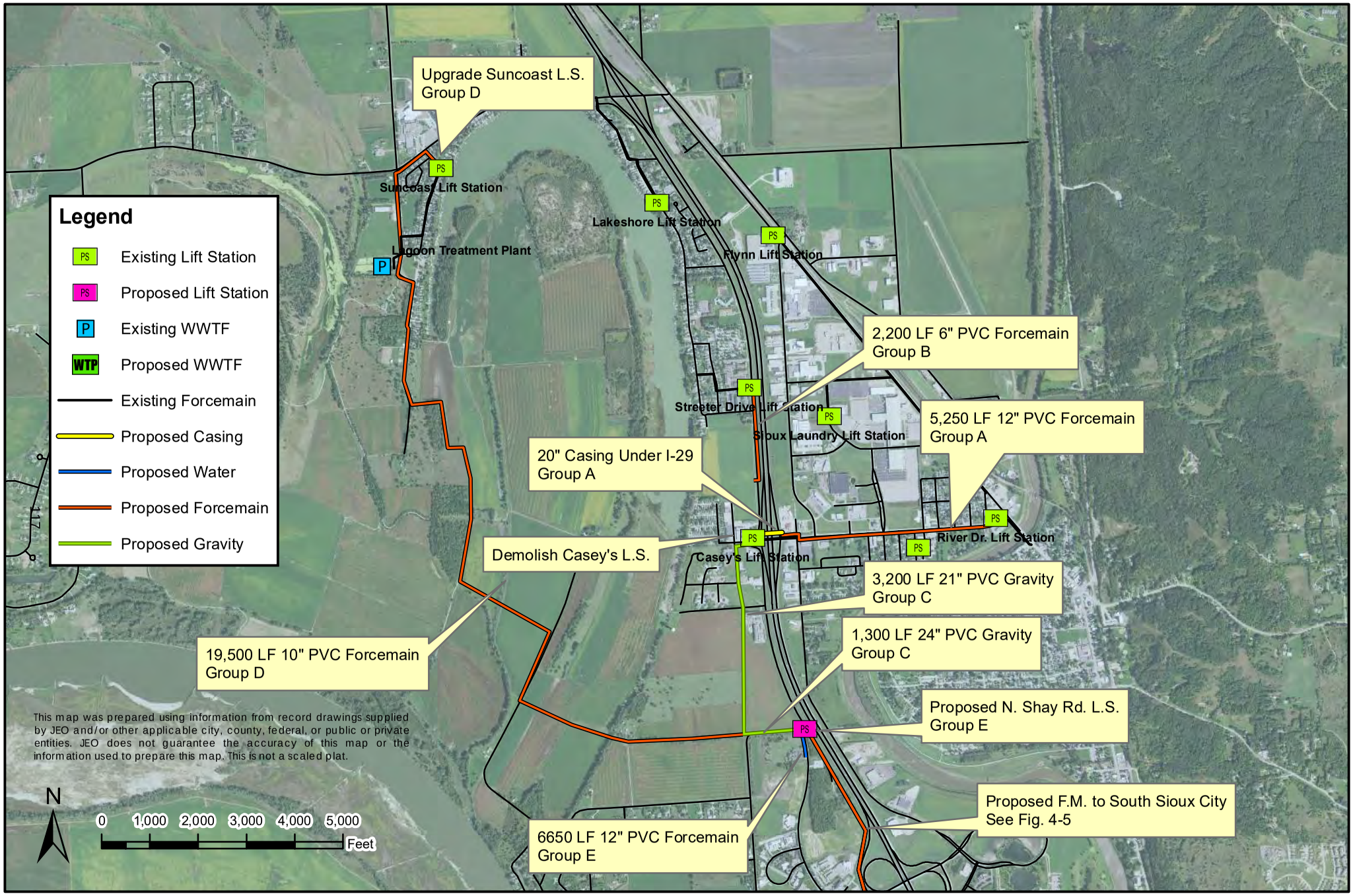
Table 4-12 shows a summary of the opinion of budgetary cost, annual O&M cost increase, and life cycle cost for these infrastructure improvements. Additional detail can be found in **Appendix C**.

Table 4-12: Opinion of Budgetary Cost for Alternatives 5A and 5B

Cost Type	Cost Detail	Opinion of Budgetary Cost Alternative 5A	Opinion of Budgetary Cost Alternative 5B
Capital Cost	Group A: New Forcemain from River Dr. L.S. to New Casey's L.S.	$ 1,051,000	$ 1,051,000
	Group B: New Streeter Dr. Forcemain	$ 122,000	$ 122,000
	Group C: Gravity Trunk Sewer to N. Shay Rd. Lift Station	$ 1,790,000	$ 1,790,000
	Group D: New Forcemain from Suncoast L.S. to New Gravity Trunk Sewer	$ 1,460,000	$ 1,460,000
	Group E: New N. Shay Rd. Lift Station and Forcemain to South Sioux City	$ 14,900,000	$ 16,700,000
	Total Project Cost[1]	**$ 24,300,000**	**$ 26,600,000**
Operation and Maintenance	**Equivalent Annual O&M Cost[2]**	**$ 37,000**	**$ 37,000**

1: Total Opinion of Project Cost includes all construction costs, contingencies, and soft costs, Group X costs do not include these additional soft costs.

2: Opinion of Equivalent Annual O&M Cost includes regular annual O&M costs as well as annualized non-regular O&M costs such as short lived assets and other costs that vary from year to year.



ALTERNATIVE 5A/5B
PROPOSED COLLECTION SYSTEM
INFRASTRUCTURE

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-4

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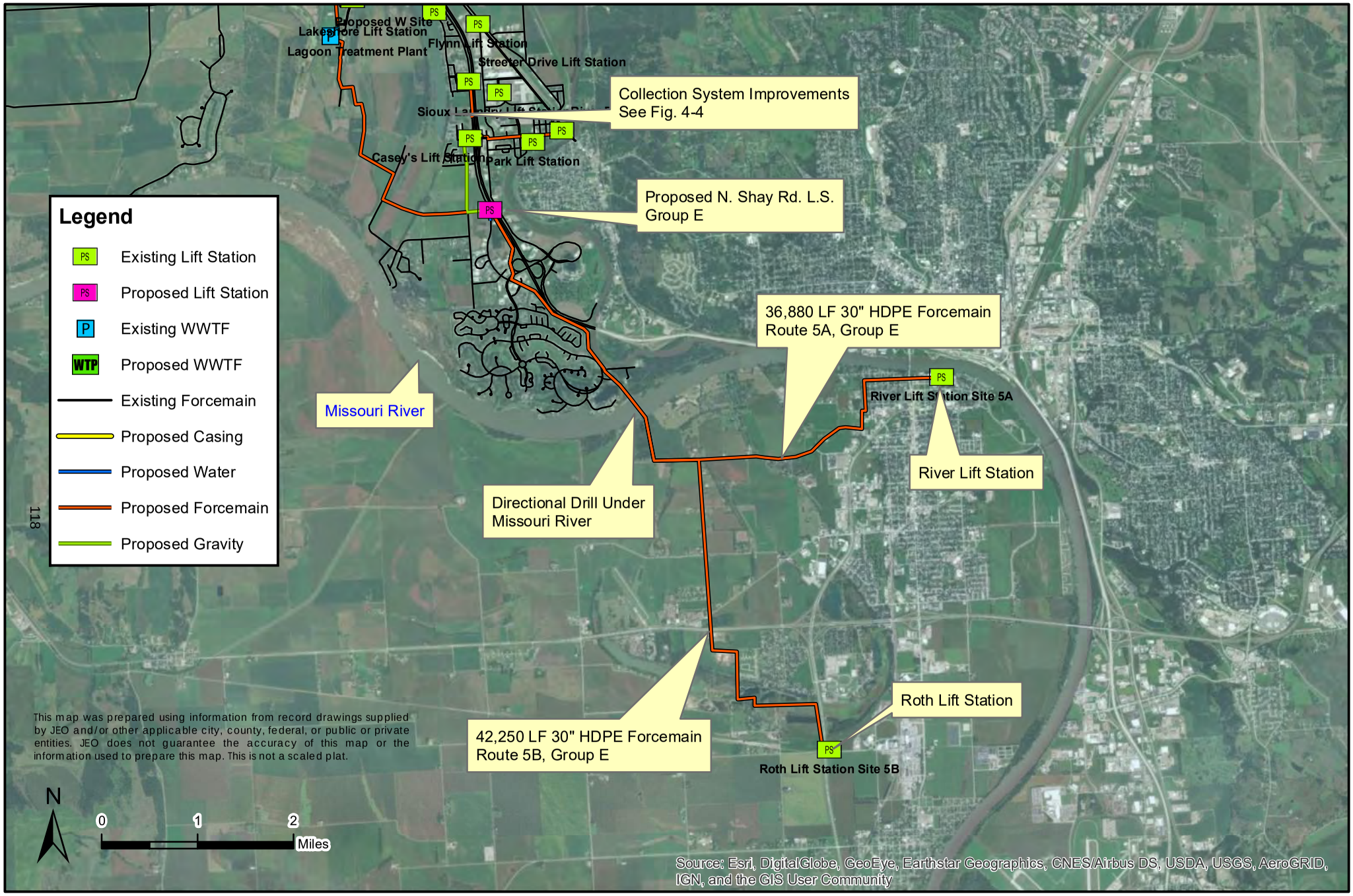

ALTERNATIVE 5A/5B
PROPOSED FORCEMAIN ROUTES

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-5

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4.4 Wastewater Treatment Facility Site Selection

The alternatives for constructing a new wastewater treatment facility (WWTF) will allow the opportunity to evaluate moving the facility to a new location or keeping it at the existing site. In reviewing potential sites, three main factors are taken into account:

- Regulatory Factor: the receiving bodies of water may have different discharge requirements which will affect which unit operations are included in the treatment process. The southwest discharge to the Missouri River allows for less stringent effluent limits from the SD DENR due to the relatively large river flow and small WWTF effluent flow, versus the northeast discharge to the Big Sioux River.
- Location Factor: the selected site needs to be far enough away from the community to accommodate future growth, but not so far that sewer transportation costs are excessive. Ideally, the site will have easy access via the existing roadways or will require a minimal amount of additional access road. Meeting these goals reduces cost to construct roads and limits long term operation and maintenance costs (O&M) by reducing the amount of pumps in the system.
- Availability Factor: land availability is a key factor when siting any new-terrain system. Any proposed site that is not currently owned by the city, needs to be purchasable for this use or be obtained by easement or eminent domain. Each of the alternatives presented below assumes that 5 acres will be needed to construct the treatment system.

Four site locations are examined as a part of this study, a graphic is presented in **Figure 4-6**.

The first location, Site A, is adjacent to (north of) the existing lagoon treatment site:

- Regulatory Factor: SD DENR has noted that this discharge location is not impaired and will not receive more stringent limits in the future, although the community should prepare as though limits will be at least as stringent as Site C on the Big Sioux River. Additional flows discharging to Mud Lake may have a negative impact on the existing nature preserve to the Southwest.
- Location Factor: this location is largely land-locked and there are few alternatives nearby that can accommodate a new treatment system and be near the Mud Lake discharge location. The location is near built infrastructure but also near residential properties, making this location less than ideal.
- Availability Factor: property values are generally high in this area which may make this location more difficult to purchase.

The second location, Site B, is proposed to be on the southwest side of the community:

- Regulatory Factor: this site is relatively near to the Missouri River which will likely have the most favorable long-term permitted effluent limits.
- Location Factor: this site is in an area above the forthcoming flood plain delineation to minimize flood protection costs. Although the site is on the windward side of North Sioux City, it is likely far enough from future growth that transient odors will cause minimal issues.
- Availability Factor: the ability to purchase suitable land in this region will greatly influence the final site location. Most of the nearby parcels are actively farmed.

The third location, Site C, is located to the northeast of the city near a bend in the Big Sioux River:

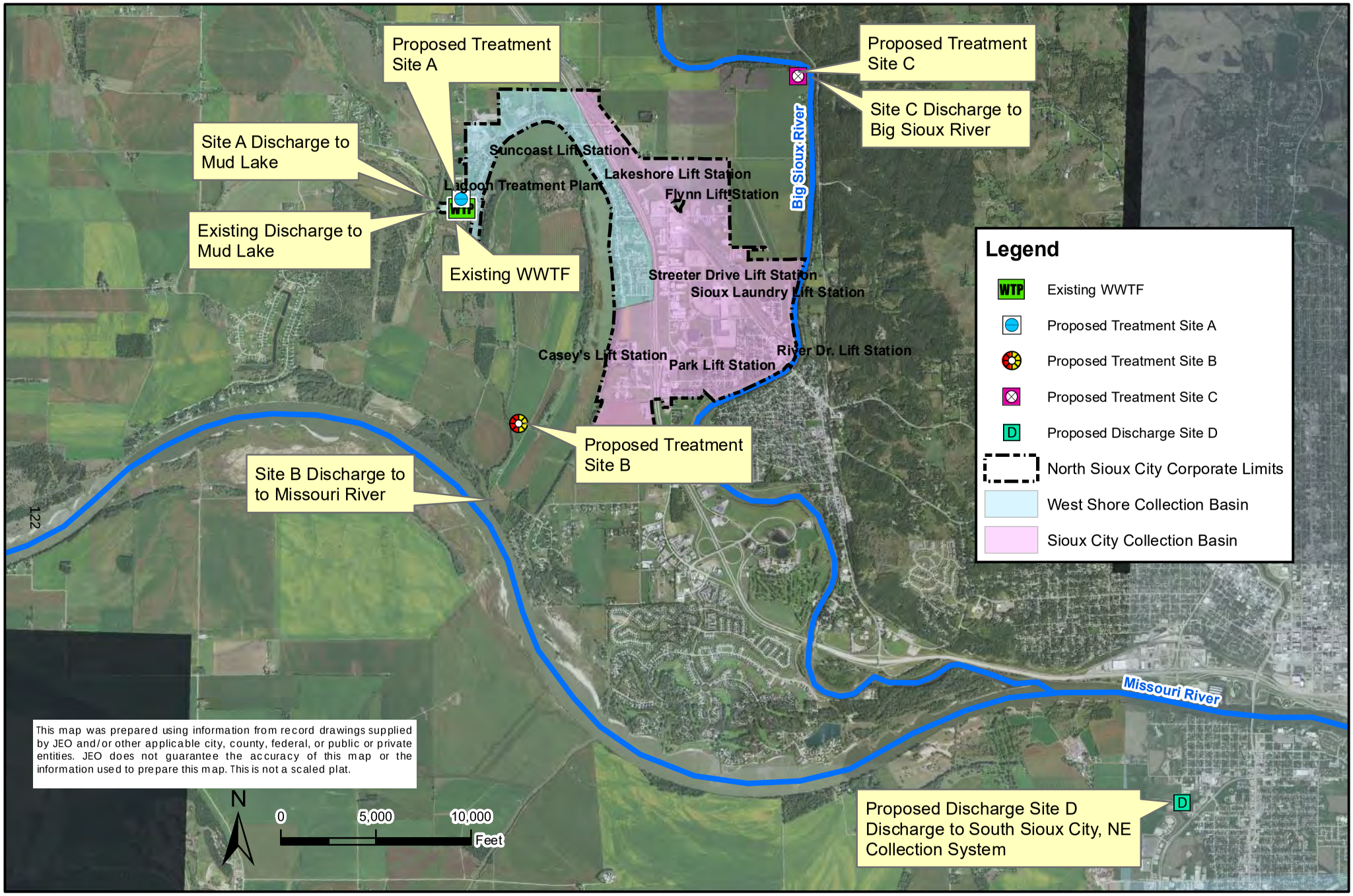
- Regulatory Factor: the Big Sioux River is expected to be impaired after SD DENR completes evaluating this stream for triennial EPA reporting requirements. This discharge location will likely require complete nitrification as part of the treatment process.
- Location Factor: the site is ideally located down-wind of North Sioux City.
- Factor 3: Most of the nearby parcels are actively farmed. This potential site is above the forthcoming flood plain delineation for the Big Sioux River, but other adjacent sites may not be.

The final location, Site D, will be at one of the two locations shown in **Figure 4-5**

in South Sioux City. One of these locations is where North Sioux City will discharge all flows from either Alternative 5A or Alternative 5B. South Sioux City will provide pumping from this site to their treatment location and will charge North Sioux City for this service based on a negotiated agreement.

- Regulatory Factor: since South Sioux City will provide treatment regulatory compliance, North Sioux City continues to operate and maintain the collection system which the city is well equipped to do.
- Location Factor: this alternative is favorably ranked regarding this factor since treatment will be done far from the residents of North Sioux City.
- Availability Factor: no land needs to be purchased for these alternatives, so this factor is also favorably ranked. However, a significant number of easements will be required to locate the pipeline.

Figure 4-6 shows the locations of each of these potential sites.



PROPOSED TREATMENT/DISCHARGE SITES

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-6

JEO CONSULTING GROUP INC

4.5 Wastewater Treatment System Alternatives

The two major treatment types wastewater treatment systems in this geographical area are lagoons and mechanical treatment. Each of these systems have unique characteristics that have advantages and disadvantages to their application in a community's wastewater treatment system. The following is a brief summary of each type.

There are many types of lagoon systems, but by far the most common type for small communities is the facultative lagoon system. This treatment system is well suited for small community wastewater treatment because it provides long retention times and can handle large variations in hydraulic flow and biological loading. Since the biological treatment process within the lagoon is self-supporting, typically no mechanical or aeration equipment is required to maintain the process. This becomes the primary advantage of the system as it substantially reduces the operation and maintenance costs of treatment. When compared to mechanical plant options, the primary disadvantages are the much larger land area required for siting these systems and the difficulty in meeting stringent nutrient discharge limits.

Several wastewater treatment technologies are available for a mechanical plant, the selection of which is predominantly based upon the influent characteristics and the required effluent quality sought. Most common technologies include fixed-film treatment (i.e. rotating biological contactor) or suspended growth (activated sludge) systems. The primary advantages of a mechanical plant for wastewater treatment are the ability to achieve very high treatment performance during the entire year and the reduction of the total land requirement for siting. However, the biggest disadvantage can be the initial cost and operation and maintenance costs are much greater than for facultative lagoon systems. These systems are designed for continuous discharge, thus increasing the frequency for monitoring effluent parameters and requiring disinfection.

In discussions with the City of North Sioux City, it is preferred to construct a mechanical treatment system instead of a lagoon system. The benefits of a small land footprint is a large factor in the decision to proceed with a mechanical system, and the City has determined that they do not wish to pursue a lagoon system. As such, only mechanical treatment options will be evaluated in this study.

4.5.1 Mechanical Treatment Facility Summary

As stated, several wastewater treatment technologies are available for a mechanical plant for the City of North Sioux City. Each technology and process has unique features and operational considerations that differ from other processes. For the purposes of this report, three general technologies will be evaluated along with estimated construction and O&M costs. Note that in the interest of simplicity, the alternatives included herein will apply at any of the previously discussed WWTF Sites A, B, or C. It is anticipated that the proposed scope of any new facility will include the following items:

- New headworks facility with mechanical fine screen and grit removal
- New activated sludge treatment system
- New sludge pumping and dewatering facilities
- New aerobic digestion basins
- New UV disinfection equipment
- New laboratory and MCC facilities

4.5.1.1 Headworks Facility

Since all flows to the new treatment facility will be pumped, an influent lift station is not necessary. Therefore, the new Headworks facility can be constructed at a high elevation to allow for gravity flow through the downstream treatment system. The new headworks facility will be constructed near the entrance to the new WWTF.

The first piece of equipment in the new Headworks is a Parshall flume and ultrasonic type flow meter to accurately measure flow into the WWTF. The flow measurement structure will be designed to be free of downstream surcharge conditions, and the equipment will be easily accessible for equipment maintenance.

Next, a mechanical fine screen (1/4" or smaller openings) with a bypass manual bar screen will remove rags, plastics, and other large inorganic solids from the wastewater flow and deposit the material into easily disposed of plastic bags. A bypass manual bar screen will be installed to allow the installation of a second mechanical fine screen in the future.

It is recommended that a grit removal system be installed following the screening equipment. The proposed system is a vortex style grit unit. The screened wastewater will enter the circular basin and allow heavy materials and grit to settle to the bottom of the basin via the assistance of a vortex impeller. Settled grit would be removed via a pump to a classifier mechanism that allows for grit collection and disposal.

4.5.1.2 Activated Sludge Treatment Facility

North Sioux City is currently utilizing an aerated lagoon wastewater treatment system. It involves adding oxygen into the wastewater to create a liquid suspension of microorganisms with a long hydraulic retention time. The microorganisms utilize the organic matter (BOD) in the wastewater to synthesize new organisms, and solids settle out in the lagoon cells. Microorganisms in the settled sludge undergo endogenous respiration and naturally cannibalize themselves to reduce the sludge volume, and clear water is disinfected and discharged to the receiving body of water.

In many ways the proposed activated sludge system is similar to aerated lagoon treatment with the primary difference being that the process occurs much faster, in a smaller footprint, and in different sized reactors.

Although many of the processes are similar, the current treatment system operators may require additional training and licensure to operate the new activated sludge treatment facility. A facility score of approximately 63 points is estimated for this new facility, potentially requiring a Class III Operator License to operate. Note that the treatment threshold from Class II to Class III is 56 points, and since this estimate is so close, a final count should be conducted when applying for a construction permit to confirm the required level of Operator licensing.

This report will evaluate the following types of activated sludge facility as sub alternatives:

- Sequencing Batch Reactor (SBR)
- Extended Aeration (Aero-Mod)
- Oxidation Ditch

Sequencing Batch Reactor (SBR)

The Sequencing Batch Reactor style of treatment treats the wastewater in much the same way as an oxidation ditch. The main difference between the two is that in the SBR style, the aeration basin and the clarifier are contained within one tank. SBR tank configurations are generally square or rectangular and utilize common wall construction which reduces the plant footprint when compared to an oxidation ditch system which requires external clarifiers.

Flow enters into the SBR facility through a lift station and is then pumped to either one of two tanks (or three depending on the system). All SBR systems have five (5) similar steps when in operation, (1) fill, (2) react (aeration), (3) settle, (4) decant, and (5) idle. However, each SBR system manufacturer has specific variations in each step such as mixing, anoxic conditions, and aeration methods to achieve different levels of treatment and/or nutrient removal. Once the first tank is full, flow is diverted to the second tank and blowers provide air through diffusers in the first tank to aerate the wastewater. After successful aeration and mixing, the tank is allowed to sit and settle out solids. The supernatant is decanted off of the top and the sludge is pumped from the bottom to the aerobic sludge holding tanks. Once decanting has been completed, the tank is ready to receive another batch of flow.

This report assumes that the SBR will consist of 3 chambers. If additional aeration capacity is needed in the future, a new 4th and/or 5th chamber can be constructed. Two aerated digesters will be included as separate reactors.

For this particular installation, given high organic loads due to industrial sources, and based on previous experience with highly loaded Sequencing Batch Reactor facilities, a pre-aeration reactor is proposed to provide supplemental treatment and roughing of the influent wasteload.

UV disinfection systems for SBR units are larger than systems designed for a typical extended aeration treatment facility due to the effluent arriving at the UV bulbs at a higher instantaneous rate due to the batch style of treatment. Additional complexities of the system includes the programmable logic controllers (PLC) needed to operate the plant. Batch timing and process control is more involved than other wastewater treatment systems.

There are various styles of SBR treatment available from several different manufacturers that each incorporates their own changes into the unit. For the purposes of this report, a typical SBR design will be utilized for these calculations.

The following are the design calculations for an SBR style of treatment:

This analysis assumes there will be three (3) basins, each square, with 22 ft. side water depth at maximum water level and 16 ft. side water depth at minimum water level. Each basin will have four (4) cycles per day for a total of 8 cycles. A third basin will be constructed of identical size but will be purposed as a digester that can be converted to SBR reactor in the future, effectively adding 50% more capacity.

Aeration Reactor Capacity:

Assume F/M ratio for the system is 0.085 (activated sludge with 20-30 day SRT)

$$\frac{3{,}234 \text{ lb. BOD}}{0.085 \text{ lb. BOD / lb. MLSS}} = 38{,}050 \text{ lb. MLSS}$$

Assume 4,500 ppm concentration at minimum water level.

$$\frac{38{,}050 \text{ lb. MLSS}}{4{,}500 \text{ ppm} \times 8.34} = 1.01 \text{ MG or } 135{,}000 \text{ ft}^3 \text{ at minimum water level.}$$

$$\frac{135{,}000 \text{ ft}^3}{3 \text{ basins}} = 45{,}000 \text{ ft}^3 \text{ per basin}$$

Decant volume needs to be added for peak day flow.

$$\frac{2{,}100{,}000 \text{ gal/day}}{8 \text{ cycles}} = 262{,}500 \text{ gallons} = 35{,}100 \text{ ft}^3 \text{ per decant}$$

Total volume required is the minimum water level volume (at end of decant) plus the decant volume.

$$45{,}000 \text{ ft}^3 + 35{,}100 \text{ ft}^3 = 80{,}100 \text{ ft}^3$$

The dimensions of the reactors are as follows.

$$\frac{80{,}100 \text{ ft}^3}{22 \text{ ft.}} = 3{,}640 \text{ ft}^2 = \text{Square Basins at 61 ft. x 61 ft.}$$

Actual Detention Time at Average Day Flow:

At minimum water level of 16 ft.

$$\frac{3 \times 59{,}500 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 \times 24}{1{,}045{,}000 \text{ gal/day}} = 30.7 \text{ hr.}$$

At maximum water level of 22 ft.

$$\frac{3 \times 81{,}860 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 \times 24}{1{,}045{,}000 \text{ gal/day}} = 42.2 \text{ hr.}$$

Air Requirements:

$$\frac{1{,}500 \text{ ft}^3\text{/lb. BOD} \times 3{,}234 \text{ lbs. BOD/day}}{1{,}440 \text{ min/day}} = 3{,}370 \text{ cfm}$$

$$\frac{3{,}370 \text{ cfm} \times 24 \text{ hr.}}{18 \text{ hr. of aeration/day} \times 2 \text{ basins}} = 2{,}250 \text{ cfm per blower}$$

Extended Aeration (Aero-Mod)

The Aero-Mod style of treatment employs much of the same principles and processes to treatment as an extended aeration style of treatment as well as additional mixing and clarification. The Aero-Mod process, like typical extended aeration processes, introduces return activated sludge (RAS) to raw wastewater in the selector tank before entering one of two (2) aeration basins for BOD removal and the beginnings of nitrification. Flow then continues to one of two second stage aeration tanks for further nitrification. The mixture then enters one of two ClarAtor clarifiers. Supernatant is withdrawn from the clarifiers and discharged while biomass accumulated on the clarifier tank bottom is returned (RAS) to the anoxic selector tank for denitrification.

The Aero-Mod process is a proprietary process from a single manufacturer and is typically designed by the manufacturer for each proposed facility. Design loadings for the process generally follow typical design guidance with specific modifications due to the manufacturer's unique process.

The manufacturer provided design details to handle the future design flows of North Sioux City. The design consists of a two-train, ten-tank shared wall basin, with outside dimensions of approximately 150' x 170'.

When the accumulation of solids exceeds the capacity of the aeration/reaeration areas the biosolids will be wasted (WAS) to the aerobic sludge digester that are integral to the Aero-Mod system. Separate tankage for sludge storage and treatment are not required with this proposed system, however, due to the anticipated high industrial loads, additional solids storage is included.

The Aero-Mod system will require separate headworks and solids processing facilities. Disinfection will be with ultraviolet light.

Oxidation Ditch

The oxidation ditch extended aeration process is typically accomplished by the construction of two (2) or three (3) reactors with a common concrete wall. Extended aeration commonly can be accomplished in an oxidation ditch style of layout or in an orbital style of layout. Both of these designs follow the same general design guidelines. The following calculations help define the dimensions of the reactors:

Hydraulic Loading at Average Flows:

$$1{,}045{,}000 \text{ gpd} \times \frac{1 \text{ day}}{24 \text{ hours}} \times 24 \text{ hours of detention time} = 1{,}045{,}000 \text{ gal/system}$$

Organic Loading:

$$\frac{3{,}234 \text{ lbs. BOD/day}}{15 \text{ lbs. BOD/1,000 ft}^3\text{/day}} \times 1{,}000 = 215{,}600 \text{ ft}^3 \text{ or } 1{,}610{,}000 \text{ gal/system}$$

The organic loading will be the limiting factor on the size of the oxidation ditches. The system will need to have a volume equal to or greater than 1,610,000 gallons via separate ditches or in a combination of orbital rings. Note that SD DENR design criteria will allow 30 lbs. BOD/1,000 ft^3/day for Carrousel systems with vertical shaft mechanical aerators.

Blowers or mechanical aerators will need to be installed to provide air to the ditches. The following calculations define the volume of air needed:

Aeration Requirement:

$$\frac{2{,}050\ ft^3/lb.\ BOD \times 3{,}234\ lbs.\ BOD/day}{1{,}440\ min/day} = 4{,}600\ cfm$$

The installation of an oxidation ditch facility would also require the installation of two (2) final clarifiers. The following calculations help define the dimensions of the clarifiers:

Detention Time at Average Flow:

$$5\ hrs\ detention \times 1{,}045{,}000\ gal/day \times \frac{1\ day}{24\ hrs} \times \frac{1}{2\ clarifiers} = 109{,}000\ gallons$$

For each clarifier, the side water depth is to be 12 feet. The effective settling volume is considered to be the upper eight (8) feet of the clarifier. The volume found above will need to all be contained in that upper eight feet providing for the following surface area:

$$109{,}000\ gal \times \frac{1\ ft^3}{7.48\ gal} \times \frac{1}{8\ ft} = 1{,}830\ ft^2$$

The next step is to calculate the surface area needed to meet the surface overflow rate requirement.

Surface Overflow Rate at Peak Hour Flow Rate:

$$\frac{3{,}700{,}000\ gal/day}{1{,}000\ gpd/\ ft^2 \times 2\ clarifiers} = 1{,}850\ ft^2$$

Because the surface overflow rate provides a greater surface area needed, it will control the size of the clarifiers providing the following diameter:

SQRT (1,850 / Pi) x 2 = 48.5 ft. use 50 ft.

Each clarifier will also need to meet the weir loading rate and solids loading rate design standards at the specified flow rates. The following are the calculations:

Weir Loading Rate at Peak Hour Flow Rate:

50 ft. x Pi = 157 ft of weir

$$\frac{3{,}700{,}000 \text{ gal/day}}{157 \text{ ft. x 2 clarifiers}} = 11{,}800 \text{ gpd / LF} < 20{,}000 \text{ gpd / LF}$$

Solids Loading Rate at Peak Day Flow (Includes max sludge return rate)

(50/2)^2 x Pi = 1,960 ft^2 of surface area per clarifier

Return Activated Sludge Rate = 150% x 1,045,000 = 1,568,000 gpd

$$\frac{(1{,}045{,}000 \text{ gpd} + 1{,}568{,}000 \text{ gpd}) \times 3{,}000 \text{ MLSS} \times 8.34}{1{,}920 \text{ ft}^2 \times 2 \text{ clarifiers} \times 1{,}000{,}000} = 17.0 \text{ lb/day/ ft}^2$$

(Acceptable Design Standard is < 35 lb/day/ ft^2 @ Peak Day Flow)

The biosolids that are settled in the final clarifiers will be collected at the bottom of the tank and pumped back (RAS) to the aeration tanks. The rate of this return will vary between 50% and 150% of the plant flow. When the accumulation of solids exceeds the capacity of the clarifier the biosolids will be wasted (WAS) to the aerobic digesters for further treatment.

4.5.1.3 Ultraviolet (UV) Disinfection

It is recommended that the city install a UV disinfection system to reduce the coliform bacteria in the effluent from the WWTF. The existing NPDES permit includes recreational season disinfection requirements in addition to a Total Residual Chlorine (TRC) limit. This report assumes that such requirements will remain for alternative discharge locations as well. Thus, if chlorine were to be used a separate dechlorination system would be needed. Therefore, it is recommended that an ultraviolet disinfection system be included in the mechanical plant design to avoid two separate chemical feed systems. It should be designed to handle the peak hour flow or the maximum decant rate of the treatment system in the case of SBR designs.

4.5.1.4 Aerobic Sludge (Biosolids) Holding Tanks

The digester volume capacity required by current criteria in Ten States Standards is to provide 4.5 ft^3 per population equivalent plus 25% when supernatant drawoff is performed within the digester. However, given the high influent organic loads anticipated due to significant industrial flows, the population equivalent is based on 0.22 lb/d BOD_5 per capita. In addition to aerobic digester volume it is also necessary to provide 120-180 days of storage if no sludge thickening mechanism is provided in the plant.

Depending on the main treatment technology selected, the configuration and size of Aerobic Digestion tanks may vary from the calculations presented here. The following information provides a general baseline of the expected sizing of the tanks. The final design process along with the selected treatment alternative may require variations to the following calculations:

Calculate Digestion Population Equivalent

$$\frac{3{,}234 \text{ mg/L } BOD_5}{0.22 \text{ lb/d/cap}} = 14{,}700 \text{ P.E.}$$

Aerobic Digestion Tank Capacity Requirement

$$\frac{4.5\ ft^3}{P.E.} \times 1.25 \times 14{,}700\ P.E. = 82{,}700\ ft^3\ (618{,}600\ gal.)$$

For the aerobic digestion tanks proposed, the storage shall include aeration and decant equipment. Providing a minimum of 30 cfm / 1,000 ft^3 of digester volume, the aeration requirement would be:

$$82{,}700\ ft^3 \times \frac{30\ cfm}{1{,}000\ ft^3} = 2{,}481\ cfm\ total$$

Digested Sludge Storage Capacity

Typically, sludge storage facilities are designed to hold 120 to 180 days of sludge production if no further treatment options are provided and liquid sludge is the final product. In the case of this alternative, it is recommended to install a sludge dewatering system. Although the liquid sludge storage requirements are typically less with a dewatering system, given the significant industrial organic loads on this system, a value of 90 days is used to provide operations staff with operational flexibility.

$$90\ days \times 0.13\ ft^3/P.E./day \times 14{,}700\ P.E. = 171{,}990\ ft^3\ (1{,}290{,}000\ gal.)$$

For the aerobic sludge storage tanks proposed, the storage shall include aeration and decant equipment. Providing a minimum of 30 cfm / 1,000 ft^3 of digester volume, the aeration requirement for mixing would be:

$$171{,}900\ ft^3 \times \frac{30\ cfm}{1{,}000\ ft^3} = 5{,}160\ cfm\ total$$

However, since aeration is a generally inefficient form of mixing, and process air is not necessarily required for sludge storage, although it may be preferred for odor control, it is recommended to install a tank mixing system in-lieu of aeration, or a hybrid system with dedicated tank mixers and intermittent/minimal aeration to prevent solids upset.

An array of sludge pumps will need to be installed to pump sludge to the digestion tank and sludge storage tanks. In the case of the oxidation ditch option, return sludge pumping will also be needed to return activated sludge from the clarifiers to the aeration basins. Pumping of these biosolids will allow for greater control of flows compared to gravity flows. The sludge pump system will consist of a concrete structure with positive displacement pumps on variable frequency drives (VFDs) capable of pumping between 70 – 200 gpm of sludge each. The sludge return system should also include magnetic flow meters on the sludge return lines in the case of the extended aeration to accurately control the return sludge flow.

4.5.1.5 Sludge Dewatering

There are many variations to sludge dewatering. These include belt presses, drum thickeners, screw presses, etc. All of these accomplish the same goal of reducing the amount of water within

the sludge. It is desired to install a belt filter press at the facility to allow for dewatering of the sludge. The dewatered sludge will then need to be stored on site until the sludge or biosolids can be land applied. The city then will need to take steps to incorporate the biosolids or sludge into the soil to meet 40 CFR regulations.

4.5.1.6 Backup Power

It will be required that the city install a new backup generator for use during emergency situations that has the capabilities of powering the primary treatment components of a mechanical plant and disinfection.

4.5.2 Mechanical Wastewater Treatment System Alternatives Opinion of Costs

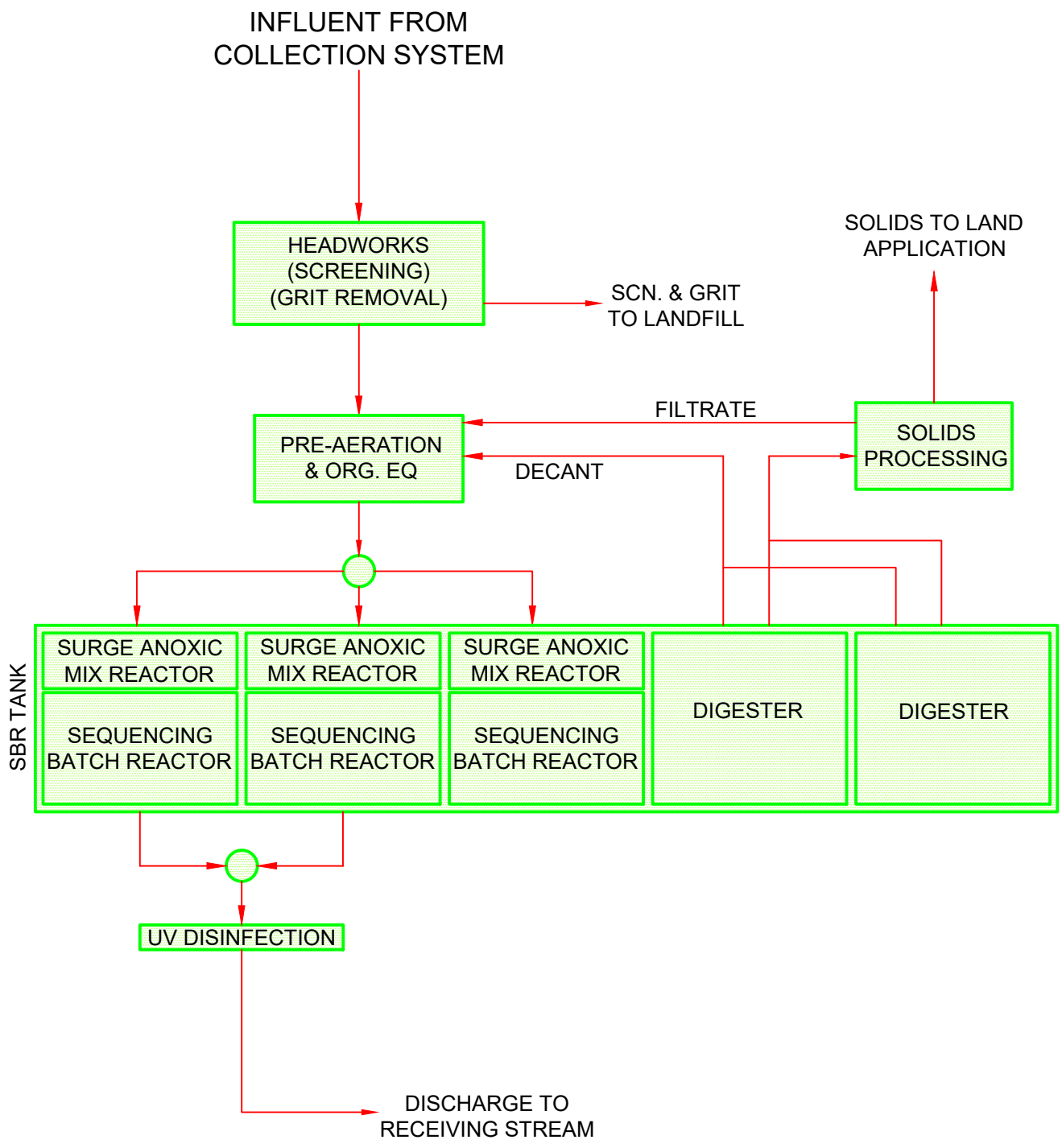
4.5.2.1 Alternative 6: New Sequencing Batch Reactor (SBR) Treatment Facility

Table 4-13 summarizes the budgetary costs for this alternative. Additional detail can be found in **Appendix C**.

Table 4-13: Cost Summary for Alternative 6

Cost Type	Opinion of Budgetary Cost
Capital Cost	$ 15,779,000
Equivalent Annual O&M Cost	$ (949,000)

The following **Figure 4-7** illustrates the proposed site and schematic layout of the system.



NOTES:
1. NOT ALL ROUTES OF FLOW BETWEEN UNIT PROCESSES SHOWN FOR CLARITY.

ALTERNATIVE 6
SEQUENCING BATCH REACTOR (SBR)
TREATMENT FACILITY

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FIGURE 4-7

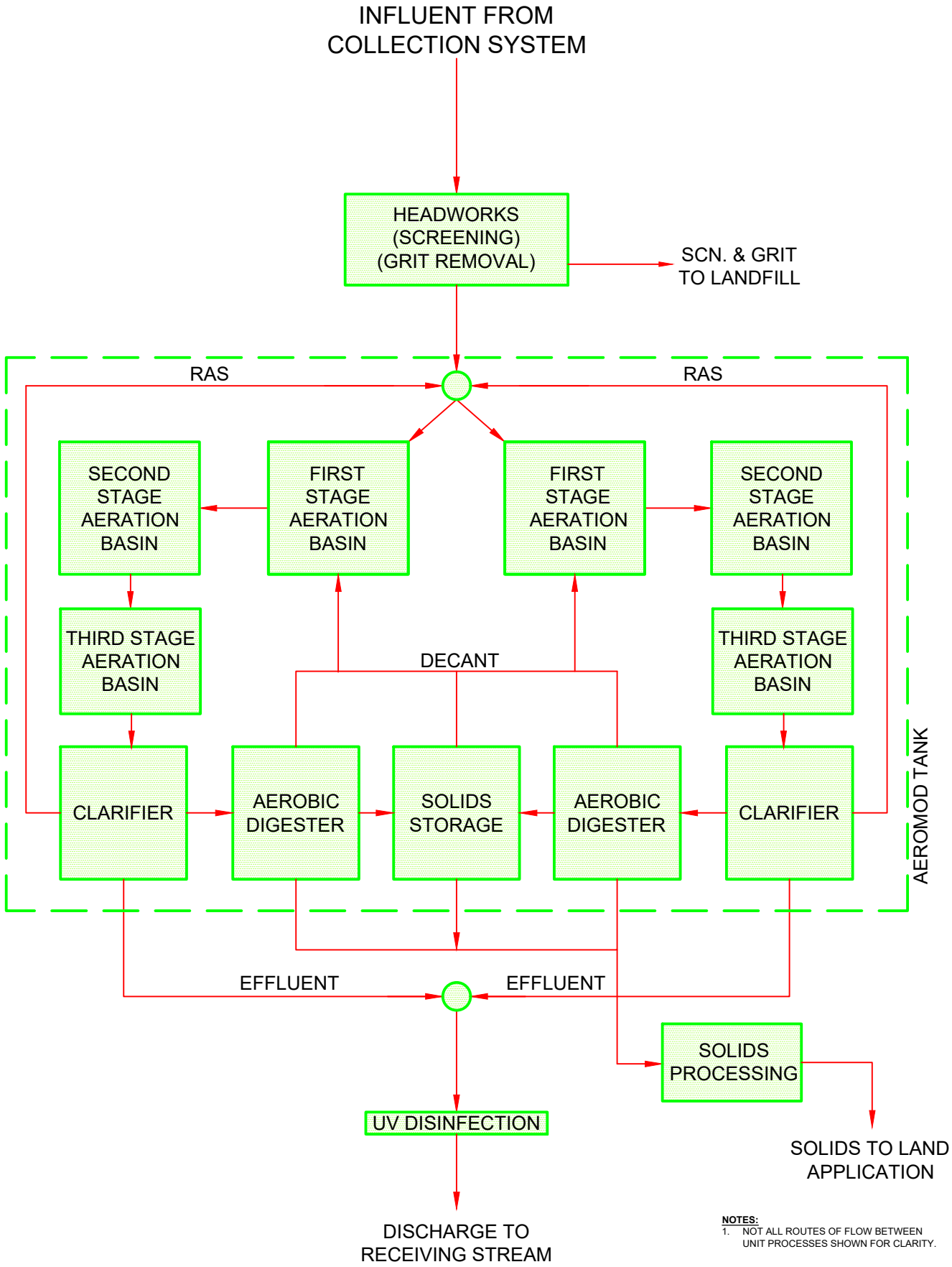
4.5.2.2 Alternative 7: New AeroMod™ Treatment Facility

Table 4-14 summarizes the budgetary costs for this alternative. Additional detail can be found in **Appendix C**.

Table 4-14: Cost Summary for Alternative 7

Cost Type	Opinion of Budgetary Cost
Capital Cost	$ 15,607,000
Equivalent Annual O&M Cost	$ (933,000)

The following **Figure 4-8** illustrates the proposed site and schematic layout of the system.



NOTES:
1. NOT ALL ROUTES OF FLOW BETWEEN UNIT PROCESSES SHOWN FOR CLARITY.

ALTERNATIVE 7
ACTIVATED SLUDGE (AEROMOD) TREATMENT FACILITY

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FIGURE 4-8

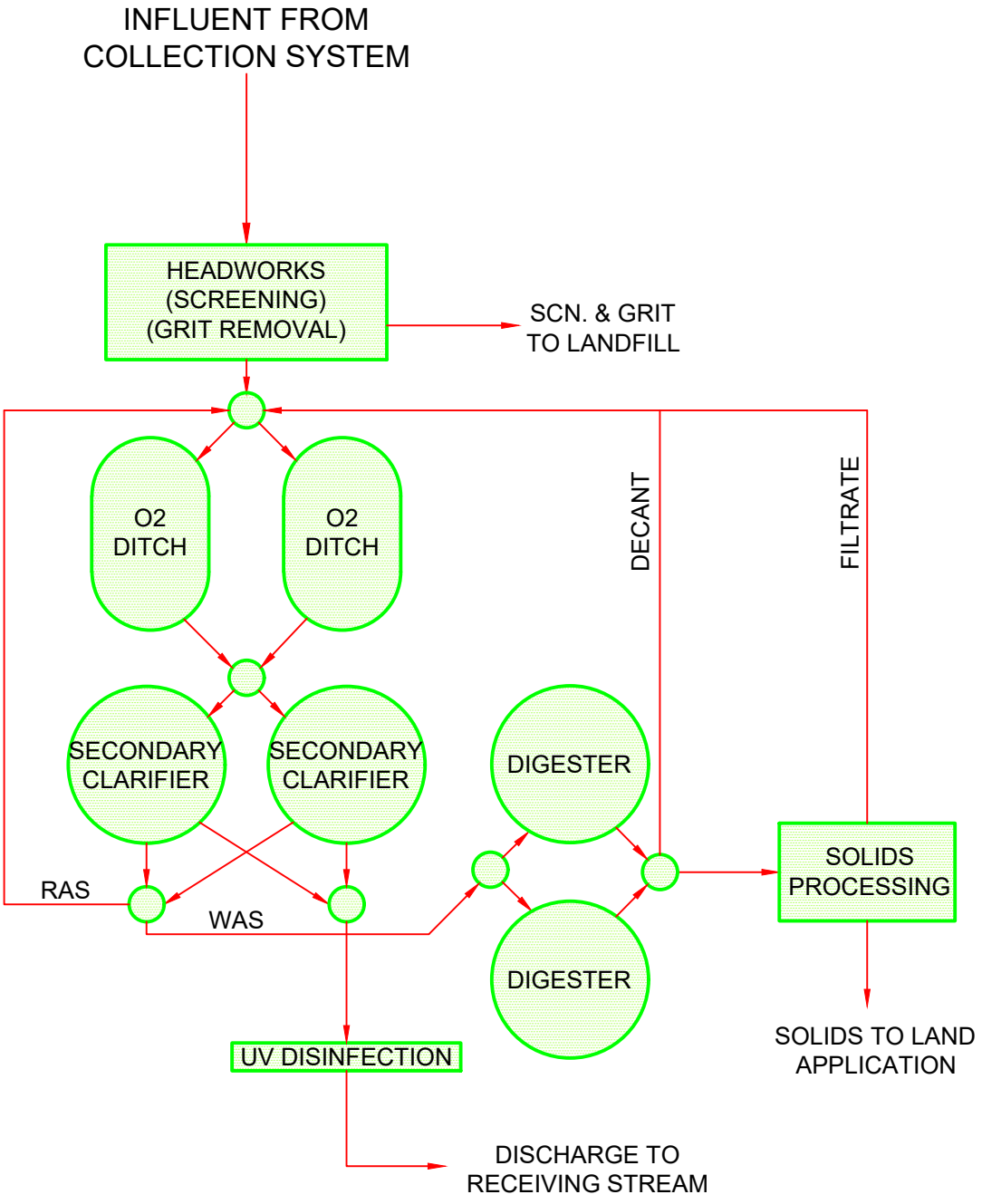
4.5.2.3 Alternative 8: New Oxidation Ditch Treatment Facility

Table 4-15 summarizes the budgetary costs for this alternative. Additional detail can be found in **Appendix C**.

Table 4-15: Cost Summary for Alternative 8

Cost Type	Opinion of Budgetary Cost
Capital Cost	$ 14,361,000
Equivalent Annual O&M Cost	$ (967,000)

The following **Figure 4-9** illustrates the proposed site and schematic layout of the system.



NOTES:
1. NOT ALL ROUTES OF FLOW BETWEEN UNIT PROCESSES SHOWN FOR CLARITY.

ALTERNATIVE 8
OXIDATION DITCH TREATMENT FACILITY

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FIGURE 4-9

4.6 Alternative No. 9 – Treatment by South Sioux City

This Alternative No. 9 addresses the treatment fees that would apply for a regionalization option. For this alternative, wastewater generated by North Sioux City is pumped to South Sioux City for treatment at South Sioux City's proposed wastewater treatment facility. A preliminary rate of $3.00 per 1,000 gallons is assumed, which increases by $0.25 per 1,000 gallons every three years.

To accept this large influent flow, this report assumes that South Sioux City will require additional capacity at the existing WWTF, and a connection fee is assumed to cover the cost of these upgrades. This report assumes a connection fee of $10 per gallon of annual average flow for this construction cost. The fee is assumed to be a onetime lump sum capital cost.

The costs to transport this flow to discharge at one of two Site D locations in South Sioux City is included in Alternatives No. 5A and 5B.

The total cost of South Sioux City treatment is listed in **Table 4-16**. Additional detail can be found in **Appendix C**.

Table 4-16: Cost Summary for Alternative 9

Cost Type	Opinion of Budgetary Cost
Capital Cost	$ 10,450,000
Equivalent Annual O&M Cost	$ 1,094,000

4.7 Summary of Engineer's Opinion of Budgetary and O&M Costs for Alternatives

Table 4-17 provides a side by side comparison of the estimated opinions of budgetary cost for each of the alternatives.

Table 4-17: Summary of Engineer's Opinion of Budgetary and O&M Costs for Alternatives

Alt. No.	Alternative Description	Capital Cost[1]	Equivalent Annual O&M Cost[1]
1	No Action (Treatment by Sioux City, IA)	$480,700	$491,000
2	New Collection Systems to West Shore Treatment Site A	$5,364,000	$20,000
3	New Collection Systems to New SW Treatment Site B	$6,797,000	$35,000
4	New Collection Systems to New NE Treatment Site C	$6,994,000	$14,000
5	New Collection Systems to South Sioux City Treatment Site D	$24,306,000	$37,000
5	New Collection Systems to South Sioux City Treatment Site D	$26,593,000	$37,000
6	New Sequencing Batch Reactor (SBR) WWTF	$15,779,000	-$949,000
7	New AeroMod™ WWTF	$15,607,000	-$933,000
8	New Oxidation Ditch WWTF	$14,631,000	-$967,000
9	Treatment by South Sioux City, NE	$10,450,000	$1,094,000

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SECTION 5

5 Alternative Selection

5.1 Elimination of Alternatives

5.1.1 Technically Not Feasible

All of the proposed alternatives are technically feasible. However, it is noted that some alternatives are more technically challenging than others. For example, collection system Alternatives 5A and 5B include a long forcemain that is installed beneath the Missouri River, presenting interesting technical challenges not normally encountered in municipal wastewater systems. Also, the different wastewater treatment sites will have different treatment objectives, therefore increasing the technical challenges of the solution. Although these alternatives present challenges, they are all technically feasible.

However, Alternative 2 (Site A) is considered to be an unwise choice of locations for a new discharge. The most recent NPDES permit renewal added Total Nitrogen and Total Phosphorus to the monitoring requirements. This monitoring requirement often precedes additional treatment requirements in forthcoming permit renewals, and therefore it is assumed that any new discharges to this location will have advanced TN and TP limits. Alternative 2 is considered technically not feasible due to the uncertainty of having these advanced limits applied at some point in the future.

5.1.2 Financially Not Feasible

Each of the proposed alternatives are financially feasible. However, Alternatives 5A, 5B and 9 have significantly higher costs than other alternatives that analyze local treatment options.

5.2 Feasible Alternatives

5.2.1 Life Cycle Costs

The purpose of the cost-effective evaluation is to determine the average annual equivalent cost of the alternatives identified over the design life of the project. This evaluation considers the initial cost, estimated annual operation and maintenance costs, the present value of non-annual and annually variable operation and maintenance costs, and salvage value, if any.

5.2.1.1 Alternative Calculations

Table 5-1: Life Cycle Costs Summary, Collection System Alternatives

Description	Alt 1 - No Action	Alt 2 - Collection to Site A	Alt 3 - Collection to Site B	Alt 4 - Collection to Site C	Alt 5A - Collection to Site D	Alt 5B - Collection to Site D
Total Capital Cost	$480,700	$5,364,000	$6,797,000	$6,994,000	$24,306,000	$26,593,000
PW of Annual O&M Cost*	$1,258,683	$291,867	$566,565	$240,361	$583,734	$583,734
PW of Non-Annual O&M Costs*	$4,864,790	$54,429	$28,604	$0	$58,737	$58,737

Description	Alt 1 - No Action	Alt 2 - Collection to Site A	Alt 3 - Collection to Site B	Alt 4 - Collection to Site C	Alt 5A - Collection to Site D	Alt 5B - Collection to Site D
PW of Salvage Value of Constructed Alternative	($84,800)	($2,300,916)	($2,915,681)	($2,922,364)	($9,124,961)	($9,981,772)
Total Present Worth Life Cycle Cost**	**$6,520,000**	**$3,410,000**	**$4,480,000**	**$4,310,000**	**$15,820,000**	**$17,250,000**

Table 5-2: Life Cycle Costs Summary, Treatment System Alternatives

Description	Alt 6 - SBR Treatment	Alt 7 - AeroMod Treatment	Alt 8 - O2 Ditch Treatment	Alt 9 - South Sioux City Treatment
Total Capital Cost	$15,779,000	$15,607,000	$14,631,000	$10,450,000
PW of Annual O&M Cost*	-$1,052,438	-$764,004	-$1,456,913	-$4,687,038
PW of Non-Annual O&M Costs*	-$15,240,733	-$15,253,062	-$14,361,566	$23,473,730
PW of Salvage Value of Constructed Alternative	($5,086,665)	($5,343,560)	($4,383,062)	$0
Total Present Worth Life Cycle Cost**	**-$5,600,000**	**-$5,750,000**	**-$5,570,000**	**$29,240,000**

Life Cycle Costs is calculated as Net Present Value = Capital Cost + Pres. Worth of O&M Costs – Pres. Worth of Salvage
* Additional Annual O&M Costs represent the annual O&M costs that are anticipated if each alternative is implemented and does not include the existing O&M costs.
** Represents value of proposed alternative and does not include existing system.

A few observations from the analysis are provided below:

- Alternatives 1, 5A/5B, and 9 are independent from other alternatives. However, collection alternatives to sites A, B , and C must be added to a treatment alternative for comparison. For example, one complete scope item might include Alternative 2 plus Alternative 7 which represents both the collection system improvements needed as well as the end-of-pipe treatment alternative.
- The present worth of treatment alternatives (6, 7, and 8) is generally less than zero because these alternatives account for the savings of eliminating treatment expenses to Sioux City.
- Collection Alternatives 3 and 5A/5B includes rerouting Streeter Lift Station to the new development with gravity sewers to the south. This work includes about $125,000 of new infrastructure that could be eliminated. However, this is a minimal cost that will provides the benefit of eliminate pumping Streeter L.S. flows through Lakeshore and Suncoast Lift Stations.
- The treatment rate for South Sioux City, NE has not been negotiated. The rate has been approximated and will need to be negotiated before this alternative can be implemented.

5.2.2 Non-Monetary Factors & Environmental Impacts

For the previously presented alternatives, a preliminary look at the potential impacts upon social and environmental factors that are important when determining which alternative(s) should be pursued for the city. This evaluation will examine impacts to air, land, surface water and groundwater, as well as social and economic impacts. Beneficial water reuse or conservation are also important to consider when they are available.

The following is a preliminary list of likely known impacts from the potential improvement alternatives. A more comprehensive environmental analysis will be prepared for the selected alternative in a separate report at the conclusion of this review. As a part of that analysis, state and federal agencies will be consulted to review any potential concerns they may have.

5.2.2.1 Air

Alternatives No. 1 and No. 9: Regionalized Treatment
These alternatives have no impact on local air quality as the treatment for these flows is done in Sioux City, IA and South Sioux City, NE, respectively.

Alternative No. 2: Collection System Improvements to Treatment Site A
The construction may require the clearing and burning of trees and brush. All burning will be performed in accordance with the applicable permits and regulations. The excavation and placement of earth may cause fugitive dust emissions, but the process will be conducted with water application to reduce the amount of dust created.

Alternatives No. 3 through No.8
All potential air impacts will be similar to Alternative 2.

5.2.2.2 Land Use

Alternatives No. 1 and No.9: Regionalized Treatment
These alternatives will have no changes in land use. The treatment sites are already constructed and operating, and it is assumed that additional flows from North Sioux City will not require expansion of the existing facilities.

Alternatives No. 2, 3, 4, and 5A/5B: Collection Systems
These alternatives will generally have no changes in land use. The collection system improvements have a minimal footprint and are often installed in areas that are currently developed. Where the areas are not currently developed, buried pipelines will typically not change the land use of the impacted site.

Alternatives No. 6, 7, and 8: Treatment Systems
These alternatives will require approximately 5 acres of undeveloped property to construct the new wastewater treatment facility. The proposed location of the plant is likely to be on property that is currently farmed and is not already owned by the city.

The primary effect on the surrounding land occurs during the construction process where storm water runoff and erosion is the main concerns. To mitigate this process and comply with applicable regulations to reduce erosion, erosion control fencing and other erosion control

methods will be employed. Site restoration will occur promptly following any proposed construction. Vegetation will be restored to the site via site seeding and mulching.

5.2.2.3 Biological Resources

Alternative No. 1 and No. 9: Regionalized Treatment
These alternatives will have no impact on the biological resources in the area.

Alternatives 2 through 8
A thorough wildlife and endangered species review will be conducted in a separate report. Several known threatened and endangered species are present in Union County, and a detailed evaluation of the presence of these species will be needed for the selected alternatives.

5.2.2.4 Archeological Resources

All Alternatives
A thorough historical buildings and archeological review will be conducted in a separate report. No known historical resources are present in the proposed site area at this time.

5.2.2.5 Surface Water & Wetlands

Alternatives No. 1 and No. 9: Regionalized Treatment
These alternatives do not impact local surface water and wetlands.

Alternatives 2 through 8
These alternatives are not proposed to impact surface water and will not affect municipal, industrial or agricultural water users' availability of water. The potential impact to surface water from storm water runoff will be controlled via erosion control methods and best management construction practices.

From on-site inspections and review of the area topoquads, there does appear to be areas of wetlands or wetland type environments. All alternatives' proposed construction is not planned to be within any wetland areas. Prior to design of any of these alternatives, it is recommended that wetland delineation be accomplished to appropriately locate and define wetlands and to confirm that no proposed construction occurs within the defined areas. If any wetlands are encountered and disturbed for a proposed project, the wetland will be restored or mitigated to preconstruction condition in compliance with applicable regulations

5.2.2.6 Groundwater

All Alternatives
A thorough groundwater and wells review will be conducted in a separate report. No known wells are present in the proposed site area at this time and groundwater levels are not expected to be significantly impacted as a part of this alternative.

5.2.2.7 Economic and Social Impacts

All Alternatives
The primary economic impact for this alternative is the cost to the water users in the city. The city may be eligible for low-interest loans and/or grants that could reduce the financial burden

of the rate payers. The city should establish a future rate study to be fair to both industrial and non-industrial users of the system.

There are expected to be few social impacts of this project. No permanent relocations and minimal traffic disruptions are expected from this alternative.

8.2.4 Summary of Total Project Costs and Rate Impacts

Table 7-1: Summary of Total Project Costs and Rate Impacts provides a summary of the total estimated costs for each recommended alternative and also lists the potential rate impacts for each alternative.

Table 8-1: Summary of Total Project Costs and Rate Impacts

Alt. No.	Description	Capital Cost	Estimated Debt Service @ 2.5% over 20 yrs.	Estimated Added O&M Per Year	Total Annual Industrial Contribution	Total Added Yearly Expense	Monthly Change to Averge Non-Industrial User
1	No Action	$515,000	$33,036	$491,363	($273,000)	$251,399	$21.90
2	Collection to Site A	$5,364,000	$344,085	$20,170	$0	$364,255	$31.73
3	Collection to Site B	$6,797,000	$436,008	$34,666	$0	$470,674	$41.01
4	Collection to Site C	$6,994,000	$448,645	$14,000	$0	$462,645	$40.31
5A	Collection to Site D (5A)	$24,306,000	$1,559,160	$37,421	$0	$1,596,581	$139.10
5B	Collection to Site D (5B)	$26,591,000	$1,705,736	$37,421	$0	$1,743,157	$151.87
6	SBR Treatment	$15,786,000	$1,012,627	($949,008)	($273,000)	($209,381)	-$18.24
7	AeroMod Treatment	$15,612,000	$1,001,465	($932,926)	($273,000)	($204,461)	-$17.81
8	Oxidation Ditch Treatment	$14,630,000	$938,472	($967,406)	($273,000)	($301,934)	-$26.30
9	South Sioux City Treatment	$10,450,000	$670,337	$1,094,245	($273,000)	$1,491,582	$129.95
***Range of Total Monthly Increase to User Cost for Alternatives plus 15% Reserve =**							$-26.3 to $151.87

* Total user rate range varies dependent on which alternatives are selected. This does not account for future expenses that may change significantly over time, such as third-party treatment costs.

It has been a pleasure for JEO to assist the city of North Sioux City in identifying areas of need for the water system. If the city should consider proceeding in any of the endeavors, JEO would be excited about assisting the city once again in developing design plans and specifications for any improvements necessary to continue providing quality water to the city's users.

THIS CONCLUDES THE
WASTEWATER FACILITY PLAN
FOR THE
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA

APPENDIX

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Appendix A: NPDES Permit and Statement of Basis

Permit No.: SD0020567

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Surface Water Discharge Permit
Authorizing Discharge
Under The South Dakota Surface Water Discharge System

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

the city of North Sioux City

is authorized under this permit to discharge to

Mud Lake

from its wastewater treatment facility located northwest of the city in the Southeast ¼ of Northeast ¼ of Section 8, Township 89 North, Range 48 West, in Union County, South Dakota (Latitude 42.541302°, Longitude -96.528696°), in accordance with discharge points, effluent limits, monitoring requirements, and other conditions set forth herein. Authorization is limited to those outfalls specifically listed in the permit. The permittee must comply with all conditions of this 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 permit shall become effective November 1, 2019.

This permit and the authorization to discharge shall expire at midnight, September 30, 2024.

Signed this 16th day of October 2019,

Authorized Permitting Official

Hunter Roberts
Secretary
Department of Environment and Natural Resources

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APPENDIX A – Emergency Discharge and SSO Reporting Form

1.0 DEFINITIONS

"30-day (and monthly) Average" means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

"7-day (and weekly) Average" means the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week that begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.

"Acute Toxicity" occurs when in the LC_{50} test when 50 percent or more mortality is observed for either species at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the effluent results to be considered valid.

The "**Approval Authority"** is the Secretary of the South Dakota Department of Environment and Natural Resources.

"ARSD" means the Administrative Rules of South Dakota. These often referred to as "Standards".

An **"Authorized Release"** is a discharge from a permitted outfall that meets all permit conditions and effluent limits.

"Biosolids" means any sewage sludge or material derived from sludge that can be beneficially used. Beneficial use includes, but is not limited to, land application to agricultural land, forest land, a reclamation site or sale or give away to the public for home lawn and garden use.

"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 collection system or treatment facility other than the permitted outfall(s). Bypasses may result in releases from the sanitary sewer collection system (see **"Sanitary Sewer Overflow"**) or emergency releases from the treatment facility (see **"Emergency Discharge"**). If a bypass results in a release of wastewater, it shall be sampled and reported as either a sanitary sewer overflow from the collection system or an emergency discharge from the treatment facility.

"Chronic Toxicity" occurs when in the IC_{25} test when the survival, growth, or reproduction, as applicable, for either test species, at the effluent dilution(s) designated in this permit, is significantly less (at the 95 percent confidence level) than that observed for the control specimens.

"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.

"DMR" means Discharge Monitoring Report, EPA Form 3320-1, or a report filed electronically by an EPA-approved electronic system, or other forms provided by the Department which are used to report sampling data.

An **"Emergency Discharge"** is a discharge from the treatment or containment system through a release structure or over or through retention dikes or walls. 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. An emergency discharge is an enforceable violation of the permit unless it is an allowable bypass that does not cause effluent limitations to be exceeded, an anticipated bypass approved by the Secretary, or an unanticipated bypass allowed under Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.

"EPA" or **"US EPA"** means 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.

Inhibition Concentration, 25 Percent (IC_{25}) is a point estimate of the toxicant concentration that would cause a 25-percent reduction in a non-lethal biological measurement (e.g., reproduction or growth), calculated from a continuous model (i.e., Interpolation Method).

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 either taken at the facility or within 15 minutes of the sample.

"Instream Waste Concentration (IWC)" is the concentration of a toxicant in the receiving water after mixing. It is also referred to as the receiving water concentration (RWC).

"Lethal Concentration, 50 Percent (LC_{50})" is the toxic or effluent concentration that would cause death in 50 percent of the test organisms over a specified period of time.

"MGD" is the measure of flow rate meaning million gallons per day.

"Mixing Zone (Zone of mixing)" is an area in a stream where an effluent or discharge mixes with the upstream water under ARSD 74:51:01:01. A mixing zone for wastewater discharges to flowing waters is allowed under ARSD 74:51:01:26. Lakes are not allowed a mixing zone under ARSD 74:51:01:27.

"No Observed Effect Concentration (NOEC)" is the highest tested concentration of an effluent or a toxicant that causes no observable adverse effect on the test species (i.e., the highest concentration of toxicant at which the values for the observed responses are not statistically different from the controls). NOEC is determined using hypothesis testing.

"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.

"PTI" means Preliminary Toxicity Investigation. Up to a 30-day period where the permittee investigates the cause(s) of a whole effluent toxicity exceedance and if the toxicity is known, includes a proposal for its elimination.

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.

"Reasonable Potential (RP)" is the likelihood that an effluent will cause or contribute to an excursion above a water quality standard based on a number of factors, including the use of data (e.g. whole effluent toxicity test data). In the context of this document, references to RP and WET limits include both lethal and sub-lethal effects.

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, lift stations, etc. An SSO is an enforceable violation of the permit unless it is an allowable bypass that does not cause effluent limitations to be exceeded, an anticipated bypass approved by the Secretary, or an unanticipated bypass allowed under Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.

"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. Discharges 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.

"Surface Water Discharge (SWD) Permitting Program" is the state program that regulates the discharge of pollutants into the state's waters. This is the state's implementation of the federal NPDES program.

"Test Acceptability Criteria (TAC)" are specific criteria for determining whether toxicity test results are acceptable, pursuant to EPA's WET test methods in 40 CFR 136 (additional TAC may be established by the Department). The effluent and reference toxicant must meet specific criteria as defined in the test method.

"Toxic Unit - Acute (TU_a)" is 100 times the reciprocal of the effluent concentration that causes 50 percent of the organisms to die in an acute toxicity test ($TUa = 100/LC_{50}$) (see LC_{50}).

"Toxic Unit - Chronic (TU_c)" is 100 times the reciprocal of the effluent concentration that causes no observable effect on the test organisms in a chronic toxicity test ($TUc = 100/IC_{25}$).

"Toxicity Identification Evaluation (TIE)" is a set of site-specific procedures used to identify the specific chemical(s) causing effluent toxicity.

"Toxicity Reduction Evaluation (TRE)" is a site-specific study conducted in a step-wise process to identify the causative agents of effluent toxicity, isolate the source of toxicity, evaluate the

effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity after the control measures are put in place.

"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.

"Water Quality-based Effluent Limit (WQBEL)" is a NPDES permit limit that is developed to assure protection of aquatic life or human health consistent with applicable State water quality standards.

"Whole Effluent Toxicity (WET)" is the total toxic effect of an effluent measured directly with a toxicity test.

"Whole Effluent Toxicity (WET) Test" is a procedure using living organisms to determine whether a chemical or an effluent is toxic. A toxicity test measures the degree of the effect of a specific chemical or effluent on exposed test organisms.

2.0 PERMIT COVERAGE

2.1 Permit Transfers

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

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

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

    c. The new permittee submits a 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 permit based on the information received and other permit information.

2.2 Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the 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 permit are modified in such a manner as to require different effluent limits than contained in this permit;

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

3. Effluent Guidelines: Effluent limit guidelines are promulgated or revised for point sources covered by this 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. Whole Effluent Toxicity: Whole effluent toxicity is detected in the discharge; this permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity (WET) testing, a WET limit, a compliance date, additional or modified numerical limits, or any other conditions related to the control of toxicants if toxicity is detected during the life of this permit; or

7. 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

8. Other Changes: Other conditions or standards change so that the discharge 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.

2.3 Duty to Reapply

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

2.4 Continuation of the Expired Permit

An expired permit continues in full force and effect until a new permit is issued. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must submit an application at least 180 days before the expiration date of the permit.

2.5 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.

2.6 Permit Actions

The Secretary may modify, revoke and reissue, or terminate coverage under this permit for cause, including failure to comply with any provision of this permit or any condition imposed by the Secretary upon granting coverage under this 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.

2.7 Severability

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

3.0 EFFLUENT LIMITS

3.1 Description of Discharge Points

The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under this permit are a violation of the South Dakota Water Pollution Control Act and could subject the person(s) responsible for such discharge to penalties under Section 34A-2-75 of the Act. Knowingly discharging from an unauthorized location or failing to report a discharge as required by the permit could subject the permittee to penalties as provided under the South Dakota Water Pollution Control Act.

Outfall Number	Description of Discharge Points
001	Any discharge from the chlorine contact basin to Mud Lake (Latitude 42.541453°, Longitude -96.530352°).

3.2 Prohibition of Bypass, Emergency Discharges, and SSOs

1. The permittee may allow 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. An emergency discharge, sanitary sewer overflow, or bypass, other than that described in Paragraph 1 above, is prohibited and the Secretary may take enforcement action against a permittee, unless:

   a. The emergency discharge, SSO, or bypass 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, SSO, or bypass, 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 to prevent an emergency discharge, SSO, or bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

   c. The permittee submitted notices as required in **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.**

3. The permittee shall sample an emergency discharge or SSO for the parameters and at the frequencies listed in **Section 3.6 – Self-Monitoring Requirements - *Sanitary Sewer Overflows and Emergency Discharges***. The sample results shall be reported in accordance with the reporting requirements listed in **Section 4.1 – Reporting of Monitoring Results**.

4. The Secretary may approve an emergency discharge, SSO, or bypass, after considering its adverse effects, if the Secretary determines that it will meet the three conditions listed above in Paragraph 2.

5. If a bypass, emergency discharge, or sanitary sewer overflow 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.

3.3 Proper Operation and Maintenance

1. 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 permit or other conditions required by the Secretary upon issuance.

2. Proper operation and maintenance may include adequate laboratory controls and appropriate quality assurance procedures.

3. 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 permit.

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

3.4 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 inspections 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. **Facility Inspections.** The permittee shall inspect the facility and discharge location at least **five times per week**. At a minimum, the notebook shall include the following:

   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;

   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; and,

   h. Other information, as appropriate.

2. **Lift Station Inspections.** The permittee shall inspect each lift station on at least a **weekly** basis. The inspections shall be performed to determine if proper operation and maintenance procedures are being undertaken and verify no sanitary sewer overflows are occurring or have occurred. During any sanitary sewer overflow, the lift stations shall be inspected on a **daily** basis. At a minimum, the notebook shall include the following for each lift station:

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; and,

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 US EPA.

3.5 Effluent Limits and Self-Monitoring Requirements – *Outfall 001*

1. Upon the effective date of this permit and lasting through the life of the permit, the quality of effluent discharged by the facility shall, as a minimum, be monitored and meet the effluent limits as set forth in the following table. The permittee shall report the monitoring results in accordance with **Section 4.1 – Reporting of Monitoring Results.**

Effluent Parameter		Effluent Limit and Reporting Values			Monitoring Requirements	
		30-Day Average [1]	7-Day Average [1]	Daily Maximum [1]	Frequency	Sample Type
Five-Day Biochemical Oxygen Demand (BOD_5)		30 mg/L	45 mg/L	--	Weekly [2]	Grab
Total Suspended Solids (TSS)		30 mg/L	45 mg/L	--	Weekly [2]	Grab
Total Residual Chlorine [3]		--	--	0.019 mg/L	5 Times/Week [2,4]	Instantaneous
Escherichia coli (*E. coli*)	May 1 – September 30 [5]	630 per 100 mL	--	1,178 per 100 mL	5 Times/Month [2]	Grab
pH		The pH of the discharge shall not be less than 6.0 standard units or greater than 9.0 standard units in any sample.			Weekly [2, 5]	Instantaneous [6]
Water Temperature [7]		Report, °C	--	Report, °C	Weekly [2, 5]	Instantaneous [8]
Flow Rate [7]		Report, MGD	--	Report, MGD	Weekly [2]	Instantaneous
Total Nitrogen (as N) [7]		--	--	Report, mg/L	Monthly	Grab
Total Phosphorus (as P) [7]		--	--	Report, mg/L	Monthly	Grab
Total Flow [7]		Report Monthly Total, Million Gallons			Monthly	Calculate
No chemicals, such as chlorine, shall be used without prior written permission from the Secretary.						

[1] See **Section 1.0 - Definitions**.

[2] A minimum of one sample per week of BOD_5, TSS, pH, water temperature, and flow rate shall be taken, with a minimum of four samples per month. A minimum of five samples per month of *E. coli* and five samples per week of total residual chlorine shall be taken. All samples collected during the 7-day or 30-day period shall be used in determining the averages. The permittee always has the option of collecting additional samples if appropriate.

[3] SDDENR considers the analytical detection limit for total residual chlorine to be 0.05 mg/L. If the effluent value is less than the analytical detection limit, "Below Detection" shall be used for reporting purposes.

[4] The sampling protocol for total residual chlorine only applies if chlorination is used in the wastewater treatment process.

[5] For *E. coli* if a minimum of five samples are collected in a calendar month, all of the samples collected are to be used in determining the geometric mean. Samples are to be collected at the same time as BOD_5, TSS, etc. If less than five samples are taken during any calendar month, the daily maximum effluent limit still applies. This sampling protocol for *E. coli* only applies if the discharge occurs between May 1 and September 30.

[6] The 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 standards 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.

[7] This parameter shall be monitored and reported, but does not have an effluent limit associated with it.

[8] 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.

3.6 Self-Monitoring Requirements – *Emergency Discharges and Sanitary Sewer Overflows*

All emergency discharges and sanitary sewer overflows shall be monitored for the following parameters at the frequency and with the type of measurement indicated. Promptly upon discovery of an emergency discharge or sanitary sewer overflow, 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 4.1 – Reporting of Monitoring Results.**

Effluent Parameter	Frequency	Reporting Values [1]	Sample Type [1]
Duration of Discharge, days	Monthly	Monthly Total [2]	Calculate
Total Flow, million gallons	Monthly	Monthly Total	Calculate
Flow Rate, MGD	Daily	Actual Value	Instantaneous
pH, standard units	Daily	Actual Value	Instantaneous [3]
Water Temperature, °C	Daily	Actual Value	Instantaneous [4]
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L	Daily	Actual Value	Grab
Total Suspended Solids (TSS), mg/L	Daily	Actual Value	Grab
Total Residual Chlorine, mg/L[5]	Daily	Actual Value	Instantaneous [6]
Escherichia coli (E. coli), no./100 mL	Daily	Actual Value	Grab

[1] See **Section 1.0 – Definitions**.

[2] The date and time of the start and termination of each discharge shall also be reported.

[3] The 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.

[4] 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.

[5] SDDENR considers the analytical detection limit for total residual chlorine to be 0.05 mg/L. If the effluent value is less than the analytical detection limit, "Below Detection" shall be used for reporting purposes.

[6] The sampling protocol for total residual chlorine only applies if chlorination is used in the wastewater treatment process.

3.7 Monitoring Procedures

1. Effluent samples taken in compliance with the monitoring requirements established under this 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 Section 74:52:03:06 (a.b.r. 40 CFR, Part 136), unless other test procedures have been specified in this permit or approved by the Secretary. Analysis methods shall be sufficiently sensitive to ensure the minimum detection level for a pollutant is below the permit limit. If no sufficiently sensitive method is available, the method with the lowest minimum detection level shall be used.

3.8 Additional Monitoring by the Permittee

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

3.9 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 REPORTING & RECORD KEEPING REQUIREMENTS

4.1 Reporting of Monitoring Results

1. Effluent monitoring results obtained from the outfalls during each month shall be summarized and reported on a separate Discharge Monitoring Report Form (as defined in **Section 1.0 - Definitions**), and submitted to SDDENR via NetDMR on a **monthly** basis.

2. Effluent results obtained from all other sources shall be reported on Emergency Discharge and SSO Reporting Summary Forms in Appendix A.

3. All reports must be submitted **no later than the 28th day of the month** following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported on the Discharge Monitoring Report.

4. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with **Section 4.5 – Signatory Requirements** and submitted to the Secretary at the following address:

   South Dakota Department of Environment and Natural Resources
   Surface Water Quality Program
   Joe Foss Building
   523 East Capitol
   Pierre, SD 57501-3182

   In accordance with 40 CFR, Part 122, all permit reports shall be submitted electronically starting no later than **December 21, 2020.**

5. 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.

4.2 Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements

1. Any possible or actual endangerment to health or the environment attributed to an effluent violation, bypass, emergency discharge, or sanitary sewer overflow shall be reported as soon as possible, but no later than 24 hours after becoming 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 contact the South Dakota Emergency Management at (605) 773-3231.

2. Effluent violations, bypass, sanitary sewer overflows, and emergency discharges that do not meet the conditions 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. The permittee shall submit notice of bypass as follows:

    a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior 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. The Secretary may require the permittee to notify the general public or downstream users that could be or will be impacted by the effluent violation, bypass, emergency discharge, or SSO.

    a. In making the decision to require public notification, the Secretary will consider the potential impacts as a result of the effluent violation, bypass, emergency discharge, or SSO, 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 effluent violation, bypass, emergency discharge, or SSO begins.

5. In addition to verbal notification, the permittee shall submit a written report of the circumstances regarding the effluent violation, bypass, sanitary sewer overflow, or emergency discharge to the Secretary. The permittee shall use the Emergency

Discharge and SSO Reporting Summary Form in Appendix A to report an emergency discharge or SSO. Effluent violations shall be reported on the Discharge Monitoring Report forms required in **Section 4.1 – Reporting of Monitoring Results**.

a. Reports shall be submitted in accordance with **Section 4.1 – 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.

6. The written report shall be submitted 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.

4.3 Other Noncompliance Reporting Requirements

1. The permittee shall submit a written report of all instances of permit noncompliance not reported under **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.**

a. Reports shall be submitted in accordance with **Section 4.1 – 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.

2. The written report shall be submitted 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.

4.4 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.

4.5 Signatory Requirements

1. All permit applications, reports or information submitted to the Secretary shall be signed and certified by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Secretary shall be signed by a person described in Paragraph 1 of this section 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.

3. If an authorization under Paragraph 2 a. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the Secretary.

4. Any person signing a document under this section shall include 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.

4.6 Retention of Records

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

   a. Data collected on site;

   b. Copies of all Discharge Monitoring Report Forms;

   c. A copy of the 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 permit; and

   g. Records of all data used to complete the application for this 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. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this permit must be maintained on site during the duration of the permitted activity.

4.7 Availability of Reports

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

4.8 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 permit, or to determine compliance with this permit. The permittee shall also furnish to the Secretary, upon request, copies of records required to be kept by this permit.

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

4.9 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 also applies to pollutants that are not subject to effluent limits or other notification requirements in this permit.

5.0 COMPLIANCE REQUIREMENTS

5.1 Duty to Comply

The permittee shall comply with all conditions of this 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 this permit is subject to SDCL Section 34A-2-75).

5.2 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any wastewater discharge and/or sludge disposal or reuse in violation of this 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 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 2 of this section 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 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 as required under **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO 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 – Upset Conditions**, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

5.6 Penalties for Falsification of Reports

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 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.

5.7 Oil and Hazardous Substance Liability

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

6.0 INDUSTRIAL WASTES

6.1 Industrial Users

1. The Permittee has the responsibility to protect the Publicly-Owned Treatment Works (POTW) from pollutants which would inhibit, interfere, or otherwise be incompatible with operation of the treatment works including interference with the use or disposal of municipal sludge.

2. 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. 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 3 below 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

Under no circumstances shall the permittee allow the introduction of the following pollutants to the POTW from any source of nondomestic discharge:

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

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

3. 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;

4. 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;

5. 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);

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

7. 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;

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

9. Any pollutant that causes pass through or interference.

6.3 Categorical Standards

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

6.4 Legal Action

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 permit;

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

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

Emergency Discharge and SSO Reporting Form

EMERGENCY DISCHARGE and SSO REPORTING FORM

This form is to be used to summarize the reporting requirements for any emergency discharge or sanitary sewer overflow.

Address:		**Point of Discharge**	☐ **001** ☐ **SSO** ☐ **Other**
Facility Contact:		**Phone:**	

Description of Event *(Attach additional sheets if necessary)*

Please check the boxes below, as appropriate, to indicate the type of release being reported (See* Definitions *for an explanation of each term).

☐ **Emergency Discharge** ☐ **Sanitary Sewer Overflow**

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 did the event occur and where was the wastewater released to:

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							
Water Temperature, °C							
Flow Rate, million gallons per day							
pH, standard units							
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L							
Total Suspended Solids (TSS), mg/L							
Total Residual Chlorine, mg/L							
Escherichia Coli (E. coli), no./100 mL							

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: _____

STATEMENT OF BASIS

Applicant:	City of North Sioux City
Permit Number:	SD0020567
Contact Person:	Randy Fredericksen, Mayor Rusty Montagne, Public Works Director 504 River Drive North Sioux City, SD 57049
Phone:	(605) 232-4276 (city hall) (605) 232-9165 (public works)
Permit Type:	Minor Municipal - Renewal

This document is intended to explain the basis for the requirements contained in the draft Surface Water Discharge Permit. This document provides guidance to aid in complying with the permit requirements. This guidance is not a substitute for reading the draft permit and understanding its requirements.

DESCRIPTION

The city of North Sioux City operates the West Shore wastewater treatment facility (WWTF) located northwest of the city in the Southeast ¼ of Northeast ¼ of Section 8, Township 89 North, Range 48 West, in Union County, South Dakota (Latitude 42.541302°, Longitude -96.528696°, Navigational Quality GPS)

The wastewater treatment facility consists of six stabilization ponds followed by a chlorination basin. Cell #1 through Cell #4 are aerated and have treatment volumes of 0.92 million gallons (MG) each. The cells are aerated with three diffused air blowers. Cell #5 used to be aerated, however, the city has ceased aeration of the cell due to corrosion of the air pipes. Cell #5 has a treatment volume of 0.65 MG. The polishing pond has a treatment volume of 1.495 MG and the chlorination basin has a treatment volume of 0.54 MG. At the outfall, a V-notch weir is used for effluent flow measurement. The facility discharges continuously and a facility diagram is presented in Attachment 1. The facility has an average design flow of 0.176 million gallons per day (MGD) and a peak flow of 0.352 MGD. The average design organic loading of the facility is 374 pounds per day. Wastewater flows by gravity, aided by two area lift stations, to a main lift station located on Suncoast Dr (Longitude 42.546623°, Longitude -96.523350°, Navigational Quality GPS), which pumps wastewater to either Cell #1 or Cell #2. The city also has 5 lift stations that pump wastewater to the city of Sioux City, Iowa.

This wastewater treatment facility serves a population of 1,832 persons (permit application), with no known industrial users contributing flow to the system. The majority of North Sioux City's wastewater flows into Sioux City, Iowa's sanitary sewer system.

RECEIVING WATERS

Any discharge from this facility will enter Mud Lake which is classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Sections 74:51:01:01 and 74:51:02:04 for the following beneficial uses:

(8) Limited contact recreation waters; and
(9) Fish and wildlife propagation, recreation, and stock watering waters.

Mud Lake is a disconnected oxbow of the Missouri River and under normal conditions would not impact the Missouri River. Therefore, permit limits for the proposed permit will be based on the beneficial use classification of Mud Lake.

TOTAL MAXIMUM DAILY LOAD

Section 303(d) of the federal Clean Water Act requires states to develop Total Maximum Daily Loads (TMDLs) for waters at levels necessary to achieve and maintain water quality standards. TMDLs are calculations of the amount of pollution a waterbody can receive and still maintain applicable water quality standards. TMDLs are necessary for waters that do not meet or are not expected to meet water quality standards with the application of technology-based controls for point sources. TMDLs address specific waterbodies, segments of waterbodies, or even entire watersheds, and are pollutant specific. TMDLs must allow for seasonal variations and a margin of safety, which accounts for any lack of knowledge concerning the relationship between pollutant loads and water quality.

This segment of the receiving waterbody has not been identified as being impaired; therefore a TMDL is not needed.

ANTIDEGRADATION

SDDENR has fulfilled the antidegradation review requirements for this permit. In accordance with South Dakota's Antidegradation Implementation Procedure and the SDSWQS, no further review is required. The results of SDDENR's review are included in Attachment 2.

MONITORING DATA

The city of North Sioux City has been submitting Discharge Monitoring Reports (DMRs) as required under the current permit. As shown in Attachment 3, this facility has had 2 violations of fecal coliform daily max, 1 violation of 30-day fecal coliform geometric mean, 5 violations of E. coli daily max violations, 1 violation of 30-day E. coli geometric mean, and 1 violation of max 7-day average for total suspended solids since June 2013. October 2015 and November 2015 total suspended solids are incorrectly submitted as NODI 9 (not required) but TSS is required year round.

INSPECTIONS

Personnel from SDDENR conducted a Compliance Inspection of the North Sioux City wastewater treatment facility on September 29, 2016. The following comments and corrective actions were required in order to come into compliance with the city's Surface Water Discharge (SWD) permit:

COMMENTS	REQUIRED CORRECTIVE ACTIONS
Not all inspections at the treatment facility are being recorded. The time of the inspection of the lift stations is not being recorded in the inspection notebook.	All of the information required by the permit should be recorded in a notebook. **Please review page 11 of your permit.**
The methods used in the analysis of pH, Temperature and Chlorine Reside were not being recorded on the laboratory sheets.	The methods used in the analysis of required parameters must be recorded.
The August 2016 Discharge Monitoring Report (DMR) was used for the inspection. An error was made in the reporting of the Minimum pH.	Greater care must be taken when data is reported on the DMR.
Time was not being recorded when the pH meter was being calibrated.	The time of calibration must be recorded in the pH calibration notebook.
The facility had violations for TSS in May 2015 and E. Coli in July and August 2015 and July 2016.	Violations are not acceptable and can lead to enforcement action. The facility may need to modify its operation to ensure violations do not occur.
Wastewater backed up into homes on July 6, 2015 due to a power failure. This back up was not reported to the Department of Environment and Natural Resources.	Wastewater backing up into homes is considered a Sanitary Sewer Overflow (SSO) and must be reported to the Department.

EFFLUENT LIMITS

The permittee shall comply with the effluent limits specified below. These limits are based on the Secondary Treatment Standards (ARSD Section 74:52:06:03), the SDSWQS, permit writer's judgment, and current permit limits.

Outfall 001 – Any discharge from the chlorine contact basin to Mud Lake (Latitude 42.541453°, Longitude -96.530352°, Navigational Quality GPS).

1. The Five-Day Biochemical Oxygen Demand (BOD_5) concentration shall not exceed 30 mg/L (30-day average) or 45 mg/L (7-day average). These limits are based on the

Secondary Treatment Standards and are being included because SDDENR has determined there is a reasonable potential for BOD_5 to be present in the discharge at levels that may violate the SDSWQS.

2. The Total Suspended Solids (TSS) concentration shall not exceed 30 mg/L (30-day average) or 45 mg/L (7-day average). These limits are based on Secondary Treatment Standards and are being included because SDDENR has determined there is a reasonable potential for TSS to be present in the discharge at levels that may violate the SDSWQS.

3. The pH shall not be less than 6.0 standard units or greater than 9.0 standard units in any single analysis and/or measurement. These limits are based on the Secondary Treatment Standards and are being included because SDDENR has determined there is a reasonable potential for the pH of the effluent to violate the SDSWQS.

   Note: SDDENR specifies that pH analyses are to be conducted within 15 minutes of sample collection with a pH meter. Therefore, the permittee must have the ability to conduct onsite pH analyses. The pH meter used 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.

4. The Total Residual Chlorine (TRC) concentration in any one sample shall not exceed 0.019 mg/L. This limit is based on the fish and wildlife propagation, recreation, and stock watering waters classification of Mud Lake and the SDSWQS (ARSD Section 74:51:01:55) and are being included because SDDENR has determined there is a reasonable potential for TRC to be present in the discharge at levels that may violate the SDSWQS. This limit is applicable only if the effluent is chlorinated.

   Note: SDDENR considers the analytical detection limit for total residual chlorine to be 0.05 mg/L. If the effluent value is less than the analytical detection limit, "Below Detection Level" shall be used for reporting purposes.

5. The *Escherichia coli (E. coli)* organisms shall not exceed a concentration of 630 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods for any 30-day period. *This limit is only applicable if five or more samples are taken and is only effective May 1 to September 30.*

   In addition, the *E. coli* organisms shall not exceed 1,178 per 100 milliliters in any one sample from May 1 to September 30. These limits are based on the limited-contact recreation beneficial use classification of Mud Lake and the SDSWQS (ARSD Section 74:51:01:51) and are being included because SDDENR has determined there is a reasonable potential for *E. coli* to be present in the discharge at levels that may violate the SDSWQS.

6. No chemicals, such as chlorine, shall be used without prior written permission. This limit is based on permit writer's professional judgment.

SDDENR does not believe there is a reasonable potential for other pollutants to violate the SDSWQS. The limits and monitoring in the draft permit will be sufficient to ensure the protection of the water quality near North Sioux City's discharge.

SELF MONITORING REQUIREMENTS

The draft permit requires the permittee to monitor all discharges for BOD_5 (mg/L), TSS (mg/L), pH (s.u.), TRC (mg/L), and *E. coli* (#/100mL). These monitoring requirements are based on the limits in the draft permit for these parameters. Effluent water temperature (°C), total nitrogen (as N, mg/L), total phosphorus (as P, mg/L), total flow (million gallons), and flow rate (MGD) shall be monitored but will not have a limit. These monitoring requirements are based on the need to fully characterize the discharge.

A minimum of one sample per week of BOD_5, TSS, pH, water temperature, and flow rate shall be taken, with a minimum of four samples per month. A minimum of five samples per month of *E. coli* and five samples per week of total residual chlorine shall be taken. All samples collected during the 7-day or 30-day period shall be used in determining the averages. The permittee always has the option of collecting additional samples if appropriate.

North Sioux City was approved to electronically submit DMRs through NetDMR on June 24, 2013. Effluent monitoring results shall be summarized for each month and recorded on a DMR to be submitted via NetDMR to SDDENR on a **monthly** basis. If no discharge occurs during a month, it shall be stated as such on the DMR.

On October 22, 2015, the Environmental Protection Agency (EPA) published in the federal register a rule that makes electronic reporting of permit reporting requirements mandatory for all SWD permits. Phase 1 of the rule requires that all DMRs must be submitted electronically as of December 21, 2016. Currently, SDDENR is approved to accept DMRs electronically via NetDMR.. EPA's rule will require all permit reporting requirements (such as permit applications and violation reports) to be submitted electronically. SDDENR is working on programs to meet this requirement and will notify facilities as they become available.

Monitoring shall consist of at least **five inspections per week** of the facility and the outfall to verify that proper operation and maintenance procedures are being practiced. The lift stations shall be inspected on at least a **weekly** basis, although **daily** inspections are recommended. During any sanitary overflow, the lift stations shall be inspected on a **daily** basis. Documentation of each of these visits shall be kept in a notebook to be reviewed by SDDENR or EPA personnel when an inspection occurs.

WHOLE EFFLUENT TOXICITY

The SDDENR *Reasonable Potential Implementation Procedure for SWD Permits* was reviewed to determine if Whole Effluent Toxicity (WET) testing is applicable to North Sioux City. Following the guidance document, North Sioux City is not believed to have reasonable potential to cause or contribute to an exceedance of the SDSWQS for toxicity.

The draft permit will not include WET monitoring or limits. SDDENR has determined that due to the facility's minor discharge status, the lack of significant industrial contributions to the wastewater treatment facility, and the minimum fishery beneficial use of the receiving stream, there is no reasonable potential for WET. SDDENR has the authority to reopen the permit to add WET effluent limits, compliance schedules, monitoring, or other appropriate requirements.

PRETREATMENT

Publicly Owned Treatment Works (POTWs) with a 5 MGD or greater design flow which receive wastewater from a significant industrial user are required under 40 CFR 403.8 to develop a pretreatment program. The state may also require a POTW with a lower design flow to develop a program to prevent Pass Through or Interference with the POTW, including biosolids.

North Sioux City has a design flow of less than 5.0 MGD, and the industries who are likely to cause pass through or interference with the POTW in the city discharge to Sioux City, Iowa. Therefore, the draft permit will not require North Sioux City to develop an industrial pretreatment program. Any categorical industrial user (CIU) or significant industrial user (SIU) that discharges to the POTW will be permitted by the state. However, the city must still meet the requirements for regulating nondomestic sources of wastewater entering its system in accordance with the requirements of section 6.0 of the draft permit.

SLUDGE

Based on North Sioux City's permit application, SDDENR does not anticipate sludge will be removed or disposed of during the life of the permit. Therefore, the draft Surface Water Discharge permit shall not contain sludge disposal requirements. However, if sludge disposal is necessary, North Sioux City is required to submit to SDDENR a sludge disposal plan for review and approval **prior** to the removal and disposal of sludge.

ENDANGERED SPECIES

This is a renewal of an existing permit. No listed endangered species are expected to be impacted by activities related to this permit. However, the table below shows the species that may be present in North Sioux City's geographic area.

COUNTY	GROUP	SPECIES	CERTAINTY OF OCCURRENCE
Union	Bird	Tern, Least	Known
	Fish	Shiner, Topeka	Known
		Sturgeon, Pallid	Possible
	Mussel	Mussel, Scaleshell [1]	Historic

[1] Shells of these species have been found, but no populations have been located.

This information was accessible at the following US Fish and Wildlife Service website as of July 24, 2019, and was last updated by the US Fish and Wildlife Service January 11, 2017: https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf.

PERMIT EXPIRATION

A five-year permit is recommended.

PERMIT CONTACT

This statement of basis and the draft permit were developed by Kyle Doerr, Engineer II for the Surface Water Quality Program. Any questions pertaining to this statement of basis or the draft permit can be directed to the Surface Water Quality Program, at (605) 773-3351.

July 24, 2019

ATTACHMENT 1

Facility Flow Diagram

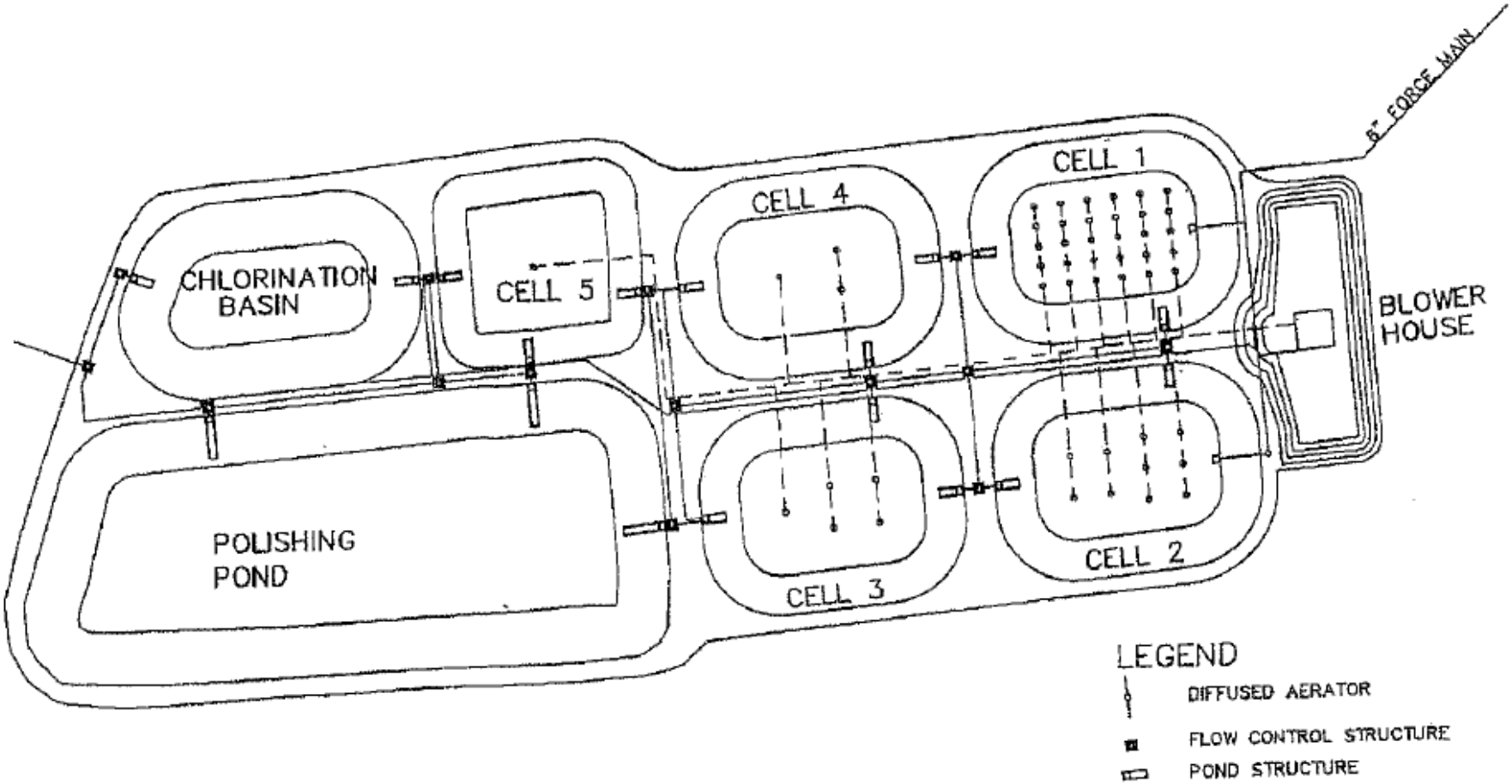


Figure 1: Flow Diagram

ATTACHMENT 2

Antidegradation Review

Permit Type: **Minor Municipal - Renewal** Applicant: **City of North Sioux City**
Date Received: **08/03/2018** Permit #: **SD0020567**
County: **Union** Legal Description: **SE ¼ of NE ¼ Sec 8, T89N, R48W**
Receiving Stream: **Mud Lake** Classification: **(8,9)**
If the discharge affects a downstream waterbody with a higher use classification, list its name and uses: **None**

APPLICABILITY

1. Is the permit or the stream segment exempt from the antidegradation review process under ARSD 74:51:01? Yes ☒ No ☐ If no, go to question #2. If yes, check those reasons why the review is not required:

☐ Existing facility covered under a surface water discharge permit is operating at or below design flows and pollutant loadings;
☐ *Existing effluent quality from a surface water discharge permitted facility is in compliance with all discharge permit limits;

☐ *Existing surface water discharge permittee was discharging to the current stream segment prior to March 27, 1973, and the quality and quantity of the discharge has not degraded the water quality of that segment as it existed on March 27, 1973;
☐ *The existing surface water discharge permittee, with DENR approval, has upgraded or built new wastewater treatment facilities between March 27, 1973, and July 1, 1988;
☐ The existing surface water discharge permittee discharges to a receiving water assigned only the beneficial uses of (9) and (10); the discharge is not expected to contain toxic pollutants in concentrations that may cause an impact to the receiving stream; and DENR has documented that the stream cannot attain a higher use classification. This exemption does not apply to discharges that may cause impacts to downstream segments that are of higher quality;
☐ Receiving water meets Tier 1 waters criteria. Any permitted discharge must meet water quality standards;
☐ The permitted discharge will be authorized by a Section 404 Corps of Engineers Permit, will undergo a similar review process in the issuance of that permit, and will be issued a 401 certification by the department, indicating compliance with the state's antidegradation provisions; or
☒ Other: This permit does not authorize an increase in effluent limits.

*An antidegradation review is not required where the proposal is to maintain or improve the existing effluent levels and conditions. Proposals for increased effluent levels, in these categories of activities are subject to review.

No further review required.

ANTIDEGRADATION REVIEW SUMMARY

2. The outcome of the review is:

- ☒ A formal antidegradation review was not required for reasons stated in this worksheet. Any permitted discharge must ensure water quality standards will not be violated.
- ☐ The review has determined that degradation of water quality should not be allowed. Any permitted discharge would have to meet effluent limits or conditions that would not result in any degradation estimated through appropriate modeling techniques based on ambient water quality in the receiving stream, or pursue an alternative to discharging to the waterbody.
- ☐ The review has determined that the discharge will cause an insignificant change in water quality in the receiving stream. The appropriate agency may proceed with permit issuance with the appropriate conditions to ensure water quality standards are met.
- ☐ The review has determined, with public input, that the permitted discharge is allowed to discharge effluent at concentrations determined through a total maximum daily load (TMDL). The TMDL will determine the appropriate effluent limits based on the upstream ambient water quality and the water quality standard(s) of the receiving stream.
- ☐ The review has determined that the discharge is allowed. However, the full assimilative capacity of the receiving stream cannot be used in developing the permit effluent limits or conditions. In this case, a TMDL must be completed based on the upstream ambient water quality and the assimilative capacity allowed by the antidegradation review.
- ☐ Other: _____

3. Describe any other requirements to implement antidegradation or any special conditions That are required as a result of this antidegradation review: _____

Kyle Doerr	07/24/2019
Reviewer	Date
Albert Spangler, PE	07/24/2019
Team Leader	Date

ATTACHMENT 3

Monitoring Data

The monitoring data was obtained from the facility's DMRs and retrieved through the ICIS database, accessed July 24, 2019. The period of the data is from June 1, 2013 through June 30, 2019. Public access to the facility's monitoring data is available at EPA's Enforcement and Compliance History Online (ECHO) website: https://echo.epa.gov/

DMR		BOD_5		Total Residual Chlorine	Fecal Coliform		E. coli		Total Flow
		30-Day Avg	Max 7-Day Avg	Daily Max	30-Day Geo Mean	Daily Max	30-Day Geo Mean	Daily Max	Month Total
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	30 mg/L	45 mg/L	.019 mg/L	1000 #/100mL	2000 #/100mL	630 #/100mL	1178 #/100mL	N/A Mgal
06/30/2013	**7/12/2013**	11.2	14	0	56	130	NR	NR	30
07/31/2013	**8/14/2013**	13	24	0	137	790	NR	NR	31
08/31/2013	**9/24/2013**	10	12	0	**2,402**	**9,200**	NR	NR	31
09/30/2013	**10/17/2013**	9	12	0	NR	NR	NR	NR	30
09/30/2013	**11/8/2013**	NR	NR	NR	NR	49	NR	NR	NR
10/31/2013	**11/6/2013**	7.2	14	NR	NR	NR	NR	NR	31
11/30/2013	**12/10/2013**	3.8	4	NR	NR	NR	NR	NR	30
12/31/2013	**1/7/2014**	13.7	18	NR	NR	NR	NR	NR	31
01/31/2014	**2/4/2014**	18.8	21	NR	NR	NR	NR	NR	31
02/28/2014	**3/10/2014**	15.7	17	NR	NR	NR	NR	NR	28
03/31/2014	**4/10/2014**	12	13	NR	NR	NR	NR	NR	31
04/30/2014	**5/8/2014**	12.6	14	NR	NR	NR	NR	NR	30
05/31/2014	**6/10/2014**	11	16	0	NR	NR	6.85	49	31
06/30/2014	**7/7/2014**	8	10	0	NR	NR	31.05	150	30
07/31/2014	**8/7/2014**	7.6	9	0	NR	NR	107	488	31
08/31/2014	**9/10/2014**	8.7	10	0	NR	NR	163.2	921	31
09/30/2014	**10/3/2014**	10.5	15	0	NR	NR	76	548	30
10/31/2014	**11/5/2014**	6	8	NR	NR	NR	NR	NR	30
11/30/2014	**12/5/2014**	8.5	15	NR	NR	NR	NR	NR	30
12/31/2014	**1/5/2015**	12	15	NR	NR	NR	NR	NR	30

DMR		BOD5		Total Residual Chlorine	Fecal Coliform		E. coli		Total Flow
		30-Day Avg	Max 7-Day Avg	Daily Max	30-Day Geo Mean	Daily Max	30-Day Geo Mean	Daily Max	Month Total
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	30 mg/L	45 mg/L	.019 mg/L	1000 #/100mL	2000 #/100mL	630 #/100mL	1178 #/100mL	N/A Mgal
01/31/2015	**2/5/2015**	14.7	17	NR	NR	NR	NR	NR	31
02/28/2015	**3/4/2015**	13	16	NR	NR	NR	NR	NR	28
03/31/2015	**4/2/2015**	15.7	17	NR	NR	NR	NR	NR	30
04/30/2015	**5/7/2015**	16.2	18	NR	NR	NR	NR	NR	30
05/31/2015	**6/5/2015**	16.5	31	0	NR	NR	19.9	102	31
06/30/2015	**7/14/2015**	10.5	12	0	NR	NR	23.91	161	30
07/31/2015	**8/10/2015**	6.4	7	0	NR	NR	215	**1,300**	30
08/31/2015	**9/9/2015**	9.2	13	0	NR	NR	230	**1,986**	31
09/30/2015	**10/10/2015**	5.4	6	0	NR	NR	4.5	93	30
10/31/2015	**11/12/2015**	4.5	6	NR	NR	NR	NR	NR	30
11/30/2015	**12/3/2015**	6.25	14	NR	NR	NR	NR	NR	30
12/31/2015	**1/6/2016**	9	8	NR	NR	NR	NR	NR	30
01/31/2016	**2/8/2016**	10.7	12	NR	NR	NR	NR	NR	31
02/29/2016	**3/8/2016**	15	20	NR	NR	NR	NR	NR	29
03/31/2016	**4/11/2016**	15.8	22	NR	NR	NR	NR	NR	30
04/30/2016	**5/5/2016**	20	25	NR	NR	NR	NR	NR	30
05/31/2016	**6/8/2016**	6.7	8	0	NR	NR	4.76	66	31
06/30/2016	**7/8/2016**	8.6	10	0	NR	NR	405	727	30
07/31/2016	**8/10/2016**	12	19	0	NR	NR	**1,186**	**10,500**	30
08/31/2016	**9/8/2016**	10.4	16	0	NR	NR	111	410	30
08/31/2016	**11/9/2016**	NR	NR	NR	NR	NR	NR	NR	NR
09/30/2016	**10/5/2016**	12.5	17	0	NR	NR	1.8	10	30
10/31/2016	**11/4/2016**	5.2	11	NR	NR	NR	NR	NR	31
11/30/2016	**12/7/2016**	16	24	NR	NR	NR	NR	NR	30

DMR		BOD5		Total Residual Chlorine	Fecal Coliform		E. coli		Total Flow
		30-Day Avg	Max 7-Day Avg	Daily Max	30-Day Geo Mean	Daily Max	30-Day Geo Mean	Daily Max	Month Total
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	30 mg/L	45 mg/L	.019 mg/L	1000 #/100mL	2000 #/100mL	630 #/100mL	1178 #/100mL	N/A Mgal
12/31/2016	**1/3/2017**	14	20	NR	NR	NR	NR	NR	31
01/31/2017	**2/6/2017**	22	26	NR	NR	NR	NR	NR	31
02/28/2017	**3/9/2017**	21	25	NR	NR	NR	NR	NR	28
03/31/2017	**4/5/2017**	14.4	17	NR	NR	NR	NR	NR	31
04/30/2017	**5/3/2017**	15	20	NR	NR	NR	NR	NR	30
05/31/2017	**6/19/2017**	8.6	10	0	NR	NR	28	**1,200**	30
06/30/2017	**7/6/2017**	6.5	11	0	NR	NR	92	980	30
07/31/2017	**8/9/2017**	8	10	0	NR	NR	6.8	64	31
08/31/2017	**11/14/2017**	9.2	14	0	NR	NR	38.2	727	30
09/30/2017	**10/4/2017**	8.7	14	0	NR	NR	2.67	16	30
10/31/2017	**11/8/2017**	4.5	6	NR	NR	NR	NR	NR	30
11/30/2017	**12/7/2017**	8.4	11	NR	NR	NR	NR	NR	30
12/31/2017	**1/3/2018**	15.5	18	NR	NR	NR	NR	NR	31
01/31/2018	**2/26/2018**	20.4	22	NR	NR	NR	NR	NR	31
02/28/2018	**3/9/2018**	16	22	NR	NR	NR	NR	NR	28
03/31/2018	**4/3/2018**	15	19	NR	NR	NR	NR	NR	31
04/30/2018	**5/7/2018**	18	22	NR	NR	NR	NR	NR	30
05/31/2018	**6/14/2018**	10.8	13	0	NR	NR	2.42	83	31
06/30/2018	**7/10/2018**	9	13	0	NR	NR	45.18	**1,410**	30
07/31/2018	**8/2/2018**	10.5	16	0	NR	NR	50.13	201	31
08/31/2018	**9/12/2018**	13.2	16	0	NR	NR	73	225	30
09/30/2018	**10/3/2018**	10	13	0	NR	NR	2.2	52	30
10/31/2018	**11/13/2018**	3.6	4	NR	NR	NR	NR	NR	30
11/30/2018	**12/6/2018**	9.5	12	NR	NR	NR	NR	NR	30

DMR End Date	DMR Recv'd Date	BOD_5 30-Day Avg	BOD_5 Max 7-Day Avg	Total Residual Chlorine Daily Max	Fecal Coliform 30-Day Geo Mean	Fecal Coliform Daily Max	E. coli 30-Day Geo Mean	E. coli Daily Max	Total Flow Month Total
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
		30 mg/L	45 mg/L	.019 mg/L	1000 #/100mL	2000 #/100mL	630 #/100mL	1178 #/100mL	N/A Mgal
12/31/2018	1/2/2019	14	16	NR	NR	NR	NR	NR	31
01/31/2019	2/6/2019	18	21	NR	NR	NR	NR	NR	30
02/28/2019	3/21/2019	17.2	19	NR	NR	NR	NR	NR	28
03/31/2019	4/11/2019	16	18	NR	NR	NR	NR	NR	31
04/30/2019	5/20/2019	16.3	20	NR	NR	NR	NR	NR	3.02
05/31/2019	6/13/2019	8	10	0	NR	NR	16.63	326	3.46
06/30/2019	7/17/2019	7.25	11	0	NR	NR	5.01	9.6	3.1

DMR End Date	DMR Recv'd Date	Flow rate 30-Day Avg	Flow rate Daily Max	pH Daily Min	pH Daily Max	Total Suspended Solids 30-Day Avg	Total Suspended Solids Max 7-Day Avg	Temperature 30-Day Avg	Temperature Daily Max
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
		N/A MGD	N/A MGD	6 SU	9 SU	30 mg/L	45 mg/L	N/A deg C	N/A deg C
06/30/2013	7/12/2013	0.09	0.1	7	7.2	9.7	1.7	20.4	23.5
07/31/2013	8/14/2013	0.09	0.1	6.9	7.5	8.6	12	23.1	24.3
08/31/2013	9/24/2013	0.09	0.1	7	7	6.2	11	21.4	23.7
09/30/2013	10/17/2013	0.09	0.1	6.9	7	4.7	7	20.5	22.5
09/30/2013	11/8/2013	NR	NR	NR	NR	NR	NR	NR	NR
10/31/2013	11/6/2013	0.09	0.11	6.9	7.6	4	6	12.5	17.4
11/30/2013	12/10/2013	0.08	0.09	7.7	7.8	4.7	6	5.6	6.5
12/31/2013	1/7/2014	0.08	0.08	7.4	7.8	6.7	9	3.3	4.6

DMR		Flow rate		pH		Total Suspended Solids		Temperature	
		30-Day Avg	Daily Max	Daily Min	Daily Max	30-Day Avg	Max 7-Day Avg	30-Day Avg	Daily Max
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	N/A MGD	N/A MGD	6 SU	9 SU	30 mg/L	45 mg/L	N/A deg C	N/A deg C
01/31/2014	**2/4/2014**	0.08	0.08	7.5	7.8	7.6	11	2.6	3.9
02/28/2014	**3/10/2014**	0.08	0.08	7.9	8	14.2	15	2	3
03/31/2014	**4/10/2014**	0.08	0.08	7.9	8.6	10	14	4.3	5.9
04/30/2014	**5/8/2014**	0.08	0.08	8.1	8.9	13.2	26	11.3	15.4
05/31/2014	**6/10/2014**	0.08	0.09	7.4	7.8	6	16	17.8	20.8
06/30/2014	**7/7/2014**	0.9	0.12	6.8	7.1	6.2	9	21.6	25.1
07/31/2014	**8/7/2014**	0.08	0.08	6.8	6.9	5.8	8	21.5	23.1
08/31/2014	**9/10/2014**	0.08	0.11	6.7	6.9	4.7	6	21.4	21.9
09/30/2014	**10/3/2014**	0.08	0.08	6.7	6.9	5.7	7	19.4	21.4
10/31/2014	**11/5/2014**	0.07	0.09	7.4	7.7	4.6	7	14.5	20.1
11/30/2014	**12/5/2014**	0.07	0.07	7.7	8	5	8	6	9.3
12/31/2014	**1/5/2015**	0.07	0.07	7.6	8	8.6	11	3.5	4.8
01/31/2015	**2/5/2015**	0.07	0.07	7.6	8	10.2	13	2.1	3.7
02/28/2015	**3/4/2015**	0.07	0.07	7.9	8.3	15.7	20	2	2.6
03/31/2015	**4/2/2015**	0.08	0.08	8	8.5	14.7	18	6.2	9.8
04/30/2015	**5/7/2015**	0.08	0.08	8.4	8.8	9.6	17	14.6	18
05/31/2015	**6/5/2015**	0.08	0.08	7.3	8.1	19.5	**50**	17.2	18.5
06/30/2015	**7/14/2015**	0.08	0.08	6.9	7.7	12	16	22.5	24.7
07/31/2015	**8/10/2015**	0.08	0.1	6.9	7.4	7.6	11	23	25
08/31/2015	**9/9/2015**	0.08	0.1	6.6	7	3.7	5	22	23.3
09/30/2015	**10/10/2015**	0.08	0.09	6.7	6.8	3.4	5	21.2	23.3
10/31/2015	**11/12/2015**	0.08	0.08	7.7	7.8	**NR**	**NR**	14.7	17
11/30/2015	**12/3/2015**	0.08	0.1	7.7	7.9	**NR**	**NR**	9.8	13.7
12/31/2015	**1/6/2016**	0.09	0.1	7.6	7.9	5.2	8	3.8	5.7
01/31/2016	**2/8/2016**	0.09	0.09	7.7	7.9	5.5	8	1.9	2.7

DMR		Flow rate		pH		Total Suspended Solids		Temperature	
		30-Day Avg	Daily Max	Daily Min	Daily Max	30-Day Avg	Max 7-Day Avg	30-Day Avg	Daily Max
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	N/A MGD	N/A MGD	6 SU	9 SU	30 mg/L	45 mg/L	N/A deg C	N/A deg C
02/29/2016	**3/8/2016**	0.09	0.1	7.8	8	8	11	1.7	2.8
03/31/2016	**4/11/2016**	0.1	0.1	8.2	8.8	11.6	20	8.6	12.2
04/30/2016	**5/5/2016**	0.1	0.1	8.7	8.8	17	21	13.3	15.3
05/31/2016	**6/8/2016**	0.11	0.13	6.9	7.1	6	8	18	21.3
06/30/2016	**7/8/2016**	0.1	0.1	6.8	7	7	13	22.5	24.5
07/31/2016	**8/10/2016**	0.1	0.1	6.3	6.8	4.7	9	21.7	24.1
08/31/2016	**9/8/2016**	0.1	0.1	NR	6.7	7.4	25	23	24.8
08/31/2016	**11/9/2016**	NR	NR	6.2	NR	NR	NR	NR	NR
09/30/2016	**10/5/2016**	0.1	0.1	6.3	6.4	5	10	16.9	22.3
10/31/2016	**11/4/2016**	0.1	0.1	7.4	7.6	4.5	6	14.3	17.1
11/30/2016	**12/7/2016**	0.1	0.1	7.5	7.8	7	15	9.3	13.3
12/31/2016	**1/3/2017**	0.1	0.1	7.7	7.9	8.5	9	2.8	3.8
01/31/2017	**2/6/2017**	0.1	0.1	7.6	7.8	5.2	8	3	3.4
02/28/2017	**3/9/2017**	0.1	0.1	7.8	8.1	6.7	11	3.4	5.8
03/31/2017	**4/5/2017**	0.1	0.1	8	8.6	5	7	8	10.3
04/30/2017	**5/3/2017**	0.1	0.1	8.2	8.5	10	12	13.6	16.2
05/31/2017	**6/19/2017**	0.1	0.1	6.1	7.6	8	14	17.2	21.2
06/30/2017	**7/6/2017**	0.1	0.1	6.6	8	7.7	10	23.1	25
07/31/2017	**8/9/2017**	0.1	0.1	6.6	6.8	3.5	4	24.6	25.9
08/31/2017	**11/14/2017**	0.1	0.12	6.4	6.6	3.6	5	21.6	22.7
09/30/2017	**10/4/2017**	0.1	0.1	6.4	6.7	3.2	4	20.2	21
10/31/2017	**11/8/2017**	0.1	0.1	7.6	7.8	3	3	14.3	16.3
11/30/2017	**12/7/2017**	0.09	0.1	7.7	8	5.6	11	6.3	7.8
12/31/2017	**1/3/2018**	0.09	0.1	8	8.2	9.5	19	4.2	505
01/31/2018	**2/26/2018**	0.09	0.09	7.8	7.5	7.6	11	2.8	2.2

DMR		Flow rate		pH		Total Suspended Solids		Temperature	
		30-Day Avg	Daily Max	Daily Min	Daily Max	30-Day Avg	Max 7-Day Avg	30-Day Avg	Daily Max
		Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit
End Date	Recv'd Date	N/A MGD	N/A MGD	6 SU	9 SU	30 mg/L	45 mg/L	N/A deg C	N/A deg C
02/28/2018	**3/9/2018**	0.09	0.09	7.6	7.8	8	11	3.3	26.6
03/31/2018	**4/3/2018**	0.09	0.09	7.8	8.5	11	16	5.5	8.3
04/30/2018	**5/7/2018**	0.1	0.1	8.6	8.9	7.7	16	9.8	13.4
05/31/2018	**6/14/2018**	0.1	0.1	6.8	7.4	7.8	21	19.5	23.4
06/30/2018	**7/10/2018**	0.11	0.1	6.2	6.7	3.5	4	21.8	22.6
07/31/2018	**8/2/2018**	0.1	0.11	6.1	6.5	4.7	7	22.8	25.1
08/31/2018	**9/12/2018**	0.1	0.1	6.4	6.6	4.2	7	22.6	24.8
09/30/2018	**10/3/2018**	0.11	0.12	6.2	6.7	5	12	21.1	22.3
10/31/2018	**11/13/2018**	0.1	0.11	7.1	7.5	3.2	4	9.8	16.6
11/30/2018	**12/6/2018**	0.1	0.1	7.6	7.6	3.5	4	5.85	7.6
12/31/2018	**1/2/2019**	0.1	0.1	7.6	7.9	6.5	14	3.6	4.2
01/31/2019	**2/6/2019**	0.1	0.1	7.8	8.2	8.8	12	4	6
02/28/2019	**3/21/2019**	0.1	0.1	7.3	8	6	7	3	4.3
03/31/2019	**4/11/2019**	0.1	1.44	7.2	7.6	12	18	5.4	9.2
04/30/2019	**5/20/2019**	0.1	0.1	8	8.8	15.25	23	13.5	16.3
05/31/2019	**6/13/2019**	0.12	0.14	6.8	7	4.6	10	14.6	17.6
06/30/2019	**7/17/2019**	0.1	0.12	6.5	6.8	5.75	10	17.8	21.6

NR is Not Required. No sample was required for this parameter during the monitoring period.

Violations are bolded, shaded, and larger font.

Appendix B: Wasteload Allocation

November 21, 2019

Al Spangler
Engineering Manager I
Department of Environment & Natural Resources Surface Water Quality Team
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501

RE: North Sioux City Wastewater Treatment Facility
Existing NPDES No.: SD0020567
Request for Draft Permit Limits for New Municipal Wastewater Treatment Facility Discharge

Dear Mr. Spangler:

North Sioux City is currently in the process of preparing a Facility Plan for its existing wastewater system. One of the alternatives being considered is the construction of a new activated sludge wastewater facility at one of three possible locations. In preparing the Facility Plan the City would like guidance on any potential new NDPES limits that may come into effect if the new wastewater treatment facility is constructed.

The following parameters are being used to preliminarily design the facility:

	Quantity	Units
Design Average Daily Flow	1.05	MGD
Design Peak Daily Flow	2.10	MGD
Design Peak Hourly Flow	3.70 (2,570)	MGD (gpm)
BOD_5	3,080	lbs/day
TSS	1,550	lbs/day
TKN	410	lbs/day
Population	3,672	Capita
Population Equivalent	14,000	based on 0.22 lb BOD_5/cap

Based upon these design criteria, please provide a draft set of potential NPDES limits be provided for this potential facility so the City can adequately plan the design. There are three potential discharge locations as shown in the enclosed figure:

- Site A discharges to the Mud Lake, adjacent to the existing lagoon discharge;
- Site B discharges directly to the Missouri River;
- Site C discharges directly to the big Sioux River.

If you need any further information or have questions, please feel free to contact me at 402.494.7019 or at ejoy@jeo.com.

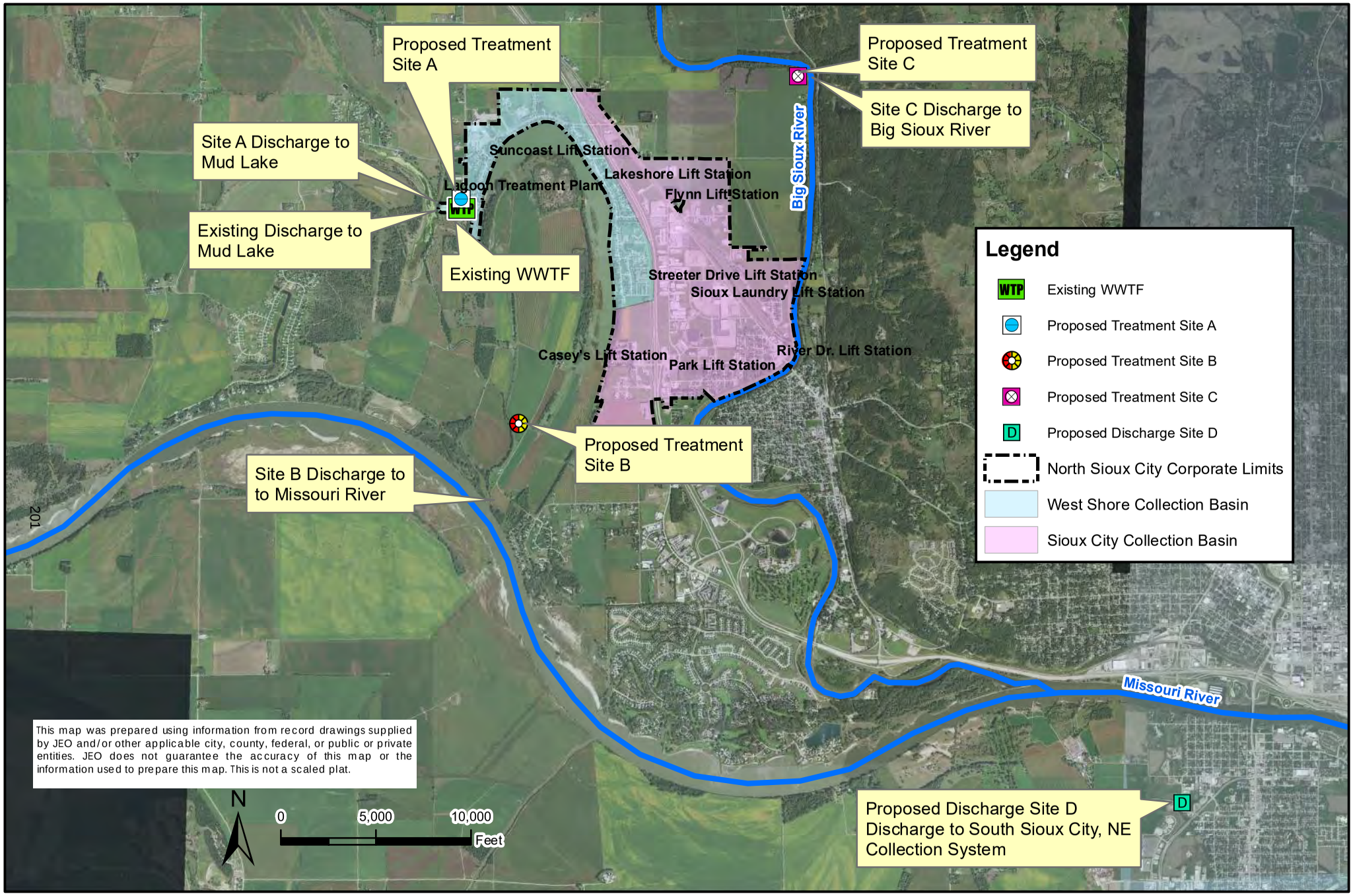
Sincerely,

Ethan E. Joy, PE
Branch Manager

aob

Enclosures

cc: North Sioux City
file



PROPOSED TREATMENT/DISCHARGE SITES

CITY OF NORTH SIOUX CITY
UNION COUNTY, SOUTH DAKOTA

FIGURE 4-5

JEO CONSULTING GROUP INC

Appendix C: Opinion of Probable Cost Details

ENGINEER'S OPINION OF PROBABLE COST - 30% DESIGN
2019 Wastewater Facility Plan Update, Alternative 1
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
Additional NSC Capital Costs for Sioux City Discharge					
1.	Mobilization	LS	1	$31,000.00	$31,000
2.	Bonding and Insurance	LS	1	$7,500.00	$7,500
3.	Online Wastewater Constituent Monitoring Station	LS	1	$300,000.00	$300,000
			Construction Subtotal	Base Bid	$338,500
			Contingency	10%	$33,850
			Total Opinion of Construction Cost		**$372,350**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			20%	$74,500
2.	Overhead (Legal, Fiscal, Etc.)			10%	$33,850
				Subtotal	$108,350
			Total Opinion of Project Cost		**$480,700**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
2019 Wastewater Facility Plan Update - Alternative 1, Treatment by Sioux City (No Action)
City of North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

Annual Operations & Maintenance Cost[1] $101,000.00

ANNUAL INFLUENT SAMPLING

Influent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	104	$23.00	**$2,395.00 per YR**
TSS	104	$12.00	**$1,250.00 per YR**
TKN	0	$43.00	**$0.00 per YR**
TN	0	$43.00	**$0.00 per YR**
TP	0	$13.00	**$0.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Miscellaneous Samples (Odor, H2S)	52	$50.00	**$2,600.00 per YR**

ANNUAL CHEMICAL COST

Hydrogen Peroxide for Odor Control	Quantity		Annual Cost
Annual Mass of H2O2 (35%)	106800	LB	
- Unit Price for Treatment	$0.47	per LB	
Annual Subtotal	**$50,200.00**	**per YR**	**$50,200.00 per YR**

ANNUAL LABOR

Grade 3 Ops. Reg. Labor (Monitoring Station Effort)	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$7,280.00**	**per YR**	**$7,280.00 per YR**

Grade 3 Ops. Reg. Labor (O&G Program Effort)	Quantity		Annual Cost
Number of Hours per Week	**8**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$14,560.00**	**per YR**	**$14,560.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Regular Labor (Monitoring Station Effort)	Quantity		Annual Cost
Number of Hours per Week	**8**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$11,232.00**	**per YR**	**$11,235.00 per YR**

General Laborer Regular Labor (O&G Program Effort)	Quantity		Annual Cost
Number of Hours per Week	**8**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$11,232.00**	**per YR**	**$11,235.00 per YR**

General Laborer Overtime Labor	Quantity	Annual Cost

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 1, Treatment by Sioux City (No Action)

City of North Sioux City, South Dakota *Date Prepared:*

JEO Project No. 190926.00 *January 29, 2020*

Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

TREATMENT COSTS (See LCC Analysis for Details)

NOTES

1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 1, Treatment by Sioux City (No Action)

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $6,519,373

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	5.0%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Sioux City Treatment Costs	$ 480,700	1.000	$ 480,700	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 480,700**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Sioux City Treatment Costs	$ 101,000	12.462	$ 1,258,683	-
0 to 20		$ -	12.462	$ -	-
0 to 20		$ -	12.462	$ -	-
0 to 20		$ -	12.462	$ -	-
0 to 20		$ -	12.462	$ -	-
0 to 20		$ -	12.462	$ -	-
				Subtotal of Present Worth Project Cost	**$ 1,258,683**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1	Projected Sioux City Treatment Costs	$ 43,362	0.952	$ 41,297	-
2	Projected Sioux City Treatment Costs	$ 98,793	0.907	$ 89,608	-
3	Projected Sioux City Treatment Costs	$ 152,768	0.864	$ 131,967	-
4	Projected Sioux City Treatment Costs	$ 217,978	0.823	$ 179,331	-
5	Projected Sioux City Treatment Costs	$ 296,461	0.784	$ 232,285	-
6	Projected Sioux City Treatment Costs	$ 318,359	0.746	$ 237,565	-
7	Projected Sioux City Treatment Costs	$ 341,876	0.711	$ 242,965	-
8	Projected Sioux City Treatment Costs	$ 367,129	0.677	$ 248,487	-
9	Projected Sioux City Treatment Costs	$ 394,247	0.645	$ 254,135	-
10	Projected Sioux City Treatment Costs	$ 423,369	0.614	$ 259,912	-
11	Projected Sioux City Treatment Costs	$ 454,641	0.585	$ 265,819	-
12	Projected Sioux City Treatment Costs	$ 488,224	0.557	$ 271,861	-
13	Projected Sioux City Treatment Costs	$ 524,287	0.530	$ 278,041	-
14	Projected Sioux City Treatment Costs	$ 563,015	0.505	$ 284,361	-
15	Projected Sioux City Treatment Costs	$ 604,602	0.481	$ 290,824	-
16	Projected Sioux City Treatment Costs	$ 649,262	0.458	$ 297,434	-
17	Projected Sioux City Treatment Costs	$ 697,221	0.436	$ 304,195	-
18	Projected Sioux City Treatment Costs	$ 748,722	0.416	$ 311,109	-
19	Projected Sioux City Treatment Costs	$ 804,027	0.396	$ 318,181	-
20	Projected Sioux City Treatment Costs	$ 863,418	0.377	$ 325,413	-
				Subtotal of Present Worth Project Cost	**$ 4,864,790**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Sioux City Treatment Costs	$ 225,000	-0.377	$ (84,800)	-
20		$ -	-0.377	$ -	-
20		$ -	-0.377	$ -	-
20		$ -	-0.377	$ -	-
20		$ -	-0.377	$ -	-
20		$ -	-0.377	$ -	-
				Subtotal of Present Worth Project Cost	**$ (84,800)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 2
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
GROUP A - New Forcemain from River Dr. Lift Station to Casey's Lift Station					
1.	Mobilization	LS	1	$87,000.00	$87,000
2.	Bonding and Insurance	LS	1	$21,500.00	$21,500
3.	12" PVC Water Main, DR 18	LF	5,250	$60.00	$315,000
4.	12" 45° Bend, MJ	EA	4	$900.00	$3,600
5.	12" 90° Bend, MJ	EA	10	$1,100.00	$11,000
6.	Connect to Existing Force Main	EA	1	$3,000.00	$3,000
7.	20" Steel Casing, 0.375" Thickness, Jack and Bore	LF	500	$500.00	$250,000
8.	Remove Pavement	SY	847	$10.00	$8,467
9.	Remove Curb and Gutter	LF	180	$10.00	$1,800
10.	Subgrade Preparation	SY	847	$15.00	$12,700
11.	6" Concrete Pavement	SY	847	$80.00	$67,733
12.	Basic Drive Replacement	EA	10	$5,000.00	$50,000
13.	Extensive Drive Replacement	EA	10	$10,000.00	$100,000
14.	Straw Wattle	LF	5,250	$3.00	$15,750
15.	Seeding, Fertilizer and Mulch	ACRE	1.5	$5,000.00	$7,533
			Construction Subtotal	Group A	$955,090
			Contingency	10%	$95,510
			Total Opinion of Construction Cost - Group A		**$1,050,600**
GROUP B - Casey's Lift Station Upgrade and Forcemain to West Shore Treatment (Site A)					
1.	Mobilization	LS	1	$259,000.00	$259,000
2.	Bonding and Insurance	LS	1	$63,500.00	$63,500
3.	Replace Casey's Lift Station	LS	1	$700,000.00	$700,000
4.	New Backup Generator at Casey's Lift Station	LS	1	$150,000.00	$150,000
5.	16" PVC Water Main, DR 18	LF	11,000	$65.00	$715,000
6.	16" PVC Water Main, DR 18, RJ, Directionally Bored	LF	2,500	$150.00	$375,000
7.	16" 22.5° Bend, MJ	EA	4	$1,600.00	$6,400
8.	16" 45° Bend, MJ	EA	2	$1,700.00	$3,400
9.	16" 90° Bend, MJ	EA	8	$1,800.00	$14,400
10.	Remove Pavement	SY	4,890	$10.00	$48,900
11.	Remove Curb and Gutter	LF	40	$10.00	$400
12.	Subgrade Preparation	SY	4,890	$15.00	$73,350
13.	6" Concrete Driveway	SY	1,890	$80.00	$151,200
14.	Asphalt Concrete	TONS	980	$175.00	$171,500
15.	Demolish Existing Casey's Lift Station	LS	1	$50,000.00	$50,000
16.	Straw Wattle	LF	11,000	$3.00	$33,000
17.	Seeding, Fertilizer and Mulch	ACRE	6.3	$5,000.00	$31,566
			Construction Subtotal	Group B	$2,846,620
			Contingency	10%	$284,670
			Total Opinion of Construction Cost - Group B		**$3,131,290**
GROUP C - Additional Gravity Effluent to Mud Lake					
1.	Mobilization	LS	1	$18,000.00	$18,000
2.	Bonding and Insurance	LS	1	$4,500.00	$4,500
3.	24" PVC Sanitary Sewer Main, SDR 35	LF	700	$120.00	$84,000
4.	Gravel Pipe Bedding Allowance	LF	700	$20.00	$14,000
5.	60" Dia. Concrete Manhole	VF	41	$1,250.00	$51,563
6.	Outfall Structure	LS	1	$20,000.00	$20,000
7.	Straw Wattle	LF	700	$3.00	$2,100
8.	Seeding, Fertilizer and Mulch	ACRE	0.4	$5,000.00	$2,009

				Construction Subtotal Group C	$196,180
				Contingency 10%	$19,620
				Total Opinion of Construction Cost - Group C	**$215,800**
GROUP D - Miscellaneous Support Infrastructure					
1.	Mobilization	LS	1	$3,000.00	$3,000
2.	Bonding and Insurance	LS	1	$1,000.00	$1,000
3.	12" PVC Water Main, DR 18	LF	300	$55.00	$16,500
4.	Straw Wattle	LF	300	$3.00	$900
5.	Seeding, Fertilizer and Mulch	ACRE	0.2	$5,000.00	$861
6.	Access Road Subgrade Preparation	SY	278	$15.00	$4,167
7.	Access Road Gravel Surface Coarse	TON	78	$35.00	$2,734
				Construction Subtotal Group D	$29,170
				Contingency 10%	$2,920
				Total Opinion of Construction Cost - Group D	**$32,090**
				Construction Subtotal - All Groups	$4,027,060
				Contingency	$402,720
				Total Opinion of Construction Cost - All Groups	**$4,429,780**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			15%	$664,500
2.	Overhead (Legal, Fiscal, Etc.)			5%	$201,350
3.	Easement/Right-of-Way Acquisition			$10,000/ac	$68,182
				Subtotal Professional Services	$934,032
				Total Opinion of Project Cost	**$5,364,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 2, Collection System to Lagoon WWTF Site A

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Annual Operations & Maintenance Cost[1] — $17,000.00

ANNUAL ELECTRICAL

Casey's Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	2	UNITS	
- Estimated Power of Units	50.00	Hp	
	37.30	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$16,350.00**	**per YR**	**$16,350.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

NOTES

1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 2, Collection System to SW Treatment Site A

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $3,409,380

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Collection System to SW Treatment Site A	$ 5,364,000	1.000	$ 5,364,000	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 5,364,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Collection System to SW Treatment Site A	$ 17,000	17.169	$ 291,867	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ 291,867**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1			0.985	$ -	-
2			0.971	$ -	-
3			0.956	$ -	-
4			0.942	$ -	-
5	Telemetry Devices	$ 1,500	0.928	$ 1,392	-
6			0.915	$ -	-
7			0.901	$ -	-
8			0.888	$ -	-
9			0.875	$ -	-
10	Pump Replacement	$ 30,000	0.862	$ 25,850	-
11			0.849	$ -	-
12			0.836	$ -	-
13			0.824	$ -	-
14			0.812	$ -	-
15	Telemetry Devices	$ 1,500	0.800	$ 1,200	-
16			0.788	$ -	-
17			0.776	$ -	-
18			0.765	$ -	-
19			0.754	$ -	-
20	Pump Replacement	$ 35,000	0.742	$ 25,986	-
				Subtotal of Present Worth Project Cost	**$ 54,429**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Collection System to SW Treatment Site A	$ 3,099,000	-0.742	$ (2,300,916)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (2,300,916)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 3
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
GROUP A - New Forcemain from River Dr. Lift Station to Casey's Lift Station					
1.	Mobilization	LS	1	$87,000.00	$87,000
2.	Bonding and Insurance	LS	1	$21,500.00	$21,500
3.	12" PVC Water Main, DR 18	LF	5,250	$60.00	$315,000
4.	12" 45° Bend, MJ	EA	4	$900.00	$3,600
5.	12" 90° Bend, MJ	EA	10	$1,100.00	$11,000
6.	Connect to Existing Force Main	EA	1	$3,000.00	$3,000
7.	20" Steel Casing, 0.375" Thickness, Jack and Bore	LF	500	$500.00	$250,000
8.	Remove Pavement	SY	847	$10.00	$8,467
9.	Remove Curb and Gutter	LF	180	$10.00	$1,800
10.	Subgrade Preparation	SY	847	$15.00	$12,700
11.	6" Concrete Pavement	SY	847	$80.00	$67,733
12.	Basic Drive Replacement	EA	10	$5,000.00	$50,000
13.	Extensive Drive Replacement	EA	10	$10,000.00	$100,000
14.	Straw Wattle	LF	5,250	$3.00	$15,750
15.	Seeding, Fertilizer and Mulch	ACRE	1.5	$5,000.00	$7,533
			Construction Subtotal	Group A	$955,090
			Contingency	10%	$95,510
			Total Opinion of Construction Cost - Group A		**$1,050,600**
GROUP B - Streeter Dr. Lift Station Forcemain Reroute to Streeter Drive					
1.	Mobilization	LS	1	$10,500.00	$10,500
2.	Bonding and Insurance	LS	1	$2,500.00	$2,500
3.	6" PVC Water Main, DR 18	LF	200	$40.00	$8,000
4.	6" PVC Force Main, DR 18, RJ, Directionally Bored	LF	2,000	$35.00	$70,000
5.	Connect to Existing Force Main	EA	1	$1,500.00	$1,500
6.	Remove Pavement	SY	167	$10.00	$1,667
7.	Subgrade Preparation	SY	167	$15.00	$2,500
8.	6" Concrete Pavement	SY	167	$80.00	$13,333
9.	Straw Wattle	LF	200	$3.00	$600
10.	Seeding, Fertilizer and Mulch	ACRE	0.1	$5,000.00	$574
			Construction Subtotal	Group B	$111,180
			Contingency	10%	$11,120
			Total Opinion of Construction Cost - Group B		**$122,300**
GROUP C - New Casey's Lift Station Upgrade and Forcemain to Proposed WWTF (Site B)					
1.	Mobilization	LS	1	$154,500.00	$154,500
2.	Bonding and Insurance	LS	1	$39,000.00	$39,000
16.	Replace Casey's Lift Station	LS	1	$700,000.00	$700,000
17.	New Backup Generator at Casey's Lift Station	LS	1	$150,000.00	$150,000
18.	16" PVC Water Main, DR 18	LF	6,500	$65.00	$422,500
22.	16" PVC Water Main, DR 18, RJ, Directionally Bored	LF	800	$150.00	$120,000
20.	16" 22.5° Bend, MJ	EA	2	$1,600.00	$3,200
21.	16" 45° Bend, MJ	EA	2	$1,700.00	$3,400
22.	16" 90° Bend, MJ	EA	4	$1,800.00	$7,200
23.	Remove Pavement	SY	356	$10.00	$3,556
24.	Remove Curb and Gutter	LF	40	$10.00	$400
25.	Subgrade Preparation	SY	600	$15.00	$9,000
26.	Crushed Rock Surface Course	TONS	244	$20.00	$4,889
27.	6" Concrete Pavement	SY	356	$80.00	$28,444

31.	Demolish Existing Casey's Lift Station	LS	1	$50,000.00	$50,000
32.	Straw Wattle	LF	6,500	$3.00	$19,500
33.	Seeding, Fertilizer and Mulch	ACRE	3.7	$5,000.00	$18,652
			Construction Subtotal	Group C	$1,734,250
			Contingency	10%	$173,430
			Total Opinion of Construction Cost - Group C		**$1,907,680**
GROUP D - Revised Suncoast Lift Station Forcemain to Proposed WWTF (Site B)					
1.	Mobilization	LS	1	$90,500.00	$90,500
2.	Bonding and Insurance	LS	1	$22,000.00	$22,000
3.	10" PVC Water Main, DR 18	LF	13,000	$50.00	$650,000
4.	10" PVC Water Main, DR 18, RJ, Directionally Bored	LF	1,250	$75.00	$93,750
5.	10" 22.5° Bend, MJ	EA	3	$700.00	$2,100
6.	10" 90° Bend, MJ	EA	8	$900.00	$7,200
7.	Remove Pavement	SY	444	$15.00	$6,667
8.	Subgrade Preparation	SY	444	$15.00	$6,667
9.	6" Concrete Pavement	SY	444	$80.00	$35,556
10.	Straw Wattle	LF	13,000	$3.00	$39,000
11.	Seeding, Fertilizer and Mulch	ACRE	7.5	$5,000.00	$37,305
			Construction Subtotal	Group D	$990,750
			Contingency	10%	$99,080
			Total Opinion of Construction Cost - Group D		**$1,089,830**
GROUP E - Additional Gravity Effluent to Missouri River					
1.	Mobilization	LS	1	$88,500.00	$88,500
2.	Bonding and Insurance	LS	1	$22,000.00	$22,000
3.	24" PVC Sanitary Sewer Main, SDR 26	LF	4,000	$120.00	$480,000
4.	Gravel Pipe Bedding Allowance	LF	4,000	$20.00	$80,000
5.	72" Dia. Concrete Manhole	VF	165	$1,250.00	$206,250
6.	Crushed Rock Surface Course	TONS	1,080	$20.00	$21,600
7.	Outfall Structure	LS	1	$50,000.00	$50,000
8.	Straw Wattle	LF	4,000	$3.00	$12,000
9.	Seeding, Fertilizer and Mulch	ACRE	2.3	$5,000.00	$11,478
			Construction Subtotal	Group E	$971,830
			Contingency	10%	$97,190
			Total Opinion of Construction Cost - Group E		**$1,069,020**
GROUP F - Miscellaneous Support Infrastructure					
1.	Mobilization	LS	1	$27,500.00	$27,500
2.	Bonding and Insurance	LS	1	$7,000.00	$7,000
3.	12" PVC Water Main, DR 18	LF	4,250	$55.00	$233,750
4.	Straw Wattle	LF	4,250	$3.00	$12,750
5.	Seeding, Fertilizer and Mulch	ACRE	2.4	$5,000.00	$12,196
6.	Access Road Subgrade Preparation	SY	278	$15.00	$4,167
7.	Access Road Gravel Surface Coarse	TON	78	$35.00	$2,734
			Construction Subtotal	Group E	$300,100
			Contingency	10%	$30,010
			Total Opinion of Construction Cost - Group E		**$330,110**
			Construction Subtotal - All Groups		$5,063,200
			Contingency		$506,340
			Total Opinion of Construction Cost - All Groups		**$5,569,540**
PROFESSIONAL SERVICES					

1.	Design Services (Engineering, Survey, Architecture)	15%	$835,500
2.	Overhead (Legal, Fiscal, Etc.)	5%	$253,160
3.	Easement/Right-of-Way Acquisition	$10,000/ac	$138,430
	Subtotal Professional Services		$1,227,090
	Total Opinion of Project Cost		**$6,797,000**

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ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
2019 Wastewater Facility Plan Update - Alternative 3, Collection System to SW Treatment Site B
City of North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

Annual Operations & Maintenance Cost[1] $33,000.00

ANNUAL ELECTRICAL

Suncoast Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Power of Units	30.00	Hp	
	22.38	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$4,950.00**	**per YR**	**$4,950.00 per YR**

New Casey's Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	2	UNITS	
- Estimated Power of Units	40.00	Hp	
	29.84	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$13,100.00**	**per YR**	**$13,100.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$7,280.00**	**per YR**	**$7,280.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**16**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$840.00**	**per YR**	**$840.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$5,616.00**	**per YR**	**$5,620.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**16**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$648.00**	**per YR**	**$650.00 per YR**

NOTES
1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 3, Collection System to SW Treatment Site B

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $4,476,488

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Collection System to SW Treatment Site B	$ 6,797,000	1.000	$ 6,797,000	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 6,797,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Collection System to SW Treatment Site B	$ 33,000	17.169	$ 566,565	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ 566,565**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1			0.985	$ -	-
2			0.971	$ -	-
3			0.956	$ -	-
4			0.942	$ -	-
5	Telemetry Devices	$ 1,500	0.928	$ 1,392	-
6			0.915	$ -	-
7			0.901	$ -	-
8			0.888	$ -	-
9			0.875	$ -	-
10	River Dr. Pump Replacement	$ 30	0.862	$ 26	-
11			0.849	$ -	-
12			0.836	$ -	-
13			0.824	$ -	-
14			0.812	$ -	-
15	Telemetry Devices	$ 1,500	0.800	$ 1,200	-
16			0.788	$ -	-
17			0.776	$ -	-
18			0.765	$ -	-
19			0.754	$ -	-
20	River Dr. Pump Replacement	$ 35,000	0.742	$ 25,986	-
				Subtotal of Present Worth Project Cost	**$ 28,604**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Collection System to SW Treatment Site B	$ 3,927,000	-0.742	$ (2,915,681)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (2,915,681)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 4
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
GROUP A - River Dr. Lift Station Forcemain Reroute to Flynn Lift Station					
1.	Mobilization	LS	1	$121,500.00	$121,500
2.	Bonding and Insurance	LS	1	$30,000.00	$30,000
3.	River Dr. Lift Station Pump Upgrades	LS	1	$250,000.00	$250,000
4.	12" PVC Water Main, DR 18	LF	7,775	$60.00	$466,500
5.	Connect to Existing Force Main	EA	2	$3,000.00	$6,000
6.	12" 90° Bend, MJ	EA	1	$1,500.00	$1,500
7.	12" 45° Bend, MJ	EA	2	$1,400.00	$2,800
8.	Upgrade/Replace Sioux Laundry Lift Station	LS	1	$300,000.00	$300,000
9.	Remove Pavement	SY	694	$10.00	$6,944
10.	Remove Curb and Gutter	LF	200	$10.00	$2,000
11.	Subgrade Preparation	SY	900	$15.00	$13,500
12.	6" Concrete Pavement	SY	694	$80.00	$55,556
13.	Remove Concrete Sidewalk	SF	2,000	$5.00	$10,000
14.	4" Concrete Sidewalk	SF	2,000	$10.00	$20,000
15.	Straw Wattle	LF	7,775	$3.00	$23,325
16.	Seeding, Fertilizer and Mulch	ACRE	4.5	$5,000.00	$22,311
			Construction Subtotal	Group A	$1,331,940
			Contingency	10%	$133,200
			Total Opinion of Construction Cost - Group A		**$1,465,140**
GROUP B - Flynn Lift Station Upgrades and Forcemain Reroute to Waters Rd. Flow Control Structure					
1.	Mobilization	LS	1	$69,000.00	$69,000
2.	Bonding and Insurance	LS	1	$17,000.00	$17,000
3.	Flynn Lift Station Pump Upgrades	LS	1	$200,000.00	$200,000
4.	Flynn Lift Station Electrical and Generator Upgrades	LS	1	$150,000.00	$150,000
5.	16" PVC Water Main, DR 18	LF	1,300	$65.00	$84,500
6.	16" PVC Water Main, DR 18, RJ, Directionally Bored	LF	800	$150.00	$120,000
7.	16" 90° Bend, MJ	EA	3	$1,500.00	$4,500
8.	16" 45° Bend, MJ	EA	2	$1,400.00	$2,800
9.	Connect to Existing Force Main	EA	2	$3,000.00	$6,000
10.	24" Steel Casing, 0.375" Thickness, Jack and Bore	LF	150	$400.00	$60,000
11.	Remove Pavement	SY	128	$10.00	$1,278
12.	Subgrade Preparation	SY	128	$15.00	$1,917
13.	6" Concrete Pavement	SY	83	$80.00	$6,667
14.	Asphalt Concrete	TONS	174	$150.00	$26,100
15.	Straw Wattle	LF	1,300	$3.00	$3,900
16.	Seeding, Fertilizer and Mulch	ACRE	0.7	$5,000.00	$3,730
			Construction Subtotal	Group B	$757,400
			Contingency	10%	$75,740
			Total Opinion of Construction Cost - Group B		**$833,140**
GROUP C - Suncoast Lift Station Forcemain Reroute to Waters Rd. Flow Control Structure					
1.	Mobilization	LS	1	$115,500.00	$115,500
2.	Bonding and Insurance	LS	1	$33,500.00	$33,500
3.	Suncoast Lift Station Pump Upgrades	LS	1	$25,000.00	$25,000
4.	Lakeshore Lift Station Pump Upgrades	LS	1	$150,000.00	$150,000
5.	Connect to Existing Sanitary Sewer Main	EA	3	$3,000.00	$9,000
6.	10" PVC Water Main, DR 18	LF	8,600	$50.00	$430,000
7.	10" PVC Water Main, DR 18, RJ, Directionally Bored	LF	500	$75.00	$37,500

8.	10" 45° Bend, MJ	EA	4	$700.00	$2,800
9.	10" 90° Bend, MJ	EA	4	$900.00	$3,600
10.	18" Steel Casing, 0.250" Thickness, Jack and Bore	LF	350	$350.00	$122,500
11.	Remove Pavement	SY	1,939	$10.00	$19,389
12.	Subgrade Preparation	SY	1,939	$15.00	$29,083
13.	6" Concrete Pavement	SY	1,883	$80.00	$150,667
14.	Asphalt Concrete	TONS	218	$150.00	$32,625
15.	Basic Drive Replacement	EA	8	$7,500.00	$60,000
16.	Extensive Drive/Road Replacement	EA	5	$15,000.00	$75,000
17.	Remove Concrete Sidewalk	SF	8,750	$5.00	$43,750
18.	4" Concrete Sidewalk	SF	8,750	$10.00	$87,500
19.	Straw Wattle	LF	8,600	$3.00	$25,800
20.	Seeding, Fertilizer and Mulch	ACRE	4.9	$5,000.00	$24,679
			Construction Subtotal	Group C	$1,477,900
			Contingency	10%	$147,790
			Total Opinion of Construction Cost - Group C		**$1,625,690**
GROUP D - Forcemain from Waters Rd. Flow Control Structure to New WWTF (Site C)					
1.	Mobilization	LS	1	$94,000.00	$94,000
2.	Bonding and Insurance	LS	1	$23,000.00	$23,000
3.	Forcemain Valve Vault	LS	1	$200,000.00	$200,000
4.	16" PVC Water Main, DR 18	LF	8,000	$75.00	$600,000
5.	16" PVC Water Main, DR 18, RJ, Directionally Bored	LF	400	$150.00	$60,000
6.	16" 45° Bend, MJ	EA	2	$1,200.00	$2,400
7.	16" 90° Bend, MJ	EA	5	$1,500.00	$7,500
8.	Straw Wattle	LF	8,000	$3.00	$24,000
9.	Seeding, Fertilizer and Mulch	ACRE	4.6	$5,000.00	$22,957
			Construction Subtotal	Group D	$1,033,860
			Contingency	10%	$103,390
			Total Opinion of Construction Cost - Group D		**$1,137,250**
GROUP E - Additional Gravity Effluent to Big Sioux River					
15.	Mobilization	LS	1	$15,000.00	$15,000
16.	Bonding and Insurance	LS	1	$4,000.00	$4,000
17.	24" PVC Sanitary Sewer Main, SDR 35	LF	400	$120.00	$48,000
18.	Gravel Pipe Bedding Allowance	LF	400	$20.00	$8,000
19.	72" Dia. Concrete Manhole	VF	30	$1,250.00	$37,500
20.	Outfall Structure	LS	1	$50,000.00	$50,000
21.	Straw Wattle	LF	400	$3.00	$1,200
22.	Seeding, Fertilizer and Mulch	ACRE	0.2	$5,000.00	$1,148
			Construction Subtotal	Group E	$164,850
			Contingency	10%	$16,490
			Total Opinion of Construction Cost - Group E		**$181,340**
GROUP F - Miscellaneous Support Infrastructure					
5.	Mobilization	LS	1	$46,000.00	$46,000
6.	Bonding and Insurance	LS	1	$11,500.00	$11,500
7.	12" PVC Water Main, DR 18	LF	5,100	$55.00	$280,500
8.	Straw Wattle	LF	5,100	$3.00	$15,300
9.	Seeding, Fertilizer and Mulch	ACRE	2.9	$5,000.00	$14,635
10.	Access Road Subgrade Preparation	SY	5,556	$15.00	$83,333
11.	Access Road Gravel Surface Coarse	TON	1,563	$35.00	$54,688
			Construction Subtotal	Group E	$505,960
			Contingency	10%	$50,600

	Total Opinion of Construction Cost - Group E		**$556,560**
	Construction Subtotal - All Groups		$5,271,910
	Contingency		$527,210
	Total Opinion of Construction Cost - All Groups		**$5,799,120**
PROFESSIONAL SERVICES			
1.	Design Services (Engineering, Survey, Architecture)	15%	$869,900
2.	Overhead (Legal, Fiscal, Etc.)	5%	$263,600
3.	Easement/Right-of-Way Acquisition	$10,000/ac	$60,606
	Subtotal Professional Services		$1,194,106
	Total Opinion of Project Cost		**$6,994,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 4, Collection System to SW Treatment Site C

City of North Sioux City, South Dakota *Date Prepared:*

JEO Project No. 190926.00 *January 29, 2020*

Annual Operations & Maintenance Cost[1] $14,000.00

ANNUAL ELECTRICAL

Additional Energy Head Along Combined FM Route	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Power of Units	20.00	Hp	
	14.92	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$13,100.00**	**per YR**	**$13,100.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

NOTES

1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 4, Collection System to NE Treatment Site C

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $4,311,997

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Collection System to SW Treatment Site C	$ 6,994,000	1.000	$ 6,994,000	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 6,994,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Collection System to SW Treatment Site C	$ 14,000	17.169	$ 240,361	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ 240,361**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1			0.985	$ -	-
2			0.971	$ -	-
3			0.956	$ -	-
4			0.942	$ -	-
5			0.928	$ -	-
6			0.915	$ -	-
7			0.901	$ -	-
8			0.888	$ -	-
9			0.875	$ -	-
10			0.862	$ -	-
11			0.849	$ -	-
12			0.836	$ -	-
13			0.824	$ -	-
14			0.812	$ -	-
15			0.800	$ -	-
16			0.788	$ -	-
17			0.776	$ -	-
18			0.765	$ -	-
19			0.754	$ -	-
20			0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ -**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Collection System to SW Treatment Site C	$ 3,936,000	-0.742	$ (2,922,364)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (2,922,364)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 5A
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
GROUP A - New Forcemain from River Dr. Lift Station to Casey's Lift Station					
1.	Mobilization	LS	1	$87,000.00	$87,000
2.	Bonding and Insurance	LS	1	$21,500.00	$21,500
3.	12" PVC Water Main, DR 18	LF	5,250	$60.00	$315,000
4.	12" 45° Bend, MJ	EA	4	$900.00	$3,600
5.	12" 90° Bend, MJ	EA	10	$1,100.00	$11,000
6.	Connect to Existing Force Main	EA	1	$3,000.00	$3,000
7.	20" Steel Casing, 0.375" Thickness, Jack and Bore	LF	500	$500.00	$250,000
8.	Remove Pavement	SY	847	$10.00	$8,467
9.	Remove Curb and Gutter	LF	180	$10.00	$1,800
10.	Subgrade Preparation	SY	847	$15.00	$12,700
11.	6" Concrete Pavement	SY	847	$80.00	$67,733
12.	Basic Drive Replacement	EA	10	$5,000.00	$50,000
13.	Extensive Drive Replacement	EA	10	$10,000.00	$100,000
14.	Straw Wattle	LF	5,250	$3.00	$15,750
15.	Seeding, Fertilizer and Mulch	ACRE	1.5	$5,000.00	$7,533
			Construction Subtotal	Group A	$955,090
			Contingency	10%	$95,510
			Total Opinion of Construction Cost - Group A		**$1,050,600**
GROUP B - Streeter Dr. Lift Station Forcemain Reroute to Streeter Drive					
1.	Mobilization	LS	1	$10,500.00	$10,500
2.	Bonding and Insurance	LS	1	$2,500.00	$2,500
3.	6" PVC Water Main, DR 18	LF	200	$40.00	$8,000
2.	6" PVC Force Main, DR 18, RJ, Directionally Bored	LF	2,000	$35.00	$70,000
5.	Connect to Existing Force Main	EA	1	$1,500.00	$1,500
6.	Remove Pavement	SY	167	$10.00	$1,667
7.	Subgrade Preparation	SY	167	$15.00	$2,500
8.	6" Concrete Pavement	SY	167	$80.00	$13,333
9.	Straw Wattle	LF	200	$3.00	$600
10.	Seeding, Fertilizer and Mulch	ACRE	0.1	$5,000.00	$574
			Construction Subtotal	Group B	$111,180
			Contingency	10%	$11,120
			Total Opinion of Construction Cost - Group B		**$122,300**
GROUP C - South Trunk Gravity Sewer from Casey's Lift Station to New Lift Station at N. Shay Rd.					
1.	Mobilization	LS	1	$148,000.00	$148,000
2.	Bonding and Insurance	LS	1	$36,500.00	$36,500
3.	21" PVC Sanitary Sewer Main, SDR 26	LF	3,200	$200.00	$640,000
4.	24" PVC Sanitary Sewer Main, SDR 26	LF	1,300	$225.00	$292,500
5.	Gravel Pipe Bedding Allowance	LF	4,500	$20.00	$90,000
6.	Connect to Existing Sanitary Sewer Main	EA	1	$3,000.00	$3,000
7.	72" Dia. Concrete Manhole	VF	150	$900.00	$135,000
8.	Remove Pavement	SY	1,883	$35.00	$65,917
9.	Subgrade Preparation	SY	1,883	$25.00	$47,083
10.	6" Concrete Pavement	SY	1,883	$80.00	$150,667
11.	Straw Wattle	LF	3,200	$3.00	$9,600
12.	Seeding, Fertilizer and Mulch	ACRE	1.8	$5,000.00	$9,183
			Construction Subtotal	Group C	$1,627,450
			Contingency	10%	$162,750

				Total Opinion of Construction Cost - Group C	**$1,790,200**
GROUP D - Revised Suncoast Forcemain to South Trunk Gravity Sewer					
1.	Mobilization	LS	1	$120,500.00	$120,500
2.	Bonding and Insurance	LS	1	$29,500.00	$29,500
3.	10" PVC Water Main, DR 18	LF	18,250	$50.00	$912,500
4.	10" PVC Water Main, DR 18, RJ, Directionally Bored	LF	1,250	$75.00	$93,750
5.	10" 22.5° Bend, MJ	EA	5	$700.00	$3,500
6.	10" 90° Bend, MJ	EA	10	$900.00	$9,000
7.	Remove Pavement	SY	444	$15.00	$6,667
8.	Subgrade Preparation	SY	444	$15.00	$6,667
9.	6" Concrete Pavement	SY	444	$80.00	$35,556
10.	Straw Wattle	LF	18,250	$3.00	$54,750
11.	Seeding, Fertilizer and Mulch	ACRE	10.5	$5,000.00	$52,370
				Construction Subtotal Group D	$1,324,760
				Contingency 10%	$132,480
				Total Opinion of Construction Cost - Group D	**$1,457,240**
GROUP E - New Lift Station at Shay Rd. and Forcemain to South Sioux City (Site D)					
1.	Mobilization	LS	1	$968,500.00	$968,500
2.	Bonding and Insurance	LS	1	$236,500.00	$236,500
3.	Structural Excavation (Sheeting/Walers/Supports)	LS	1	$250,000.00	$250,000
4.	Structural Concrete (Wet Well/Dry Well)	CY	380	$1,000.00	$380,000
5.	New Quadruplex Lift Station Pumps and Controller	LS	1	$350,000.00	$350,000
6.	12" Gate Valve, FL	EA	4	$3,000.00	$12,000
7.	12" Check Valve, FL	EA	4	$4,500.00	$18,000
8.	12" to 18" DIP Header	LS	1	$50,000.00	$50,000
9.	Misc. Dry Well Items/Lights/Stairs/Sump/Blower	LS	1	$75,000.00	$75,000
10.	Backfill	LS	1	$25,000.00	$25,000
11.	8' Chain Link Fence	LF	280	$25.00	$7,000
12.	16' Wide Double Leaf Gates	EA	1	$2,500.00	$2,500
13.	Emergency Generator	LS	1	$150,000.00	$150,000
14.	Utility Power Supply	LS	1	$100,000.00	$100,000
15.	12" PVC Water Main, DR 18	LF	650	$55.00	$35,750
16.	Straw Wattle	LF	650	$3.00	$1,950
17.	Seeding, Fertilizer and Mulch	ACRE	0.4	$5,000.00	$1,865
18.	30" DR9 IPS HDPE Pipe	LF	34,380	$200.00	$6,876,000
19.	30" 90° Bend, HDPE	EA	7	$10,000.00	$70,000
20.	30" 45° Bend, HDPE	EA	5	$8,000.00	$40,000
21.	30" DR9 IPS HDPE Pipe, Directionally Bored	LF	2,500	$400.00	$1,000,000
				Construction Subtotal Group E	$10,650,070
				Contingency 40%	$4,260,030
				Total Opinion of Construction Cost - Group E	**$14,910,100**
				Construction Subtotal - All Groups	$14,668,550
				Contingency	$4,661,890
				Total Opinion of Construction Cost - All Groups	**$19,330,440**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			20%	$3,866,100
2.	Overhead (Legal, Fiscal, Etc.)			5%	$733,430
3.	Easement/Right-of-Way Acquisition			$10,000/ac	$375,207
				Subtotal Professional Services	$4,974,737
				Total Opinion of Project Cost	**$24,306,000**

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ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 5A, Collection System to South Sioux City Site D

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Annual Operations & Maintenance Cost[1] — $34,000.00

ANNUAL ELECTRICAL

N. Shay Rd. Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Power of Units	30.00	Hp	
	22.38	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$19,650.00**	**per YR**	**$19,650.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$7,280.00**	**per YR**	**$7,280.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**16**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$840.00**	**per YR**	**$840.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$5,616.00**	**per YR**	**$5,620.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**8**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$324.00**	**per YR**	**$325.00 per YR**

NOTES

1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 5A, Collection System to SSC Treatment Site D

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $15,823,509

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Collection System to SSC Treatment Site D (Marina Inn L.S.)	$ 24,306,000	1.000	$ 24,306,000	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 24,306,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Collection System to SSC Treatment Site D (Marina Inn L.S.)	$ 34,000	17.169	$ 583,734	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ 583,734**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1			0.985	$ -	-
2			0.971	$ -	-
3			0.956	$ -	-
4			0.942	$ -	-
5	Telemetry Devices	$ 1,500	0.928	$ 1,392	-
6			0.915	$ -	-
7			0.901	$ -	-
8			0.888	$ -	-
9			0.875	$ -	-
10	Pump Replacement	$ 35,000	0.862	$ 30,158	-
11			0.849	$ -	-
12			0.836	$ -	-
13			0.824	$ -	-
14			0.812	$ -	-
15	Telemetry Devices	$ 1,500	0.800	$ 1,200	-
16			0.788	$ -	-
17			0.776	$ -	-
18			0.765	$ -	-
19			0.754	$ -	-
20	Pump Replacement	$ 35,000	0.742	$ 25,986	-
				Subtotal of Present Worth Project Cost	**$ 58,737**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Collection System to SSC Treatment Site D (Marina Inn L.S.)	$ 12,290,000	-0.742	$ (9,124,961)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (9,124,961)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 5B
North Sioux City, South Dakota
JEO Project No. 190926.00

Date Prepared:
January 29, 2020

ESTIMATE OF QUANTITIES

Item #	Description	Unit	Quantity	Unit Price	Total
GROUP A - New Forcemain from River Dr. Lift Station to Casey's Lift Station					
1.	Mobilization	LS	1	$87,000.00	$87,000
2.	Bonding and Insurance	LS	1	$21,500.00	$21,500
3.	12" PVC Water Main, DR 18	LF	5,250	$60.00	$315,000
4.	12" 45° Bend, MJ	EA	4	$900.00	$3,600
5.	12" 90° Bend, MJ	EA	10	$1,100.00	$11,000
6.	Connect to Existing Force Main	EA	1	$3,000.00	$3,000
7.	20" Steel Casing, 0.375" Thickness, Jack and Bore	LF	500	$500.00	$250,000
8.	Remove Pavement	SY	847	$10.00	$8,467
9.	Remove Curb and Gutter	LF	180	$10.00	$1,800
10.	Subgrade Preparation	SY	847	$15.00	$12,700
11.	6" Concrete Pavement	SY	847	$80.00	$67,733
12.	Basic Drive Replacement	EA	10	$5,000.00	$50,000
13.	Extensive Drive Replacement	EA	10	$10,000.00	$100,000
14.	Straw Wattle	LF	5,250	$3.00	$15,750
15.	Seeding, Fertilizer and Mulch	ACRE	1.5	$5,000.00	$7,533
			Construction Subtotal	Group A	$955,090
			Contingency	10%	$95,510
			Total Opinion of Construction Cost - Group A		**$1,050,600**
GROUP B - Streeter Dr. Lift Station Forcemain Reroute to Streeter Drive					
1.	Mobilization	LS	1	$10,500.00	$10,500
2.	Bonding and Insurance	LS	1	$2,500.00	$2,500
3.	6" PVC Water Main, DR 18	LF	200	$40.00	$8,000
4.	6" PVC Force Main, DR 18, RJ, Directionally Bored	LF	2,000	$35.00	$70,000
5.	Connect to Existing Force Main	EA	1	$1,500.00	$1,500
6.	Remove Pavement	SY	167	$10.00	$1,667
7.	Subgrade Preparation	SY	167	$15.00	$2,500
8.	6" Concrete Pavement	SY	167	$80.00	$13,333
9.	Straw Wattle	LF	200	$3.00	$600
10.	Seeding, Fertilizer and Mulch	ACRE	0.1	$5,000.00	$574
			Construction Subtotal	Group B	$111,180
			Contingency	10%	$11,120
			Total Opinion of Construction Cost - Group B		**$122,300**
GROUP C - South Trunk Gravity Sewer from Casey's Lift Station to New Lift Station at N. Shay Rd.					
1.	Mobilization	LS	1	$148,000.00	$148,000
2.	Bonding and Insurance	LS	1	$36,500.00	$36,500
3.	21" PVC Sanitary Sewer Main, SDR 26	LF	3,200	$200.00	$640,000
4.	24" PVC Sanitary Sewer Main, SDR 26	LF	1,300	$225.00	$292,500
5.	Gravel Pipe Bedding Allowance	LF	4,500	$20.00	$90,000
6.	Connect to Existing Sanitary Sewer Main	EA	1	$3,000.00	$3,000
7.	72" Dia. Concrete Manhole	VF	150	$900.00	$135,000
8.	Remove Pavement	SY	1,883	$35.00	$65,917
9.	Subgrade Preparation	SY	1,883	$25.00	$47,083
10.	6" Concrete Pavement	SY	1,883	$80.00	$150,667
11.	Straw Wattle	LF	3,200	$3.00	$9,600
12.	Seeding, Fertilizer and Mulch	ACRE	1.8	$5,000.00	$9,183
			Construction Subtotal	Group C	$1,627,450
			Contingency	10%	$162,750

				Total Opinion of Construction Cost - Group C	**$1,790,200**
GROUP D - Revised Suncoast Forcemain to South Trunk Gravity Sewer					
1.	Mobilization	LS	1	$120,500.00	$120,500
2.	Bonding and Insurance	LS	1	$29,500.00	$29,500
3.	10" PVC Water Main, DR 18	LF	18,250	$50.00	$912,500
4.	10" PVC Water Main, DR 18, RJ, Directionally Bored	LF	1,250	$75.00	$93,750
5.	10" 22.5° Bend, MJ	EA	5	$700.00	$3,500
6.	10" 90° Bend, MJ	EA	10	$900.00	$9,000
7.	Remove Pavement	SY	444	$15.00	$6,667
8.	Subgrade Preparation	SY	444	$15.00	$6,667
9.	6" Concrete Pavement	SY	444	$80.00	$35,556
10.	Straw Wattle	LF	18,250	$3.00	$54,750
11.	Seeding, Fertilizer and Mulch	ACRE	10.5	$5,000.00	$52,370
				Construction Subtotal Group D	$1,324,760
				Contingency 10%	$132,480
				Total Opinion of Construction Cost - Group D	**$1,457,240**
GROUP E - New Lift Station at Shay Rd. and Forcemain to South Sioux City (Site D)					
1.	Mobilization	LS	1	$1,086,500.00	$1,086,500
2.	Bonding and Insurance	LS	1	$265,000.00	$265,000
3.	Structural Excavation (Sheeting/Walers/Supports)	LS	1	$250,000.00	$250,000
4.	Structural Concrete (Wet Well/Dry Well)	CY	380	$1,000.00	$380,000
5.	New Quadruplex Lift Station Pumps and Controller	LS	1	$350,000.00	$350,000
6.	12" Gate Valve, FL	EA	4	$3,000.00	$12,000
7.	12" Check Valve, FL	EA	4	$4,500.00	$18,000
8.	12" to 18" DIP Header	LS	1	$50,000.00	$50,000
9.	Misc. Dry Well Items/Lights/Stairs/Sump/Blower	LS	1	$75,000.00	$75,000
10.	Backfill	LS	1	$25,000.00	$25,000
11.	8' Chain Link Fence	LF	280	$25.00	$7,000
12.	16' Wide Double Leaf Gates	EA	1	$2,500.00	$2,500
13.	Emergency Generator	LS	1	$150,000.00	$150,000
14.	Utility Power Supply	LS	1	$100,000.00	$100,000
15.	12" PVC Water Main, DR 18	LF	650	$55.00	$35,750
16.	Straw Wattle	LF	650	$3.00	$1,950
17.	Seeding, Fertilizer and Mulch	ACRE	0.4	$5,000.00	$1,865
18.	30" DR9 IPS HDPE Pipe	LF	39,750	$200.00	$7,950,000
19.	30" 90° Bend, HDPE	EA	15	$10,000.00	$150,000
20.	30" 45° Bend, HDPE	EA	5	$8,000.00	$40,000
21.	30" DR9 IPS HDPE Pipe, Directionally Bored	LF	2,500	$400.00	$1,000,000
				Construction Subtotal Group E	$11,950,570
				Contingency 40%	$4,780,230
				Total Opinion of Construction Cost - Group E	**$16,730,800**
				Construction Subtotal - All Groups	$15,969,050
				Contingency	$5,182,090
				Total Opinion of Construction Cost - All Groups	**$21,151,140**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			20%	$4,230,300
2.	Overhead (Legal, Fiscal, Etc.)			5%	$798,450
3.	Easement/Right-of-Way Acquisition			$10,000/ac	$412,190
				Subtotal Professional Services	$5,440,940
				Total Opinion of Project Cost	**$26,593,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 5B, Collection System to South Sioux City Site D

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Annual Operations & Maintenance Cost[1] — $34,000.00

ANNUAL ELECTRICAL

N. Shay Rd. Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Power of Units	30.00	Hp	
	22.38	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$19,650.00**	**per YR**	**$19,650.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$7,280.00**	**per YR**	**$7,280.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**16**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$840.00**	**per YR**	**$840.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**4**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$5,616.00**	**per YR**	**$5,620.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**8**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$324.00**	**per YR**	**$325.00 per YR**

NOTES

1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 5B, Collection System to SSC Treatment Site D

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $17,253,698

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Collection System to SSC Treatment Site D (164th St. L.S.)	$ 26,593,000	1.000	$ 26,593,000	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 26,593,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Collection System to SSC Treatment Site D (164th St. L.S.)	$ 34,000	17.169	$ 583,734	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ 583,734**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1			0.985	$ -	-
2			0.971	$ -	-
3			0.956	$ -	-
4			0.942	$ -	-
5	Telemetry Devices	$ 1,500	0.928	$ 1,392	-
6			0.915	$ -	-
7			0.901	$ -	-
8			0.888	$ -	-
9			0.875	$ -	-
10	Pump Replacement	$ 35,000	0.862	$ 30,158	-
11			0.849	$ -	-
12			0.836	$ -	-
13			0.824	$ -	-
14			0.812	$ -	-
15	Telemetry Devices	$ 1,500	0.800	$ 1,200	-
16			0.788	$ -	-
17			0.776	$ -	-
18			0.765	$ -	-
19			0.754	$ -	-
20	Pump Replacement	$ 35,000	0.742	$ 25,986	-
				Subtotal of Present Worth Project Cost	**$ 58,737**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Collection System to SSC Treatment Site D (164th St. L.S.)	$ 13,444,000	-0.742	$ (9,981,772)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (9,981,772)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 6, Sequencing Batch Reactor
North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

ESTIMATE OF QUANTITIES - SBR WWTF

Item #	Description	Unit	Quantity	Unit Price	Total
Group A: General, Site Work, Site Water Piping, Sidewalks, Seeding, Etc.					
1.	Mobilization	LS	1	$1,120,000.00	$1,120,000
2.	Bonding and Insurance	LS	1	$224,000.00	$224,000
3.	Earthwork Measured in Embankment	CY	1,500	$15.00	$22,500
4.	Site Grading	CY	2,000	$8.00	$16,000
5.	Stripping and Topsoiling	CY	2,000	$5.00	$10,000
6.	Clearing and Grubbing	LS	1	$3,500.00	$3,500
7.	Erosion Control	LS	1	$5,000.00	$5,000
8.	Seeding, Fertilizer and Mulch	ACRE	5	$3,500.00	$17,500
9.	6" Concrete Pavement	SY	1,400	$65.00	$91,000
10.	Subgrade Preparation	SY	3,000	$7.00	$21,000
11.	Gravel Surface Course	TONS	1,000	$35.00	$35,000
12.	4" Concrete Sidewalk	SF	2,400	$15.00	$36,000
13.	6" PVC Water Main, DR 18	LF	100	$25.00	$2,500
14.	1" Yard Hydrant	EA	5	$750.00	$3,750
15.	2" PE Water Service (SDR 7)	LF	1,000	$20.00	$20,000
16.	8' Chain Link Fence w/ Barbed Wire	LF	1,600	$25.00	$40,000
17.	16' Wide Double Leaf Gates	EA	3	$2,500.00	$7,500
18.	Valves, Gates, Misc. Fittings	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group A	$1,725,250
			Contingency	10%	$172,530
			Total Opinion of Construction Cost - Group A		**$1,897,780**
Group B: Site Piping					
1.	21" PVC Sanitary Sewer Main, PS 46	LF	150	$100.00	$15,000
2.	60" Dia. Concrete Manhole	VF	100	$1,500.00	$150,000
3.	6" PVC Force Main, DR 18	LF	200	$25.00	$5,000
4.	Air Piping	LS	1	$35,000.00	$35,000
5.	Gravity Transfer Piping	LS	1	$25,000.00	$25,000
6.	48" Dia. Concrete Manhole	VF	60	$350.00	$21,000
			Construction Subtotal	Group B	$251,000
			Contingency	10%	$25,100
			Total Opinion of Construction Cost - Group B		**$276,100**
Group C: Headworks Screening & Grit System					
1.	Headworks Building w/ Block Exterior	SF	1,750	$200.00	$350,000
2.	Lab Room w/Equipment, Storage, Restroom, Workstation	LS	1	$350,000.00	$350,000
3.	Excavation, Established Quantity	CY	500	$15.00	$7,500
4.	Structural Concrete (Foundation & Channels)	CY	125	$1,000.00	$125,000
5.	Parshall Flume, Flow Meter, & Bypass Bar Rack	LS	1	$15,000.00	$15,000
6.	Inclined Fine Screen	LS	1	$250,000.00	$250,000
7.	Piping, Valves, Etc.	LS	1	$150,000.00	$150,000
8.	Misc. Metals, Grating, Handrail, etc.	LS	1	$75,000.00	$75,000
9.	General Electrical	LS	1	$200,000.00	$200,000
10.	General Mechanical	LS	1	$85,000.00	$85,000
11.	Controls	LS	1	$125,000.00	$125,000
12.	Vortex Grit Basin Structural Concrete	CY	80	$1,500.00	$120,000
13.	Grit Basin Equipment	LS	1	$300,000.00	$300,000
14.	Grit Pump	LS	1	$25,000.00	$25,000
15.	Influent H2S Blower, Air Piping, and Diffusers	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group C	$2,227,500

			Contingency	10%	$222,750
			Total Opinion of Construction Cost - Group C		**$2,450,250**
Group D: Sequencing Batch Reactor Treatment System (3 Cell)					
1.	Pre-Aeration/EQ Tank	CY	943	$1,000.00	$942,848
2.	Pre-Aeration Equipment	LS	1	$300,000.00	$300,000
3.	Structural Concrete	CY	1,022	$1,000.00	$1,022,000
4.	Excavation, Established Quantity	CY	12,000	$12.50	$150,000
5.	SBR Equipment	LS	1	$1,200,000.00	$1,200,000
6.	Misc. Metals, Grating, Handrail, etc.	LS	1	$50,000.00	$50,000
7.	Effluent Equalization Chamber & Equipment	LS	1	$100,000.00	$100,000
8.	Electrical	LS	1	$250,000.00	$250,000
			Construction Subtotal	Group D	$4,014,850
			Contingency	10%	$401,490
			Total Opinion of Construction Cost - Group D		**$4,416,340**
Group E: Aerobic Digesters & Dewatering					
1.	Digester Equipment	LS	1	$200,000.00	$200,000
2.	Structual Concrete, Digesters	CY	752	$800.00	$601,600
3.	Excavation, Established Quantity	CY	8,400	$12.50	$105,000
4.	Misc. Metals, Grating, Handrail, etc.	LS	1	$25,000.00	$25,000
5.	Dewatering Building w/ Block Exterior	SF	1,200	$200.00	$240,000
6.	Sludge Pump	EA	2	$15,000.00	$30,000
7.	Belt Filter Press	EA	2	$250,000.00	$500,000
8.	Polymer Feed System	LS	2	$30,000.00	$60,000
9.	Sludge Drying Pad	SY	150	$100.00	$15,000
10.	Sludge Load Out Stand	LS	1	$20,000.00	$20,000
11.	Piping and Valves	LS	1	$20,000.00	$20,000
12.	Mechanical	LS	1	$30,000.00	$30,000
13.	Electrical	LS	1	$100,000.00	$100,000
14.	6" Concrete Pavement	SY	250	$80.00	$20,000
15.	Subgrade Preparation	SY	250	$10.00	$2,500
			Construction Subtotal	Group E	$1,969,100
			Contingency	10%	$196,910
			Total Opinion of Construction Cost - Group E		**$2,166,010**
Group F: Ultraviolet Disinfection System					
1.	UV Disinfection Basin Concrete	CY	125	$1,250.00	$156,250
2.	UV Disinfection Equipment	LS	1	$300,000.00	$300,000
3.	Misc. Metals	LS	1	$10,000.00	$10,000
4.	Electrical	LS	1	$25,000.00	$25,000
5.	Dry Storage Racks	LS	1	$15,000.00	$15,000
			Construction Subtotal	Group F	$506,250
			Contingency	10%	$50,630
			Total Opinion of Construction Cost - Group F		**$556,880**
Group G: Electrical and Instrumentation & Controls					
1.	Ductbank and Site Electrical	LS	1	$250,000.00	$250,000
2.	Local Devices, Switches, RTUs, Disconnects	LS	1	$150,000.00	$150,000
3.	MCC in Headworks Building	LS	1	$500,000.00	$500,000
4.	Padmount Backup Generator	LS	1	$250,000.00	$250,000
5.	SCADA Integration w/SBR Equip. & Others	LS	1	$300,000.00	$300,000
6.	Utility Power Supply	LS	1	$150,000.00	$150,000
			Construction Subtotal	Group G	$1,600,000
			Contingency	10%	$160,000
			Total Opinion of Construction Cost - Group G		**$1,760,000**
Group H: Demolition of Existing WWTF					
1.	Demolition	LS	1	$35,000.00	$35,000
2.	Clearing and Grubbing	LS	1	$3,000.00	$3,000

3.	Stripping and Topsoiling	CY	3,000	$5.00	$15,000
4.	Topsoil in Place	CY	2,000	$8.00	$16,000
5.	Seeding, Fertilizer and Mulch	ACRE	3	$3,500.00	$10,500
6.	Erosion Control	LS	1	$3,500.00	$3,500
7.	Lagoon Sludge Disposal	GAL	433,000	$0.50	$216,500
				Construction Subtotal Group H	$299,500
				Contingency 10%	$29,950
				Total Opinion of Construction Cost - Group H	**$329,450**
				Construction Subtotal - All Groups	$12,593,450
				Contingency	$1,259,360
				Total Opinion of Construction Cost - All Groups	**$13,852,810**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			12.5%	$1,574,190
2.	Overhead (Legal, Fiscal, Etc.)			2%	$251,870
3.	Land Acquisition			10 Acres	$100,000
				Subtotal Professional Services	$1,926,060
				Total Opinion of Project Cost	**$15,779,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

Prepared By: A. Burke

Checked By:

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
2019 Wastewater Facility Plan Update - Alternative 6, SBR Treatment System
City of North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

Annual Operations & Maintenance Cost[1] $211,700.00

ANNUAL INFLUENT SAMPLING

Influent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	52	$23.00	**$1,200.00 per YR**
TSS	52	$12.00	**$625.00 per YR**
TKN	52	$43.00	**$2,240.00 per YR**
TN	0	$43.00	**$0.00 per YR**
TP	0	$13.00	**$0.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Miscellaneous Samples	10	$500.00	**$5,000.00 per YR**

ANNUAL EFFLUENT SAMPLING

Effluent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	52	$23.00	**$1,200.00 per YR**
TSS	52	$12.00	**$625.00 per YR**
Ammonia	52	$17.00	**$885.00 per YR**
TN	4	$43.00	**$175.00 per YR**
TP	4	$19.00	**$80.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Dissolved Oxygen (Onsite)	52	$0.00	**$0.00 per YR**
E. coli	52	$22.00	**$1,145.00 per YR**

ANNUAL CHEMICAL COST

Digested Solids Polymer	Quantity		Annual Cost
Annual Mass of Polymer	2000	LB	
- Unit Price for Treatment	$2.50	per LB	
Annual Subtotal	**$5,000.00**	**per YR**	**$5,000.00 per YR**

Demo Chlorination @ Ex. Lagoon (avg of prev. 3 years)	Quantity		Annual Cost
Annual Subtotal	**-$16,300.00**	**per YR**	**-$16,300.00 per YR**

ANNUAL ELECTRICAL

Grit Mixer Motor	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$3,270.00**	**per YR**	**$3,270.00 per YR**

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
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Grit Pump Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	4	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$1,635.00**	**per YR**	**$1,635.00 per YR**

Grit Classifier Screw Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$275.00**	**per YR**	**$275.00 per YR**

SBR Transfer Pumps	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	12	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$4,905.00**	**per YR**	**$4,905.00 per YR**

SBR Jet Motive Pumps	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	50.0	Hp	
	37.3	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$32,675.00**	**per YR**	**$32,675.00 per YR**

Aeration Blowers	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	85.0	Hp	
	63.4	kW	
- Estimated Daily Unit Run-Time	19	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$44,440.00**	**per YR**	**$44,440.00 per YR**

WAS Pump	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	4	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	

Annual Subtotal	**$545.00**	**per YR**	**$545.00 per YR**
Digester Transfer Pump	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	10.0	Hp	
	7.5	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$545.00**	**per YR**	**$545.00 per YR**
Belt Filter Press & Conveyor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	1	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$685.00**	**per YR**	**$685.00 per YR**
Ultraviolet Disinfection	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	kW	
- Estimated Unit Run-Time	24	HR per DAY	
	210	DAYS per YEAR	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$2,520.00**	**per YR**	**$2,520.00 per YR**
Effluent Lift Station	**Quantity**		**Annual Cost**
Number of Units Normally Operating	2	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$8,170.00**	**per YR**	**$8,170.00 per YR**
General WWTF Electrical Loads	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Horsepower of Units	5.0	kW	
- Estimated Operating Point of Units	100%	<-12 Months	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$4,400.00**	**per YR**	**$4,400.00 per YR**
Demolish Blowers at Ex. Lagoon	**Quantity**		**Annual Cost**
Number of Units Normally Operating	-2	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
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City of North Sioux City, South Dakota *Date Prepared:*
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- Unit Price for Electricity	$0.10	per kWh		
Annual Subtotal	**-$19,600.00**	**per YR**	**-$19,600.00**	**per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	**Quantity**		**Annual Cost**	
Number of Hours per Week	**40**	**HRS per WK**		
- Hourly Wage + Benefits	$35.00	per HR		
Annual Subtotal	**$72,800.00**	**per YR**	**$72,800.00**	**per YR**

Grade 3 Operations Overtime Labor	**Quantity**		**Annual Cost**	
Number of Hours per Year	**20**	**HRS per YR**		
- Overtime Hourly Wage + Benefits	$52.50	per HR		
Annual Subtotal	**$1,050.00**	**per YR**	**$1,050.00**	**per YR**

General Laborer Regular Labor	**Quantity**		**Annual Cost**	
Number of Hours per Week	**20**	**HRS per WK**		
- Hourly Wage + Benefits	$27.00	per HR		
Annual Subtotal	**$28,080.00**	**per YR**	**$28,080.00**	**per YR**

General Laborer Overtime Labor	**Quantity**		**Annual Cost**	
Number of Hours per Year	**0**	**HRS per YR**		
- Overtime Hourly Wage + Benefits	$40.50	per HR		
Annual Subtotal	**$0.00**	**per YR**	**$0.00**	**per YR**

ANNUAL OPERATIONS, MAINTENANCE & REPAIR

OPERATIONS, MAINTENANCE & REPAIR	**Quantity**	**Unit Cost**	**Annual Cost**	
Operating & Office Supplies	1	$500.00	**$500.00**	**per YR**
Personnel Training	1	$1,000.00	**$1,000.00**	**per YR**
Telecommunications & Internet	1	$900.00	**$900.00**	**per YR**
Chemicals	1	$500.00	**$500.00**	**per YR**
Equipment Repair	1	$2,500.00	**$2,500.00**	**per YR**
Vehicle Operations, Maintenance & Repair	0	$5,000.00	**$0.00**	**per YR**
Solids Disposal	12	$1,500.00	**$18,000.00**	**per YR**

Non-Annual Operations & Maintenance Cost[2] (See LCC Analysis for Details)

NOTES
1 - Each Annual Operations & Maintenance subtotal is rounded up to the nearest $5.
2 - Each Non-Annual Operations & Maintenance subtotal budget is rounded up to the nearest $5.
3 - Total O&M Budget is rounded up to the nearest $100.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST
2019 Wastewater Facility Plan Update - Alternative 6, SBR Treatment System
City of North Sioux City, South Dakota — *Date Prepared:*
JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost -$5,600,835

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	SBR Treatment System	$ 15,779,000	1.000	$ 15,779,000	-
0	Surcharge Fee Recovery (no cap ex.)	$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 15,779,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	SBR Treatment System	$ 211,700	17.169	$ 3,634,601	-
0 to 20	Surcharge Fee Recovery (no cap ex.)	$ (273,000)	17.169	$ (4,687,038)	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ (1,052,438)**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1	Non-Annual SC Sewer Charge Recovery	$ (433,620)	0.985	$ (427,212)	-
2		$ (465,650)	0.971	$ (451,989)	-
3	UV Lamp Replacement	$ (497,046)	0.956	$ (475,333)	-
4		$ (536,982)	0.942	$ (505,936)	-
5	Grit Pump Replacement, Telemetry Devices	$ (559,647)	0.928	$ (519,498)	-
6	UV Lamp Replacement	$ (616,242)	0.915	$ (563,579)	-
7		$ (664,983)	0.901	$ (599,168)	-
8	Filter Belt Replacement	$ (708,103)	0.888	$ (628,591)	-
9	UV Lamp Replacement	$ (763,851)	0.875	$ (668,058)	-
10	Blower Core Replacement, Pump Replacements, Telemetry	$ (768,496)	0.862	$ (662,188)	-
11		$ (884,324)	0.849	$ (750,732)	-
12	UV Lamp Replacement	$ (946,646)	0.836	$ (791,763)	-
13		$ (1,019,793)	0.824	$ (840,337)	-
14		$ (1,095,121)	0.812	$ (889,074)	-
15	UV Lamp Replacement, Grit Pump Replacement, Telemetry	$ (1,155,014)	0.800	$ (923,840)	-
16	Filter Belt Replacement	$ (1,256,882)	0.788	$ (990,462)	-
17		$ (1,356,166)	0.776	$ (1,052,908)	-
18	UV Lamp Replacement	$ (1,453,341)	0.765	$ (1,111,678)	-
19		$ (1,563,916)	0.754	$ (1,178,579)	-
20	Blower Core Replacement, Pump Replacements, Telemetry	$ (1,629,437)	0.742	$ (1,209,809)	-
				Subtotal of Present Worth Project Cost	**$ (15,240,733)**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	SBR Treatment System	$ 6,851,000	-0.742	$ (5,086,665)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (5,086,665)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 7, AeroMod
North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

ESTIMATE OF QUANTITIES - Aeromod WWTF

Item #	Description	Unit	Quantity	Unit Price	Total
Group A: General, Site Work, Site Water Piping, Sidewalks, Seeding, Etc.					
1.	Mobilization	LS	1	$1,108,000.00	$1,108,000
2.	Bonding and Insurance	LS	1	$222,000.00	$222,000
3.	Earthwork Measured in Embankment	CY	1,500	$12.00	$18,000
4.	Site Grading	CY	2,000	$8.00	$16,000
5.	Stripping and Topsoiling	CY	2,000	$5.00	$10,000
6.	Clearing and Grubbing	LS	1	$3,500.00	$3,500
7.	Erosion Control	LS	1	$5,000.00	$5,000
8.	Seeding, Fertilizer and Mulch	ACRE	5	$3,500.00	$17,500
9.	6" Concrete Pavement	SY	1,400	$65.00	$91,000
10.	Subgrade Preparation	SY	3,000	$7.00	$21,000
11.	Gravel Surface Course	TONS	1,000	$35.00	$35,000
12.	4" Concrete Sidewalk	SF	2,400	$15.00	$36,000
13.	6" PVC Water Main, DR 18	LF	100	$25.00	$2,500
14.	1" Yard Hydrant	EA	5	$750.00	$3,750
15.	2" PE Water Service (SDR 7)	LF	1,000	$20.00	$20,000
16.	8' Chain Link Fence w/ Barbed Wire	LF	1,600	$25.00	$40,000
17.	16' Wide Double Leaf Gates	EA	3	$2,500.00	$7,500
18.	Valves, Gates, Misc. Fittings	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group A	$1,706,750
			Contingency	10%	$170,680
			Total Opinion of Construction Cost - Group A		**$1,877,430**
Group B: Site Piping					
1.	18" PVC Sanitary Sewer Main, PS 46	LF	150	$75.00	$11,250
2.	60" Dia. Concrete Manhole	VF	45	$800.00	$36,000
3.	6" PVC Force Main, DR 18	LF	200	$25.00	$5,000
4.	Air Piping	LS	1	$35,000.00	$35,000
5.	Gravity Transfer Piping	LS	1	$25,000.00	$25,000
6.	48" Dia. Concrete Manhole	VF	60	$350.00	$21,000
			Construction Subtotal	Group B	$133,250
			Contingency	10%	$13,330
			Total Opinion of Construction Cost - Group B		**$146,580**
Group C: Headworks Lift Station Building & Grit System					
1.	Headworks Building w/ Block Exterior	SF	1,750	$200.00	$350,000
2.	Lab Room w/Equipment, Storage, Restroom, Workstation	LS	1	$350,000.00	$350,000
3.	Excavation, Established Quantity	CY	500	$15.00	$7,500
4.	Structural Concrete (Foundation & Channels)	CY	125	$1,000.00	$125,000
5.	Parshall Flume, Flow Meter, & Bypass Bar Rack	LS	1	$15,000.00	$15,000
6.	Inclined Fine Screen	LS	1	$150,000.00	$150,000
7.	Piping, Valves, Etc.	LS	1	$150,000.00	$150,000
8.	Misc. Metals, Grating, Handrail, etc.	LS	1	$75,000.00	$75,000
9.	General Electrical	LS	1	$200,000.00	$200,000
10.	General Mechanical	LS	1	$85,000.00	$85,000
11.	Controls	LS	1	$125,000.00	$125,000
12.	Vortex Grit Basin Structural Concrete	CY	80	$1,500.00	$120,000
13.	Grit Basin Equipment	LS	1	$300,000.00	$300,000
14.	Grit Pump	LS	1	$25,000.00	$25,000
15.	Influent H2S Blower, Air Piping, and Diffusers	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group C	$2,127,500

			Contingency	10%	$212,750
			Total Opinion of Construction Cost - Group C		**$2,340,250**
Group D: Aeromod Treatment System w/ Digesters (2 Train)					
1.	Structural Concrete	CY	2,574	$1,000.00	$2,574,000
2.	Excavation, Established Quantity	CY	15,000	$12.50	$187,500
3.	Aeromod Equipment	LS	1	$2,400,000.00	$2,400,000
4.	Misc. Metals, Grating, Handrail, etc.	LS	1	$50,000.00	$50,000
5.	Electrical	LS	1	$25,000.00	$25,000
			Construction Subtotal	Group D	$5,236,500
			Contingency	10%	$523,650
			Total Opinion of Construction Cost - Group D		**$5,760,150**
Group E: Sludge Dewatering					
1.	Dewatering Building w/ Block Exterior	SF	1,000	$200.00	$200,000
2.	Sludge Pump	EA	2	$15,000.00	$30,000
3.	Belt Filter Press	EA	2	$250,000.00	$500,000
4.	Polymer Feed System	LS	2	$30,000.00	$60,000
5.	Sludge Drying Pad	SY	150	$100.00	$15,000
6.	Sludge Load Out Stand	LS	1	$20,000.00	$20,000
7.	Piping and Valves	LS	1	$20,000.00	$20,000
8.	Mechanical	LS	1	$15,000.00	$15,000
9.	Electrical	LS	1	$20,000.00	$20,000
10.	6" Concrete Pavement	SY	250	$55.00	$13,750
11.	Subgrade Preparation	SY	250	$7.00	$1,750
			Construction Subtotal	Group E	$895,500
			Contingency	10%	$89,550
			Total Opinion of Construction Cost - Group E		**$985,050**
Group F: Ultraviolet Disinfection System					
1.	UV Disinfection Basin Concrete	CY	125	$1,250.00	$156,250
2.	UV Disinfection Equipment	LS	1	$250,000.00	$250,000
3.	Misc. Metals	LS	1	$10,000.00	$10,000
4.	Electrical	LS	1	$25,000.00	$25,000
1.	Dry Storage Racks	LS	1	$15,000.00	$15,000
			Construction Subtotal	Group F	$456,250
			Contingency	10%	$45,630
			Total Opinion of Construction Cost - Group F		**$501,880**
Group G: Electrical and Instrumentation & Controls					
1.	Ductbank and Site Electrical	LS	1	$250,000.00	$250,000
2.	Local Devices, Switches, RTUs, Disconnects	LS	1	$150,000.00	$150,000
3.	MCC in Headworks Building	LS	1	$500,000.00	$500,000
4.	Padmount Backup Generator	LS	1	$250,000.00	$250,000
5.	SCADA Integration w/AeroMod Equip. & Others	LS	1	$300,000.00	$300,000
6.	Utility Power Supply	LS	1	$150,000.00	$150,000
			Construction Subtotal	Group G	$1,600,000
			Contingency	10%	$160,000
			Total Opinion of Construction Cost - Group G		**$1,760,000**
Group H: Demolition of Existing WWTF					
1.	Demolition	LS	1	$35,000.00	$35,000
2.	Clearing and Grubbing	LS	1	$3,000.00	$3,000
3.	Stripping and Topsoiling	CY	3,000	$5.00	$15,000
4.	Topsoil in Place	CY	2,000	$8.00	$16,000
5.	Seeding, Fertilizer and Mulch	ACRE	3	$3,500.00	$10,500
6.	Erosion Control	LS	1	$3,500.00	$3,500
7.	Lagoon Sludge Disposal	GAL	433,000	$0.50	$216,500
			Construction Subtotal	Group H	$299,500

	Contingency	10%	$29,950
	Total Opinion of Construction Cost - Group H		**$329,450**
	Construction Subtotal - All Groups		$12,455,250
	Contingency		$1,245,540
	Total Opinion of Construction Cost - All Groups		**$13,700,790**
PROFESSIONAL SERVICES			
1.	Design Services (Engineering, Survey, Architecture)	12.5%	$1,556,910
2.	Overhead (Legal, Fiscal, Etc.)	2%	$249,110
3.	Land Acquisition	10 Acres	$100,000
	Subtotal Professional Services		$1,906,020
	Total Opinion of Project Cost		**$15,607,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

Prepared By: A. Burke

Checked By:

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
2019 Wastewater Facility Plan Update - Alternative 7, AeroMod Treatment System
City of North Sioux City, South Dakota *Date Prepared:*
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Annual Operations & Maintenance Cost[1] $228,500.00

ANNUAL INFLUENT SAMPLING

Influent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	52	$23.00	**$1,200.00 per YR**
TSS	52	$12.00	**$625.00 per YR**
TKN	52	$43.00	**$2,240.00 per YR**
TN	0	$43.00	**$0.00 per YR**
TP	0	$13.00	**$0.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Miscellaneous Samples	10	$500.00	**$5,000.00 per YR**

ANNUAL EFFLUENT SAMPLING

Effluent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	52	$23.00	**$1,200.00 per YR**
TSS	52	$12.00	**$625.00 per YR**
Ammonia	52	$17.00	**$885.00 per YR**
TN	4	$43.00	**$175.00 per YR**
TP	4	$19.00	**$80.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Dissolved Oxygen (Onsite)	52	$0.00	**$0.00 per YR**
E. coli	52	$22.00	**$1,145.00 per YR**

ANNUAL CHEMICAL COST

Digested Solids Polymer	Quantity		Annual Cost
Annual Mass of Polymer	2000	LB	
- Unit Price for Treatment	$2.50	per LB	
Annual Subtotal	**$5,000.00**	**per YR**	**$5,000.00 per YR**

Demo Chlorination @ Ex. Lagoon (avg of prev. 3 years)	Quantity		Annual Cost
Annual Subtotal	**-$16,300.00**	**per YR**	**-$16,300.00 per YR**

ANNUAL ELECTRICAL

Grit Mixer Motor	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$3,270.00**	**per YR**	**$3,270.00 per YR**

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
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Grit Pump Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	4	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$1,635.00**	**per YR**	**$1,635.00 per YR**

Grit Classifier Screw Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$275.00**	**per YR**	**$275.00 per YR**

Aeration Blowers	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	150.0	Hp	
	111.9	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$98,025.00**	**per YR**	**$98,025.00 per YR**

Air Lift Compressor for RAS/WAS	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	2.0	Hp	
	1.5	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$1,310.00**	**per YR**	**$1,310.00 per YR**

Digester Transfer Pump	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	10.0	Hp	
	7.5	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$545.00**	**per YR**	**$545.00 per YR**

Belt Filter Press & Conveyor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	1	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	

Annual Subtotal	**$685.00**	**per YR**	**$685.00 per YR**
Ultraviolet Disinfection	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	kW	
- Estimated Unit Run-Time	24	HR per DAY	
	210	DAYS per YEAR	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$2,520.00**	**per YR**	**$2,520.00 per YR**
Effluent Lift Station	**Quantity**		**Annual Cost**
Number of Units Normally Operating	2	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$8,170.00**	**per YR**	**$8,170.00 per YR**
General WWTF Electrical Loads	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Horsepower of Units	5.0	kW	
- Estimated Operating Point of Units	100%	<-12 Months	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$4,400.00**	**per YR**	**$4,400.00 per YR**
Demolish Blowers at Ex. Lagoon	**Quantity**		**Annual Cost**
Number of Units Normally Operating	-2	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**-$19,600.00**	**per YR**	**-$19,600.00 per YR**
ANNUAL LABOR			
Grade 3 Operations Regular Labor	**Quantity**		**Annual Cost**
Number of Hours per Week	**40**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$72,800.00**	**per YR**	**$72,800.00 per YR**
Grade 3 Operations Overtime Labor	**Quantity**		**Annual Cost**
Number of Hours per Year	**20**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$1,050.00**	**per YR**	**$1,050.00 per YR**
General Laborer Regular Labor	**Quantity**		**Annual Cost**

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 7, AeroMod Treatment System

City of North Sioux City, South Dakota — *Date Prepared:*

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Number of Hours per Week	**20**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$28,080.00**	**per YR**	**$28,080.00 per YR**

General Laborer Overtime Labor	**Quantity**		**Annual Cost**
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

ANNUAL OPERATIONS, MAINTENANCE & REPAIR

OPERATIONS, MAINTENANCE & REPAIR	**Quantity**	**Unit Cost**	**Annual Cost**
Operating & Office Supplies	1	$500.00	**$500.00 per YR**
Personnel Training	1	$1,000.00	**$1,000.00 per YR**
Telecommunications & Internet	1	$900.00	**$900.00 per YR**
Chemicals	1	$500.00	**$500.00 per YR**
Equipment Repair	1	$2,500.00	**$2,500.00 per YR**
Vehicle Operations, Maintenance & Repair	0	$5,000.00	**$0.00 per YR**
Solids Disposal	12	$1,500.00	**$18,000.00 per YR**

Non-Annual Operations & Maintenance Cost[2] (See LCC Analysis for Details)

NOTES

1 - Each Annual Operations & Maintenance subtotal is rounded up to the nearest $5.

2 - Each Non-Annual Operations & Maintenance subtotal budget is rounded up to the nearest $5.

3 - Total O&M Budget is rounded up to the nearest $100.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST
2019 Wastewater Facility Plan Update - Alternative 7, AeroMod Treatment System
City of North Sioux City, South Dakota — *Date Prepared:*
JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost -$5,753,626

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	AeroMod Treatment System	$ 15,607,000	1.000	$ 15,607,000	-
0	Surcharge Fee Recovery (no cap ex.)	$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 15,607,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	AeroMod Treatment System	$ 228,500	17.169	$ 3,923,034	-
0 to 20	Surcharge Fee Recovery (no cap ex.)	$ (273,000)	17.169	$ (4,687,038)	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ (764,004)**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1	Non-Annual SC Sewer Charge Recovery	$ (433,620)	0.985	$ (427,212)	-
2		$ (465,650)	0.971	$ (451,989)	-
3	UV Lamp Replacement	$ (497,046)	0.956	$ (475,333)	-
4		$ (536,982)	0.942	$ (505,936)	-
5	Grit Pump Replacement, Telemetry Devices	$ (559,647)	0.928	$ (519,498)	-
6	UV Lamp Replacement	$ (616,242)	0.915	$ (563,579)	-
7		$ (664,983)	0.901	$ (599,168)	-
8	Filter Belt Replacement	$ (708,103)	0.888	$ (628,591)	-
9	UV Lamp Replacement	$ (763,851)	0.875	$ (668,058)	-
10	Blower Core Replacement, Pump Replacements, Telemetry	$ (778,496)	0.862	$ (670,804)	-
11		$ (884,324)	0.849	$ (750,732)	-
12	UV Lamp Replacement	$ (946,646)	0.836	$ (791,763)	-
13		$ (1,019,793)	0.824	$ (840,337)	-
14		$ (1,095,121)	0.812	$ (889,074)	-
15	UV Lamp Replacement, Grit Pump Replacement, Telemetry	$ (1,155,014)	0.800	$ (923,840)	-
16	Filter Belt Replacement	$ (1,256,882)	0.788	$ (990,462)	-
17		$ (1,356,166)	0.776	$ (1,052,908)	-
18	UV Lamp Replacement	$ (1,453,341)	0.765	$ (1,111,678)	-
19		$ (1,563,916)	0.754	$ (1,178,579)	-
20	Blower Core Replacement, Pump Replacements, Telemetry	$ (1,634,437)	0.742	$ (1,213,521)	-
				Subtotal of Present Worth Project Cost	**$ (15,253,062)**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	AeroMod Treatment System	$ 7,197,000	-0.742	$ (5,343,560)	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ (5,343,560)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE COST
2019 Wastewater Facility Plan Update, Alternative 8, Extended Aeration
North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

ESTIMATE OF QUANTITIES - Oxidation Ditch WWTF

Item #	Description	Unit	Quantity	Unit Price	Total
Group A: General, Site Work, Site Water Piping, Sidewalks, Seeding, Etc.					
1.	Mobilization	LS	1	$899,500.00	$899,500
2.	Bonding and Insurance	LS	1	$180,000.00	$180,000
3.	Earthwork Measured in Embankment	CY	1,500	$12.00	$18,000
4.	Site Grading	CY	2,000	$8.00	$16,000
5.	Stripping and Topsoiling	CY	2,000	$5.00	$10,000
6.	Clearing and Grubbing	LS	1	$3,500.00	$3,500
7.	Erosion Control	LS	1	$5,000.00	$5,000
8.	Seeding, Fertilizer and Mulch	ACRE	5	$3,500.00	$17,500
9.	6" Concrete Pavement	SY	1,400	$65.00	$91,000
10.	Subgrade Preparation	SY	3,000	$7.00	$21,000
11.	Gravel Surface Course	TONS	1,000	$35.00	$35,000
12.	4" Concrete Sidewalk	SF	2,400	$15.00	$36,000
13.	6" PVC Water Main, DR 18	LF	100	$25.00	$2,500
14.	1" Yard Hydrant	EA	8	$750.00	$6,000
15.	2" PE Water Service (SDR 7)	LF	1,000	$20.00	$20,000
16.	8' Chain Link Fence w/ Barbed Wire	LF	1,600	$25.00	$40,000
17.	16' Wide Double Leaf Gates	EA	3	$2,500.00	$7,500
18.	Flow Splitter Structures	CY	50	$1,250.00	$62,500
19.	Valves, Gates, Misc. Fittings	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group A	$1,521,000
			Contingency	10%	$152,100
			Total Opinion of Construction Cost - Group A		**$1,673,100**
Group B: Site Piping					
1.	18" PVC Sanitary Sewer Main, PS 46	LF	150	$75.00	$11,250
2.	60" Dia. Concrete Manhole	VF	45	$800.00	$36,000
3.	6" PVC Force Main, DR 18	LF	200	$25.00	$5,000
4.	Air Piping	LS	1	$50,000.00	$50,000
5.	Gravity Transfer Piping	LS	1	$50,000.00	$50,000
6.	RAS/WAS Piping	LS	1	$100,000.00	$100,000
7.	48" Dia. Concrete Manhole	VF	100	$350.00	$35,000
			Construction Subtotal	Group B	$287,250
			Contingency	10%	$28,730
			Total Opinion of Construction Cost - Group B		**$315,980**
Group C: Headworks Lift Station Building & Grit System					
1.	Headworks Building w/ Block Exterior	SF	1,750	$200.00	$350,000
2.	Lab Room w/Equipment, Storage, Restroom, Workstation	LS	1	$350,000.00	$350,000
3.	Excavation, Established Quantity	CY	500	$15.00	$7,500
4.	Structural Concrete (Foundation & Channels)	CY	125	$1,000.00	$125,000
5.	Parshall Flume, Flow Meter, & Bypass Bar Rack	LS	1	$15,000.00	$15,000
6.	Inclined Fine Screen	LS	1	$150,000.00	$150,000
7.	Piping, Valves, Etc.	LS	1	$150,000.00	$150,000
8.	Misc. Metals, Grating, Handrail, etc.	LS	1	$75,000.00	$75,000
9.	General Electrical	LS	1	$200,000.00	$200,000
10.	General Mechanical	LS	1	$85,000.00	$85,000
11.	Controls	LS	1	$125,000.00	$125,000
12.	Vortex Grit Basin Structural Concrete	CY	80	$1,500.00	$120,000
13.	Grit Basin Equipment	LS	1	$300,000.00	$300,000
14.	Grit Pump	LS	1	$25,000.00	$25,000

15.	Influent H2S Blower, Air Piping, and Diffusers	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group C	$2,127,500
			Contingency	10%	$212,750
			Total Opinion of Construction Cost - Group C		**$2,340,250**
Group D: Oxidation Ditch Treatment System (2 Train)					
1.	Structual Concrete	CY	1,270	$1,000.00	$1,270,000
2.	Excavation	CY	2,000	$12.50	$25,000
3.	O2 Ditch Equipment	LS	1	$1,100,000.00	$1,100,000
4.	Misc. Metals, Grating, Handrail, etc.	LS	1	$100,000.00	$100,000
5.	Electrical	LS	1	$150,000.00	$150,000
			Construction Subtotal	Group D	$2,645,000
			Contingency	10%	$264,500
			Total Opinion of Construction Cost - Group D		**$2,909,500**
Group E: Final Clarifiers (2 ea, 50' Diameter)					
1.	Structual Concrete	CY	400	$850.00	$340,000
2.	Excavation, Established Quantity	CY	2,500	$12.50	$31,250
3.	Clarifer Equipment	LS	1	$400,000.00	$400,000
4.	Splitterbox, Piping, & Weirs	LS	1	$25,000.00	$25,000
5.	Scum Lift Station	LS	1	$50,000.00	$50,000
6.	Misc. Metals, Grating, Handrail, etc.	LS	1	$50,000.00	$50,000
7.	Electrical	LS	1	$50,000.00	$50,000
			Construction Subtotal	Group E	$946,250
			Contingency	10%	$94,630
			Total Opinion of Construction Cost - Group E		**$1,040,880**
Group F: Aerobic Digester & Dewatering					
1.	Structual Concrete, Digesters	CY	777	$850.00	$660,450
2.	Excavation, Established Quantity	CY	600	$12.50	$7,500
3.	Digester Equipment	LS	1	$200,000.00	$200,000
4.	Misc. Metals, Grating, Handrail, etc.	LS	1	$25,000.00	$25,000
5.	Dewatering Building w/ Block Exterior	SF	1,000	$200.00	$200,000
6.	Sludge Pump	EA	2	$15,000.00	$30,000
7.	Belt Filter Press	EA	2	$250,000.00	$500,000
8.	Polymer Feed System	LS	2	$30,000.00	$60,000
9.	Sludge Drying Pad	SY	150	$100.00	$15,000
10.	Sludge Load Out Stand	LS	1	$20,000.00	$20,000
11.	Piping and Valves	LS	1	$20,000.00	$20,000
12.	Mechanical	LS	1	$15,000.00	$15,000
13.	Electrical	LS	1	$20,000.00	$20,000
14.	6" Concrete Pavement	SY	250	$55.00	$13,750
15.	Subgrade Preparation	SY	250	$7.00	$1,750
			Construction Subtotal	Group F	$1,788,450
			Contingency	10%	$178,850
			Total Opinion of Construction Cost - Group F		**$1,967,300**
Group G: Ultraviolet Disinfection System					
1.	UV Disinfection Basin Concrete	CY	125	$1,250.00	$156,250
2.	UV Disinfection Equipment	LS	1	$250,000.00	$250,000
3.	Misc. Metals	LS	1	$10,000.00	$10,000
4.	Electrical	LS	1	$25,000.00	$25,000
18.	Dry Storage Racks	LS	1	$15,000.00	$15,000
			Construction Subtotal	Group G	$456,250
			Contingency	10%	$45,630
			Total Opinion of Construction Cost - Group G		**$501,880**
Group H: Electrical and Instrumentation & Controls					

1.	Ductbank and Site Electrical	LS	1	$250,000.00	$250,000
2.	Local Devices, Switches, RTUs, Disconnects	LS	1	$150,000.00	$150,000
3.	MCC in Headworks Building	LS	1	$500,000.00	$500,000
4.	Padmount Backup Generator	LS	1	$250,000.00	$250,000
5.	SCADA Integration w/O2 Ditch Equip. & Others	LS	1	$300,000.00	$300,000
6.	Utility Power Supply	LS	1	$150,000.00	$150,000
				Construction Subtotal Group H	$1,600,000
				Contingency 10%	$160,000
				Total Opinion of Construction Cost - Group H	**$1,760,000**
Group I: Demolition of Existing WWTF					
1.	Demolition	LS	1	$35,000.00	$35,000
2.	Clearing and Grubbing	LS	1	$3,000.00	$3,000
3.	Stripping and Topsoiling	CY	3,000	$5.00	$15,000
4.	Topsoil in Place	CY	2,000	$8.00	$16,000
5.	Seeding, Fertilizer and Mulch	ACRE	3	$3,500.00	$10,500
6.	Erosion Control	LS	1	$3,500.00	$3,500
7.	Lagoon Sludge Disposal	GAL	433,000	$0.50	$216,500
				Construction Subtotal Group I	$299,500
				Contingency 10%	$29,950
				Total Opinion of Construction Cost - Group I	**$329,450**
				Construction Subtotal - All Groups	$11,671,200
				Contingency	$1,167,140
				Total Opinion of Construction Cost - All Groups	**$12,838,340**
PROFESSIONAL SERVICES					
1.	Design Services (Engineering, Survey, Architecture)			12.5%	$1,458,900
2.	Overhead (Legal, Fiscal, Etc.)			2%	$233,420
3.	Land Acquisition			10 Acres	$100,000
				Subtotal Professional Services	$1,792,320
				Total Opinion of Project Cost	**$14,631,000**

JEO Consulting Group Inc.'s (JEO) Opinions of Probable Cost provided for herein are to be made on the basis of JEO's experience and qualifications and represent JEO's best judgment. However, since JEO has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, JEO cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Cost prepared by JEO.

Prepared By: A. Burke

Checked By:

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 8, Oxidation Ditch Treatment System

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Annual Operations & Maintenance Cost[1] — $183,900.00

ANNUAL INFLUENT SAMPLING

Influent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	1	$23.00	**$25.00 per YR**
TSS	1	$12.00	**$15.00 per YR**
TKN	1	$43.00	**$45.00 per YR**
TN	0	$43.00	**$0.00 per YR**
TP	0	$13.00	**$0.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Miscellaneous Samples	0	$500.00	**$0.00 per YR**

ANNUAL EFFLUENT SAMPLING

Effluent Sampling	Quantity	Unit Cost	Annual Cost
BOD_5	12	$23.00	**$280.00 per YR**
TSS	12	$12.00	**$145.00 per YR**
Ammonia	12	$17.00	**$205.00 per YR**
TN	4	$43.00	**$175.00 per YR**
TP	4	$19.00	**$80.00 per YR**
pH (Onsite)	104	$0.00	**$0.00 per YR**
Temperature (Onsite)	104	$0.00	**$0.00 per YR**
Dissolved Oxygen (Onsite)	52	$0.00	**$0.00 per YR**
E. coli	12	$22.00	**$265.00 per YR**

ANNUAL CHEMICAL COST

Digested Solids Polymer	Quantity		Annual Cost
Annual Mass of Polymer	2000	LB	
- Unit Price for Treatment	$2.50	per LB	
Annual Subtotal	**$5,000.00**	**per YR**	**$5,000.00 per YR**

Demo Chlorination @ Ex. Lagoon (avg of prev. 3 years)	Quantity		Annual Cost
Annual Subtotal	**-$16,300.00**	**per YR**	**-$16,300.00 per YR**

ANNUAL ELECTRICAL

Grit Mixer Motor	Quantity		Annual Cost
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$3,270.00**	**per YR**	**$3,270.00 per YR**

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 8, Oxidation Ditch Treatment System

City of North Sioux City, South Dakota *Date Prepared:*

JEO Project No. 190926.00 *January 29, 2020*

Grit Pump Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	4	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$1,635.00**	**per YR**	**$1,635.00 per YR**

Grit Classifier Screw Motor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	Hp	
	3.7	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$275.00**	**per YR**	**$275.00 per YR**

Mechanical Surface Aerators	**Quantity**		**Annual Cost**
Number of Units Normally Operating	4	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$65,350.00**	**per YR**	**$65,350.00 per YR**

Circular Clarifier Turntable	**Quantity**		**Annual Cost**
Number of Units Normally Operating	2	UNITS	
- Estimated Electrical Load of Units	1.0	Hp	
	0.7	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$1,310.00**	**per YR**	**$1,310.00 per YR**

Digester Transfer Pump	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	10.0	Hp	
	7.5	kW	
- Estimated Daily Unit Run-Time	2	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$545.00**	**per YR**	**$545.00 per YR**

Belt Filter Press & Conveyor	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	1	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	

Annual Subtotal	**$685.00**	**per YR**	**$685.00 per YR**
Ultraviolet Disinfection	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Electrical Load of Units	5.0	kW	
- Estimated Unit Run-Time	24	HR per DAY	
	210	DAYS per YEAR	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$2,520.00**	**per YR**	**$2,520.00 per YR**
Effluent Lift Station	**Quantity**		**Annual Cost**
Number of Units Normally Operating	2	UNITS	
- Estimated Electrical Load of Units	25.0	Hp	
	18.7	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$8,170.00**	**per YR**	**$8,170.00 per YR**
General WWTF Electrical Loads	**Quantity**		**Annual Cost**
Number of Units Normally Operating	1	UNITS	
- Estimated Horsepower of Units	5.0	kW	
- Estimated Operating Point of Units	100%	<-12 Months	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**$4,400.00**	**per YR**	**$4,400.00 per YR**
Demolish Blowers at Ex. Lagoon	**Quantity**		**Annual Cost**
Number of Units Normally Operating	-2	UNITS	
- Estimated Electrical Load of Units	15.0	Hp	
	11.2	kW	
- Estimated Daily Unit Run-Time	24	HR per DAY	
- Unit Price for Electricity	$0.10	per kWh	
Annual Subtotal	**-$19,600.00**	**per YR**	**-$19,600.00 per YR**
ANNUAL LABOR			
Grade 3 Operations Regular Labor	**Quantity**		**Annual Cost**
Number of Hours per Week	**40**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$72,800.00**	**per YR**	**$72,800.00 per YR**
Grade 3 Operations Overtime Labor	**Quantity**		**Annual Cost**
Number of Hours per Year	**20**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$1,050.00**	**per YR**	**$1,050.00 per YR**
General Laborer Regular Labor	**Quantity**		**Annual Cost**

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST

2019 Wastewater Facility Plan Update - Alternative 8, Oxidation Ditch Treatment System

City of North Sioux City, South Dakota *Date Prepared:*

JEO Project No. 190926.00 *January 29, 2020*

Number of Hours per Week	**20**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$28,080.00**	**per YR**	**$28,080.00 per YR**

General Laborer Overtime Labor	**Quantity**		**Annual Cost**
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

ANNUAL OPERATIONS, MAINTENANCE & REPAIR

OPERATIONS, MAINTENANCE & REPAIR	**Quantity**	**Unit Cost**	**Annual Cost**
Operating & Office Supplies	1	$500.00	**$500.00 per YR**
Personnel Training	1	$1,000.00	**$1,000.00 per YR**
Telecommunications & Internet	1	$900.00	**$900.00 per YR**
Chemicals	1	$500.00	**$500.00 per YR**
Equipment Repair	1	$2,500.00	**$2,500.00 per YR**
Vehicle Operations, Maintenance & Repair	0	$5,000.00	**$0.00 per YR**
Solids Disposal	12	$1,500.00	**$18,000.00 per YR**

Non-Annual Operations & Maintenance Cost[2] (See LCC Analysis for Details)

NOTES

1 - Each Annual Operations & Maintenance subtotal is rounded up to the nearest $5.

2 - Each Non-Annual Operations & Maintenance subtotal budget is rounded up to the nearest $5.

3 - Total O&M Budget is rounded up to the nearest $100.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST
2019 Wastewater Facility Plan Update - Alternative 8, Oxidation Ditch Treatment System
City of North Sioux City, South Dakota — *Date Prepared:*
JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost -$5,570,541

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	2.0%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	Oxidation Ditch Treatment System	$ 14,631,000	1.000	$ 14,631,000	-
0	Surcharge Fee Recovery (no cap ex.)	$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 14,631,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	Oxidation Ditch Treatment System	$ 183,900	16.351	$ 3,007,029	-
0 to 20	Surcharge Fee Recovery (no cap ex.)	$ (273,000)	16.351	$ (4,463,941)	-
0 to 20		$ -	16.351	$ -	-
0 to 20		$ -	16.351	$ -	-
0 to 20		$ -	16.351	$ -	-
0 to 20		$ -	16.351	$ -	-
				Subtotal of Present Worth Project Cost	**$ (1,456,913)**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1	Non-Annual SC Sewer Charge Recovery	$ (433,620)	0.980	$ (425,118)	-
2		$ (465,650)	0.961	$ (447,568)	-
3	UV Lamp Replacement	$ (497,046)	0.942	$ (468,377)	-
4		$ (536,982)	0.924	$ (496,089)	-
5	Grit Pump Replacement, Telemetry Devices	$ (559,647)	0.906	$ (506,890)	-
6	UV Lamp Replacement	$ (616,242)	0.888	$ (547,205)	-
7		$ (664,983)	0.871	$ (578,908)	-
8	Filter Belt Replacement	$ (708,103)	0.853	$ (604,359)	-
9	UV Lamp Replacement	$ (763,851)	0.837	$ (639,157)	-
10	Blower Core Replacement, Pump Replacements, Telemetry	$ (778,496)	0.820	$ (638,638)	-
11		$ (884,324)	0.804	$ (711,229)	-
12	UV Lamp Replacement	$ (946,646)	0.788	$ (746,424)	-
13		$ (1,019,793)	0.773	$ (788,333)	-
14		$ (1,095,121)	0.758	$ (829,965)	-
15	UV Lamp Replacement, Grit Pump Replacement, Telemetry	$ (1,155,014)	0.743	$ (858,192)	-
16	Filter Belt Replacement	$ (1,256,882)	0.728	$ (915,570)	-
17		$ (1,356,166)	0.714	$ (968,523)	-
18	UV Lamp Replacement	$ (1,453,341)	0.700	$ (1,017,571)	-
19		$ (1,563,916)	0.686	$ (1,073,520)	-
20	Blower Core Replacement, Pump Replacements, Telemetry	$ (1,634,437)	0.673	$ (1,099,929)	-
				Subtotal of Present Worth Project Cost	**$ (14,361,566)**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	Oxidation Ditch Treatment System	$ 6,513,000	-0.673	$ (4,383,062)	-
20		$ -	-0.673	$ -	-
20		$ -	-0.673	$ -	-
20		$ -	-0.673	$ -	-
20		$ -	-0.673	$ -	-
20		$ -	-0.673	$ -	-
				Subtotal of Present Worth Project Cost	**$ (4,383,062)**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

ENGINEER'S BUDGETARY OPINION OF PROBABLE O&M COST
2019 Wastewater Facility Plan Update - Alternative 9, Treatment by South Sioux City Site D
City of North Sioux City, South Dakota *Date Prepared:*
JEO Project No. 190926.00 *January 29, 2020*

Annual Operations & Maintenance Cost[1] $0.00

ANNUAL ELECTRICAL

N. Shay Rd. Lift Station	Quantity		Annual Cost
Number of Units Normally Operating	0	UNITS	
- Estimated Power of Units	50.00	Hp	
	37.30	kW	
- Estimated Daily Unit Run-Time	6	HR per DAY	
- Unit Price for Electricity	$0.15	per kWh	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

ANNUAL LABOR

Grade 3 Operations Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$35.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

Grade 3 Operations Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$52.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Regular Labor	Quantity		Annual Cost
Number of Hours per Week	**0**	**HRS per WK**	
- Hourly Wage + Benefits	$27.00	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

General Laborer Overtime Labor	Quantity		Annual Cost
Number of Hours per Year	**0**	**HRS per YR**	
- Overtime Hourly Wage + Benefits	$40.50	per HR	
Annual Subtotal	**$0.00**	**per YR**	**$0.00 per YR**

TREATMENT COSTS (See LCC Analysis for Details)

NOTES
1 - The Total Annual Operations & Maintenance Cost is rounded up to the nearest $1,000.

ENGINEER'S BUDGETARY OPINION OF PROBABLE PRESENT WORTH LIFE CYCLE COST

2019 Wastewater Facility Plan Update - Alternative 9, Treatment by South Sioux City Site D

City of North Sioux City, South Dakota — *Date Prepared:*

JEO Project No. 190926.00 — *January 29, 2020*

Present Worth Life Cycle Cost — $29,236,691

Assumed OMB Circular A-94 Appendix C Federal Discount Rate	1.5%
Number of Years in Analysis Period	20

PRESENT WORTH ANALYSIS

Project Cost

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
0	South Sioux City Treatment Costs	$ 10,450,000	1.000	$ 10,450,000	-
0	Surcharge Fee Recovery (no cap ex.)	$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
0		$ -	1.000	$ -	-
				Subtotal of Present Worth Project Cost	**$ 10,450,000**

Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[4]	Present Value	Present Value
0 to 20	South Sioux City Treatment Costs	$ -	17.169	$ -	-
0 to 20	Surcharge Fee Recovery (no cap ex.)	$ (273,000)	17.169	$ (4,687,038)	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
0 to 20		$ -	17.169	$ -	-
				Subtotal of Present Worth Project Cost	**$ (4,687,038)**

Non-Annual O&M Expenses

Year	Description	Base Cost[1]	Conversion Factor[3]	Present Value	Present Value
1	Projected South Sioux City Treatment Costs	$ 1,003,750	0.985	$ 988,916	-
2	Projected South Sioux City Treatment Costs	$ 1,036,436	0.971	$ 1,006,029	-
3	Projected South Sioux City Treatment Costs	$ 1,070,186	0.956	$ 1,023,437	-
4	Projected South Sioux City Treatment Costs	$ 1,105,035	0.942	$ 1,041,147	-
5	Projected South Sioux City Treatment Costs	$ 1,141,020	0.928	$ 1,059,163	-
6	Projected South Sioux City Treatment Costs	$ 1,178,176	0.915	$ 1,077,491	-
7	Projected South Sioux City Treatment Costs	$ 1,216,541	0.901	$ 1,096,136	-
8	Projected South Sioux City Treatment Costs	$ 1,256,157	0.888	$ 1,115,104	-
9	Projected South Sioux City Treatment Costs	$ 1,297,062	0.875	$ 1,134,400	-
10	Projected South Sioux City Treatment Costs & Pump Repl.	$ 1,389,299	0.862	$ 1,197,113	-
11	Projected South Sioux City Treatment Costs	$ 1,382,912	0.849	$ 1,174,000	-
12	Projected South Sioux City Treatment Costs	$ 1,427,945	0.836	$ 1,194,315	-
13	Projected South Sioux City Treatment Costs	$ 1,474,444	0.824	$ 1,214,982	-
14	Projected South Sioux City Treatment Costs	$ 1,522,457	0.812	$ 1,236,006	-
15	Projected South Sioux City Treatment Costs	$ 1,572,034	0.800	$ 1,257,394	-
16	Projected South Sioux City Treatment Costs	$ 1,623,226	0.788	$ 1,279,152	-
17	Projected South Sioux City Treatment Costs	$ 1,676,084	0.776	$ 1,301,287	-
18	Projected South Sioux City Treatment Costs	$ 1,730,664	0.765	$ 1,323,805	-
19	Projected South Sioux City Treatment Costs	$ 1,787,021	0.754	$ 1,346,712	-
20	Projected South Sioux City Treatment Costs & Pump Repl.	$ 1,895,213	0.742	$ 1,407,139	-
				Subtotal of Present Worth Project Cost	**$ 23,473,730**

Salvage Value

Age at End of	Description	Base 20-YR Salvage	Conversion Factor[5]	Present Salvage	Present Salvage
20	South Sioux City Treatment Costs	$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
20		$ -	-0.742	$ -	-
				Subtotal of Present Worth Project Cost	**$ -**

[1] The "Base Cost" listed above is the Engineer's Opinion of Probable Project Cost, Annual O&M Cost, or Non-Annual O&M Cost in the base year. The "Base 20-YR Salvage Value" listed above is assumed to be the Engineer's Opinion of Probable Project Salvage 20 years from the base year.

[2] The conversion factor for the "Cost at Time of Construction" in the above table was calculated using the following equation:
$(1+i)^n$ where "i" is equal to the average annual inflation rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[3] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the time period from the base year to the anticipated year of letting/construction.

[4] The conversion factor for the "uniform series present worth" calculation in the table above was calculated using the following equation:
$((1+i)^n-1) / (i(1+i)^n)$ where "i" is equal to the discount rate and "n" is equal to the time period from the anticipated year of letting/construction to the end of the analysis period.

[5] The conversion factor for the specific year "present worth" calculation in the table above was calculated using the following equation:
$1 / (1+i)^n$ where "i" is equal to the discount rate and "n" is equal to the analysis period.

[6] The "Present Salvage Value" reflects the salvage value of the proposed improvement at the end of the analysis period using straightline depreciation between the base capital cost and base 20-year salvage value based on the age of the improvement at the end of the analysis period, multiplied by the specified conversion factor.

[7] The engineer's opinion of probable project present worth life cycle cost is the summation of the probable project cost and the present worth of the probable annual O&M cost and non-annual O&M cost, minus the present worth of the probable salvage value.

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

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To: North Sioux City, City Council
From: Mike Hamm
Date: 02/03/2020
Re: JEO Project Status

Background: JEO has provided the Council with a project status update which is included in your packets for discussion.

Financial Consideration: None.

Recommendation: NA.

JEO Project Status Report

To: City of North Sioux City

Date: January 30, 2020

Report Prepared By: Ethan E. Joy, PE

JEO #	Project	Funding Source #	Current Status	JEO Action	City Action	Schedule
R161479	Big Sioux River Levee Certification Evaluation	Local funds	FEMA has reviewed and concurred with most of the mapping comments		None at this time	Next step is FEMA will finalize and issue the flood plain maps
R160368	Military Road Bridge Reconstruction	Sioux City Project	Roadway open for the winter		None at this time	Roadway will be open all winter, but intersection at Riverside will be closed next spring to be reconstructed.
R190926	Wastewater Study Addendum and Rate Study	Local Funds	Industry stakeholder meetings held in the past two weeks. Draft report is complete and submitted to Staff	Setup meetings with staff and council to discuss results	None at this time	
R190597	Northshore Sewer CIPP	Local Funds	Work to begin around March 1st.	Pre-construction conference scheduled for February 19, 2020	None at this time	Project Completion Date: June 29, 2020

Items in red are new from the previous report

Thank you.

Ethan E. Joy, PE
Branch Manager

Your Goals, Our Team, One Vision

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Mike Hamm
Date: 02/03/2020
Re: Stockwell Amendment No. 1

Background: On September 3, 2019 the Council approve a contract with Stockwell for Water Supply Improvements. This is an amendment to that for additional services provided by Stockwell to include platting the water tower site and geotechnical explorations (boring tests). Below is the original memo presented to the Council by Ted Cherry.

Background: The City has undergone a water study previously and the contract provided would give the City additional details that were stated in the current study that would need to be studied further. Also, the contract provided would give take the City through the end of a construction project to provide a new water tower to the City. The City needs to be prepared for future growth in both the residential and commercial sectors of water use.

At this time the administration is assuming that a new 750,000 gallon water tower will need to be constructed. Minimal pipe work will have to happen as well. Due to the location of the existing tower we believe optimal placement would be to locate a new tower in the Flynn Business Park on approximately 1.5 acres of ground. NSCEDC has been made aware of this and they will save a portion of ground for the City's use in the future.

The contract is for a cost of $346,000 and would complete the water study, provide a rate analysis, provide all processes through the SD DENR with the assistance of SECOG, provide all survey and design work, and provide the construction administration on the project.

This project would be required to happen for the city to continue to provide growth to the community. A second reason to move forward with this and final construction of a tower would be that it would allow us to do needed maintenance on the existing tower in the future. The current tower needs to be painted and without more capacity in the system staff does not feel comfortable draining the current tower at this time. The process to seal the interior of the current tower would take between 6 and 8 weeks for the curing process to finish.

Financial Consideration: $346,000 in funds to be drawn out of the 521-construction account

Recommendation: Administration would recommend approval of the contract for services with Stockwell Engineering for the Water Supply Improvements.

Financial Consideration: Additional costs to the city in the amount of $13,200.

Recommendation: Administration would recommend approval.

AMENDMENT TO AGREEMENT

Project: Water Supply Improvements Stockwell Project No.: 19273

This is an Amendment to the Agreement for Professional Services (hereinafter "Agreement") dated August 15, 2019, by and between STOCKWELL ENGINEERS, INC., 801 North Phillips Avenue, Suite 100, Sioux Falls, SD 57104, (hereinafter "Engineer") and CITY OF NORTH SIOUX CITY, (hereinafter "Client"), for the above mentioned project. Revisions to the Agreement are as described below.

Client City of North Sioux City
504 River Drive
North Sioux City, SD 57049

Amendment No. 1

Attachments: Amendment for Professional Services

Scope of Services: Client hereby agrees to retain Engineer to perform the Services as outlined in the attached correspondence dated January 29, 2020.

Compensation: In consideration of the change in Work, compensation shall be amended as follows:

Original Agreement Amount:	$346,000.00
Net Previous Amendments:	$0.00
Current Agreement Amount:	$346,000.00
Change this Amendment:	$13,200.00
New Agreement Amount:	$359,200.00

Client and Stockwell hereby amend the Agreement as set forth within. In all other respects, the original Agreement is to remain unchanged and in full force between the undersigned.

IN WITNESS WHEREOF, this Agreement is accepted on the date last written below, subject to the terms and conditions above stated and the provisions set forth herein.

CLIENT	STOCKWELL ENGINEERS, INC.
Signed:_____	Signed:_____
Name (printed):_____	Name (printed): Jon Brown, P.E.
Title: _____	Title: President
Date:_____	Date: _____

January 29, 2020

Mr. Mike Hamm
City of North Sioux City
504 River Drive
North Sioux City, SD 57049

BY EMAIL ONLY
Mike.Hamm@NorthSiouxCity-SD.gov

Re: Amendment for Professional Services
Water Supply Improvements

Dear Mike,

Stockwell Engineers, Inc. (Stockwell) appreciates the opportunity to add professional engineering and surveying services.

As requested Stockwell will prepare a plat of the water tower site and adjacent City owned lot for filing by the City. All fees associated with the filing shall be the responsibility of the City.

Fee: $2,700

Additionally, Stockwell will sub-consult with GeoTek Engineering and Testing Services, Inc. to conduct geotechnical explorations. GeoTek will drill five test borings; four to a depth of 51 feet and one to a depth of 101 feet and prepare a written report. Stockwell will provide a copy of the report to the City for their file. Stockwell is not responsible for any impact on the Project caused by subsurface conditions. Stockwell is entitled to rely on the accuracy of information and services provided by its agents.

Fee: $10,500

Amendment Fee Total: $13,200

Compensation

Compensation for services provided by Stockwell pursuant to this Amendment will be on a lump sum basis in an amount of $13,200.00 excluding sales tax. This fee is in addition to our current contract amount of $346,000.00.

Thank you for your consideration. If you have any questions, please contact our office at your convenience.

Sincerely,

STOCKWELL ENGINEERS, INC.

Jon Brown, P.E.
President

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Mayor Fredericksen
Date: 02/03/2020
Re: Petition

Background: Mayor Fredericksen received a petition. He spoke with City Attorney Darrell Jesse about said petition. The Mayor would like to discuss this with the Council.

Financial Consideration: None.

Recommendation: NA.

To to whom if may Concern: 1-27-20

I'm Residident on Rose St in North Sioux city: there is a piese of property that is owned by Releigh + Brenda Beavers also Live on Rose St... a strip back of property of our homes. used as a Race track - that is 150 feet wide by three Blocks long Saturday + Sunday approximately thee or four 4 wheelers + motorcycles & truck that runs al the time, and we need to get this stoped

1 Troy Rosenbaum 206 Rose 1,27-2020

2 Yalanda Anzaldo 204 Rose — 1-27-20

3 Francisco Anzaldo 204 Rose — 1-27-20

4 Ed Solomon 302 Rose 1-27-20

5 [illegible] 304 Rose 1-27-20

7 [illegible] 206 Rose 1.27.20

City Council MEMO

504 River Drive
North Sioux City, SD 57049
Phone (605) 232-4276
Fax (605) 232-0506

To: North Sioux City, City Council
From: Mike Hamm, City Finance Officer
Date: 02/03/2020
Re: Employee Handbook

Background: Several Council members met with several employees, department heads, and the Mayor to discuss the changes to the Employee Handbook last week. The Mayor requested it be on the agenda for discussion.

Financial Consideration: None

Recommendation:

UNION COUNTY
DIRECTOR OF EQUALIZATION
209 EAST MAIN STREET SUITE 130
ELK POINT SD 57025
PHONE (605) 356-2252

A meeting has been scheduled for Monday, March 2nd at 2:00 pm in the basement of the Union County Courthouse for members of the Local Boards of Equalization. The city and township boards may pick up the 2019 real estate assessment books at this time.

The changes of AG value in the townships based on soil type productivity will be reviewed as well as the revaluation in the county.

A representative from the South Dakota Association of Towns & Townships will be present.

From the county, Jerry Buum, Union County Public Works Administrator, will be available for any questions.

It is important someone from your jurisdiction attends to pick-up the assessment information. If no one is able to make the meeting, it is important arrangements are made to pick-up assessment information by Monday, March 9th.

If you have any questions, be sure to bring them to the meeting.

Sincerely,

Dawn Steckelberg

Dawn Steckelberg
Union County
Director of Equalization

Dawn.Steckelberg@unioncountysd.org