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March 2017

Wastewater Treatment Facility Plan

City of Silver Bay, Minnesota

Project Number M25.113173

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Certification

Wastewater Treatment Facility Plan

for

City of Silver Bay, Minnesota
M25.113173

March 2017

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

By: 

John Graupman P.E.
License No. 26868

Date: March 3, 2017

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1. INTRODUCTION

A. PURPOSE

This report provides the City of Silver Bay, Minnesota with recommendations for wastewater treatment facility improvements and upcoming needs, specifically for preliminary treatment and mercury removal. A report was submitted on January 31, 2017 by Bolton & Menk, Inc. that details the results of full-scale pilot testing using solids contact clarifiers with chemcial addition for mercury removal. The findings of the pilot study were inconclusive and more data is required before it can be determined if the clarifiers are effective at removing mercury to below permitted final effluent limits. Recommendations for improvements are based on input from the City staff and an evaluation of facility requirements in accordance with the current recommended practices and regulatory agency requirements.

Section 2 provides a review of the current and future design conditions; Section 3 provides an evaluation of the existing wastewater system components; Section 4 discusses various alternatives for wastewater system improvements that are non-mercury related; Section 5 provides alternatives for mercury removal treatment technologies; Section 6 details cost analysis of the various alternatives; and Section 7 provides recommendations and general conclusions concerning the proposed wastewater system improvements.

B. BACKGROUND

The current Silver Bay Wastewater Treatment Facility (WWTF) has continuous discharge to Lake Superior. The WWTF was originally constructed to treat an average flow of 0.83 million gallons per day (MGD) with a five-day carbonaceous biochemical oxygen demand ($CBOD_5$) strength of 184 mg/L. The facility was later expanded in 1995 to treat an average wet weather (AWW) flow of 0.919 MGD with a $CBOD_5$ strength of 70 mg/L.

Pre-treatment processes include a manual bar screen, a high flow diversion structure which diverts water to the primary clarifier, a manual bar screen, grit removal chamber, and a submersible comminuter. Primary treatment includes two 40-foot primary clarifiers, one 60-foot diameter trickling filter with rock media, and a single 40-ft secondary clarifier. Tertiary treatment was originally constructed to aid in phosphorus removal, using chemical addition, and includes two tertiary solids contact clarifiers. A chlorination/dechlorination unit provides disinfection. Biosolids are processed in two heated anaerobic digesters and are land applied. The treated wastewater flows through a manhole and finally to the outfall where it is discharged into Lake Superior.

The WWTF has a current NPDES permit (No. MN0024899) that was issued on September 4, 2015 and will expire August 31, 2020. See Appendix A for a copy of the permit. Within the permit are requirements for mercury monitoring and effluent limits. In accordance with the Great Lakes Initiative, the permit includes both interim and final effluent limits on total mercury. The interim limits are 3.8 nanograms per liter (ng/L) calendar month average and 7.0 ng/L daily maximum. The final limits are 1.9 ng/L calendar month average and 3.5 ng/L daily maximum. The City must comply with all the final limits no later than March 31, 2020. Permitted limits on other pollutants are discussed later in this report.

The Silver Bay WWTF has been evaluating the effectiveness of using solids contact clarifiers, with chemical addition, for low-level mercury removal. A full-scale pilot study officially started in December of 2016 after both tertiary contact clarifiers were rehabilitated. The full-scale pilot study objective was to use the existing tertiary solids contact clarifiers with chemical addition of alum and polymer to evaluate the effectiveness the system has for mercury removal to below permitted final mercury limits. A reported by Bolton & Menk, Inc., titled "Phase I Report – Silver Bay Mercury Removal Pilot Studies" details the pilot study results and recommendations. This report and all recommendations are attached in Appendix H. With the short duration of the pilot study and limited data on mercury, temperature, and total suspended solids (TSS), it cannot be concluded at this time that the solids contact clarifiers are able to remove mercury to below permitted final limits. Alternative treatment technologies and improvements to the existing clarifiers for mercury removal should be explored so the facility can meet final mercury limits.

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2. DESIGN CONDITIONS

A. PLANNING PERIOD

Wastewater treatment facilities are typically designed based on a 20-year planning period, as it is generally not feasible to make frequent changes in the capacity of a wastewater treatment facility. In addition, a 20-year planning period is required for the project to be eligible for funding assistance with the MN Public Facilities Authority (PFA).

A design year of 2037 is used for this evaluation. Projected wastewater flows and loadings are determined using a combination of population trends and expected commercial and industrial growth. Figure 2.1 shows the planning area encompassed by this report and the improvements discussed herein.

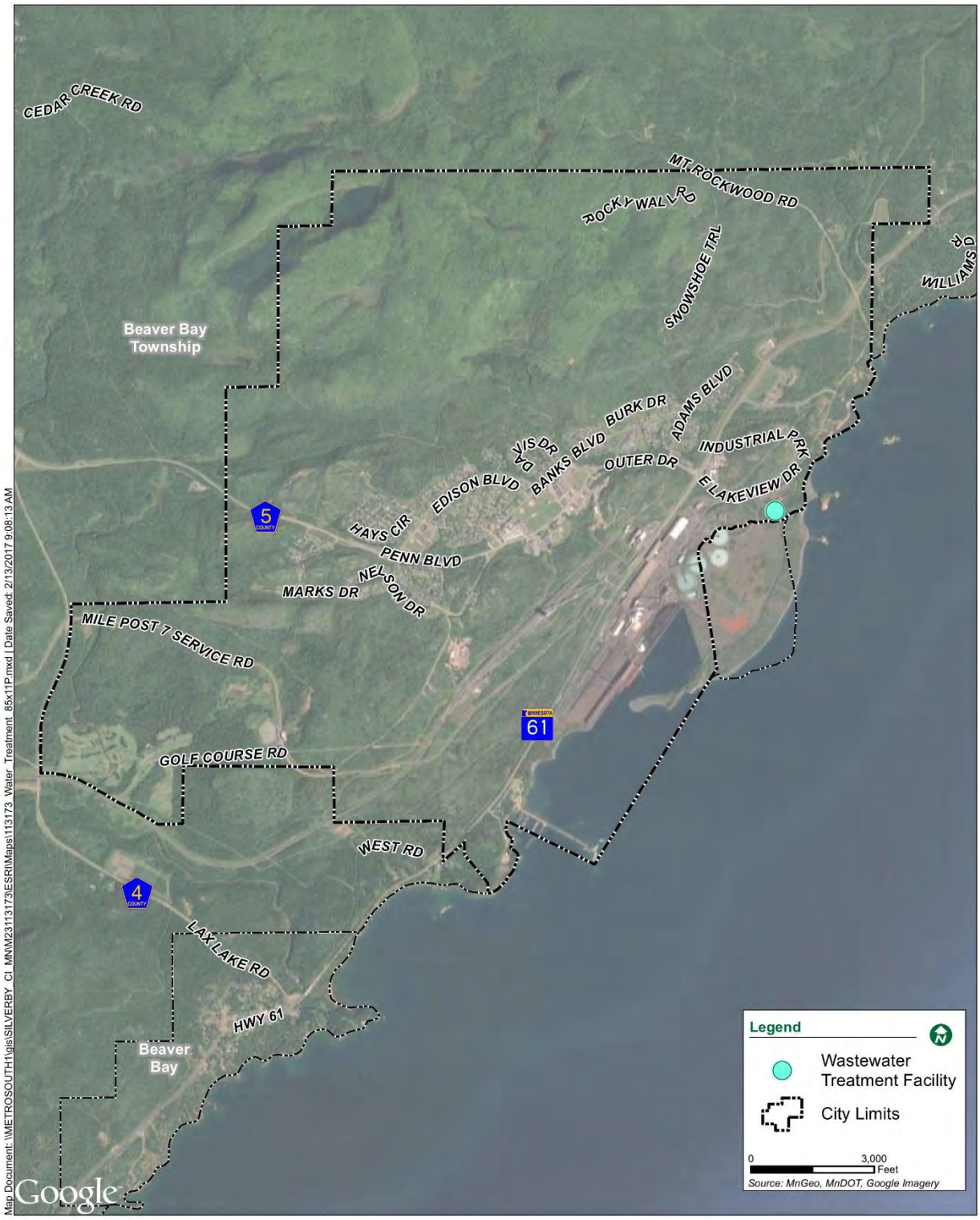


Figure 2.1 – Planning Area

B. DEVELOPMENT PROJECTIONS

1. Population Projections

There are a number of methods available for predicting population trends for cities such as Silver Bay. Historical city and county population trends are reviewed. Future trends can be predicted using a variety of mathematical projections including arithmetic, geometric, and linear regression methods. Additionally, the Minnesota State Demographic Center (SDC) publishes population projections for all counties in Minnesota. The most recent estimates and projections by the SDC were released in July 2016 and March 2014, respectively.

Table 2.1 and Figure 2.2 show historical and projected populations for the City of Silver Bay and Lake County as reported by the Minnesota State Demographer. Historically, the population of Lake County has been slightly decreasing from a peak population of 11,229 in 2004 to a current population of 10,634 in 2015. It is assumed that this is the current population in 2017. Projections provided by the MN State Demographer indicate that the population of Lake County will slightly increase until 2020 before decreasing through the design year of 2037.

Historically, the City of Silver Bay has accounted for an average of 18% of the county population. The population has decreased from a population of 2,068 in 2000 to a current population of 1,849 in 2015. Again, it is assumed that the 2015 population is the current population. Population projections predict a continually declining population. With a continually decreasing population, it is assumed that the design population will be the current population. Based on these assumptions, the 2037 design population for the City of Silver Bay will be 1,849 people.

Table 2.1 – Population Projections		
Year	**City of Silver Bay [3]**	**Lake County [3]**
2000	2,068	11,058
2001	2,065	11,083
2002	2,050	11,088
2003	2,052	11,160
2004	2,049	11,229
2005	2,039	11,189
2006	2,013	11,100
2007	1,993	11,119
2008	1,980	10,970
2009	1,962	10,853
2010	1,887	10,866
2011	1,869	10,822
2012	1,868	10,815
2013	1,866	10,777
2014	1,860	10,695
2015	1,849	10,634
2020	*1,849 [1]*	*11,322 [2]*
2025	*1,849 [1]*	*11,335 [2]*
2030	*1,849 [1]*	*11,184 [2]*
2035	*1,849 [1]*	*11,013 [2]*
2037 – Design Year	*1,849 [1]*	*10,908 [2]*

(1) Based on both historical population trends

(2) Projected by MN State Demographic Center (March 2014)

(3) Historic population by MN State Demographic Center (July 2016)

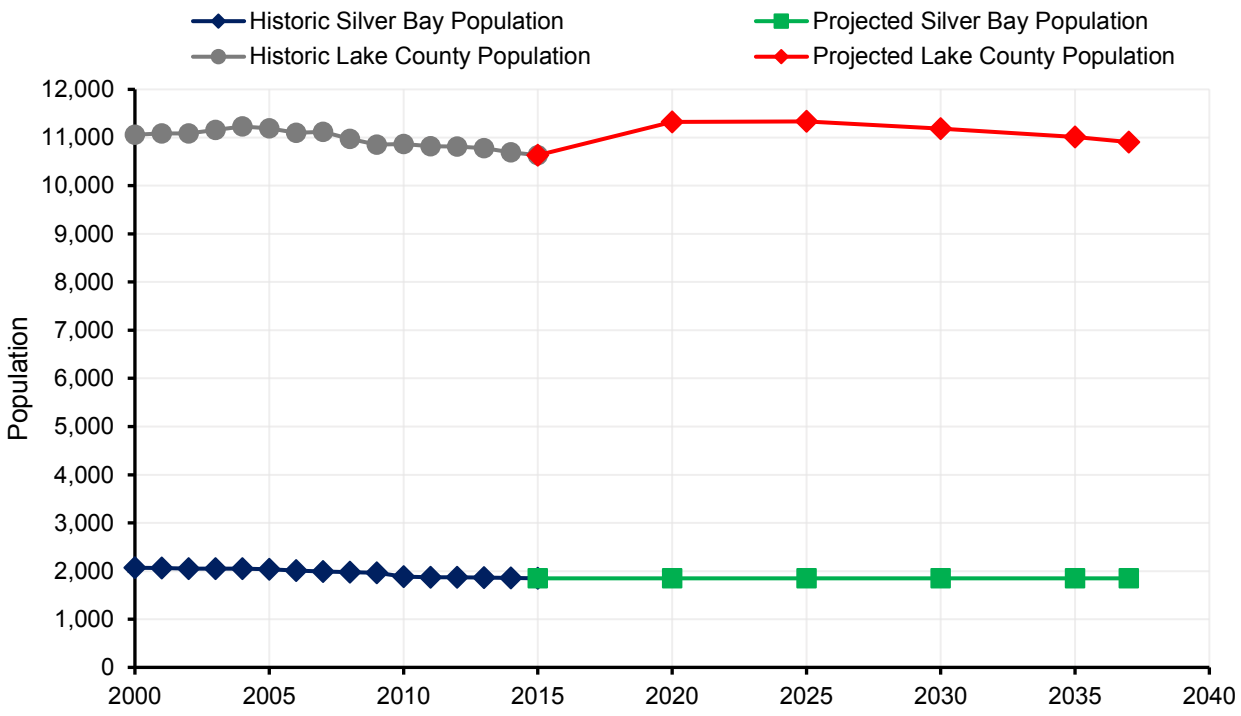


Figure 2.2 – Population Projections

2. Industrial Development

There is currently no Significant Industrial Users (SIU) within the City of Silver Bay. Future planning for the wastewater treatment facility will not include anticipated loads and flows from any SIUs. The small industries within the City are accounted for in the residential and commercial flows and loadings.

C. WASTEWATER FLOWS

1. Historical Monitoring Data

a) Influent Monitoring

The Silver Bay Wastewater Treatment Facility records influent flows on a continuous basis. The flows to the treatment facility are measured using a Parshall Flume with an ultrasonic level transducer after the raw wastewater has been screened. Community wastewater flows include contributions from domestic users. Domestic users include residential, commercial, and small industrial users, as these flows are typically of domestic strength. Table 2.2 provides a summary of the domestic flow data from January 2012 through December 2016.

A historical summary of the average and maximum day influent flows to the Silver Bay WWTF are presented in Table 2.3 and Figure 2.3. The average daily flow over this period is 0.448 MGD. The average daily flow shows a slightly increasing trend over the five-year monitoring period. Future wastewater flows are projected to increase and follow the same trend as the historical data. The

max day flows tend to peak in early spring, specifically around April and May each year. The historic maximum daily flow occurred in April of 2014 at 2.7 MGD. The peak flows that occur in the early spring can be correlated to snowmelt and spring rain events. The historic peaking factor (peak day to average day ratio) is 6.03.

Table 2.2 – Historical Flow Data Summary			
	Date	**Flow (MGD)**	**GPCD**
Minimum Month Average Flow	February 2015	0.170	92
Average Daily Flow	January 2012 - December 2016	0.448	242
Max. Month Average Flow	April 2014	1.576	847
Max. Day Flow	April 2014	2.700	1,452

Table 2.3 – Historical Flow Data – Silver Bay WWTF

Month/Year	**2012**		**2013**		**2014**		**2015**		**2016**		**5-Year**	
	Monthly Average (MGD)	**Max Day (MGD)**	**Monthly Average (MGD)**	**Max Day (MGD)**	**Monthly Average (MGD)**	**Max Day (MGD)**	**Monthly Average (MGD)**	**Max Day (MGD)**	**Monthly Average (MGD)**	**Max Day (MGD)**	**5-year Average (MGD)**	**5-year Max Day (MGD)**
January	0.359	0.377	0.242	0.357	0.194	0.209	0.180	0.230	0.269	0.373	0.249	0.377
February	0.216	0.360	0.213	0.231	0.179	0.195	0.170	0.190	0.249	0.407	0.205	0.407
March	0.424	0.656	0.314	1.260	0.289	0.609	0.230	0.370	0.932	1.553	0.438	1.553
April	0.571	1.316	0.949	1.530	1.576	2.700	0.440	1.200	0.841	1.762	0.875	2.700
May	0.678	1.864	0.899	1.467	1.075	2.169	0.790	2.100	0.452	0.882	0.779	2.169
June	0.668	1.822	0.745	1.280	0.566	1.545	0.610	1.400	0.783	1.648	0.674	1.822
July	0.363	0.659	0.542	1.126	0.259	0.373	0.250	0.360	0.500	1.414	0.383	1.414
August	0.258	0.322	0.266	0.397	0.250	0.500	0.360	1.500	0.495	1.762	0.326	1.762
September	0.217	0.236	0.213	0.251	0.386	1.003	0.720	1.784	0.392	0.698	0.386	1.784
October	0.259	0.512	0.384	0.669	0.288	0.635	0.451	1.280	0.219	0.381	0.320	1.280
November	0.310	0.600	0.324	0.488	0.205	0.257	0.736	1.579	0.304	1.077	0.376	1.579
December	0.302	0.487	0.217	0.266	0.260	0.550	0.701	1.293	0.341	0.913	0.364	1.293
Yearly Average/Max	0.385	1.86	0.442	1.530	0.461	2.70	0.470	2.10	0.481	1.762	0.448	2.70

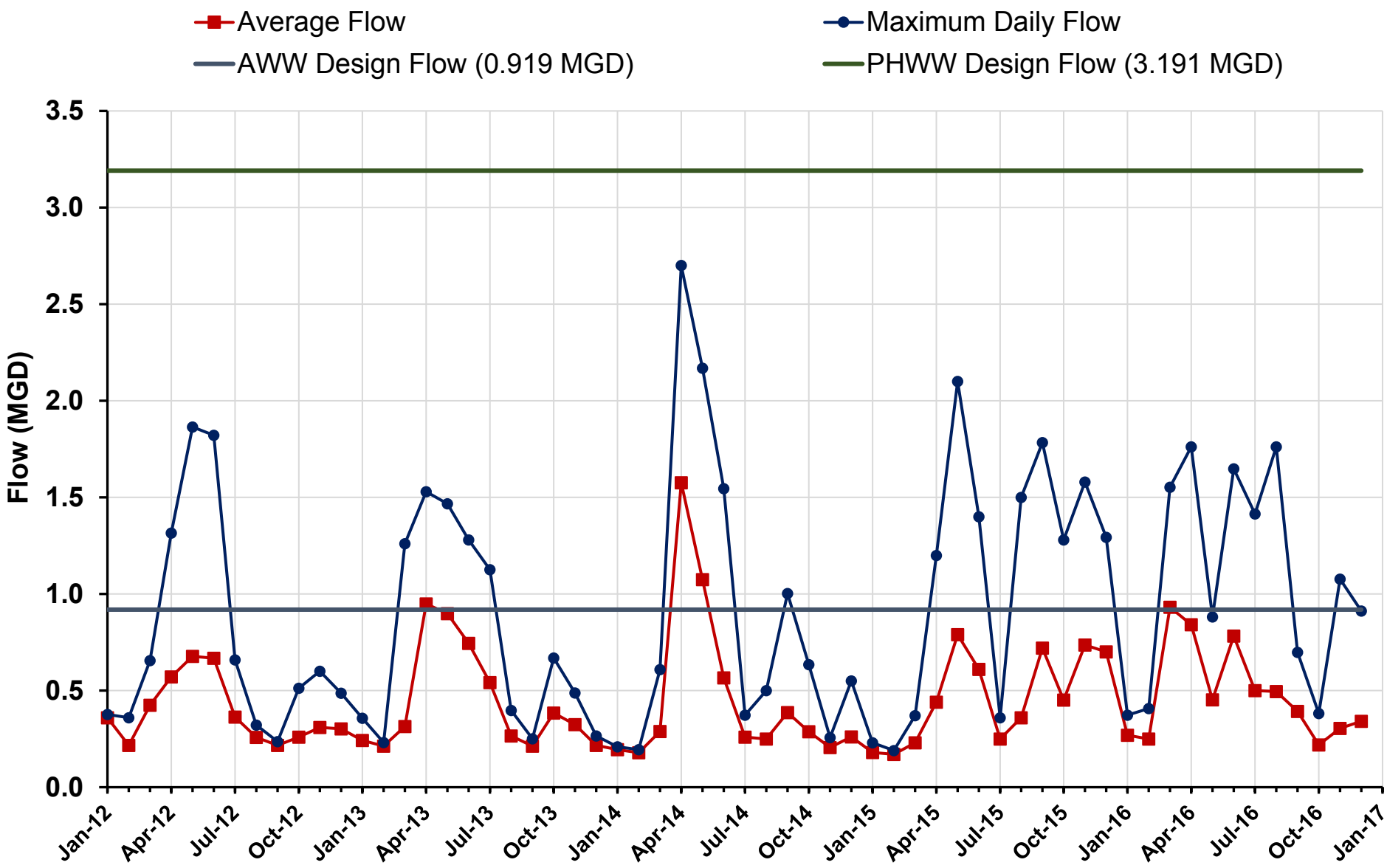


Figure 2.3 – Silver Bay Historical Flows

b) Infiltration and Inflow Analysis

The Minnesota Pollution Control Agency (MPCA) has developed guidelines to provide a comprehensive and systematic approach to analyze I&I. These guidelines were used to determine if I&I is considered excessive in the City of Silver Bay's wastewater collection system. The following are definitions of inflow and infiltration as provided by the MPCA guidelines:

- *Infiltration* – is water other than wastewater that enters a sewer system (including service sewer connections and foundation drains) from the ground through broken or defective pipes, pipe joints, connections, manholes, and wet basements.

- *Inflow* – is water other than wastewater that enters a sewer system (including sewer service connections) through sources such as, but not limited to, roof leaders, foundation drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, storm waters, surface runoff, street wash water, or other drainage structures.

- *Excessive Infiltration* – Infiltration is excessive if the quantity of flow (domestic base flow and infiltration) is greater than 120 gallons per capita per day (gpcd). The quantity of flow was determined using the annual average residential/commercial flow over the past five (5) years, and the 2015 population of 1,849.

  448,000 gpd / 1,849 people = 242 gpcd

- *Excessive Inflow* – Inflow is excessive if the quantity of flow during storm events that results in chronic operational problems related to the hydraulic overloading of the treatment system or that results in a total flow of more than 275 gpcd (domestic base flow plus infiltration and inflow). The flow during storm events was determined using the maximum residential/commercial flow over the past five (5) years, and the 2015 population of 1,849.

  2,700,000 gpd / 1,849 people = 1,452 gpcd

According to MPCA criteria, infiltration and inflow are considered excessive in Silver Bay's wastewater collection system. This issue is largely attributed to the City's aging and deteriorating collection system infrastructure. For the purposes of developing design flow projections, infiltration and inflow will be allocated at present day values.

2. Design Flows

The MPCA has guidelines for determining design wastewater flows for new or expanded treatment facilities. Flow projections are developed for different climatic conditions as described below:

- Average Dry Weather (ADW) Flow – Measure of flow during which there is no inflow due to precipitation and/or snowmelt and no infiltration due to high groundwater. This flow typically occurs during winter months or very dry summers. It is also strongly correlated with drinking water usage.

- Average Wet Weather (AWW) Flow – Daily average flow for the wettest 30 consecutive days for mechanical treatment facilities. AWW flow is based on flow with infiltration due to high groundwater and typical inflow due to precipitation and/or snowmelt. This flow typically occurs during the spring and early summer.

- Peak Hourly Wet Weather (PHWW) Flow – Peak flow during the peak hour of the day at a time when the groundwater is high and a five-year, one-hour storm event is occurring.

- Peak Instantaneous Wet Weather (PIWW) Flow – Peak instantaneous flow during the day at a time when the groundwater is high and a 25-year, one-hour storm event is occurring. This flow is used for sizing pumps and piping systems.

The flow parameters described above are determined by following the procedures outlined in the MPCA document "Design Flow and Loading Determination Guidelines for Wastewater Treatment Plants". Additional flow from population increase will be estimated based on a Ten States Standard flow of 100 gal/cap/day (gpcd).

a) Residential/Commercial/Institutional Flows

Commercial flows include wastewater from businesses, small industries, restaurants, and city offices. These flows are typically similar to residential flows and will be considered in future flow allocations. Institutional flows include wastewater from the elementary school and the high school. Residential flows include household wastewater flows. These flows contribute to a significant portion of flow for the City of Silver Bay.

Linear regression of historical residential/commercial flows suggests that wastewater inflows will slightly increase as the City's collection system continues to age and the population remains constant.

b) Industrial Flows

There are no Significant Industrial Users (SIU's) in the City of Silver Bay. Northshore Mining Company regulates flows and only discharges from bathrooms and shower facilities.

c) Design Flows

Design flows have been projected utilizing the following criteria and historical flow values:

- Population will remain constant at 1,849 people through 2037
- Infiltration and inflow will be similar to historical flow values
- Industrial flow is accounted for in the residential and commercial flows
- AWW flow will remain the same as existing design AWW flow

Table 2.4 presents a summary of the allocated design flows. It is important to note, there is no projected change in the Average Wet Weather Flow for the 2037 design year.

Table 2.4 – Summary of Allocated Design Flows

Parameter	Existing Facility Design	New Design Flow
Average Dry Weather Flow (mgd)	0.344	0.532
Average Wet Weather Flow (mgd)	0.919	0.919
Peak Hourly Wet Weather Flow (mgd)	3.191	3.480
Peak Instantaneous Wet Weather Flow (mgd)	3.476	3.682

The MPCA Determination of Design Flows worksheet has been completed and is shown in Table 2.5.

Table 2.5 – Determination of Design Flow Summary - City of Silver Bay

A)	For Determination of Peak Hourly Wet Weather Design Flow (PHWW)		MGD
1	Present peak hourly dry weather flow		0.464
2	Present peak hourly flow during high ground water period (no runoff)		1.160
3	Present peak hourly dry weather flow [same as (1)]	-	0.464
4	Present peak hourly infiltration	=	0.696
5	Present hourly flow during high ground water period and runoff at point of greatest distance between Curves Y and Z		3.016
6	Present hourly flow during high ground water (no runoff) at same time of day as (5) measurement	-	0.696
7	Present peak hourly inflow	=	2.320
8	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event		2.320
9	Present peak hourly infiltration [same as (4)]		0.696
10	Peak hourly infiltration cost effective to eliminate	-	0
11	Peak hourly infiltration after rehabilitation (where rehabilitation is cost effective)	=	0.696
12	Present Peak hourly adjusted inflow [same as (8)]		2.320
13	Peak hourly inflow cost effective to eliminate	-	0
14	Peak hourly inflow after rehabilitation (where rehabilitation is cost effective)	=	2.320

15	Population increase __0__ @ _100_ gpcd times 3 (peaking factor)		0.000
16	Peak hourly flow from planned industrial increase		0
17	Estimated peak hourly flow from future unidentified industries		0
18	Peak hourly flow from other future increases		0
19	Peak hourly wet weather design flow [(1)+(11)+(14)+(15)+(16)+(17)+(18)]		**3.480**
B)	**For Determination of Peak Instantaneous Wet Weather Design Flow (PIWW)**		**MGD**
20	Peak hourly wet weather design flow [same as (19)]		3.480
21	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event [same as (8)]	-	2.320
22	Present peak inflow adjusted for a 25-year 1-hour rainfall event	+	2.522
23	Peak instantaneous wet weather design flow	=	**3.682**
C)	**For Determination of Average Dry Weather Design Flow (ADW)**		**MGD**
24	Present average dry weather flow		0.232
25	Population increase __0__ @ _100_ gpcd	+	0.000
26	Average flow from planned industrial increase	+	0
27	Estimated average flow from other future unidentified industries	+	0.20
28	Average flow from other future increases	+	0.10
29	Average dry weather design flow [(24)+(25)+(26)+(27)+(28)]	=	**0.532**
D)	**For Determination of Average Wet Weather Design Flow (30-day Average)**		**MGD**
30	Present average dry weather flow		0.232
31	Average infiltration after rehabilitation (where rehabilitation is cost effective)	+	0.125
32	Average inflow after rehabilitation (where rehabilitation is cost effective)	+	0.262
33	Population increase ___0__ @ _100_ gpcd	+	0.000
34	Average flow from planned industrial increase	+	0
35	Estimated average flow from future unidentified industries	+	0.20
36	Average flow from other future industries	+	0.10
37	Average wet weather design flow [(30)+(31)+(32)+(33)+(34)+(35)+(36)]	=	**0.919**

D. WASTEWATER LOADINGS

1. Historical Monitoring Data

a) Influent Monitoring

The City of Silver Bay monitors influent pollutant loadings per the requirements of their NPDES Discharge Permit. The City monitors the 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), and

Total Phosphorus (P). The City does not measure Total Kjeldahl Nitrogen (TKN). The historical loadings are shown in Table 2.6, which indicates the total loadings entering the wastewater treatment facility.

The average $CBOD_5$ concentration has decreased from 358 lbs./day in 2012 to 249 lbs./day in 2016. This corresponds to a decrease in $CBOD_5$ load of 30% over the five-year period. An increase in the $CBOD_5$ load was observed in 2014. Historical per capita loading has averaged 0.174 pounds per capita per day (lbs./cap/day). The average day $CBOD_5$ load is 327 lbs./day with a peak day load of 2,920 lbs./day.

Total suspended solids (TSS) loadings fluctuate over the five-year historical monitoring period. 2014 saw an average TSS load of 491 lbs./day, while 2015 saw an average TSS load of 612 lbs./day. The five-year average TSS loading was 537 lbs./day with a peak day load of 4,626 lbs./day. Per capita loadings have averaged 0.287 lbs./capita/day over the last five-years.

Total Phosphorus (TP) loading has remained consistent from 2012 through 2016. The lowest average load occurred in 2012 at 8.8 lbs./day and the average peaked in 2013 at 11.5 lbs./day. The five-year average total phosphorus load is 10.2 lbs./day. Per-capita loadings have followed the same trend as the TP load and average 0.0055 lbs./cap/day. Table 2.7 provides a summary of the average day and peak day loading data described above, from 2012 through 2016.

Table 2.6 – Historical Pollutant Loading Summary

Parameter	Unit	2012	2013	2014	2015	2016 (1)	5 Year Average
Flow	MGD	0.385	0.442	0.461	0.470	0.481	0.448
$CBOD_5$	mg/L	119	118	98	109	65	104
	lbs./day	358	363	271	375	249	327
	lbs./capita/day (2)	0.191	0.194	0.146	0.203	0.135	0.174
TSS	mg/L	168	178	168	183	118	149
	lbs./day	519	581	491	612	463	537
	lbs./capita/day (2)	0.278	0.311	0.264	0.331	0.250	0.287
Total Phosphorus	mg/L	2.96	3.63	3.75	3.19	2.82	3.28
	lbs./day	8.8	11.5	9.9	10.3	10.8	10.2
	lbs./capita/day (2)	0.0047	0.0062	0.0053	0.0056	0.0058	0.0055

(1) 2016 data is through September of 2016. Data after September was not available.

(2) lbs./capita/day loadings calculated based on respective year's population.

Table 2.7 – Historical Average and Peak Day Summary	
Loadings	**Residential/ Commercial Loading**
CBOD – Average Day (lbs./day)	327
CBOD – Peak Day (lbs./day)	2,920
TSS – Average Day (lbs./day)	537
TSS – Peak Day (lbs./day)	4,626
P – Average Day (lbs./day)	10.2

b) Industrial Monitoring

The City of Silver Bay does not have any significant industrial users. Flows from the small industries are accounted for in the residential and commercial loadings.

2. Design Loadings

The City of Silver Bay's existing wastewater treatment facility receives pollutant-loading contributions from residential, commercial, and small institutional users. Design loadings will be projected for one category of users:

- Domestic users, including residential, commercial, institutional, and small industrial users

a) Residential and Commercial Loadings

Design loadings from residential/commercial users are developed utilizing historical loading data and adding pollutant mass loadings for projected population increases. Since there is no projected population increase, the future design loadings are calculated by multiplying the design population by the per capita design loading parameters. Design loadings for the projected population are developed utilizing mass per capita (lbs./person/day) values for $CBOD_5$, TSS, TKN, and TP.

Common per capita design loading rates for residential/commercial sources, as per the *Recommended Standards for Wastewater Facilities – 2014 Edition* (Commonly known as Ten States Standards), are 0.17-0.22 lbs. $CBOD_5$/capita/day, 0.20-0.25 lbs. TSS/capita/day, and 0.036-0.048 lbs. TKN-N/capita/day. According to Metcalf & Eddy (2003), typical per capita Total Phosphorus loading is 0.008 lbs./capita/day.

Based on historical data provided in Table 2.6, the City of Silver Bay per capita loadings for $CBOD_5$ are within the typical range so Ten States Standard design criteria apply. The historical TSS per capita loadings for all years, except 2016, exceed the Ten States Standards design range. Therefore, the average historical per capita loading from 2012 to 2015 of 0.296 lbs./cap/day will be the design parameter used to calculate future TSS loadings. The Ten States design standard

of 0.046 lbs./day of TKN will be used for future loadings. All future per capita contributions for the projected population will be based on values included in Table 2.8.

Table 2.8 – Residential & Commercial Design Loadings

Parameter	Per Capita Design Loading[(1)]	Projected Design Loading
Population	–	1,849
$CBOD_5$	0.200 lbs./capita-day	370 lbs./day
TSS	0.296 lbs./capita-day [(2)]	547 lbs./day
TKN	0.046 lbs./capita-day	85 lbs./day
TP	0.008 lbs./capita-day [(3)]	15 lbs./day

(1) Design loadings from Ten State Standards unless otherwise noted
(2) Historic TSS per capita loading. See Table 2.6.
(3) Recommended design loading from Metcalf & Eddy (2003).

b) Industrial Loadings

Since there are no Significant Industrial User agreements between industries and the City of Silver Bay, there are no industrial loadings to account for. The small industrial users are considered in the residential and commercial loadings.

c) 20-Year Design Loadings

Table 2.9 summarizes both existing and calculated 20-year design loadings that include all wastewater sources.

Table 2.9 – Summary of Existing and Calculated 20-Year Loadings

Parameter	Existing/Historic Parameters	Future Design Parameters
Year	2017	2037
Population	1,849	1,849
CBOD – Average Day (lbs./day)	327	370
CBOD – Peak Day (lbs./day)	2,920	3,302
TSS – Average Day (lbs./day)	537	547
TSS – Peak Day (lbs./day)	4,626	4,716
TKN – Average Day (lbs./day)	N/A	85
TKN – Peak Day (lbs./day)	N/A	213
P – Average Day (lbs./day)	10.2	15

E. BIOSOLIDS

The Silver Bay Wastewater Treatment Facility produces Class B biosolids. Sludge is processed in a first and second stage anaerobic digester. Biosolids production is expected to

increase over the design period as flows and loadings increase. The NPDES permit in Appendix A describes the biosolids limits for land application with monitoring requirements.

F. EXISTING EFFLUENT LIMITS

The current effluent limits for the Silver Bay's Wastewater Treatment Facility are described in NPDES Permit No. MN0024899. A copy of the permit is included in Appendix A. A summary of the final effluent limits is presented in Table 2.10.

Table 2.10 – NPDES Discharge Limits – Silver Bay, MN

Parameter	Season	Limit Type	Limits
$CBOD_5$	Jan-Dec	Calendar Month Average	25 mg/L (78.4 kg/day)
	Jan-Dec	Max Calendar Week Ave.	40 mg/L (125 kg/day)
	Jan-Dec	Min. Calendar Month Ave.	85% removal
Chlorine, Total Residual	Jan-Dec	Daily Maximum	0.038 mg/L
Fecal Coliform	Apr-Oct	Calendar Month Geometric Mean	200 #/100 mL
Mercury, Total (as Hg)	May, Sep.	Calendar Month Average	1.9. ng/L
	May, Sep.	Daily Max	3.5 ng/L
Phosphorus, Total (as P)	Jan-Dec	Calendar Month Average	1 mg/L (3.1 kg/day)
pH	Jan-Dec	Monthly Max.	9
	Jan-Dec	Monthly Min.	6
TSS	Jan-Dec	Monthly Ave.	30 mg/L (94.1 kg/day)
	Jan-Dec	Max. Week Ave.	45 mg/L (141 kg/day)
	Jan-Dec	Min. Month Ave.	85% removal

G. CONSIDERATIONS FOR FUTURE EFFLUENT LIMITS

Based on the types of improvements being considered in Section 4 and Section 5, the MPCA requires the submittal of a Preliminary Effluent Limits Review Request (PELRR) in order to re-evaluate the facility's current discharge limits. Completed review forms are included in Appendix E.

3. EVALUATION OF EXISTING FACILITIES

A. OVERVIEW

The City of Silver Bay owns and operates a mechanical wastewater treatment facility that has a continuous discharge to Lake Superior in accordance with National Pollutant Discharge Elimination System (NPDES/SDS) permit MN0024899. The permit was issued on September 5, 2015 and expires on August 31, 2020. The facility has a current AWW design flow of 0.919 MGD.

The City's gravity collection system and forcemains conveys all raw wastewater to the WWTF. Pre-treatment processes include a manual bar screen, a high flow diversion structure to bypass the bar screen and grit removal chamber, and a comminuter. Primary treatment includes two 40-foot diameter primary clarifiers, one 60-foot diameter trickling filter with rock media, and a 40-foot diameter secondary clarifier. Tertiary treatment was originally constructed to aid in phosphorus removal, using chemical addition, and includes two tertiary solids contact clarifiers. A chlorination/dechlorination unit provides disinfection. Biosolids are processed in two heated anaerobic digesters. The treated wastewater flows through a manhole and finally to the outfall where it is discharged into Lake Superior.

To improve mercury removals at the WWTF, the City of Silver Bay recently upgraded both tertiary solids contact clarifiers in 2016. Tertiary clarifier No. 1 received new equipment and a new coating, while tertiary clarifier No. 2 received only a new coating. Neither of the clarifiers received covers during the last rehabilitation project. Historically, ice has formed on the surface of the clarifiers, which may affect performance, specifically for mercury removal. Overall, the facility is in good condition and has been well maintained and has the ability to meet all permitted discharge limits, except mercury. Mercury removal alternatives and costs are found in section five of this report.

A process flow diagram for the normal flow path is presented in Figure 3.1. The site overview of the existing wastewater treatment facility is presented in Figure 3.2.

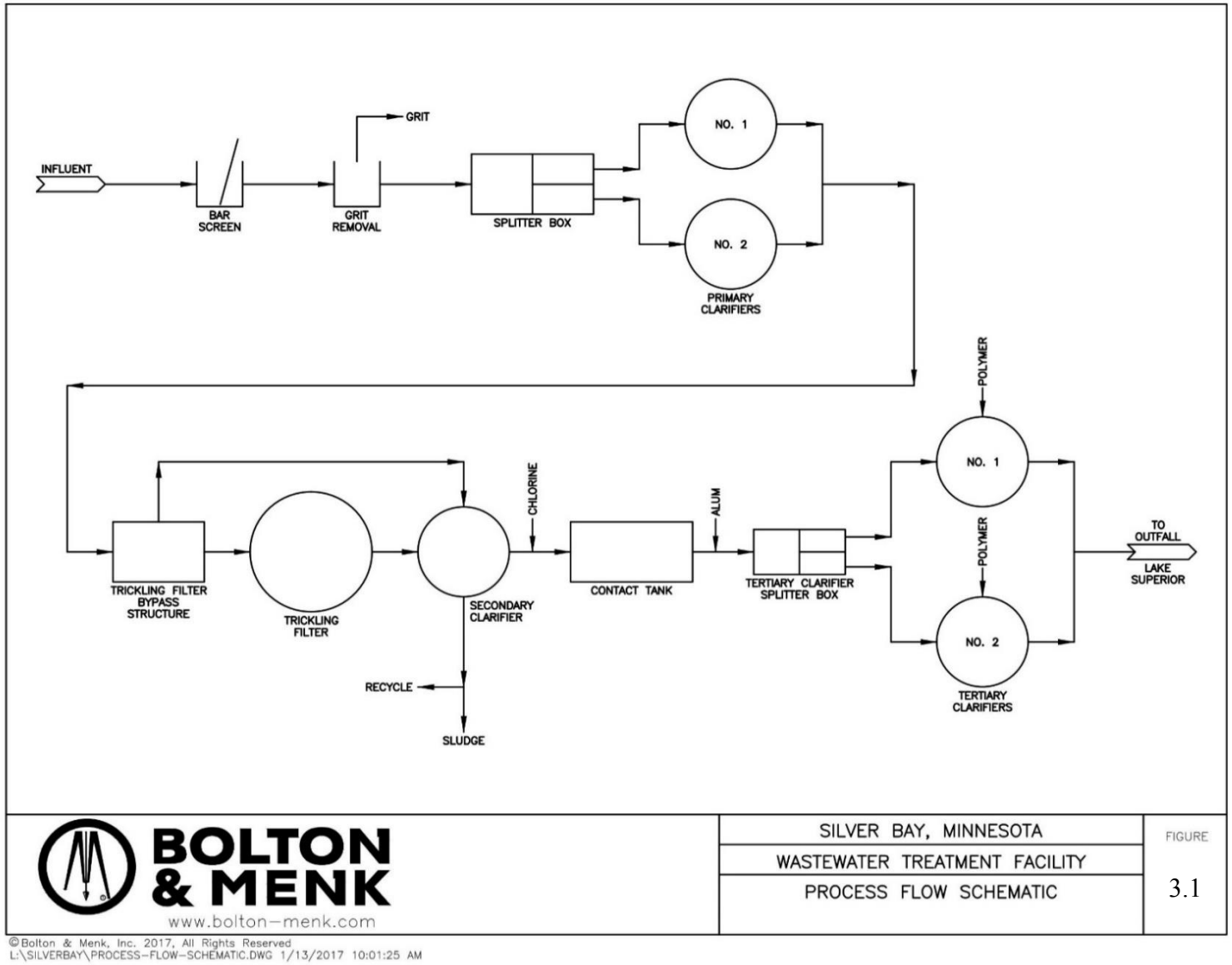


Figure 3.1: Silver bay WWTF Process Schematic

Figure 3.2 – Silver Bay WWTF Aerial Overview

B. COLLECTION SYSTEM

1. Gravity Collection System

The City of Silver Bay existing gravity collection system consists of varying pipe sizes. The City performs infrastructure improvements as necessary to replace aging infrastructure. The City has been focusing these improvements on areas believed to be major sources of infiltration and inflow (I&I).

Improvements to the existing gravity collection system are not considered in this Facility Plan. However, it is highly recommended that the City continue efforts to reduce I&I.

C. TREATMENT FACILITY

1. Pre-Treatment

a) Influent Manhole

The influent manhole was constructed with the original plant in 1954. The concrete has shown signs of deterioration but the manhole structure is in fair condition overall. With improvements to the preliminary treatment, the influent manhole should be replaced.

b) High Flow Diversion Structure and High Flow Manual Bar Screen

A high-flow diversion structure precedes the pre-treatment process at the WWTF. This structure was added in 1994 and includes an influent by-pass structure, a manually cleaned bar screen on the by-pass line, and influent flow monitoring for the by-pass. The by-pass constructed in 1994 involves diverting flows in excess of the capacity of the previously constructed bar screen, grit removal, and influent flow monitoring to the primary clarifier splitter box.

The concrete structure for the high-flow bypass has 20 plus years of useful life remaining and is in good condition. However, operational issues with the manual bar screen during high flow events have resulted in rags and other debris continuing downstream and causing operational problems with pumps, digester heating, and contributing to excess solids accumulating in the digesters which increases costs associated with biosolids removal. The high flow diversion structure and manual bar screen are exposed to weather resulting in operation that is more difficult during rainfall and winter conditions. With the above operational concerns noted, the manual bar screen and high flow diversion structure are in need of replacement.

c) Manual Bar Screen

Under normal flow conditions, pre-treatment at the WWTF begins with a manual bar screen. The existing bar screen has 3/8" bars and 1 ½" openings. The effective area of the screen is 2'-1" by 3'-0" and sits at a 26^{o} angle with the horizontal plane. The manual bar screen was installed in 1972. The existing manual bar screen has operational problems that allow rags and other debris to pass through which has led to clogging problems with pumps and excess debris and solids settling in the clarifiers. The excess solid are sent to the digesters, which has affected digester heating and has led to increase biosolids handling costs. The manual bar screen is currently not protected from the weather. High flows and winter freezing conditions make operation of the bar screen difficult. Overall, with poor screening efficiency and difficult operation, the manual bar should be replaced.

d) Grit Removal

Once the wastewater has been screened, flow enters the grit removal chamber. The grit removal chamber was installed in 1972 and is 14 feet in diameter with an effective liquid depth of 4.67 feet. The grit chamber and associated grit removal equipment are in poor condition. The conveyor that removes the settled

material from the grit tank has been repaired numerous times and is inoperable at times. The existing equipment in the chamber is inefficient and is in need of replacement. With equipment that is outdated and has poor efficiency and reliability, significant amounts of grit pass through this structure and settle in the primary clarifiers. The excess solids from the clarifiers are sent to the digesters. These excess solids accumulate in the digesters, and as noted before, increase the costs for biosolids handling and removal from the facility.

The existing grit removal chamber is undersized for the influent flows and has several operational concerns. As noted earlier the equipment has failed several times and is inoperable. The existing concrete structure is showing signs of deterioration and requires significant rehabilitation and modifications to accommodate new equipment.

The grit and solids that settle out in the bottom of the tank are sent to a washing unit and collection bin in the adjacent building. The adjacent building is in poor condition. The building was replaced in 1994 and requires repairs to the masonry walls and concrete. The building does not have any wall insulation and only 1 ½" of board insulation on the roof that results in freezing conditions during winter months. The building is in need of significant improvements. The grit removal chamber is shown in Figure 3.3.

Figure 3.3: Grit Removal Chamber

e) Bar Screen/Comminuter Combination

Following grit removal, wastewater enters the bar screen/comminuter combination. The purpose of the comminuter is to grind up rags and other debris to prevent downstream processes and pipes from clogging. The bar screen is manually cleaned in the 24 inch channel in which the comminuter sits in. However, flows often exceed the capacity of the bar screen and watermarks on the concrete structure indicate water levels above the bar screen. These flows exceed the capacity of the comminuter. The comminuter was installed in 1954 with the original WWTF. The bar screen and comminuter combination is inefficient at removing debris from the wastewater and has exceeded its useful life.

2. Primary Clarifiers

After preliminary treatment, wastewater enters two primary clarifiers. Both clarifiers are both 40 feet in diameter with a sidewater depth of 7.5-ft each. Primary clarifier No. 1 was installed in 1954 while primary clarifier No. 2 was installed in 1995. Clarifier No. 1 received new equipment in 2014. The equipment in clarifier No. 2 is almost 20 years old and should be replaced. Both clarifiers should be drained down and inspected. Overall, the clarifiers appear to be in good operating condition and are in adequate condition for current and future design flows. Primary clarifier No. 1 and No. 2 are shown in Figure 3.4 and 3.5, respectively.

Figure 3.4: Primary Clarifier No. 1

Figure 3.4: Primary Clarifier No. 2

3. Trickling Filter

Primary biological treatment at the WWTF is completed by a single 60-foot diameter trickling filter with 6 feet of rock media that is made from 3-inch crushed rock. Historically, the trickling filter has achieved high removals of $CBOD_5$ to below permitted limits. The structure has 20 plus years of useful life remaining and has been well maintained. The trickling filter is in good condition and has the capacity to handle current and future loading and flows. The trickling filter is shown in Figure 3.6.

Figure 3.6: Trickling Filter

4. Secondary Clarifier

Following the trickling filter is one 40-foot diameter secondary clarifier. The clarifier has a sidewater depth of 7.5 feet and was installed in 1954 with the original WWTF. The secondary clarifier also serves a purpose to recycle solids back to the trickling filter to maintain a healthy population of organisms to treat the wastewater and to waste excess solids to the anaerobic digesters. The concrete in the secondary clarifier is in good condition and has 20 plus years of useful life remaining.

Figure 3.7: Secondary Clarifier

5. Disinfection

Flow from the secondary clarifier enters the chlorine contact tank that sits below the operations building. The chlorine contact tank allows for a flow of 1.04 MGD with a minimum of a 15-minute detention time. The contact basin is made from concrete that has 20 plus years of useful life remaining. No major improvements are required for the chlorine contact basin. Under higher flows, the detention time in the chlorine contact time is relatively short, but additional contact time is achieved in the tertiary clarifiers. With the tertiary clarifiers included in the detention time, the allowable flow exceeds 10 MGD.

Pumps convey the wastewater to the tertiary clarifier splitter box that sends the wastewater to one of two tertiary solids contact clarifiers. Currently, the three original dry-pit that were designed to convey the water to the tertiary clarifiers, are not being use and are in need of replacement. These pumps are rated for 600 gpm. Two smaller submersible pumps in the wet well are the only pumps that convey water to the splitter box. The splitter box is in good condition and has 20 plus years of useful life remaining. Dechlorination is accomplished in the effluent trough of the tertiary solids contact clarifiers with the addition of sodium bisulfate.

6. Tertiary Solids Contact Clarifiers

Two tertiary solids contact clarifiers follow the chlorine contact basin. These clarifiers were originally designed to reduce effluent phosphorus loads, but are also currently being used to test the effectiveness of reducing mercury levels with chemical addition in a full-scale pilot study. Tertiary clarifier number one was constructed in 1975 and is 40 feet in diameter with a sidewater depth of 11 feet. Four sludge hoppers collect the settled sludge where it is pumped to the anaerobic digesters. A second clarifier was added in 1995 and is 45 feet in diameter with a sidewater depth of 10.8 feet. The second clarifier has a sloped floor that conveys settled sludge to one centralized sludge hopper.

Freezing temperatures in the winter historically have caused ice to form in the clarifiers. Colder wastewater temperatures and ice formation could cause the coagulant (alum) to be less effective in forming precipitates, thus reducing the removal efficiency of phosphorus and mercury. The addition of covers will prevent ice formation and other operation concerns that occur when the surface of the clarifiers freeze.

Both clarifiers were rehabilitated in 2016 with solid contact clarifier No. 1 receiving new equipment and a new coating, while solids contact clarifier No. 2 received only a new coating. The project was completed in December of 2016. This most recent project added 20 plus years of useful life to the clarifiers. Currently, the clarifiers are in good condition. Clarifier number one can be seen in Figure 3.8 while clarifier number two is shown in Figure 3.9. Additional discussion on the clarifiers is later in this report.

Figure 3.8: Solids Contact Clarifier No. 1

Figure 3.9: Solids Contact Clarifier No. 2

7. Biosolids Storage

Solids produced at the WWTF (in the primary, secondary, and tertiary clarifiers) are sent via pumps to the first and second stage anaerobic digesters. The first stage anaerobic digester was installed in 1954, while the second stage anaerobic digester was added in 1995. It has been noted that the waste gas burner and equipment is not

operating correctly and requires new parts and components. The sediment trap on the stage two digester is in need of replacement. The second stage digester has a floating cover that was rehabilitated in 1995, but has not had any major improvements since that time. The cover exterior is in ok condition, but an inspection will need to be completed to verify the condition inside the tank. Floating covers typically require maintenance after 20 years and it is most likely that the floating cover will need to be rehabilitated. In addition, the concrete foundation inside the first stage digester is noted to have a crack that needs to be sealed. The mixer in digester one in in need of replacement. There is no mixer in the second stage digester. The facility produces class B biosolids that are applied to local fields. The structures are in good condition and have 30 plus years of useful life remaining. The first stage digester is shown in Figure 3.10, while the second stage anaerobic digester is shown in Figure 3.11.

Figure 3.10: First Stage Anaerobic Digester

Figure 3.11: Second Stage Anaerobic Digester

D. TREATMENT PERFORMANCE

1. CBOD, TSS, and Phosphorus Removal

The City of Silver Bay NPDES permit specifies pollutant discharge limits for $CBOD_5$, TSS, phosphorus, and mercury. Figures 3.12 through 3.14 show reported effluent discharge values for each $CBOD_5$, TSS, and phosphorus, respectively over the past five years. In this timeframe, there was only one instance where the weekly maximum $CBOD_5$ concentration exceeded the weekly maximum limit. Otherwise, the WWTF has met all discharge limits for $CBOD_5$.

Twice, the weekly maximum effluent TSS concentration exceed the weekly maximum limit of 40 mg/L, and only one time has the weekly maximum TSS load exceeded the weekly maximum limit of 311 lbs./day. The TSS load exceeded the average monthly limit of 207 lbs./day only once during the historical monitoring period. There were no other instances where the average monthly concentration or TSS loads, exceed permitted limits.

The total phosphorus concentration exceeded the permitted limit of 1 mg/L only once during the historical monitoring period. The total phosphorus load exceeded the permitted limit of 6.83 lbs./day one time in the last five years.

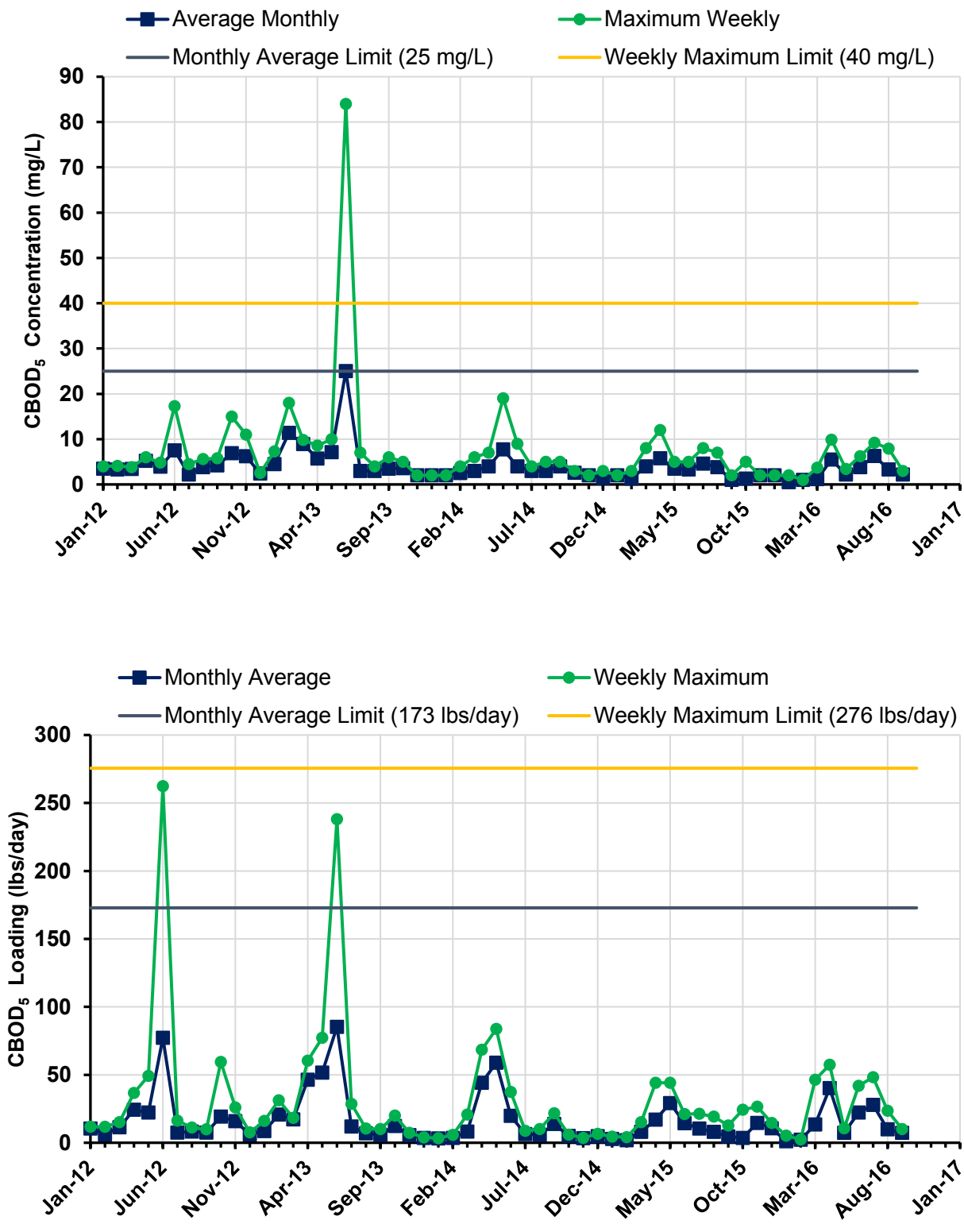


Figure 3.12 – $CBOD_5$ Effluent Discharge Concentration (top) and Loading (bottom)

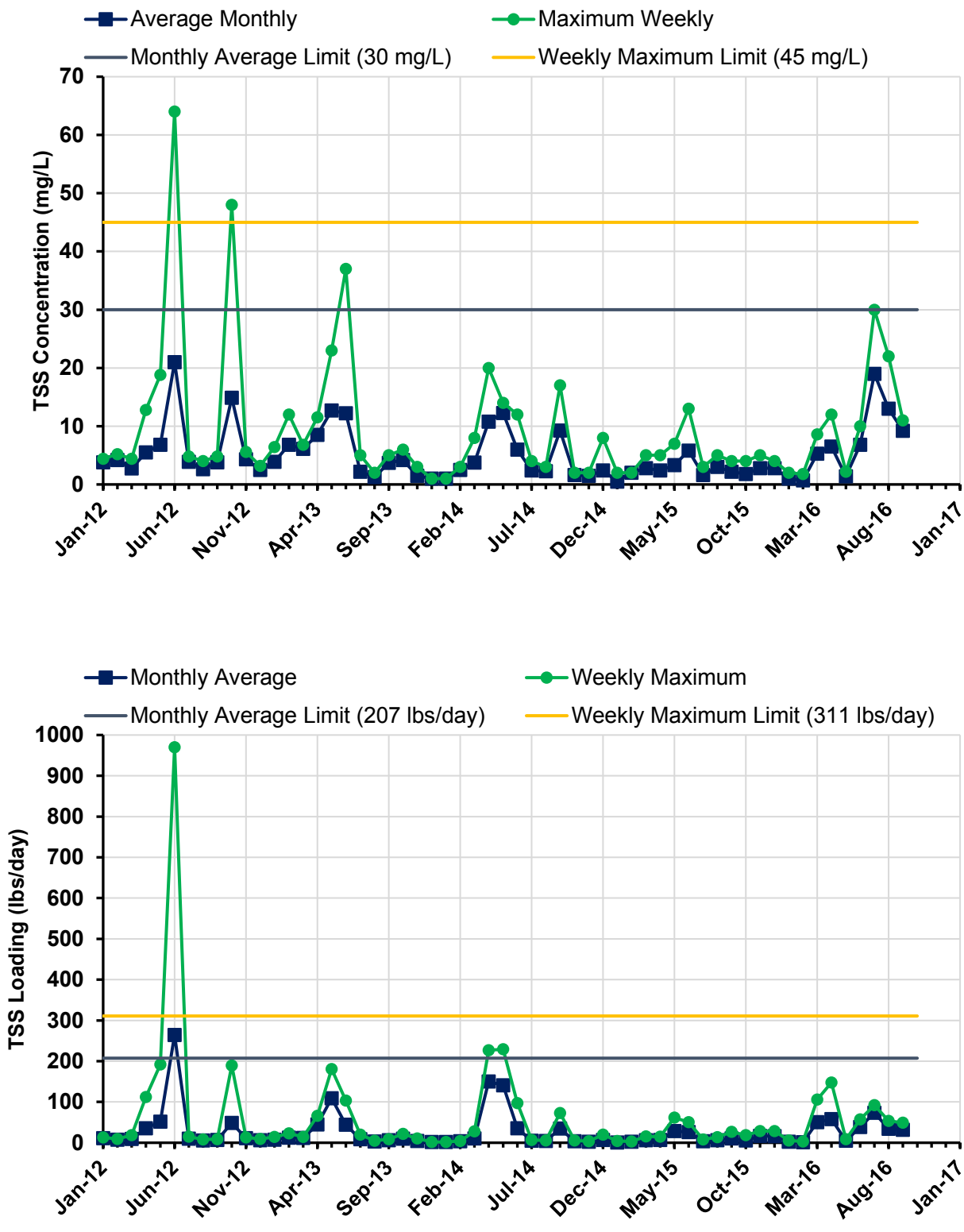


Figure 3.13 – TSS Effluent Discharge Concentration (top) and Loading (bottom)

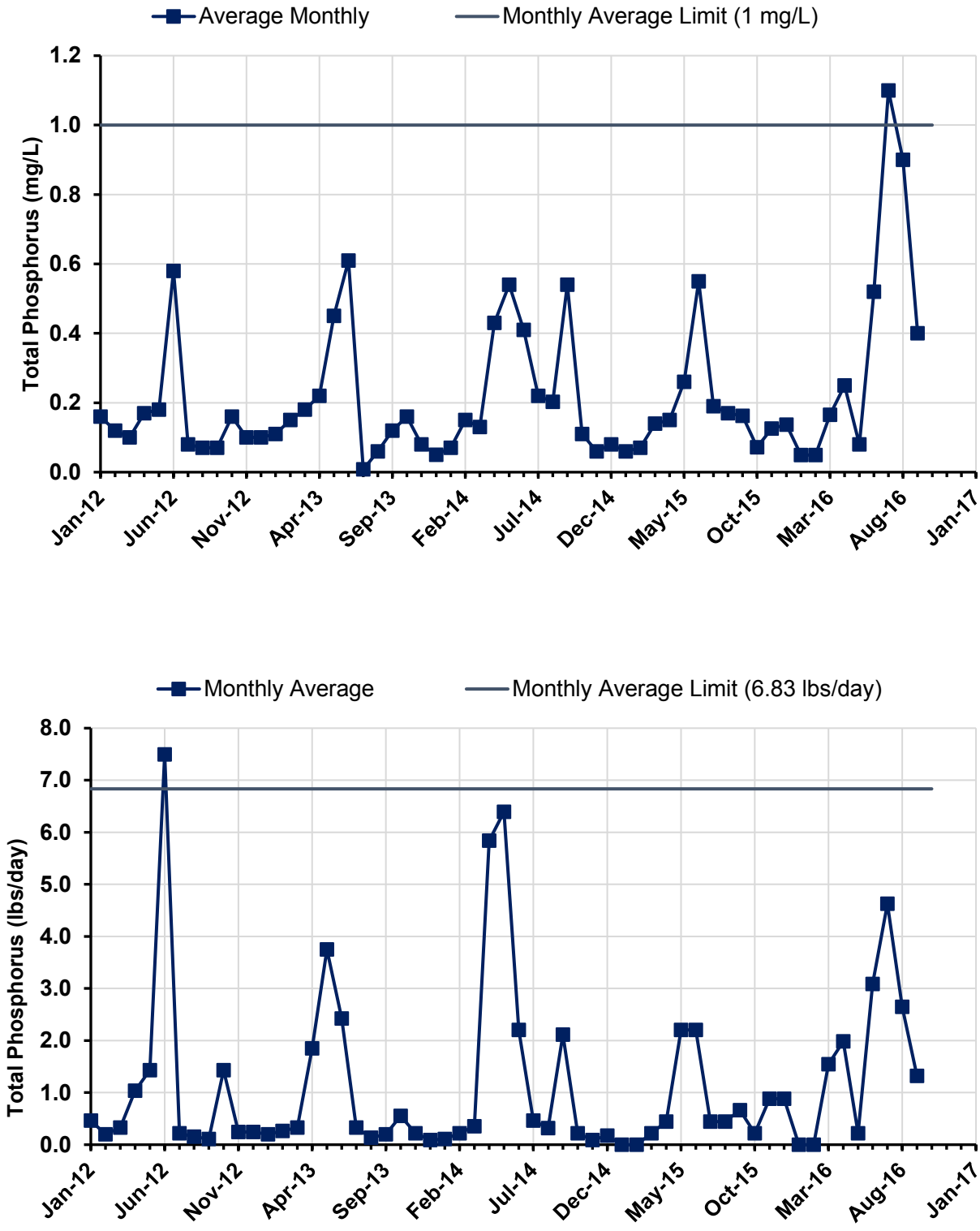


Figure 3.14– Total Phosphorus Discharge Concentration (top) and Loading (bottom)

E. ENVIRONMENTAL SOURCES OF MERCURY - RAINFALL

Studies have indicated that significant concentrations of mercury can be found in rainfall. Mercury in rainwater is linked to atmospheric pollutants, mainly from coal burning facilities. There are often higher levels of mercury in rainwater downwind of large industrial areas as well. Data is collected by the National Atmospheric Deposition Program and compiled to compare mercury in rainfall from a number of monitoring stations across the upper Midwest. Mercury data collected across the Northeastern section of Minnesota indicates that mercury levels in rainfall are elevated and are above the permitted final mercury limits noted in the NPDES permit.

High levels of mercury in rainfall may warrant specific improvements to the existing facility to prevent erroneous mercury testing results in the effluent waste stream. Some of the elevated mercury results discussed later may have occurred during heavy rain events where rainwater with a high mercury concentration may have entered the effluent waste stream of the uncovered solids contact clarifiers. If a mercury grab sample was collected during a precipitation event or within a several hour window, this could lead to an elevated mercury concentration. Specific improvements to the tertiary solids contact clarifiers to prevent rainfall from entering the effluent waste stream are presented in section four (4).

F. FULL-SCALE PILOT STUDY & MERCURY COLLECTION AND MONITORING

1. Background

A pilot study is currently being run to test the effectiveness of using coagulant and flocculant to increase TSS, and consequently total mercury, removal in the tertiary clarifiers. Mercury sampling for the pilot study started in December 2016 after the rehabilitation project on the tertiary clarifiers was completed and both clarifiers were operational. A change to operation was made on January 10, 2017. The coagulant feed point was moved from the tertiary splitter box to the center well of the tertiary clarifiers. No change was made to the polymer feed point, which remains in the tertiary clarifier center well.

2. Water Quality Summary

This section includes a summary of the influent and effluent mercury and TSS data collected to date. As stipulated by the current permit, once per month total and dissolved mercury samples are required to be collected in May and September. While the required once per week 24-hour composite TSS effluent samples have been collected, TSS samples have not been collected with mercury samples as required in the permit. Unfortunately, this makes correlating mercury and TSS concentrations less reliable.

As part of the City's mercury reduction effort, weekly mercury sampling has been conducted beginning in December 2016. Mercury data collection is shown in Table 3.1.

Table 3.1 – Historical Mercury Data (2014 – 2017)										
Sample Date	Influent		Effluent				Combined Average Total mercury (ng/L) [3]	Effluent TSS (mg/L) [4]	WWTF Flow (MGD)	Total Mercury Percent Removal
	Total Mercury (ng/L)	Dissolved Mercury (ng/L)	Clarifier No. 1 Total Mercury (ng/L) [1] [2]	Clarifier No. 1 Dissolved Mercury (ng/L)	Clarifier No. 2 Total Mercury (ng/L) [2]	Clarifier No. 2 Dissolved Mercury (ng/L)				
June 18, 2014	26.2				2.07		2.07	6.0		92.1%
Oct. 22, 2014	65.4	2.32			3.19	1.95	3.19	1.6	0.433	95.1%
Nov. 9, 2014					1.42		1.42	1.5	0.215	N/A
Jan. 14, 2015	43.2				0.7	<0.5	0.7	0.5	0.23	98.4%
Feb. 4, 2015					0.661	<0.5	0.661	2.0	0.128	N/A
April 1, 2015	74.8	3.46			2.68	0.907	2.68	2.4	0.165	96.4%
May 31, 2015	51.1				3.07	2.18	3.07	3.3	0.244	94.0%
Sep. 30, 2015	25.8	1.76			5.56	1.4	5.56	2.2	0.448	78.4%
Jan 6, 2016	62.6	2.09			0.656	<0.5	0.656	1.0	0.525	99.0%
May 18, 2106	194				1.55	0.822	1.55		0.317	99.2%
May 31, 2016	159				1.88	<0.5	1.88	1.4	0.324	98.8%
July 6, 2016	35.1	1.72			4.95	1.04	4.95		0.636	85.9%
Oct. 18, 2016	12.2		2.12				2.12		0.342	82.6%
Oct. 27, 2016	55.5		2.98	0.723			2.98		0.532	94.6%
Dec. 7, 2016	11.9	1.42					2.47		N/A	79.2%
Dec. 13, 2016	43.9						1.43		N/A	96.7%
Dec. 21, 2016	35.5	2.68	1.44	< 0.50	6.34	0.526	3.89		N/A	89.0%
Dec. 28, 2016	20.7	1.63					2.92		N/A	85.9%
Jan. 4, 2017	24.6	2.51					3.00		N/A	87.8%
Jan. 11, 2017	31.4		1.58		5.34		3.46		N/A	89.0%
Jan. 18, 2017	27.3	3.87	1.36	< 0.50	0.923	<0.50	1.14		N/A	95.8%
Jan. 25, 2017	45.3	2.88	1.26	< 0.50	1.71	< 0.50	1.49	7.5	N/A	96.7%
Feb. 1, 2017	22.1	1.32	1.60	< 0.50	0.521	< 0.50	1.06		N/A	95.2%
Average	51.6	2.3	1.76	0.723	2.54	1.26	2.41	2.67	0.333	92.2%

(1) Clarifier No. 1 was out of service until August 25, 2016 and came online on August 26, 2016 when renovations began on tertiary clarifier No. 2.
(2) Both clarifiers became operational on November 14, 2016.
(3) Average effluent total mercury concentrations are the average mercury concentrations between samples taken from tertiary clarifier No. 1 and tertiary clarifier No. 2.
(4) TSS data represents composite calendar month average and was not collected with the mercury samples

The average influent total mercury concentration over this reporting period is 51.6 ng/L with an average dissolved concentration of 2.3 ng/L. While clarifier No. 1 was offline for a majority of the period of historical data, clarifier No. 2 had a long-term average effluent total mercury concentration of 2.54 ng/L and an average dissolved concentration of approximately 1.26 ng/L. When clarifier No. 1 came back online on August 26, 2016 after it was rehabilitated, clarifier No. 2 was shut down for renovations from August 26, 2016 to November 14, 2016. The average effluent total mercury concentration in tertiary clarifier No. 1 during this time was 1.76 ng/L with an average dissolved concentration of 0.723 ng/L. Both clarifiers became operational on November 14, 2016. Historically, the clarifiers have been removing approximately 92% of the influent mercury. Although the treatment facility has achieved a high percentage of mercury removal, historical effluent mercury concentrations have exceeded final limits of 1.9 ng/L for a calendar month average and 3.5 ng/L for a daily maximum.

As noted in the table, there is significant variability in the influent mercury data, ranging from 11.9 ng/L to 194 ng/L. To determine the cause of this variability, precipitation data recorded at Silver Bay Municipal Airport was compiled and compared to the mercury data. Figure 3.15 shows the relationship between the influent

mercury levels and the inches of precipitation on that particular day. This follows the discussion from earlier relating rainfall and mercury in northeastern Minnesota. While not definitive, there may be a correlation between influent mercury concentration and precipitation events. There may be a number of possible contributors to the elevated influent levels and a review of the mercury minimization plan may identify new sources of mercury since completion of that plan to possibly reduce or eliminate the influent spikes

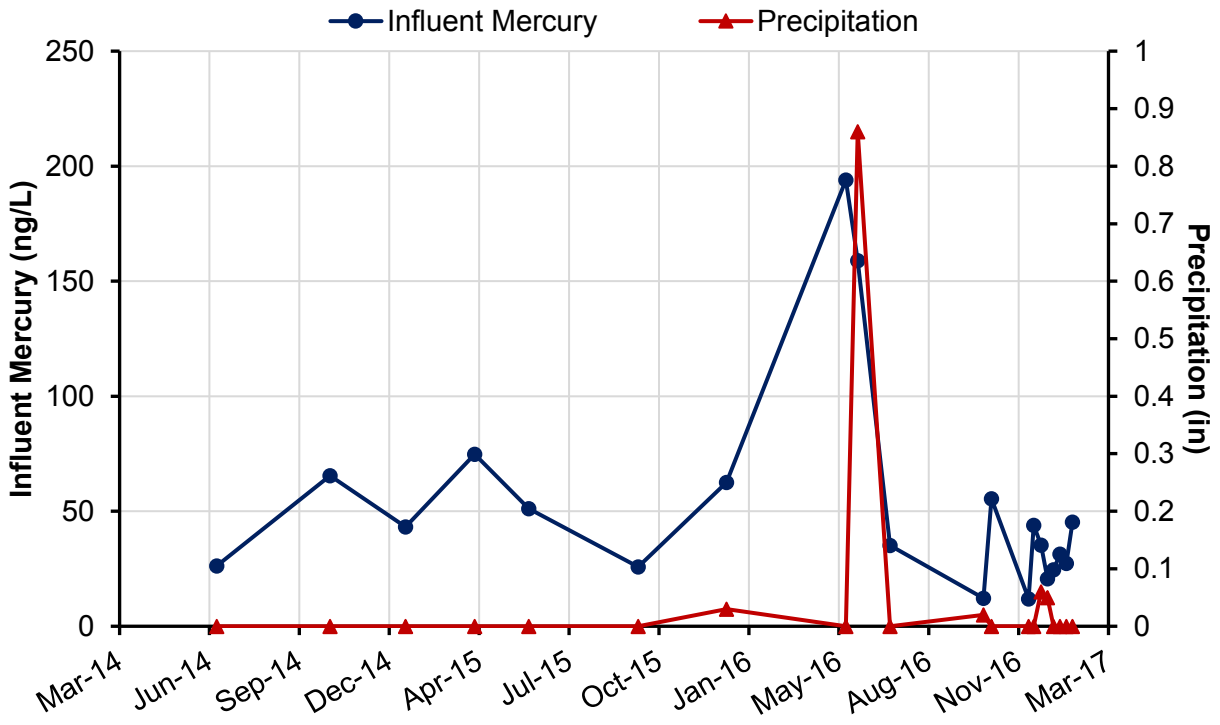


Figure 3.15– Influent Mercury Compared to Daily Precipitation

Figures 3.16 and 3.17 show historical total and dissolved effluent mercury as compared to the interim and final limits set forth in the NPDES permit.

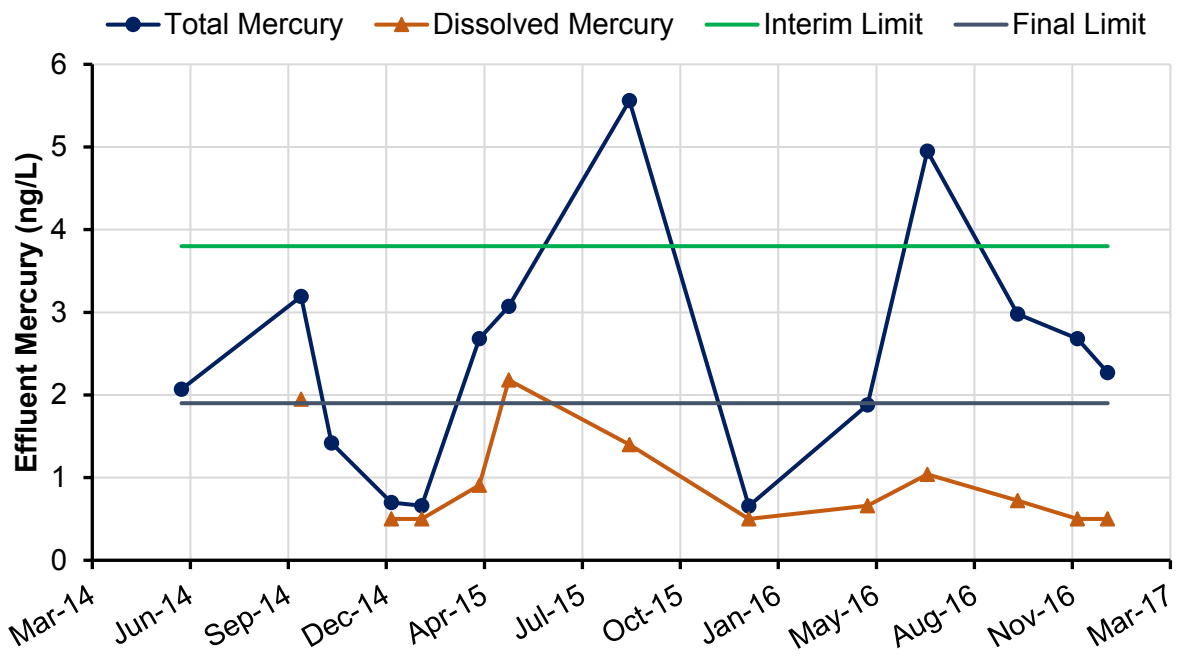


Figure 3.16– Total Effluent Calendar Monthly Average Mercury Compared to Interim and Final Limits

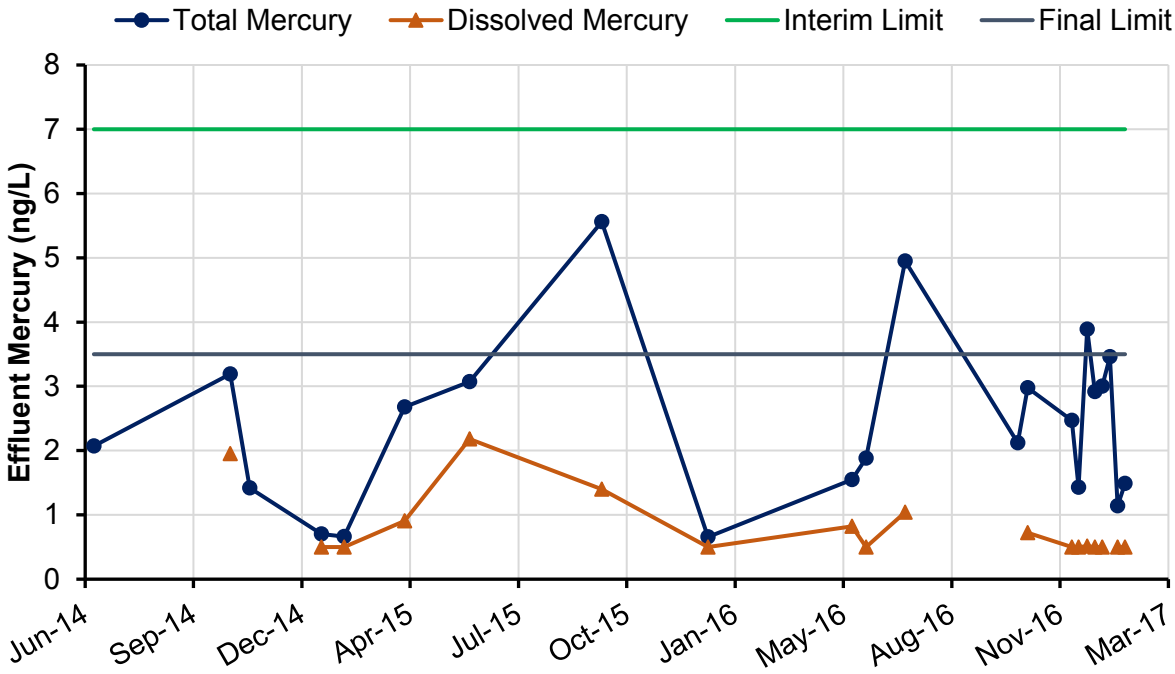


Figure 3.17– Total Effluent Daily Maximum Mercury Compared to Interim and Final Limits

As shown in Figure 3.16, the existing treatment plant has consistently been able to meet the calendar monthly average interim limits (3.8 ng/L), with exceptions in September 2015 and July 2016. Figure 3.17 show the plant has been able to consistently meet the daily maximum interim limits (7 ng/L).

While the treatment plant has been able to generally meet the interim limits, it has not been able to consistently meet the daily maximum (3.5 ng/L) and the calendar monthly average (1.9 ng/L) final limits. Additionally, the dissolved effluent mercury concentration has exceeded the final limits two times.

To identify potential causes of the exceedances, the flow rate through the facility was reviewed and is plotted with the mercury concentration in Figure 3.18 below. At higher flow rates, the settling times may be reduced reducing TSS removal and subsequently mercury removal. The carryover in the clarifiers could result in the higher effluent mercury levels.

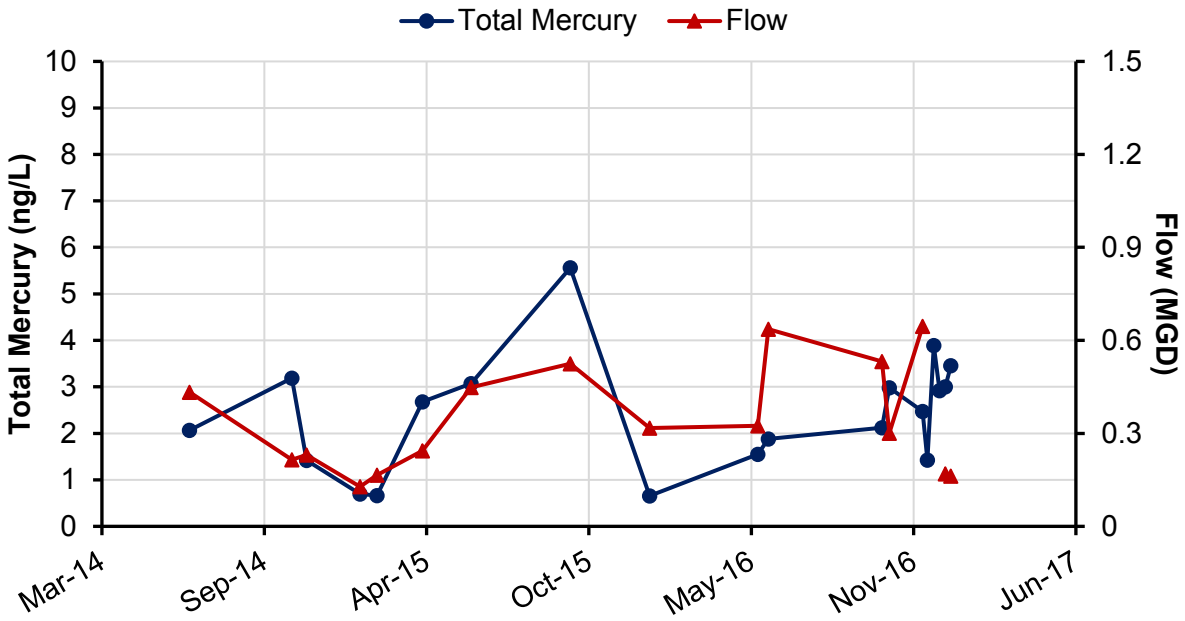


Figure 3.18– Effluent Mercury Relationship to WWTF Flow Rate

While they were not collected together, there seems to be some correlation between total effluent mercury and TSS as shown in Figure 3.19. Renovations to the tertiary clarifiers were completed in November 2016. At that time, the City began the full-scale pilot study. These test results begin on December 7, 2016.

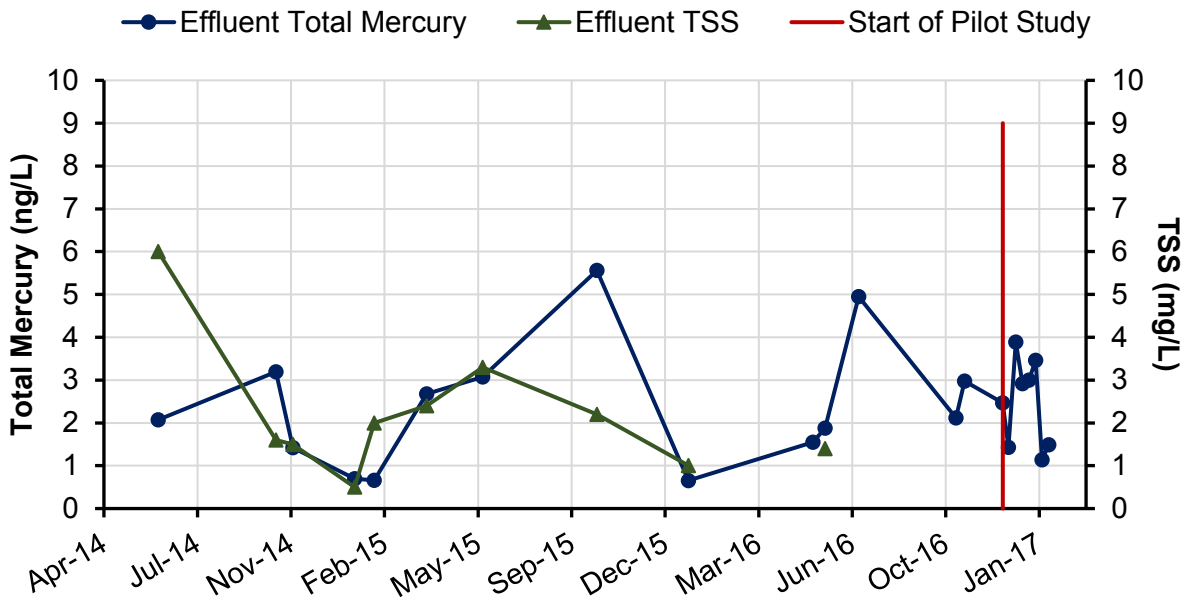


Figure 3.19– Effluent Mercury and TSS Comparison

While the TSS and mercury data were not collected together, there does appear to be a possible correlation between the two constituents. This is consistent with the findings at other facilities. TSS data that is available was used in the comparison. TSS sampling has been taken during the full-scale pilot and sent to the lab for analysis, and the results are pending at this time. Reviewing the available TSS data indicates the current treatment system does a good job of removing TSS and consistently discharges low TSS. However, this also means it is unlikely that much more TSS would be removed through settling alone.

Another item to note is the mercury data collected in the splitter located ahead of the tertiary clarifiers. This data provides insight into potential mercury removal at the various stages of the existing treatment train. Figure 3.20 below shows mercury levels sampled at the influent, secondary clarifier effluent (tertiary splitter box), and tertiary clarifier effluent. While most removal takes place in the primary and secondary clarifiers, there is still some removal in the tertiary clarifier. In the primary and secondary clarifiers, there will be a higher percent of TSS for the mercury to attach to and settle out. As this TSS is reduced, additional chemical feed may be needed to get more mercury in suspension prior to the tertiary clarifiers to allow for more settling of the mercury.

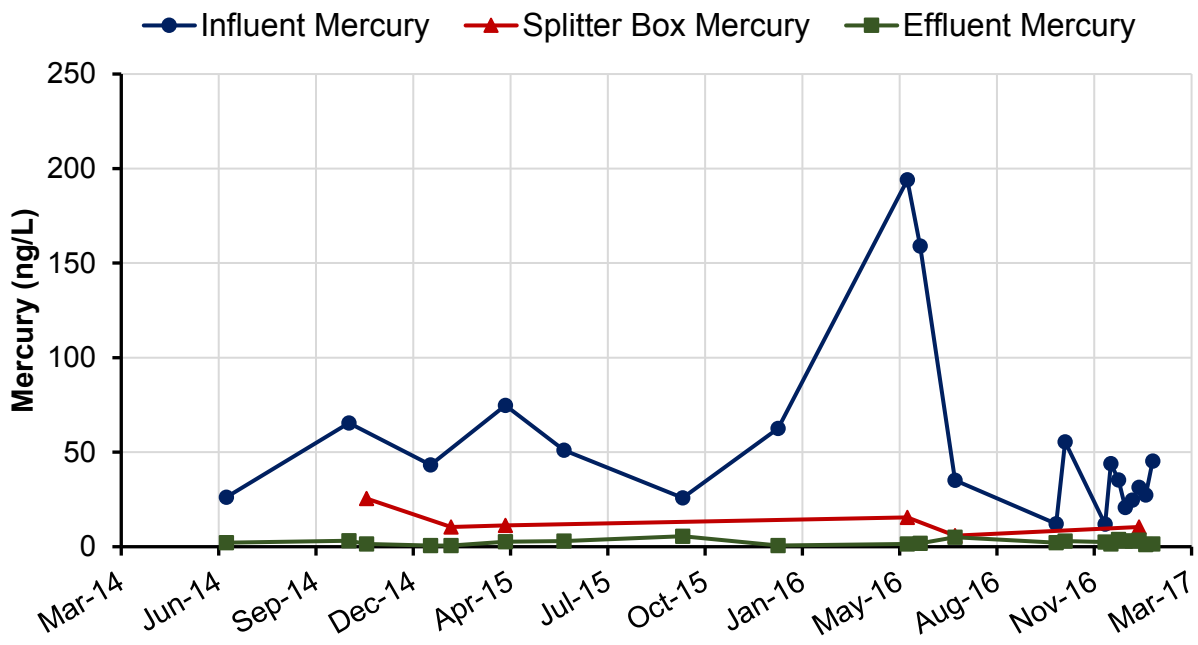


Figure 3.20– Mercury Levels Throughout the Treatment Process

The test results of the full-scale pilot show that occasionally the system can meet the final discharge limits for mercury. However, it has not been able to consistently meet the final effluent limits over the entire pilot test period. Continuing the full-scale pilot study and monitoring the results during anticipated changes in influent flow rates, influent mercury level fluctuations and weather changes will provide additional data to assist with the decisions for long-term mercury treatment options.

4. WASTEWATER TREATMENT FACILITY IMPROVEMENT ALTERNATIVES

A. GENERAL

Over the past five years, the City of Silver Bay Wastewater Treatment Facility has met compliance criteria specified in their NPDES discharge permit. However, with new mercury limits, the facility must explore alternative treatments that will improve mercury removals. By improving other treatment processes at the facility, it may benefit mercury removal. This section details improvements to the existing WWTF that are non-mercury related. Section five (5) will detail mercury related removal alternatives.

B. WASTEWATER TREATMENT FACILITY IMPROVEMENTS

The City of Silver Bay existing treatment infrastructure is in good condition to comply with current permitted limits. However, the preliminary treatment system has several operational concerns and will require improvements. Table 4.1 identifies alternatives for non-mercury related (preliminary treatment) and other miscellaneous improvements. Regardless of what mercury removal technology is discussed and recommended in section five (5), the following improvements will be included with the recommended mercury removal treatment alternative. Details of the preliminary treatment and other miscellaneous improvements are described in the following paragraphs.

Table 4.1 – Proposed Non-Mercury Related Alternatives for Wastewater Treatment Facility Improvements

Alternative	Description
Alternative No. 1	Rehabilitate Pre-treatment, add Clarifier Covers to all clarifiers, and rehabilitate digester gas-burner equipment

1. Alternative No. 1 – Rehabilitate Pre-treatment, add Clarifier Covers, and rehabilitate digester equipment

The first alternative includes the rehabilitation of the pre-treatment process at the WWTF and providing covers for the tertiary solids contact clarifiers. As noted in section three, the existing pre-treatment process has several operational concerns as the manual bar screen has clogging issues and the grit removal equipment is outdated and in need of replacement. This alternative includes replacing the influent manhole, replacing the by-pass bar screen and channel, replacing the manual bar screen with a mechanical fine screen, replacing the grit removal equipment, modifying the grit removal structure, constructing a new pre-treatment building, adding covers to the tertiary solids contact clarifiers, adding covers to the primary and secondary clarifiers, replacing pumps in the control building, replacing the gas burner equipment on the digesters, adding a digester mixer to the anaerobic digesters. Details on this alternative are provided below.

a) Preliminary Treatment Building

Part of the rehabilitation of the existing preliminary treatment process involves the construction of a new pre-treatment building. The pre-treatment building will

house the mechanical fine screen, flow-monitoring equipment, and a new grit classifier and washer. This alternative will require the existing building that houses the grit washer to be demolished. The new building will be constructed over the existing preliminary treatment process. This building will have to be constructed while maintaining operation of the treatment process. Some processes will need to be by-passed during construction.

The new building will contain mechanical and electrical rooms due to the classification of the process space in the building. The building would be a masonry wall building with reinforced concrete. Heating and air conditioning will be included with construction. The proposed building would have dimensions of 32 feet by 40 feet with a 12-foot high ceiling. The mechanical and electrical rooms would have dimensions of 8 feet by 12 feet each. These dimensions are preliminary and may change during design if it is determined a smaller footprint is needed to reduce capital costs. The roof would be made from pre-cast concrete planks with insulation and a membrane roof system. An 8-foot-by-8-foot overhead door would be installed so a truck could back-up to the dumpster to remove the screening materials. Minor site improvements will be necessary to grade the surrounding ground to slope drainage away from the building and to re-route the driveway to the new building.

b) Influent Manhole and Diversion Structure

As noted in section three, the existing influent manhole is in need of replacement. This alternative includes demolishing the old influent manhole and replacing it with a new 48" manhole. The new manhole would be located upstream of the diversion structure to allow all of the flow to the WWTF pass through this manhole. This also includes modifying route of the influent from North Shore Mining to pass through this manhole.

Flow from the influent manhole would flow to a new diversion structure with influent monitoring capability. This is where flow would be diverted to the by-pass channel during high flow events. Flow would be monitored by either a Parshall Flume or an ultrasonic level transducer that could record flow.

c) By-pass Bar Screen and Channel

With the construction of a new pre-treatment building and operational problems with the existing by-pass structure, a new manually cleaned bar screen in a new by-pass channel will be installed. With this option, the existing by-pass bar screen and structure will be demolished. The new screen would be 2 - 4 feet wide and have a bar spacing similar to the existing manual bar screen. This process would be installed outside the new preliminary treatment building and be covered to protect equipment and the structure from the elements and allow for easy access for maintenance and cleaning. Flow monitoring equipment will be installed in the downstream channel as either a Parshall Flume or ultrasonic level transducer to record flows during by-pass events. The flow would be sent to the primary clarifier splitter box.

d) Mechanical Fine Screen

The existing manual bar screen has operational issues such as clogging and freezing during winter months. With improvements to the WWTF, a new mechanical fine screen will replace the manual bar screen. The purpose of the new mechanical fine screen would be to improve removal efficiency of debris and solids that could possibly affect downstream processes. The mechanical screen would be positioned in the influent channel upstream of the grit removal chamber. The screen would be designed to handle the design peak hourly wet weather flow of 3.48 MGD. Flows above this would most likely be diverted to the new by-pass channel. The screen cleaning would cycle based on headloss or on a timed system where the screen is cleaned at specific time intervals. With the addition of a mechanical fine screen, the existing comminuter and associated concrete structure would be demolished and not replaced.

e) Grit Removal Chamber and Equipment

As noted in section three, the concrete structure on the existing grit removal chamber is deteriorating in certain locations and is in need of rehabilitation. The existing equipment is non-operational at times and in need of replacement. The old grit removal equipment will be replaced with a new vortex style grit removal system. The new system would include a shaft with adjustable paddles that rotate and create a mechanically induced vortex, which settles grit, transports it to the center opening of the fixed floor for collection, and lifts and returns the light organic particles to the main flow. The new grit equipment would be sized for the PHWW design flow of 3.48 MGD.

The existing concrete structure would need to be modified to reshape the tank bottom and to relocate pipe penetrations into the structure for grit removal. The new preliminary treatment building would be constructed around the existing grit removal chamber to reduce costs with forming a new chamber. By placing this structure inside, it will remove operational issues associated with freezing temperatures in the winter and heavy rain events in the summer. A recessed impeller pump would then transport the grit to the grit classifier and grit washer.

The grit classifier and washer clean and separate the grit from the water. The grit classifier would deposit the de-watered grit in a dumpster while the wash water would be recycled back to the head of the plant for re-treatment.

f) Tertiary Solids Contact Clarifier Covers

This alternative includes installing aluminum covers on both tertiary solids contact clarifiers to improve treatment performance. The existing tertiary solids contact clarifiers recently underwent renovations to replace equipment and recoat the interior of the clarifiers in 2016. Both clarifiers are in good shape and have been well maintained. However, these most recent renovations did not provide covers for the clarifiers. Operations staff at the WWTF has noted that the clarifiers form ice during winter months. This can affect the treatment performance of the clarifiers, especially with chemical addition. Cold temperatures reduce the kinetics of the chemical reactions making them less

efficient, which can reduce effluent water quality. It is best to try maintain a consistent wastewater temperature for optimum efficiency.

The covers will help provide control for chemical feed doses and feed rates as well as maintaining a more consistent wastewater temperature. As noted earlier in this report, the City is in the process of running a full-scale pilot study using chemical addition in the solids contact clarifiers to remove mercury. By covering the clarifiers and providing control over temperature, it may help improve mercury removals in the clarifiers. The covers may also prove beneficial in preventing mercury contamination from outside environmental sources.

The covers will help reduce ice formation during the winter and prevent algae growth during summer months. This is critical in optimizing mercury removal from the clarifiers, especially prior to a tertiary treatment system. As noted earlier in this report, data collected on the mercury concentration in rainfall indicates that the area receives rainfall that may have elevated levels of mercury above the treatment facilities final permitted discharge limits. During heavy precipitation events, the rainfall that hits the solid contact clarifiers and flows out in the effluent channel may increase effluent mercury concentrations. This mercury would actually be from rainfall, and not from the wastewater. Covers over the clarifiers will reduce the chance that rainfall will affect the mercury concentration in the effluent waste stream. It ensures that the concentration of mercury in the grab samples is from only the wastewater, not the rainwater.

g) Primary and Secondary Clarifier Covers

As noted in section three, the two primary and single secondary clarifiers are in good condition. However, since they are open to the elements, rain and freezing conditions may affect performance. Since the facility is working on improvements to help achieve high mercury and solids removal, providing covers over these clarifiers will significantly help treatment performance. The covers included in this option will all be aluminum and sized to fit over the existing clarifiers. Access hatches will be provided for inspection and maintenance. In total, three covers will be required for these clarifiers in addition to the two required on the tertiary clarifiers for a total of five aluminum clarifier covers.

This option also includes draining the clarifiers for inspection and recoating the primary and secondary clarifiers with a new coating on the interior and all mechanical components.

h) Anaerobic Digester Equipment

The anaerobic digester structures are in good condition for 20 plus years. To help improve biosolids processing, a digester mixer is included in this alternatives. A mixer would be added into the first stage anaerobic digester to completely mix the tank. This will help improve biosolids processing and maintain good mixing throughout the tank.

In addition, it was noted that the gas burner equipment has not been operating as intended. This option includes replacing that equipment with new equipment so the facility can operate the gas burner as intended on the digester. The sediment

trap that is currently in-place has significant operation problems and will be replaced with this option.

i) Control Building Pumps, Piping, and Valves

As stated in section three, the three dry-pit pumps in the existing control building that are designed to convey water to the tertiary clarifier splitter box, are not being used due to reliability issues. To improve pumping efficiency and to provide redundancy, this alternative includes replacing these three pumps in-kind, with three new dry-pit pumps capable of producing the same flow rate (600 gpm).

j) Site Improvements

With significant modifications to the pre-treatment facilities, additional site modifications will be required. The new pre-treatment building will require a new driveway to be constructed up to the building to allow access and for dumpster removal. The site grading will need to drain water away from the structure. It may be required to add masonry retaining walls depending on final floor elevations and channel elevations in the pre-treatment building.

Depending on what alternative is recommended for mercury removal treatment, new buildings to house filters or other equipment may need to be constructed. This would require significant site improvements and grading to improve drainage. New driveways and sidewalks would need to be constructed as well. This part of the site improvements is contingent on what mercury removal technology is recommended and implemented at the WWTF.

C. ADVANTAGES AND DISADVANTAGES

The advantages for this alternative include greatly increasing screening efficiency and grit removal by adding a fine screen and new vortex grit removal equipment. The existing system has limitations, especially during winter months when freezing temperatures impact the manual bar screen. The addition of a new building, screening equipment, and grit removal equipment will remove more solids and debris, which can help improve downstream treatment efficiency. By removing debris and grit upstream, it may be possible to reduce wear on pumps and increase the pumping efficiency.

Improving grit and debris removal may also prove beneficial at helping to reduce mercury concentrations entering the WWTF. Some of the influent mercury will be attached to suspended particles. By improving TSS removal in the preliminary treatment, it may be possible to help improve mercury removal downstream by removing solids that may have attached mercury.

Additionally, covering the clarifiers prevents them from freezing and provides more control over chemical dosing and controlling effluent mercury and phosphorus concentrations. The covers will also prevent the growth of algae in the summer months that can affect treatment performance and potentially lead to increased pollutant loadings when algae die. Again, covers over the clarifiers will prevent rainfall with potentially high levels of mercury from

entering the effluent waste stream leading to high mercury concentrations in the grab samples.

The disadvantages to this alternative are that another building will need to be constructed which increases capital and operations costs. The building will require heat and air conditioning. Overall, the advantages greatly outweigh the disadvantages for rehabilitating the preliminary treatment process and adding tertiary clarifier covers. These improvements will greatly benefit the recommended mercury removal treatment process discussed in the next section.

5. MERCURY REMOVAL IMPROVEMENTS AND ALTERNATIVES

A. GEMERAL

As noted in previous sections, the effluent mercury concentrations do not meet the mercury permit limits in the final period. While there is limited TSS data that was collected with the grab mercury samples, based on experience with other projects, reducing TSS will likely have a positive effect on mercury removal. However, the current treatment process is already very efficient at removing TSS, additional tertiary treatment for mercury removal may be required. The pilot study using the tertiary clarifiers to remove mercury has shown that mercury removal is possible, but the results from the Phase I report (attached in Appendix H) are inconclusive and it is recommended to explore additional mercury removal alternatives. This section will discuss and evaluate different treatment options for mercury removal. It is important to note, that with each of the three alternatives discussed below, the preliminary treatment improvements from section four (4) are included.

B. TREATMENT ALTERNATIVES

Three options for additional solids and mercury removal have been identified:

1. Enhance existing tertiary solids contact clarifiers for mercury and TSS removal.
2. Construct new tertiary treatment facilities with media filters.
3. Construct new tertiary treatment facilities with membrane filters.

Additional information is presented for each of these options below.

1. Enhancement of Existing Tertiary Solids Contact Clarifiers for Mercury and TSS Removal

It is possible that enhancing the efficiency of the existing tertiary clarifiers will increase mercury removal. The mercury suspended in the water will attach to other suspended solids and settle out of solution, often with the help of coagulant, flocculant, and/or mercury scavenger chemistry. It has been demonstrated in other applications that mercury particles will settle out with other suspended solids in clarification steps of the treatment system. However, because the effluent already has low TSS, it is not expected that much more can be removed. Using a mercury scavenger, along with the current alum and polymer combination, the tertiary clarifier may potentially increase the settling of solids and mercury. While it is possible to improve mercury removal with the existing tertiary treatment process using additional additives, it is uncertain that this option will reliably meet final effluent limits for mercury.

This option is currently being evaluated with the full-scale pilot study. The current pilot study is evaluating how effective coagulant and flocculant chemistry is at removing mercury. The City is using a combination of alum plus a polymer to form flocs that sequester the particulate mercury to settle in the bottom of the clarifiers. Additional combinations of alum and polymer may be explored with this option to determine the optimum doses of each chemical for each season. To sustain mercury removals with the tertiary solids contact clarifiers, it may require more detail and care

in adjusting chemical feed rates and doses as temperatures change and as rainfall changes throughout the year.

The preliminary results of the pilot study indicate that mercury removal is possible with the tertiary solids contact clarifiers and chemical addition. However, the pilot study also indicates that mercury removal to below permitted levels is inconsistent and additional treatment is necessary to meet final limits. With inconclusive pilot study results, and with the full-scale pilot study ongoing, it is best to wait until the pilot study is finished before discussing this option.

One treatment technology included in this option to aide in mercury removal is adding the tertiary clarifier coves discussed in section four (4) of this report. The clarifier covers are required in this option. Covers over the clarifiers may help improve mercury removal by removing outside environmental factors, such as rainfall induced mercury discussed earlier, and providing more control over chemical feed doses and wastewater temperatures. If this option is not selected, there is still value in optimizing the existing tertiary solids contact clarifiers with the addition of covers and chemical addition for additional mercury and TSS removal prior to a tertiary treatment system.

Part of the recommendation of the Phase I report attached in Appendix H was to extend the duration of the pilot study into June of 2017 to cover a range of seasonal conditions to see if the clarifiers are able to sustain mercury removal. If it is determined that by the end of the pilot study that an optimum chemical feed and operation process is found, and the tertiary clarifiers can remove mercury to below permitted limits, then this Facility Plan may be amended with a report stating that the tertiary solids contact clarifiers will be the primary mercury removal technology used at the Silver Bay WWTF and additional tertiary treatment will not be required.

2. Construct Tertiary Treatment Facilities with Media Filters

While enhancing the existing tertiary solids contact clarifiers may be able to remove additional mercury, it is unlikely that it will have the ability to remove the mercury down to the final discharge limits. Therefore, it is likely that tertiary treatment of the effluent will be required. Based on evaluation of the available data, focusing treatment on additional solids removal is recommended. In particular, a filtration system is a viable treatment alternative. Such a system would be installed after the tertiary clarifiers. This option also includes the installation of covers over the tertiary clarifiers as discussed in section four (4) of this report as they prevent external sources of mercury from rainfall and other environmental sources from entering the wastewater.

A pressure or gravity multimedia filtration system has been used for polishing effluent at other wastewater treatment facilities and has been effective to capture solids not removed by upstream clarifiers. In additional to filtration, it is likely that chemical addition may be required to consistently meet the final effluent mercury limits. Chemical addition is currently in operation in the tertiary clarifiers and would be key to sustaining low mercury levels. The current pilot study will provide key details on chemical addition to optimize solids and mercury removal in the tertiary clarifiers.

Based on these assumptions, a conceptual design for a tertiary filtration system was developed. The intent of this conceptual design is to provide a basis for the preparation of AACE, Class 5 level budgetary costs for planning purposes. This conceptual design would need to be validated after additional data has been collected and reviewed.

The proposed tertiary treatment facility would consist of the following major components, which are described, in more detail below. It is important to note that if the results of the current pilot study show that solids contact clarification, with chemical addition, are feasible and remove mercury down to below permitted limits, utilizing the tertiary clarifiers, as the primary mercury removal treatment method may be recommended in an amendment to this Facility Plan. The sizing of the filtration units is based on treating a peak hourly wet weather (PHWW) flow of 3.48 MGD. The tertiary treatment system with media filters will include:

- Multimedia filter influent pump station
- Multimedia filters
- Backwash water pump station
- Backwash water supply

A multimedia filter influent pump station with redundant pumping would be needed to feed the multimedia filters. This pump station would likely have 4 wastewater pumps with discharge piping and valves to allow for flexibility in operation.

Gravity filtration will provide the most economical long-term solution for a filtration system. The flux rate target for mercury removal through a gravity filter is 4-6 gpm/ft^2. Using the conservative rate to allow for unknowns, the total filter area for 4 – 6 gravity filters would be approximately 605 square feet. The range of the number of filters allows for flexibility during design regarding filter size and available space on-site. More filters will require more space, but reduces the size of each filter. Backwash rates for this filter option would be approximately 12-15 gpm/ft^2 for 15-20 minutes. This is a typical range for the backwash rate for gravity filters. Chlorine will be added prior to the filters to prevent biological growth within the filter media, unless a sufficient residual is carried through the tertiary solids contact clarifiers. Dechlorination would be moved to after the filtration system.

A backwash water pump station would provide a means to pump backwash water to the head of the plant for re-treatment. It is assumed the solids in the backwash water would settle out in the primary clarifiers, so treatment of this water is proposed. A duplex submersible pump station is proposed for this unit. To minimize pump sizes, which would help reduce capital costs, it is assumed the wet well will have a volume in the range of 10,000 to 15,000 gallons for this unit. Process controls will allow the backwash water to be pumped back to the head of the treatment plant during a backwash cycle as to not overflow the backwash waste pump station. This operation minimizes the size required for the pump station and reduces capital costs.

Backwash water supply would consist of a tank/reservoir with pumps to collect treated effluent from the multimedia filters for use in backwashing the filters. This unit would

likely consist of a wet well with multiple pumps to meet the backwash rates and volumes needed for the filters described above. To ensure enough water is available for backwashing one filter per day, a tank with a volume in the range of 50,000 to 60,000 gallons is required for backwashing. In order to backwash two filters per day, a tank with a volume in the range of 80,000 to 100,000 gallons is required. The footprint of these tanks can vary depending on the desired water depth in the tank.

To prevent biological growth in the backwash water supply tank/reservoir, chlorine could be added after filtration to maintain a sufficient residual in the reservoir. Dechlorination would occur as the water leaves the reservoir prior to discharge. Typical chemicals for dechlorination are sodium bisulfate and sulfur dioxide. Since dechlorination is typically a fast reaction, in the order of seconds, this could be done in a small mixing chamber as the water leaves the reservoir.

3. Construct Tertiary Treatment Facilities with Membrane Filters

Another filtration option that can be used to remove mercury is membrane filtration. Membrane filtration removes nearly all non-soluble contaminants. Therefore very low CBOD and TSS limits are capable of being met. By removing high levels of TSS, high levels of mercury removal may be possible with membrane filtration. Membranes are available in a range of pore sizes. Typical wastewater applications utilize microfiltration (MF), which removes solids in the 0.025 to 10 µm range. Ultrafiltration (UF) removes solids to a much smaller size and macromolecules with molecular weights of 1,000 to 1,000,000. Membrane filtration systems also remove most bacteria.

A membrane system draws water from a tank through numerous membrane 'tubes' assembled into cassettes. The cassettes are installed in steel or concrete tanks. The permeate, or effluent, pumps draw water through the membranes under a vacuum. These pumps are sized for peak hourly wet weather flow. The treated water flows from the permeate skid to a disinfection chamber. The reject stream is returned to the head of the plant or intermediate point in the process for further treatment. The membranes are cleaned by reversing the permeate pumps to reverse the direction of flow through the membrane in conjunction with periodic chemical cleaning.

It is important to have an efficient clarification process upstream as high solids entering the membrane filters can cause membrane fouling which may lead to replacing membranes often and increases maintenance required. To help prevent outside mercury contamination from rainfall, the tertiary clarifier covers discussed in section four (4) are required with this alternative. Membrane filtration is a feasible option for mercury removal treatment. However, capital costs and operations costs are generally higher than that for gravity media filters.

C. VARIANCE FOR MERCURY COMPLIANCE

The alternatives above are all feasible options that will reduce effluent mercury levels at the WWTF. The NPDES permit has a deadline where the facility must achieve the final limits. This date is March 31, 2020. If the facility can meet and sustain mercury levels to below

permitted limits before this date, the MPCA must be notified in writing that compliance has been achieved. However, circumstances may prevent the selected treatment option from meeting final limits by the deadline. This instance may warrant an extension for meeting the deadline to achieve final limits. This can be achieved through a variance. A variance is essentially an extended compliance date. The City would still be required to reduce effluent mercury to try to meet final limits and provide annual updates on these efforts. A variance typically is good for five (5) years and is renewable if the conditions prohibiting mercury treatment still exist. A variance is not common and requires MPCA and Environmental Protection Agency (EPA) approval. A variance is an option that may be considered if it can be proven that a treatment alternative will require sufficient time beyond the required date in the NPDES permit to meet final mercury limits, or if environmental conditions make low level mercury removal difficult.

6. OPINION OF PROBABLE COSTS AND FUNDING

A. GENERAL

This section presents cost opinions for the Wastewater Treatment Facility improvement alternatives presented in Section four (4) and five (5). The alternatives in section four (4) are included with each alternative in section five (5). Costs were developed primarily through the use of contractor pay estimates of recent projects with similar scopes of work.

The cost opinions presented herein are meant to be used as a guideline in the decision-making process. The accuracy of these cost opinions should be considered within +/- 25% of actual project costs. If the City decides to move forward with one of the proposed alternatives, a more refined cost estimate of the selected alternative will be available during the design phase of the actual selected project.

B. CAPITAL COSTS

The opinion of costs for mercury removal alternatives 1, 2, and 3 from section five (5) are presented in Table 6.1 including engineering, construction observation, and administration. Again, it is important to note that all of the preliminary treatment items discussed in section four (4) are included with each mercury removal option in section five (5).

Table 6.1 – Capital Cost Opinion City of Silver Bay, Minnesota			
Item	**Alternative No. 1 - Enhance Solid Contact Clarifiers**	**Alternative No. 2 - Add Tertiary Gravity Filters**	**Alternative No. 3 - Add Tertiary Membrane Filters**
General			
General/Mobilization	$100,000	$245,000	$275,000
Site Improvements/Earthwork	$250,000	$250,000	$250,000
Preliminary Treatment and Misc. Improvements			
Demo Existing Pre-Treatment Building	$30,000	$30,000	$30,000
Fine Screen Equipment	$100,000	$100,000	$100,000
Grit Removal Equipment	$175,000	$175,000	$175,000
Construction of Pre-treatment Building	$450,000	$450,000	$450,000
Pumps/Piping/Valves	$350,000	$350,000	$350,000
Digester Equipment	$200,000	$200,000	$200,000
HVAC	$100,000	$100,000	$100,000
Electrical and Controls	$275,000	$275,000	$275,000
Mercury Treatment Improvements			
Clarifier Covers	$400,000	$400,000	$400,000
New Tertiary Filtration Building	N/A	$1,000,000	$1,000,000
Filter Construction/Installation	N/A	$400,000	$450,000
Filter Equipment (Membranes)	N/A	N/A	$600,000
Filter Media/underdrain system	N/A	$150,000	N/A
Backwash supply tank	N/A	$150,000	$150,000
Backwash waste pump station (15,000 gallons)	N/A	$50,000	$50,000
Lift/Pump Station	N/A	$250,000	$250,000
Pumps/Piping/Valves	N/A	$400,000	$400,000
Chemical Equipment	$30,000	$40,000	$90,000
Electrical and Controls	$65,000	$550,000	$660,000
Subtotal	**$2,525,000**	**$5,565,000**	**$6,255,000**
Contingencies (10%)	$255,000	$560,000	$625,000
Engineering/Administration/Legal (15%)	$380,000	$835,000	$940,000
TOTAL	**$3,160,000**	**$6,960,000**	**$7,820,000**

C. OPERATIONS AN MAINTENANCE

The estimated annual operational costs include labor utilities, chemicals and other non-capital related expenditures. The staff time necessary to any of the mechanical wastewater treatment facility alternatives averages 20 hours per week. This includes daily visits for process control.

Energy costs are associated with the pumps, mechanical equipment, and chemical feed equipment operating in the processes. Some of these pieces of equipment run 24 hours a day.

Electrical costs are assumed to be $0.10 per kilowatt hour. Electrical costs associated with alternative 1, are based on current use of the mixers and chemical feed.

Chemicals are used to achieve the desired total mercury limit by using an alum and polymer combination prior to a filtration system. It is assumed that with each alternative, the City will continue operating with the current process of adding alum plus polymer to the tertiary solids contact clarifiers.

Biosolids production will increase with a filtration system, as more solids are captures by the filters and wasted from backwashing. Biosolids from the system will be land applied. The estimated cost for this service is $0.05 per gallon of biosolids at three percent.

As equipment is used, it wears out. The City needs to plan for equipment replacement. The table presents an estimated average cost. Alternative 2 and 3 have slightly higher energy costs due to the intermediate pumping station to pump to the filters.

Table 6.2 – Operations, Maintenance, and Replacement Costs
City of Silver Bay, Minnesota

Item	Alternative No. 1 - Enhance Solid Contact Clarifiers	Alternative No. 2 - Add Tertiary Gravity Filters	Alternative No. 3 - Add Tertiary Membrane Filters
Electrical Cost	$ 25,000	$ 35,000	$ 40,000
Repairs and Media/Membrane Replacement	$ -	$ 15,000	$ 20,000
Labor/Operations Staff	$ 25,000	$ 30,000	$ 30,000
Biosolids Costs	$ 5,000	$ 10,000	$ 10,000
Chemical Costs	$ 10,000	$ 10,000	$ 10,000
Equipment Replacement	$ 50,000	$ 50,000	$ 50,000
Annual Operating Cost	$ 115,000	$ 150,000	$ 160,000

D. PRESENT WORTH ANALYSIS

Minnesota Rules require the evaluation of alternatives on a present worth basis. Alternative present worth is calculated by assuming a 20-year life cycle and 3% rate of inflation. Table 6.4 is the summary of the present worth analysis. Although alternative 1 has the lowest present worth cost, this alternative might not have the capability to remove mercury to below permitted limits. Therefore, alternative 2 will provide the most economical solution for the City to achieve mercury removal to below permitted limits.

Table 6.3 – Present Worth Analysis City of Silver Bay, Minnesota			
Item	**Alternative No. 1 - Enhance Solid Contact Clarifiers**	**Alternative No. 2 - Add Tertiary Gravity Filters**	**Alternative No. 3 - Add Tertiary Membrane Filters**
Capital Cost	$ 3,160,000	$ 6,960,000	$ 7,820,000
OM & R Annual Costs	$ 115,000	$ 150,000	$ 160,000
OM & R Present Worth Cost at 20 years 3%	$ 1,710,910	$ 2,231,621	$ 2,380,396
Total Present Worth Cost	$ 4,870,910	$ 9,191,621	$ 10,200,396

E. PROJECT FUNDING

It will be important to explore as many options as possible for funding the recommended project. There are several funding options the City of Silver Bay can explore to help finance these improvements:

1. Bonding

   The City could sell general obligation, local improvement, or revenue bonds in order to raise the capital costs to improve the treatment facility. The proceeds of the bonds would need to be repaid, through either property taxes, assessments, or user charges to the system.

2. Assessment

   A portion of the capital costs of the project can be assessed to local property owners under Minnesota Statute 429. Using this method, a one-time assessment could be levied and repaid over a period of 10 to 20 years. This cost could help offset some monthly increases in user fees and permit use of general obligation bonding.

3. State Revolving Fund Loan (through the PFA)

   The Clean Water Revolving Fund (CWRF) loan program was created under the State Revolving Fund (SRF) provisions in the Federal Clean Water Act to provide financial assistance for water pollution control projects. Minnesota's revolving loan program provides loans to municipalities for planning, design, and construction of wastewater treatment projects. The loans are typically for a 20-year period at an interest rate of two to four percent. The loan monies are administered through the Public Facilities Authority. To be eligible for PFA funding, the City must submit this Facilities Plan for review and approval by the Minnesota Pollution Control Agency.

   Revenue for loan repayment is typically generated by user rates, availability charges, or assessment. In recent years, interest rates have been approximately one percent, and this has proven to be an excellent funding source for this type of project.

4. Rural Development (RD) Loan

The City may be eligible to secure a loan or grant through the USDA Office of Rural Development to help finance wastewater system improvements. Repayment could be through an increase in local property tax rates, user fees, or assessments. A portion of the project costs may be eligible for grant funding as a part of this program depending on the economic status of the residents in the City.

In order to be considered for Rural Development monies, a Preliminary Engineering Report (PER) must be completed and submitted to RD. This provides specific treatment and financial information for RD to consider.

Rural Development uses an Equivalent Dwelling Unit (EDU) calculation for assisting in determining the amount and type of funding for which a community is eligible. Rural Development financing is a 40-year term. While this term is favorable from an annual cost basis, typically, wastewater facilities require a significant upgrade after 20 or 30 years. Since the life expectancy of the facility is shorter than the loan term, it is generally not advisable to consider paying for wastewater treatment facilities with this method. Additionally, the interest rate on this type of loan has typically been higher when compared to the CWRF.

5. Small Cities Development Program

The Small Cities Development Program provides federal grants from the US Department of Housing and Urban Development (HUD) to local units of the government on a competitive basis for a variety of community development projects. Eligible applicants include cities and townships with populations under 50,000 and counties with populations under 200,000.

The proposed project must meet one of the three national objectives:

1. Benefit to low and moderate low-income persons
2. Elimination of slum and blight conditions; or
3. Elimination of an urgent threat to public health or safety.

In addition, the proposed activities must be eligible for funding, project needs must be documented, and the public must be involved in the application preparation.

Under this program, Small Cities Development Public Facility grants are available for wastewater treatment projects, including collection systems and treatment plants; fresh water projects, including wells, water towers, and distribution systems; storm sewer projects; flood control projects; and occasionally street projects. The maximum grant award for Public Facility project is $600,000.

6. Wastewater Infrastructure Funding Program

Supplemental assistance to municipalities is currently available through the wastewater infrastructure (WIF) program. The Public Facilities Authority (PFA) administers the WIF program to those communities what are applying for funding under the clean

water revolving fund loan program or the United States Department of Agriculture Rural Economic and Community Development's (USDA/RECD) Water and Waste Disposal Loans and Grants Program.

Assistance is in the form of zero percent loans, which may be forgiven upon receipt of the notice from MPCA that the project operational performance standards have been met.

This program is income based. The City of Silver Bay's median household income (MHI) is $41,439 (2011 - 2015 estimation by American Community Survey). The project cost with O&M would need to exceed 1.4% of the MHI. This is potential that this funding source may apply.

7. Economic Development Administration

The Economic Development Administration (EDA) has a grant program, which is used to help communities develop the infrastructure required to attract or maintain businesses or industries. Grant sizes vary depending upon the community's need and the impact the project would have on the community. If the City of Silver Bay expects to get an industry that provides jobs to its residents and has wastewater treatment need, the City may be eligible for an EDA Grant, or by leveraging existing industries, it could also be eligible.

8. Point Source Implementation Grant

The Point Source Implementation Grant (PSIG) is a grant program to assist and encourage communities to make infrastructure improvements in order to comply with new stringent NPDES permit limits, such as TMDL waste load requirements, phosphorus reduction requirements, and water quality based effluent limits. The program is funded through the Clean Water Legacy Program and is competitive based on scoring from the MPCA under the same criteria as the CWRF.

The grant program provides 50% grant on eligible portions of the project up to a maximum of $3 million dollars. The "Regulatory Certainty" program for voluntary compliance of TN of 10 mg/L and TP of 1 mg/L for nutrient removal at wastewater treatment facilities is part of the Point Source Implementation Grant program and therefore, is eligible for a grant under the PSIG program.

9. Iron Range Resources and Rehabilitation Board

Iron Range Resources and Rehabilitation Board (IRRRB) is a State of Minnesota development agency whose mission is to promote and invest in business, community, and workforce development for the betterment of northeastern Minnesota. A variety of grants are available to local units of government that promote workforce development and sustainable communities. Grants will require a 1:1 match of City funds and have historically been awarded with a maximum grant of $350,000. This funding source could be possible for these improvements.

7. RECOMMENDATIONS AND IMPLEMENTATION

A. RECOMMENDED IMPROVEMENTS

Based on the evaluation of alternatives and their respective costs presented in Sections four (4) and five (5), it is recommended that the City of select option No. 2 – Construct Tertiary Gravity Filters with improvements to the preliminary treatment facilities and addition of clarifier covers. These improvements will greatly improve the treatment performance at the WWTF and provide needed improvements to reduce mercury to comply with permitted limits.

B. IMPLEMENTATION SCHEDULE

The proposed implementation schedule for the recommended project is presented in Table 7.1.

Table 7.1 – Project Implementation Schedule - City of Silver Bay

Item	Date
Review with City / Finalize Report	March 2017
Submit Funding Applications and Facility Plan to MPCA	March 6, 2017 (no later)
Public Hearing / Council Approval of Facility Plan	March 2017
Design Period	July 2017 – January 2018
Submit Plans and Specifications to MPCA	March 2018
Advertise to Receive Construction Bids	April – June 2018
Begin Construction	September 2018
Submit Construction Progress Report	September 2019
Finish Construction and Initiate New Facilities	March 1, 2020 (no later)
Gain Compliance with Mercury Limit*	March 31, 2020 (no later)

**Must meet final limits by this date. If the facility is able to meet final limits before this date, the MPCA must be notified in writing.*

C. SUMMARY AND RECOMMENDATIONS ON OTHER WASTEWATER ISSUES

Infiltration & Inflow Reduction – Over the past several years, the City has been proactive in replacing defective sewer infrastructure in order to reduce issues with I&I. Moving forward, it is recommended that the City continue this infrastructure improvements program in order to further reduce I&I. By attacking the source of the issue, the City will not need to consider expanding their wastewater treatment facility in order to handle excess flows.

Appendix A: Silver Bay Wastewater Treatment Facility NPDES/SDS Discharge Permit

Minnesota Pollution Control Agency

Duluth Office | 525 Lake Avenue South | Suite 400 | Duluth, MN 55802 | 218-723-4660

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

September 4, 2015

The Honorable Joanne Johnson
Mayor, City of Silver Bay
7 Davis Drive
Silver Bay, MN 55614

RE: Final Reissued NPDES/SDS Permit No. MN0024899
Silver Bay Wastewater Treatment Facility
T56N, R7W, Section 32, Silver Bay, Lake County, Minnesota

Dear Mayor Johnson:

Enclosed is the final National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit for your facility. This permit supersedes an earlier NPDES/SDS permit that was issued on March 3, 2010. All comments submitted in writing during the public notice comment period have been considered in the formulation of the terms and conditions of the permit.

It is the responsibility of the Permittee to maintain compliance with all of the terms and conditions of this permit. Please carefully review the entire permit. A "Submittals Checklist" that is specific for your facility is also enclosed for your use. You may find this checklist to be a convenient tool in tracking the due dates and status of submittals required by the final issued permit.

Special attention should be directed to the following:

Limits and Monitoring Requirements

Flow Monitoring on Discharge Monitoring Reports (DMRs)

Facility flow monitoring data will now be reported on the effluent DMR (SD002) rather than the influent DMR (WS001). If the facility has the capability of measuring both influent and effluent flow, flow monitoring will be required on both DMRs. The Permittee does not have to install an effluent flow meter if the facility does not have one currently.

Mercury

This permit contains requirements for mercury monitoring and limits. These requirements were added in response to the U.S. Environmental Protection Agency's approval of the Minnesota state-wide Mercury Total Maximum Daily Load (TMDL) plan. More information on the TMDL can be found on the MPCA internet site at http://www.pca.state.mn.us/wfhy9ef. Specific mercury monitoring requirements are found in the Waste Stream Stations and Surface Discharge Stations Chapters of this permit. Those requirements include sampling for TSS via a grab sample taken at the same time as the total and dissolved mercury grab samples are taken.

Phosphorus

Phosphorus is a common constituent in many wastewater discharges and a pollutant that has the potential to negatively impact the quality of Minnesota's lakes, wetlands, rivers, and streams. Phosphorus promotes algae and aquatic plant growth often resulting in decreased water clarity and oxygen levels. In addition to creating general aesthetic problems, these conditions can also impact a water body's ability to support healthy fish and other aquatic species. Therefore, phosphorus discharges are being carefully evaluated throughout the state.

You are required to meet a phosphorus limit as specified in the limits and monitoring section of this permit. Although you are not required to prepare a Phosphorus Management Plan (PMP), elimination or reduction of phosphorus at the source will decrease the influent load to the wastewater treatment facility and has the potential to improve treatment efficiency and reduce treatment costs. The MPCA strongly encourages you to identify and eliminate/reduce sources of phosphorus to, and optimize phosphorus management within, your wastewater treatment facility.

All phosphorus samples must be analyzed by a certified laboratory and the data submitted to the MPCA. If your laboratory would like more information about becoming certified, please call the Environmental Laboratory Certification Unit at 612-676-5200. Samples must be collected in a clean bottle (preferably cleaned by a certified laboratory) that was not washed with phosphate detergent. Also, a sulfuric acid preservative must be added immediately after the sample is collected, and it must be stored at four degrees Celsius until analysis. If a contract laboratory is used, the bottle and preservative would typically be provided by the laboratory analyzing the sample.

Nitrogen

Nitrogen is a pollutant that can negatively impact the quality of Minnesota's water resources, including water used for drinking. Studies have shown that nitrogen in lakes and streams has a toxic effect on aquatic life such as fish. Like phosphorus, nitrogen is a nutrient that promotes algae and aquatic plant growth often resulting in decreased water clarity and oxygen levels. In 2013 the MPCA completed a draft Statewide Nutrient Reduction Strategy (http://www.pca.state.mn.us/zihy1146) which identifies goals and milestones for nitrogen reductions for both point and non-point nitrogen sources within Minnesota. To gain a better understanding of the current nitrogen concentrations and loadings received by and discharged from your Facility additional influent and effluent nitrogen monitoring has been added to the Permit. This monitoring has been added in accordance with Minnesota Statues Chapter 115.03.

The Permit includes influent and effluent monitoring for Ammonia Nitrogen, Nitrite plus Nitrate-Nitrogen, Total Kjeldahl Nitrogen, Total Nitrogen and Total Dissolved Solids for the five-year term of the Permit. There is no nitrogen limit in the Permit.

Chapter 1: Compliance Schedule

This chapter includes a compliance related construction schedule related to the reduction of mercury in the Lake Superior Basin. Please read this chapter carefully to determine the timeline and requirements for actions and submittals.

The MPCA strongly recommends piloting other treatment technologies in the event that this technology is unable to meet mercury limits of 1.9 ng/L calendar month average and 3.5 ng/L daily maximum.

Additional pilot testing will ensure the Permittee is able to identify and initiate operation of a technology able to meet these limits as soon as possible but no later than the five year term of this permit.

If the Permittee proposes to finance a construction project through the Minnesota Public Facilities Authority to install technology to meet the assigned mercury limits, the Regulated Party must:

1) Submit an Application and scoring worksheet for the Clean Water Project Priority List (PPL) and Facility Plan [Minn. Rule 7077.0272] for each project to the MPCA on or before March 6, 2017
2) Submit Plans and Specifications [Minn Rule 7077.0274] for the project(s) to the MPCA by March 30, 2018
3) Initiate construction by September 30, 2018

As requested, further information about water quality variances can be found in the Guidance for Water Quality Standard Variances found on the MPCA website at http://www.pca.state.mn.us/index.php/view-document.html?gid=18996.

The Permittee may also review Minn. Rule 7052.0280 regarding water quality variances.

Chapter 4: Mercury Minimization Plan (Lake Superior Basin)

You are required to submit a Mercury Pollutant Minimization Plan (MMP) or updated MMP. This requirement complies with the U.S. Environmental Protection Agency's approval of the Minnesota state-wide Mercury Total Maximum Daily Load (TMDL) plan. Guidance for completing the MMP is available on the MPCA internet site at http://www.pca.state.mn.us/gp0rb25.

Chapter 7: Biosolids-Land Application

This permit chapter requires biosolids to be treated to meet specific standards, and specifies monitoring, recordkeeping, reporting, and general requirements for biosolids that are applied to the land. Unless they are exceptional quality biosolids, sites to which biosolids are applied are approved by the MPCA by the procedures found in Minn. R. 7041.0800.

Chapter 8: Pretreatment

New state pretreatment rules, Minn. Rules, Chapter 7049, are now effective and their requirements are incorporated into this chapter. Please review these permit requirements carefully.

Chapter 9: Total Facility Requirements

Regarding your planned construction project, separate written approval of plans and specifications, in addition to the final issued permit, must be obtained from the MPCA before construction can begin.

Certified Laboratory

Effective January 1, 2013, all Minnesota municipal, county or industrial laboratories that analyze wastewater per Clean Water Act requirements must be certified by the MPCA or the Minnesota Department of Health. Information regarding MPCA laboratory certification is located on the MPCA website at http://www.pca.state.mn.us/4p44whk. If you have questions concerning MPCA laboratory

certification, please contact the MPCA at 1-800-657-3864 or by email at qa.questions.mpca@state.mn.us. Commercial laboratories doing these analyses must maintain Minnesota Department of Health certification.

Electronic Discharge Monitoring Reports (eDMRs)
The electronic Discharge Monitoring Reports (eDMRs), Sample Values/Operational Spreadsheets, and related attachments shall be electronically submitted via the MPCA Online Services Portal (https://netweb.pca.state.mn.us/private/). Paper copies of Discharge Monitoring Reports will no longer be accepted. The eDMR and Sample Value/Operational Spreadsheets are generated directly from the limits and monitoring requirements in the permit for your facility. They are generated by the Pollution Control Data Specialist (PCDS) assigned to manage the data for your facility and will be available online within 30 days of the permit action, please make sure to download the most recent version of the eDMR and Sample Value/Operational Spreadsheet prior to submitting your next monthly eDMRs.

Questions about your permit should be directed to the appropriate staff contacts listed on the first page of your permit.

Sincerely,

Stephanie M. Baublitz
Environmental Specialist II
Municipal Wastewater Section
Municipal Division

SMB:slm

Enclosures

cc: Lana Fralich, City Administrator, City of Silver Bay
Veronica Duresky, City Clerk, City of Silver Bay
Michael Miller, Utilities Superintendent, City of Silver Bay
John Thomas, MPCA, Compliance
Vinod Sathyaseelan, MPCA, Engineering
Belinda Nichols

STATE OF MINNESOTA

Minnesota Pollution Control Agency

Municipal Division

National Pollutant Discharge Elimination System (NPDES)/
State Disposal System (SDS) Permit MN0024899

PERMITTEE:	City of Silver Bay
FACILITY NAME:	Silver Bay Wastewater Treatment Facility
RECEIVING WATER:	Lake Superior (Class 1B, 2A, 3A, 3C, 4A, 4B, 5, 6 water) [ORVW]

CITY:	Silver Bay	**COUNTY:**	Lake
ISSUANCE DATE:	September 4, 2015	**EXPIRATION DATE:**	August 31, 2020

The state of Minnesota, on behalf of its citizens through the Minnesota Pollution Control Agency (MPCA), authorizes the Permittee to operate a disposal system at the facility named above and to discharge from this facility to the receiving water named above, in accordance with the requirements of this permit.

The goal of this permit is to reduce pollutant levels in point source discharges and protect water quality in accordance with Minnesota and US statutes and rules, including Minn. Stat. chs. 115 and 116, Minn. R. chs. 7001, 7041, 7049, 7050, 7053, 7060, and the US Clean Water Act.

This permit is effective on the issuance date identified above, and supersedes the previous permit that was issued for this facility on March 3, 2010. This permit expires at midnight on the expiration date identified above.

Signature: _____

Paul C. Scheirer, Supervisor
Northeast/Northwest Regional Unit
Municipal Division

for The Minnesota Pollution Control Agency

Submit eDMRs
Submit via the MPCA Online Services Portal at
https://netweb.pca.state.mn.us/private/

Submit Other WQ Reports to:
Attention: WQ Submittals Center
Minnesota Pollution Control Agency
520 Lafayette Rd N
St Paul, MN 55155-4194

Questions on this permit?

- For eDMR and other permit reporting issues, contact: Belinda Nicholas, 651-757-2613.
- For specific permit requirements or permit compliance status, contact: John Thomas, 218-302-6616.
- General permit or NPDES program questions, contact: MPCA, 651-282-6143 or 1-800-657-3938.

Table of Contents

Facility Description

The Silver Bay Wastewater Treatment Plant (Facility) is located at NE 1/4 of SE 1/4 of Section 32, Township 56 North, Range 7 West, Silver Bay, Lake County, Minnesota. This is a Class B and a Type IV sludge disposal Facility.

Major components of the Facility include:
2 Bar Screen - Manual
1 Grit Removal unit/chamber
1 Dimminutor
2 Primary Clarifiers
1 Trickling Filter
1 Secondary Clarifier
2 Tertiary Clarifiers
1 Phosphorus Removal system - Chemical
1 Chlorination/Dechlorination unit/chamber
2 Anaerobic Digesters - complete mixed, heated - mesophilic
1 Drying Bed - traditional

The Facility has a continuous discharge (SD002) to Lake Superior (Outstanding Resource Value Water (ORVW)) and was originally designed to treat an average flow of up to 0.83 million gallons per day (mgd) with a 5-day carbonaceous biochemical oxygen demand ($CBOD_5$) strength of 184 milligrams per liter (mg/l). The Facility was later expanded in 1995 to treat an average wet weather flow of up to 0.919 mgd with a $CBOD_5$ strength of 70 mg/l. Due to nondegradation requirements for ORVW waters, the $CBOD_5$, Total Suspended Solids, and Phosphorous permitted mass loads were frozen at the permitted flow of 0.83 mgd.

The digested Biosolids are land applied on a nearby farm in accordance with Minn. R. ch. 7041.

The Facility is further described in plans and specifications on file with the Minnesota Pollution Control Agency (Permit No. 7580, dated October 2, 1972) and in an engineering report by the firm of Earl Ruble and Associates, Duluth, Minnesota. In addition, plans and specifications prepared by RREM, Inc. for the 1995 expansion (approved by the agency on July 19, 1994) are also on file.

Lake Superior was designated an ORVW on November 5, 1984. The design average wet weather flow of this Facility on the date of ORVW designation is 0.83 mgd.

In accordance with MPCA rules regarding nondegradation for ORVWs, nondegradation review is required for any new or expanded discharge (Minn. R. 7050.0180). A new discharge is a discharge that was not in existence on the effective date the ORVW was designated as described in Minn. R. 7050.0460 and 7050.0470. An expanded discharge is a discharge that changes in volume, quality,

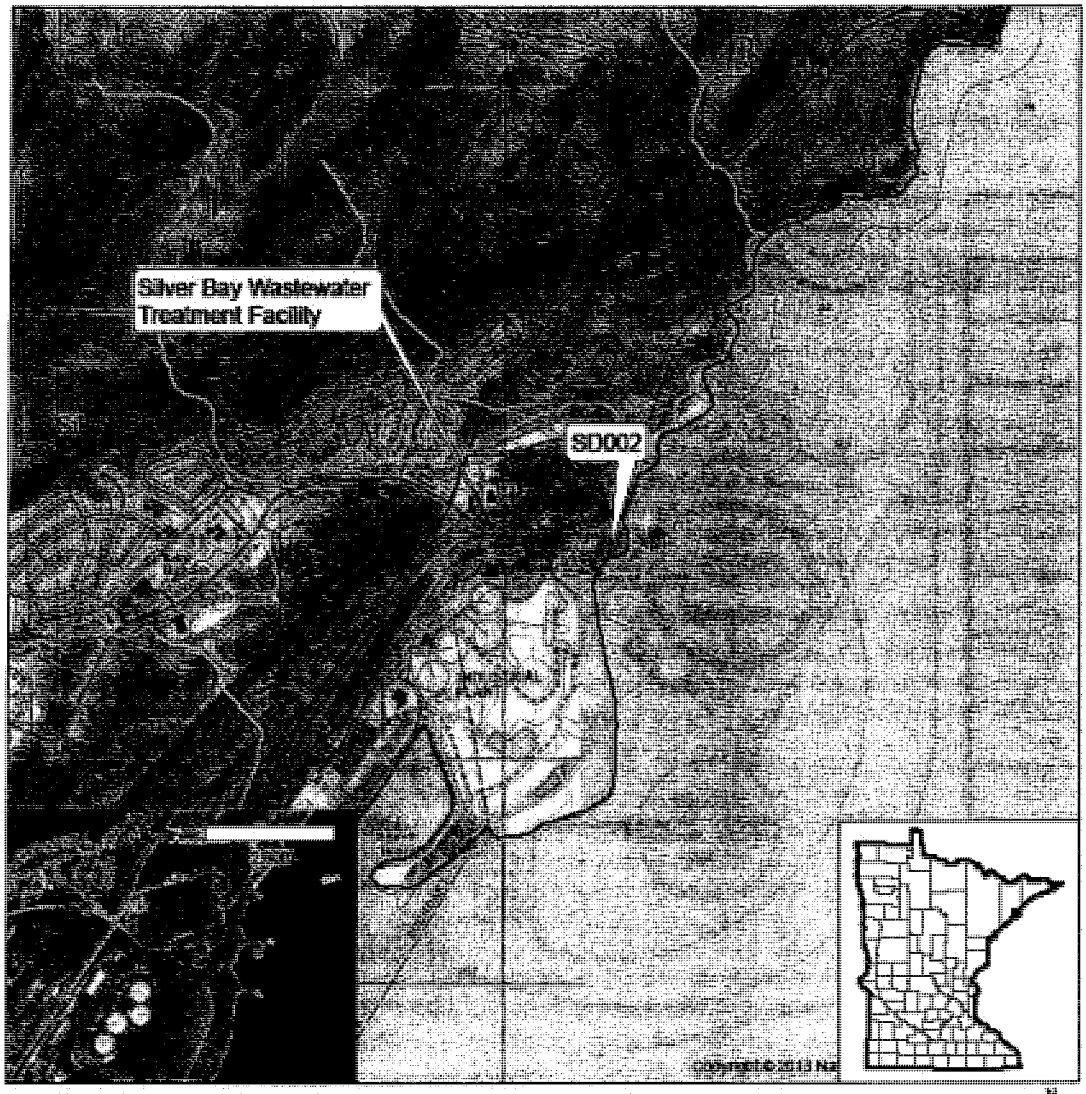
location, or any other manner after the effective date the outstanding resource value water was designated as described in Minn. R. 7050.0460 and 7050.0470, such that an increased loading of one or more pollutants results. Any change that results in an increased mass loading of one or more pollutants is subject to nondegradation review in accordance with Minn. R. 7050.0180.

This Permit also complies with Minn. R. 7053.0275 regarding anti-backsliding.

Any point source discharger of sewage, industrial, or other wastes for which a NPDES permit has been issued by the MPCA that contains effluent limits more stringent than those that would be established by parts 7053.0215 to 7053.0265 shall continue to meet the effluent limits established by the permit, unless the permittee establishes that less stringent effluent limits are allowable pursuant to federal law, under section 402(o) of the Clean Water Act, United States Code, title 33, section 1342.

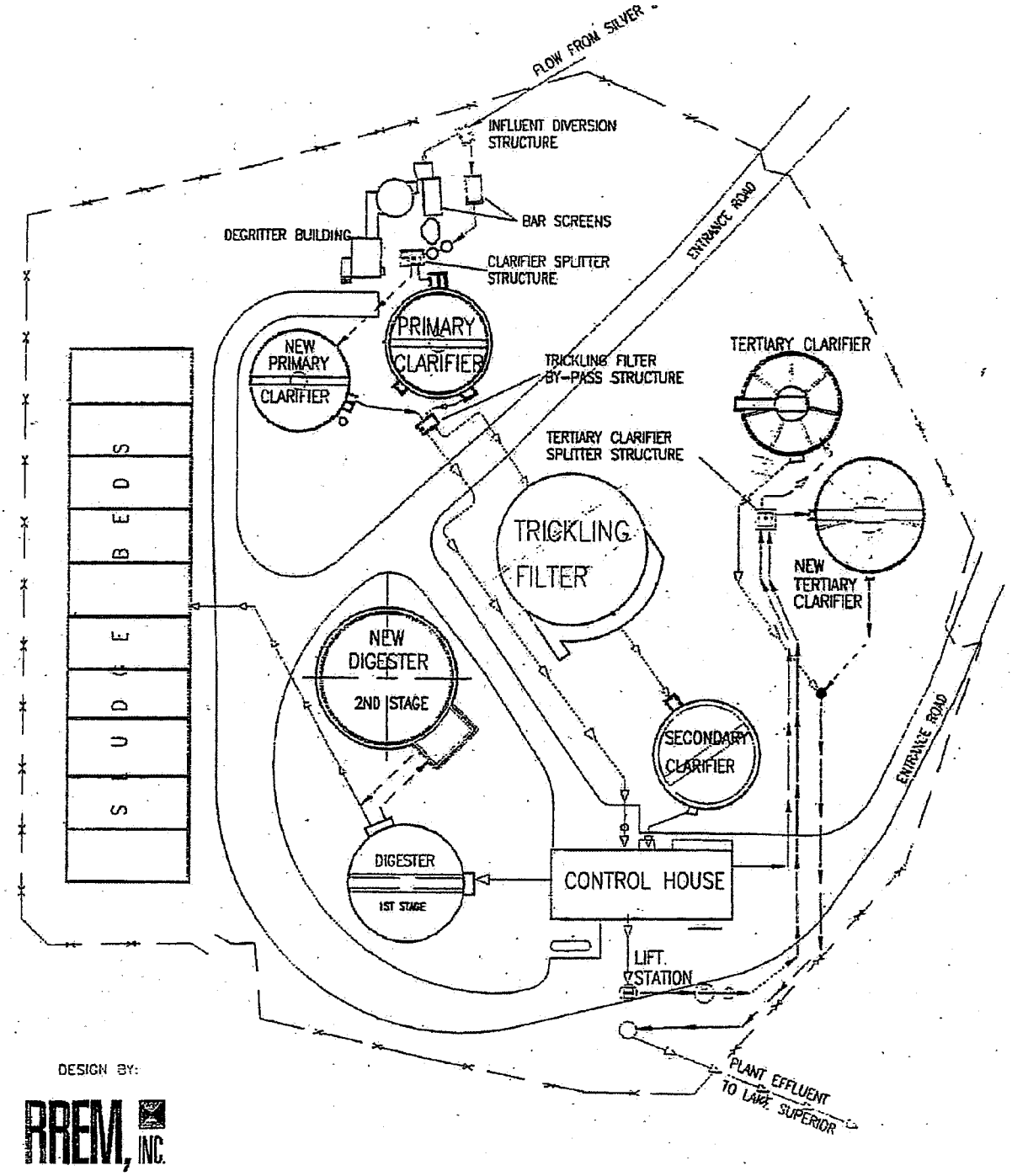
Topographic Map of Permitted Facility

MN0024899 Silver Bay Wastewater Treatment Facility
T56N, R7W, Section 32
Silver Bay, Lake County, Minnesota



Map produced by: MPCA Staff, 2/4/2015
Source: USGS Quad
Main Map Scale: 1:24,535

Schematic Flow Diagram



DESIGN BY:

RREM, INC.

Silver Bay Wastewater Treatment Facility
Summary of Stations

Surface Discharge Stations

Station	Type of Station	Local Name	PLS Location
SD002	Effluent To Surface Water	010 Total Facility Discharge	NE Quarter of the SE Quarter of Section 32, Township 56 North, Range 7 West

Waste Stream Stations

Station	Type of Station	Local Name	PLS Location
WS001	Influent Waste	Influent Waste Stream	NE Quarter of the SE Quarter of Section 32, Township 56 North, Range 7 West

Silver Bay Wastewater Treatment Facility
Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

Period: ***Limits Applicable in the Interim Period***

SD 002: 010 Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	78.4	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	25	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	125.0	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	40	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Chlorine, Total Residual	0.038	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Day	5
Fecal Coliform, MPN or Membrane Filter 44.5C	200	#100ml	Calendar Month Geometric Mean	Apr-Oct	Grab	1 x Week	
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Measurement, Continuous	1 x Day	2
Flow	Monitor Only	mgd	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day	2
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day	2
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	3
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Daily Maximum	May, Sep	Grab	2 x Month	3
Mercury, Total (as Hg)	3.8	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	3
Mercury, Total (as Hg)	7.0	ng/L	Daily Maximum	May, Sep	Grab	2 x Month	3
Nitrite Plus Nitrate, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Ammonia, Total (as N)	Monitor Only	mg/L	Calendar Month Average	Mar, Sep	24-Hour Flow Composite	1 x Month	
Nitrogen, Kjeldahl, Total	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	3
Oxygen, Dissolved	Monitor Only	mg/L	Calendar Month Minimum	Jan-Dec	Grab	1 x Day	1
pH	9.0	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1
pH	6.0	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	3.1	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Phosphorus, Total (as P)	1.0	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	3
Solids, Total Dissolved (TDS)	Monitor Only	mg/L	Calendar Month Average	Mar, Sep	24-Hour Flow Composite	1 x Month	
Solids, Total Suspended (TSS)	94.1	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	30	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	141.0	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	45	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	

Silver Bay Wastewater Treatment Facility
Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

Period: ***Limits Applicable in the Interim Period***

SD 002: 010 Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
Solids, Total Suspended (TSS) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Calendar Month Average	May, Sep	Grab	2 x Month	3
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Daily Maximum	May, Sep	Grab	2 x Month	3

WS 001: Influent Waste Stream

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	mgd	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day	
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	
Mercury, Total (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	4
Nitrite Plus Nitrate, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Kjeldahl, Total	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	4
pH	Monitor Only	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1
pH	Monitor Only	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Precipitation	Monitor Only	in	Calendar Month Total	Jan-Dec	Measurement	1 x Day	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Calendar Month Average	May, Sep	Grab	2 x Month	

Period: ***Limits Applicable in the Final Period***

SD 002: 010 Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	78.4	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	25	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	

Silver Bay Wastewater Treatment Facility
Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

Period: ***Limits Applicable in the Final Period***

SD 002: 010 Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	125.0	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	40	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Chlorine, Total Residual	0.038	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Day	5
Fecal Coliform, MPN or Membrane Filter 44.5C	200	#100ml	Calendar Month Geometric Mean	Apr-Oct	Grab	1 x Week	
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Measurement, Continuous	1 x Day	2
Flow	Monitor Only	mgd	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day	2
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day	2
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	3
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Daily Maximum	May, Sep	Grab	2 x Month	3
Mercury, Total (as Hg)	1.9	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	3
Mercury, Total (as Hg)	3.5	ng/L	Daily Maximum	May, Sep	Grab	2 x Month	3
Nitrite Plus Nitrate, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Ammonia, Total (as N)	Monitor Only	mg/L	Calendar Month Average	Mar, Sep	24-Hour Flow Composite	1 x Month	
Nitrogen, Kjeldahl, Total	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	3
Oxygen, Dissolved	Monitor Only	mg/L	Calendar Month Minimum	Jan-Dec	Grab	1 x Day	1
pH	9.0	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1
pH	6.0	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	3.1	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Phosphorus, Total (as P)	1.0	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	3
Solids, Total Dissolved (TDS)	Monitor Only	mg/L	Calendar Month Average	Mar, Sep	24-Hour Flow Composite	1 x Month	
Solids, Total Suspended (TSS)	94.1	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	30	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	141.0	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	45	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Calendar Month Average	May, Sep	Grab	2 x Month	3

Silver Bay Wastewater Treatment Facility
Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

Period: ***Limits Applicable in the Final Period***

SD 002: 010 Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Daily Maximum	May, Sep	Grab	2 x Month	3

WS 001: Influent Waste Stream

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	mgd	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day	
Mercury, Dissolved (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	
Mercury, Total (as Hg)	Monitor Only	ng/L	Calendar Month Average	May, Sep	Grab	2 x Month	4
Nitrite Plus Nitrate, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Kjeldahl, Total	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	
Nitrogen, Total (as N)	Monitor Only	mg/L	Calendar Quarter Average	Jan-Dec	24-Hour Flow Composite	1 x Quarter	4
pH	Monitor Only	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1
pH	Monitor Only	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Precipitation	Monitor Only	in	Calendar Month Total	Jan-Dec	Measurement	1 x Day	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS), grab (Mercury)	Monitor Only	mg/L	Calendar Month Average	May, Sep	Grab	2 x Month	

Notes:
1 -- Analyze immediately.
2 -- Influent flow measurements are to be reported on the SD002 DMR. You do not need to install effluent flow meters.
3 -- See Surface Discharge Stations Chapter for additional information.
4 -- See Waste Streams Stations Chapter for additional information.
5 -- Whenever chlorine is added. Analyze immediately. This means within 15 minutes or less of sample collection. A Method Detection Limit and a Reporting Limit must be established for this parameter. The Reporting Limit cannot be greater than 0.1 mg/L.

Chapter 1. Compliance Schedule

1. Special Requirements

Total Mercury Water Quality Based Effluent Limit

1.1 This permit contains requirements for mercury monitoring and limits. These requirements were added in accordance with Minn. R. 7052.0100 in efforts to protect aquatic life, human health, and wildlife from the Great Lakes Initiative (GLI) pollutants. Because the Permittee's discharge has the reasonable potential to cause or contribute to downstream impaired waters, a water quality based effluent limit (WQBEL) is required. The Minnesota Pollution Control Agency has recommended a 1.9 nanogram per liter (ng/L) limit calendar month average and a 3.5 ng/L daily maximum for the Facility's discharge. The city of Silver Bay has determined that the current facility is not designed to meet this level of treatment and capital improvements will be necessary to achieve compliance with the recommended limit at permit issuance. A compliance schedule has been included in this permit to accommodate the time required to secure funding, evaluate discharge alternatives, design, and build for advanced mercury removal technology.

2. Compliance Related Construction Schedule

Definitions

2.1 "Notice to proceed" means a written notice given by the Permittee to the contractor that affixes the contract effective date and the date that the contractor begins performing the work specified in the contract documents.

2.2 "Completion of construction" means all the construction is complete except for minor weather-related components and conforms to the approved plans and specifications and change orders.

2.3 "Initiation of operation" means the date that MPCA determines all components of the wastewater treatment system are complete and functioning and the project begins operating for the purposes for which it was planned, designed, and built.

Phase I - Number 1 Solids Contact Clarifier rehabilitation & chemical addition mercury removal study

2.4 The Permittee is currently conducting full scale testing of mercury removal using additional chemicals in the solids contact clarifiers. The Permittee also proposes to investigate the use of alternate chemical dosage and polymer types in these clarifiers and will rehabilitate the Number 1 Solids Contact Clarifier for inclusion in a portion of the investigation of mercury removal. The required submittals for this mercury removal testing (Phase I) are described in Parts (2.5) - (2.10) below.

The MPCA strongly recommends researching other treatment technologies at the same time as the full scale testing of chemical addition in the event that this technology is unable to meet mercury limits of 1.9 ng/L calendar month average and 3.5 ng/L daily maximum. The Permittee is required to meet this limit by the end of the five year permit term.

2.5 Submit a Preliminary Phase 1 report
The Permittee shall submit a detailed report with a process description, a description of the rehabilitation to be completed in the Number 1 Solids Contact Clarifier and the interim treatment provided during the rehabilitation by August 31, 2015.

2.6 After reviewing the Preliminary Phase I report the MPCA will determine if the rehabilitation project to the Number 1 Solids Contact Clarifier needs a plans and specification submittal. If plans and specifications are required, the Permittee shall submit them for review by December 31, 2015.

2.7 Notice to proceed
The Permittee must submit a notice to proceed with the rehabilitation of the Number 1 Solids Contact Clarifier by June 1, 2016.

2.8 Complete construction
The Permittee must complete rehabilitation of the Number 1 Solids Contact Clarifier by October 1, 2016.

Chapter 1. Compliance Schedule

2. Compliance Related Construction Schedule

2.9 Phase I final report
The Permittee must submit a Phase I Final Report detailing the results and a determination on the effectiveness of mercury removal for the chemical addition mercury removal testing study on January 31, 2017.

2.10 Implement technology and attain final limits
If the mercury removal study and rehabilitation project are successful and can effectively meet mercury removal to the final effluent limits, the Permittee shall implement that technology and attain final limits by March 6, 2017.

2.11 In the event that the treatment technology tested in Phase I does not effectively meet mercury removal to the final limit, Phase II of this construction schedule shall be implemented.

Phase II - mercury related construction project (If necessary)

2.12 Facility Plan
The Permittee shall submit a Facility Plan on or before March 6, 2017 if the Permittee is seeking public funding through the Public Facilities Authority (PFA).

The Facility Plan shall include information as required by Minnesota Rule 7077.0265 Subpart 2.
If the permittee seeks other funding sources, the required funding applications should be submitted on or before March 6, 2017. A detailed outline of the schedule at which the construction project will be conducted should be submitted regardless of the funding source.

2.13 Modify the permit
The Permittee shall submit an application and fee for permit modification by March 6, 2018.

2.14 Submit plans and specifications
The Permittee shall submit Plans and Specifications by March 6, 2018 for MPCA review and approval.

2.15 Notice to proceed
The Permittee must execute the Notice to Proceed by July 31, 2018. The Permittee must submit a copy of the executed Notice to Proceed to the MPCA with 14 days after its execution.

2.16 Commencement of construction
The Permittee shall begin construction of the chosen treatment technology by September 30, 2018.

2.17 Submit a construction report
The Permittee shall submit a construction progress report on or before September 30, 2019.

2.18 Submit verification of certified operator and O&M manual
The Permittee must notify the MPCA that it has employed a wastewater treatment facility operator, certified for the classification of the treatment system (according to Minn. R., Chapter 9400), that is directly responsible for the operation of the system at least 60 days before the planned initiation of operation of the new or upgraded facility.

The Permittee must also submit an operation and maintenance (O&M) manual or a maintenance plan; or a certificate of completion of an operation and maintenance manual.

2.19 The Permittee must notify the MPCA in writing at least 14 days before Initiation of Operation. Following MPCA staff's concurrence that the Facility is adequately prepared, MPCA staff will notify the Permittee that it may initiate operation of the new or upgraded facility.

2.20 Initiation of operation
The Permittee must initiate operation of the Facility on or before March 1, 2020. The Permittee must notify the MPCA in writing within 14 days after the actual initiation of operation date and attain final limits within 30 days of the notification.

Chapter 1. Compliance Schedule

2. Compliance Related Construction Schedule

2.21 Submit notification
The Permittee must notify the MPCA in writing at least 14 days before the planned completion of construction date. The MPCA may complete a final inspection.

2.22 Attain final limits
The Permittee must comply with all permit requirements and attain final limits as soon as possible, but no later than March 31, 2020.

2.23 Submit final technical documents
The Permittee must submit the following to the MPCA within one year after the initiation of operation date:

a. An MPCA-approved certification form that is signed by a professional engineer registered in the state of Minnesota stating that the project meets the performance standards.

b. A revised operation and maintenance manual or a maintenance plan; or a certificate of completion of an operation and maintenance manual on a form prescribed by the MPCA. At a minimum, this plan must include a detailed discussion of operation and controls, maintenance, sampling and analysis, problem mitigation, VOC management, personnel records and reporting, and safety. This plan must be maintained and updated regularly and made available to the MPCA staff upon request.

d. One copy of "as-built" plans and specifications, also known as record drawings, must be submitted in a format approved by the MPCA. The factsheet titled: "Wastewater Treatment Facility Construction Record Documents, As-built Submittal Requirements" contains specific information regarding the required format of the submittal. The document is located on the MPCA web page at:
http://www.pca.state.mn.us/index.php/view-document.html?gid=15492.

Chapter 2. Surface Discharge Stations

1. Requirements for Specific Stations

1.1 SD 002: Submit a monthly DMR by 21 days after the end of each calendar month following permit issuance.

2. Sampling Location

2.1 Samples for Station SD002 shall be taken collected from a point representative of the final effluent.

2.2 Samples and measurements required by this permit shall be representative of the monitored activity.

3. Surface Discharges

3.1 Floating solids or visible foam shall not be discharged in other than trace amounts.

3.2 Oil or other substances shall not be discharged in amounts that create a visible color film.

3.3 The Permittee shall install and maintain outlet protection measures at the discharge stations to prevent erosion.

4. Winter Sampling Conditions

4.1 The Permittee shall sample flows at the designated monitoring stations including when this requires removing ice to sample the water. If the station is completely frozen throughout a designated sampling month, the Permittee shall check the "No Discharge" box on the Discharge Monitoring Report (DMR) and note the ice conditions in Comments on the DMR.

Chapter 2. Surface Discharge Stations

5. Mercury Limits and Monitoring Requirements

5.1 Permittees are required to sample for TSS (grab sample) at the same time that Total/Dissolved Mercury samples are taken. Total Mercury, Dissolved Mercury, and TSS (grab sample) samples must be collected via grab samples. All results must be recorded on DMRs.

5.2 Total and Dissolved Mercury samples must be analyzed using the most current versions of EPA Method 1631 with clean techniques method 1669. Should another mercury analytical method that has a reportable quantitation level of <0.5 ng/L that allows for low-level sample characterization be approved by the EPA and certified by an MPCA recognized accreditation body, the method may be used in place of 1631/1669.

6. Nitrogen Limits and Monitoring Requirements

6.1 "Total Nitrogen" is to be reported as the summation of the Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen values.

7. Discharge Monitoring Reports

7.1 The Permittee shall submit monitoring results for discharges in accordance with the limits and monitoring requirements for this station. If no discharge occurred during the reporting period, the Permittee shall check the "No Discharge" box on the Discharge Monitoring Report (DMR).

Chapter 3. Waste Stream Stations

1. Requirements for Specific Stations

1.1 WS 001: Submit a monthly DMR by 21 days after the end of each calendar month following permit issuance.

2. Sampling Location

2.1 Grab and composite samples shall be collected at a point representative of total influent flow to the system.

2.2 Influent grab and composite samples for Station WS001 shall be taken downstream of the diminutor and prior to the splitter box.

3. Mercury Limits and Monitoring Requirements

3.1 Total Mercury samples must be grab samples and must be analyzed using EPA Method 1631 with clean techniques method 1669 and any revisions to those methods. Should another mercury analytical method that has a reportable quantitation level that allows for low-level sample characterization be approved by the EPA and certified by the Minnesota Department of Health, the Permittee is authorized to use that method.

4. Nitrogen Limits and Monitoring Requirements

4.1 "Total Nitrogen" is to be reported as the summation of the Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen values.

Chapter 4. Mercury Minimization Plan (Lake Superior Basin)

1. Mercury Pollutant Minimization Plan

1.1 The Permittee is required to complete and submit a Mercury Pollutant Minimization Plan (MMP) to the MPCA as detailed in this section. If the Permittee has previously submitted a MMP, it must update its MMP and submit the updated MMP to the MPCA. The purpose of the MMP is to evaluate collection and treatment systems to determine possible sources of mercury as well as potential mercury reduction options. Guidelines for developing a MMP are detailed in this section.

Chapter 4. Mercury Minimization Plan (Lake Superior Basin)

1. Mercury Pollutant Minimization Plan

1.2 The specific mercury monitoring requirements are detailed in the limits and monitoring section of this permit. Information gained through the MMP process can be used to reduce mercury concentrations. As part of its mercury control strategy, the Permittee should consider selecting activities based on the potential of those activities to reduce mercury loadings to the wastewater treatment facility.

1.3 The Permittee shall submit a Mercury Minimization Plan by 180 days before permit expiration. At a minimum, the MMP must include the following:

a) A summary of mercury influent and effluent concentrations and biosolids monitoring data using the most recent five years of monitoring data, if available.
b) Identification of existing and potential sources of mercury concentrations and/or loading to the facility. As appropriate for your facility, you should consider residential, institutional, municipal, and commercial sources (such as dental clinics, hospitals, medical clinics, nursing homes, schools, laundries, and industries with potential for mercury contributions). You should also consider other influent mercury sources, such as stormwater inputs, ground water (inflow & infiltration) inputs, lift station components, and waste streams or sewer tributaries to the wastewater treatment facility.
c) An evaluation of past and present WWTF operations to determine those operating procedures that maximize mercury removal.
d) A summary of any mercury reduction activities implemented during the last five years.
e) A plan to implement mercury management and reduction measures during the next five years.

1.4 The Permittee shall submit an annual update of the MMP to the MPCA Water Quality Submittals Center by March 1 of each year following MPCA approval of the MMP. The annual report shall include, but is not limited to:

a) All minimization program monitoring results for the year.

b) A list of potential sources of mercury.

c) A summary of all actions taken to meet the effluent limit for mercury.

d) Any updates of the control strategy.

Chapter 5. Total Residual Oxidants - Domestic

1. General Requirements

1.1 "Daily Maximum" for Total Residual Chlorine (TRC) concentration limits means:

a. The value of a single sample in a 24-hour period if the concentration of TRC in that sample is 0.038 mg/L or less, or below the Reportable Limit (RL).

b. If the concentration of TRC in the first sample is greater than 0.038 mg/L or greater than the RL, reporting the average of two to twelve samples analyzed in a 24-hour period is allowed. The second sample must be taken two hours after the first sample and subsequent samples are to be taken at one-hour intervals thereafter, not to exceed a total of twelve samples in a 24-hour period. Values below the Reportable Limit for TRC are assumed to be zero for averaging purposes only. Whenever daily TRC values are averaged, the 0.038 mg/L limit must be met and the average value must be reported, not < the RL.

c. The average value of multiple daily TRC effluent sample analyses must meet the 0.038 mg/L limit to be in compliance.

Chapter 5. Total Residual Oxidants - Domestic

1. General Requirements

1.2 Total Residual Chlorine must be analyzed immediately. This means within 15 minutes or less of sample collection. (40 CFR Part 136 and Standard Methods for the Examination of Water and Wastewater, Latest Edition)

1.3 A Method Detection Limit (MDL) must be established for this parameter.

1.4 The Reportable Limit must be established for this parameter. This should be based on the Method Detection Limit and laboratory, analyst, and equipment used in the analysis. The Reportable Limit cannot be greater than 0.1 mg/L.

1.5 The Method Detection Limit and Reportable Limit should be reassessed when the method, equipment, laboratory, or analyst changes.

1.6 Monitoring results below the Reportable Limit should be reported as "<" the Reportable Limit. For example, if the Reportable Limit is 0.01 mg/L and a parameter is not detected at a value of 0.01 mg/L or greater, the concentration shall be reported as "<0.01mg/L." The symbol "<" means "less than."

1.7 The equipment should be checked against a known standard at least monthly.

Chapter 6. Domestic Wastewater -- Mechanical System

1. Bypass Structures

1.1 All structures capable of bypassing the treatment system shall be manually controlled and kept locked at all times.

2. Sanitary Sewer Extension Permit

2.1 The Permittee may be required to obtain a Sanitary Sewer Extension Permit from the MPCA for any addition, extension or replacement to the sanitary sewer. If a sewer extension permit is required, construction may not begin until plans and specifications have been submitted and a written permit is granted except as allowed in Minn. Stat. 115.07, Subd. 3(b).

3. Operator Certification

3.1 The Permittee shall provide a Class B state certified operator who is in direct responsible charge of the operation, maintenance and testing functions required to ensure compliance with the terms and conditions of this permit.

3.2 The Permittee shall provide the appropriate number of operators with a Type IV certification to be responsible for the land application of biosolids or semisolids from commercial or industrial operations.

3.3 If the Permittee chooses to meet operator certification requirements through a contractual agreement, the Permittee shall provide a copy of the contract to the MPCA, WQ Submittals Center. The contract shall include the certified operator's name, certificate number, company name if appropriate, the period covered by the contract and provisions for renewal; the duties and responsibilities of the certified operator; the duties and responsibilities of the permittee; and provisions for notifying the MPCA 30 days in advance of termination if the contract is terminated prior to the expiration date.

3.4 The Permittee shall notify the MPCA within 30 days of a change in operator certification or contract status.

Chapter 7. Biosolids-Land Application

1. Authorization

1.1 This permit authorizes the Permittee to store and land apply domestic wastewater treatment biosolids in accordance with the provisions in this chapter and Minnesota Rules, ch. 7041.

Chapter 7. Biosolids-Land Application

1. Authorization

1.2 Permittees who prepare bulk biosolids must obtain approval of the sites on which bulk biosolids are applied before they are applied unless they are Exceptional Quality Biosolids. Site application procedures are set forth in Minn. R. ch. 7041.0800.

2. Compliance Responsibility

2.1 The Permittee is responsible for ensuring that the applicable requirements in this chapter and Minn. R. ch. 7041 are met when biosolids are prepared, distributed, or applied to the land.

3. Notification Requirements

3.1 The Permittee shall provide information needed to comply with the biosolids requirements of Minn. R. ch. 7041 to others who prepare or use the biosolids.

4. Pollutant Limits

4.1 Biosolids which are applied to the land must not exceed the ceiling concentrations in Table 1 and must not be applied so that the cumulative amounts of pollutant in Table 2 are exceeded.

Table 1 Ceiling Concentrations (dry weight basis)

Parameter in units mg/kg
Arsenic 75
Cadmium 85
Copper 4300
Lead 840
Mercury 57
Molybdenum 75
Nickel 420
Selenium 100
Zinc 7500

Table 2 Cumulative Loading Limits

Parameter in units lbs/acre
Arsenic 37
Cadmium 35
Copper 1339
Lead 268
Mercury 15
Molybdenum not established*
Nickel 375
Selenium 89
Zinc 2500

*The cumulative limit for molybdenum has not been established at the time of permit issuance

5. Pathogen and Vector Attraction Reduction

5.1 Biosolids shall be processed, treated, or be incorporated or injected into the soil to meet one of the vector attraction reduction requirements in Minnesota Rules, pt. 7041.1400.

5.2 Biosolids shall be processed or treated by one of the alternatives in Minnesota Rules, pt. 7041.1300 to meet the Class A or Class B standards for the reduction of pathogens. When Class B biosolids are applied to the land, the site restrictions in Minnesota Rules, pt. 7041.1300 must also be met.

Chapter 7. Biosolids-Land Application

5. Pathogen and Vector Attraction Reduction

5.3 The minimum duration between application and harvest, grazing or public access to areas where Class B biosolids have been applied to the land is as follows:

a. 14 months for food crops whose harvested parts may touch the soil/biosolids mixture (such as melons, squash, tomatoes, etc.), when biosolids are surface applied, incorporated or injected.
b. 20 months or 38 months depending on the application method for food crops whose harvested parts grow in the soil (such as potatoes, carrots, onions, etc.). The 20 month time period is required when biosolids are surface applied or surface applied and incorporated after they have been on the soil surface for at least four (4) months. The 38 month time period is required when the biosolids are injected or surface applied and incorporated within four (4) months of application.
c. 30 days for feed crops, other food crops (such as field corn, sweet corn, etc.), hay or fiber crops when biosolids are surface applied, incorporated or injected.
d. 30 days for grazing of animals when biosolids are surface applied, incorporated or injected.
e. One year where there is a high potential for public contact with the site, (such as a reclamation site located in populated areas, a construction site located in a city, turf farms, plant nurseries, etc.) and 30 days where there is low potential for public contact (such as agricultural land, forest, a reclamation site located in an unpopulated area, etc.) when biosolids are surface applied, incorporated, or injected.

6. Management Practices

6.1 The management practices for the land application of biosolids are described in detail in Minn. R. ch. 7041.1200 and must be followed unless specified otherwise in a site approval letter or a permit issued by the MPCA.

6.2 Overall management requirements:

a. Biosolids must not be applied to the land if it is likely to adversely affect a threatened or endangered species listed under Section 4 of the Endangered Species Act or its designated critical habitat.
b. Biosolids must not be applied to flooded, frozen or snow covered ground so that the biosolids enter wetlands or other waters of the state.
c. Biosolids must be applied at an agronomic rate unless specified otherwise by the MPCA in a permit.
d. Biosolids shall not be applied within 33 feet of a wetland or waters of the state unless specified otherwise by the MPCA in a permit.

7. Monitoring Requirements

7.1 Representative samples of biosolids applied to the land must be analyzed by methods specified in Minnesota Rule pt. 7041.3200 for the following parameters: arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, Kjeldahl nitrogen, ammonia nitrogen, total solids, volatile solids, phosphorus, potassium and pH.

Chapter 7. Biosolids-Land Application

7. Monitoring Requirements

7.2 At a minimum, biosolids must be monitored at the frequencies specified in Table 3 for the parameters listed above, and any pathogen or vector attraction reduction requirements in Minnesota Rules, pts. 7041.1300 and 7041.1400 if used to determine compliance with those parts.

Table 3 Minimum Sampling Frequencies

Biosolids Applied* (metric tons/365-day period)	Biosolids Applied* (tons/365-day period)	Frequency (times/365-day period)
>0 but <290	>0 but <320	1
>=290 but <1,500	>=320 but <1,650	4
>=1,500 but <15,000	>=1,650 but <16,500	6
>=15,000	>=16,500	12

* Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a person who prepares biosolids that are sold or given away in a bag or other container for application to the land (dry weight basis).

7.3 Representative samples of biosolids that are transferred to storage units and are stored for more than two years shall be analyzed by methods specified in Minnesota Rule pt. 7041.3200 for each cropping year they are stored for the following parameters: arsenic, cadmium, copper, lead, molybdenum, nickel, selenium, and zinc. Mercury is specifically NOT included in the stored biosolids analysis because of the short holding time [28 days] required between sampling and analysis.

7.4 Increased sampling frequencies are specified for the parameters listed in Table 4. Sampling at a frequency at twice the minimum frequencies in Table 3 is required if concentrations listed in Table 4 are exceeded (based on the average of all analyses made during the previous cropping year).

Table 4 Increased Frequency of Sampling

Parameter (mg/kg dry weight basis)
Arsenic 38
Cadmium 43
Copper 2150
Lead 420
Mercury 28
Molybdenum 38
Nickel 210
Selenium 50
Zinc 3750

8. Records

8.1 The Permittee shall keep records of the information necessary to show compliance with pollutant concentrations and loadings, pathogen reduction requirements, vector attraction reduction requirements and management practices as specified in Minnesota Rules, pt. 7041.1600, as applicable to the quality of biosolids produced.

9. Reporting Requirements

9.1 By December 31 following the end of each cropping year, the Permittee shall submit a Biosolids Annual Report for the land application of biosolids on a form provided by or approved by the MPCA. The report shall include the requirements in Minnesota Rules, part 7041.1700.

Chapter 7. Biosolids-Land Application

9. Reporting Requirements

9.2 The permittee shall submit a Biosolids Annual Report by December 31 of each year for biosolids storage and/or transfer activities occurring during the cropping year previous to December 31. The report must indicate whether or not biosolids were transferred and/or stored. If biosolids were transferred, the report must describe how much was transferred, where it was transferred to, the name of the facility that accepted the transfer and the contact person at that facility. "Cropping year" means a year beginning on September 1 of the year prior to the growing season and ending August 31 the year the crop is harvested. For example, the 2012 cropping year began September 1, 2011, and ended August 31, 2012.

9.3 For biosolids that are stored for more than two years, the Biosolids Annual Report must also include the analytical data from the representative sample of the biosolids generated during the cropping year.

9.4 The Permittee shall submit the Biosolids Annual Report to:

Biosolids Coordinator
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

9.5 The Permittee must notify the MPCA in writing when 90 percent or more of any of the cumulative pollutant loading rates listed for any Land Application Sites has been reached for a site.

Chapter 8. Domestic Wastewater -- Pretreatment

1. Pretreatment - Definitions

1.1 An "Individual Control Mechanism" is a document, such as an agreement or permit, that imposes limitations or requirements on an individual industrial user of the POTW.

1.2 "Significant Industrial User" (SIU) means any industrial user that:

a. discharges 25,000 gallons per day or more of process wastewater;

b. contributes a load of five (5) % or more of the capacity of the POTW; or

c. is designated as significant by the Permittee or the MPCA on the basis that the SIU has a reasonable potential to adversely impact the POTW, or the quality of its effluent or residuals. (Minn. R. 7049.0120, Subp. 24)

2. Pretreatment - Permittee Responsibility to Control Users

2.1 It is the Permittee's responsibility to regulate the discharge from users of its wastewater treatment facility. The Permittee shall prevent any pass through of pollutants or any inhibition or disruption of the Permittee's facility, its treatment processes, or its sludge processes or disposal that contribute to the violation of the conditions of this permit or any federal or state law or regulation limiting the release of pollutants from the POTW. (Minn. R. 7049.0600)

Chapter 8. Domestic Wastewater -- Pretreatment

2. Pretreatment - Permittee Responsibility to Control Users

2.2 The Permittee shall prohibit the discharge of the following to its wastewater treatment facility:

a. pollutants which create a fire or explosion hazard, including any discharge with a flash point less than 60 degrees C (140 degrees F);

b. pollutants which would cause corrosive structural damage to the POTW, including any waste stream with a pH of less than 5.0;

c. solid or viscous pollutants which would obstruct flow;

d. heat that would inhibit biological activity, including any discharge that would cause the temperature of the waste stream at the POTW treatment plant headworks to exceed 40 degrees C (104 degrees F);

e. pollutants which produce toxic gases, vapors, or fumes that may endanger the health or safety of workers; or

f. any pollutant, including oxygen demanding pollutants such as biochemical oxygen demand, released at a flow rate or pollutant concentration that will cause interference or pass through. (Minn. R. 7049.0140)

2.3 The Permittee shall prohibit new discharges of non-contact cooling waters unless there is no cost effective alternative. Existing discharges of non-contact cooling water to the Permittee's wastewater treatment facility shall be eliminated, where elimination is cost-effective, or where an infiltration/inflow analysis and sewer system evaluation survey indicates the need for such removal.

2.4 If the Permittee accepts trucked-in wastes, the Permittee shall evaluate the trucked in wastes prior to acceptance in the same manner as it monitors sewered wastes. The Permittee shall accept trucked-in wastes only at specifically designated points. (Minn. R. 7049.0140, Subp. 4)

2.5 Pollutant of concern means a pollutant that is or may be discharged by an industrial user that is, or reasonably should be of concern on the basis that it may cause the permittee to violate any permit limits on the release of pollutants. The following pollutants shall be evaluated to determine if they should be pollutants of concern: pollutants limited in this permit, pollutants for which monitoring is required in this permit, pollutants that are likely to cause inhibition of the Permittee's POTW, pollutants which may interfere with sludge disposal, pollutants for which the Permittee's treatment facility has limited capacity, phosphorus and mercury. (Minn. R. 7049.0120, Subp. 13)

3. Control of Significant Industrial Users

3.1 The Permittee shall impose pretreatment requirements on SIUs which will ensure compliance with all applicable effluent limitations and other requirements set forth in this permit or any federal or state law or regulation limiting the release of pollutants from the POTW. These requirements shall be applied to SIUs by means of an individual control mechanism. (Minn. R. 7049.0600)

3.2 The Permittee shall not knowingly enter into an individual control mechanism with any user that would allow the user to contribute an amount or strength of wastewater that would cause violation of any limitation or requirement in the permit, or any applicable federal, state or local law or regulation. (Minn. R. 7049.0600 Subp. 3)

4. Monitoring of Significant Industrial Users

4.1 The Permittee shall obtain from SIUs specific information on the quality and quantity of the SIU's discharges to the Permittee's POTW. Except where specifically requested by the Permittee and approved by the MPCA, this information shall be obtained by means of representative monitoring conducted by the Permittee or by the SIU under requirements imposed by the Permittee in the SIU's individual control mechanism. Monitoring performed to comply with this requirement shall include all pollutants for which the SIU is significant and shall be done at a frequency commensurate with the significance of the SIU. (Minn. R. 7049.0710)

Chapter 8. Domestic Wastewater -- Pretreatment

5. Reporting and Notification

5.1 If a SIU discharges to the POTW during a given calendar year, the Permittee shall submit a Pretreatment Annual Report for that calendar year, due by January 31 of the following year. The Pretreatment Annual Report shall be submitted on forms provided by the agency or shall provide equivalent information.

The Permittee shall submit the pre-treatment report to the following address:

MPCA
Attn: WQ Submittals Center
520 Lafayette Road North
St. Paul, Minnesota 55155-4194 (Minn. R. 7049.0720)

5.2 The Permittee shall notify the MPCA in writing of any:

a. SIU of the Permittee's POTW which has not been previously disclosed to the MPCA;

b. anticipated or actual changes in the volume or quality of discharge by an industrial user that could result in the industrial user becoming an SIU as defined in this chapter; or

c. anticipated or actual changes in the volume or quality of discharges by a SIU that would require changes to the SIU's required local limits.

This notification shall be submitted within 30 days of identifying the IU as a SIU. Where changes are proposed, they must be submitted prior to changes being made. (Minn. R. 7049.0700, Subp. 1)

5.3 Upon notifying the MPCA of a SIU or change in a SIU discharge as required above, the Permittee shall submit the following information on forms provided by the agency or in a comparable format:

a. the identity of the SIU and a description of the SIU's operation and process;

b. a characterization of the SIU's discharge;

c. the required local limits that will be imposed on the SIU;

d. a technical justification of the required local limits; and

e. a plan for monitoring the SIU which is consistent with monitoring requirements in this chapter. (Minn. R. 7049.0700)

5.4 In addition, the Permittee shall, upon request, submit the following to the MPCA for approval:

a. additional information on the SIU, its processes and discharge;

b. a copy of the individual control mechanism used to control the SIU;

c. the Permittee's legal authority to be used for regulating the SIU; and

d. the Permittee's procedures for enforcing the requirements imposed on the SIU. (Minn. R. 7049.0700, Subp. 3)

5.5 The permittee shall notify MPCA of any of its industrial users that may be subject to national categorical pretreatment standards.

5.6 This permit may be modified in accordance with Minnesota Rules, ch. 7001 to require development of a pretreatment program approvable under the Federal General Pretreatment Regulation (40 CFR 403).

Chapter 9. Total Facility Requirements

1. General Requirements

General Requirements

1.1 Definitions. Refer to the 'Permit Users Manual' found on the MPCA website (www.pca.state.mn.us) for standard definitions.

1.2 Incorporation by Reference. The following applicable federal and state laws are incorporated by reference in this permit, are applicable to the Permittee, and are enforceable parts of this permit: 40 CFR pts. 122.41, 122.42, 136, 403 and 503; Minn. R. pts. 7001, 7041, 7045, 7050, 7052, 7053, 7060, and 7080; and Minn. Stat. Sec. 115 and 116.

1.3 Permittee Responsibility. The Permittee shall perform the actions or conduct the activity authorized by the permit in compliance with the conditions of the permit and, if required, in accordance with the plans and specifications and/or operations and maintenance manuals approved by the Agency. (Minn. R. 7001.0150, subp. 3, item E)

1.4 Toxic Discharges Prohibited. Whether or not this permit includes effluent limitations for toxic pollutants, the Permittee shall not discharge a toxic pollutant except according to Code of Federal Regulations, Title 40, sections 400 to 460 and Minnesota Rules 7050, 7052, 7053 and any other applicable MPCA rules. (Minn. R. 7001.1090, subp.1, item A)

1.5 Nuisance Conditions Prohibited. The Permittee's discharge shall not cause any nuisance conditions including, but not limited to: floating solids, scum and visible oil film, excessive suspended solids, material discoloration, obnoxious odors, gas ebullition, deleterious sludge deposits, undesirable slimes or fungus growths, aquatic habitat degradation, excessive growths of aquatic plants, acutely toxic conditions to aquatic life, or other adverse impact on the receiving water. (Minn. R. 7050.0210 subp. 2)

1.6 Property Rights. This permit does not convey a property right or an exclusive privilege. (Minn. R. 7001.0150, subp. 3, item C)

1.7 Liability Exemption. In issuing this permit, the state and the MPCA assume no responsibility for damage to persons, property, or the environment caused by the activities of the Permittee in the conduct of its actions, including those activities authorized, directed, or undertaken under this permit. To the extent the state and the MPCA may be liable for the activities of its employees, that liability is explicitly limited to that provided in the Tort Claims Act. (Minn. R. 7001.0150, subp. 3, item O)

1.8 The MPCA's issuance of this permit does not obligate the MPCA to enforce local laws, rules, or plans beyond what is authorized by Minnesota Statutes. (Minn. R. 7001.0150, subp.3, item D)

1.9 Liabilities. The MPCA's issuance of this permit does not release the Permittee from any liability, penalty or duty imposed by Minnesota or federal statutes or rules or local ordinances, except the obligation to obtain the permit. (Minn. R. 7001.0150, subp.3, item A)

1.10 The issuance of this permit does not prevent the future adoption by the MPCA of pollution control rules, standards, or orders more stringent than those now in existence and does not prevent the enforcement of these rules, standards, or orders against the Permittee. (Minn. R. 7001.0150, subp.3, item B)

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

1.12 Compliance with Other Rules and Statutes. The Permittee shall comply with all applicable air quality, solid waste, and hazardous waste statutes and rules in the operation and maintenance of the facility.

Chapter 9. Total Facility Requirements

1. General Requirements

1.13 Inspection and Entry. When authorized by Minn. Stat. Sec. 115.04; 115B.17, subd. 4; and 116.091, and upon presentation of proper credentials, the agency, or an authorized employee or agent of the agency, shall be allowed by the Permittee to enter at reasonable times upon the property of the Permittee to inspect and copy books, papers, records, or memoranda pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit; and to conduct surveys and inspections, including sampling or monitoring, pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit. (Minn. R. 7001.0150, subp.3, item I)

1.14 Control Users. The Permittee shall regulate the users of its wastewater treatment facility so as to prevent the introduction of pollutants or materials that may result in the inhibition or disruption of the conveyance system, treatment facility or processes, or disposal system that would contribute to the violation of the conditions of this permit or any federal, state or local law or regulation.

Sampling

1.15 Representative Sampling. Samples and measurements required by this permit shall be conducted as specified in this permit and shall be representative of the discharge or monitored activity. (40 CFR 122.41 (j)(1))

1.16 Additional Sampling. If the Permittee monitors more frequently than required, the results and the frequency of monitoring shall be reported on the Discharge Monitoring Report (DMR) or another MPCA-approved form for that reporting period. (Minn. R. 7001.1090, subp. 1, item E)

1.17 Certified Laboratory. A laboratory certified by the Minnesota Department of Health and/or registered by the MPCA shall conduct analyses required by this permit. Analyses of dissolved oxygen, pH, temperature, specific conductance, and total residual oxidants (chlorine, bromine) do not need to be completed by a certified laboratory but shall be completed by equipment that is verified for accuracy before use. (Minn. Stat. Sec. 144.97 through 144.98 and Minn. R. 4740.2010 and 4740.2050 through 4740.2120) (Minn. R. 4740.2010 and 4740.2050 through 2120)

1.18 Sample Preservation and Procedure. Sample preservation and test procedures for the analysis of pollutants shall conform to 40 CFR Part 136 and Minn. R. 7041.3200.

1.19 Equipment Calibration: Flow meters, pumps, flumes, lift stations or other flow monitoring equipment used for purposes of determining compliance with the permit shall be verified and/or calibrated for accuracy at least twice annually. (Minn. R. 7001.0150, subp. 2, items B and C)

Chapter 9. Total Facility Requirements

1. General Requirements

1.20 Maintain Records. The Permittee shall keep the records required by this permit for at least three years, including DMRs, inspections, calibration and accuracy verifications, maintenance records, any calculations, original recordings from field or automatic monitoring instruments, laboratory sheets, chain of custody forms, copies of all reports required by the permit, and all data used to complete the permit application. The Permittee shall extend these record retention periods upon request of the MPCA.

The Permittee shall maintain records for each sample and measurement. The records of all monitoring and testing which is related to compliance with the terms and conditions of the permit shall include the following information (Minn. R. 7001.0150, subp. 2, item C):

a. The exact place, date, and time of the sample or measurement;

b. The date of analysis;

c. The name of the person(s) who performed the sample collection and/or measurement;

d. The name of the person(s) who performed the analysis and/or calculation;

e. The analytical techniques, procedures and methods used; and

f. The results of the analysis.

1.21 Completing Reports. The Permittee shall submit the results of the required sampling and monitoring activities on the forms provided, specified, or approved by the MPCA. The information shall be recorded in the specified areas on those forms and in the units specified. (Minn. R. 7001.1090, subp. 1, item D; Minn. R. 7001.0150, subp. 2, item B)

Required forms may include:

DMR Sample Values and/or Operational Spreadsheets or DMR Supplemental Form:
If required, individual values for each sample and measurement must be recorded on the DMR Sample Values and/or Operational Spreadsheets provided by the MPCA. DMR Sample Values and/or Operational Spreadsheets or DMR Supplemental Forms shall be submitted with the appropriate eDMRs. Note: Required summary information MUST be recorded on the electronic Discharge Monitoring Report. Summary information that is submitted ONLY on the DMR Sample Values and/or Operational Spreadsheets or DMR Supplemental Form does not comply with the reporting requirements.

Chapter 9. Total Facility Requirements

1. General Requirements

1.22 Submitting Reports. Electronic Discharge Monitoring Reports (eDMRs), DMR Sample Values and/or Operational Spreadsheets or DMR Supplemental Forms, and related attachments shall be submitted electronically via the MPCA Online Services Portal after authorization is approved. Authorization must be applied for and approved prior to submittal via the Online Services Portal.

eDMRs and DMR Sample Values and/or Operational Spreadsheets or DMR Supplemental Forms shall be electronically submitted by the 21st day of the month following the monitoring period end or as otherwise specified in this permit. Electronic DMR submittal must be complete on or before 11:59 PM of the 21st day of the month following the end of the monitoring period or as otherwise specified in this permit. A DMR shall be submitted for each required station even if no discharge occurred during the monitoring period. (Minn. R. 7001.0150, subps. 2.B and 3.H)

If electronic submittal is not possible, the Permittee must apply for an exception to electronic submittal. Exceptions requests for extreme conditions (no computer on-site is not an extreme condition) must at a minimum contain the extreme reason for the exception, actions to be taken, and date the facility will submit eDMR. All exception requests, and paper DMRs, DMR supplemental forms, and related attachments must be submitted by the 21st day of the month following the monitoring period end to:

MPCA
Attn: Discharge Monitoring Reports
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Other reports required by this permit shall be submitted on or before the due date specified in the permit to:

MPCA
Attn: WQ Submittals Center
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

1.23 Incomplete or Incorrect Reports. The Permittee shall immediately submit an electronically amended report or eDMR to the MPCA upon discovery by the Permittee or notification by the MPCA that it has submitted an incomplete or incorrect report or eDMR. The amended report or eDMR shall contain the missing or corrected data along with an explination of the circumstances of the incomplete or incorrect report. The explination must be added to the eDMR comments field or must be an attachment to the eDMR. If it is impossible to electronically amend the report or eDMR, the Permittee shall immediately notify the MPCA and the MPCA will provide direction for the amendment submittals. (Minn. R. 7001.0150 subp. 3, item G)

1.24 Required Signatures. All DMRs, forms, reports, and other documents submitted to the MPCA shall be signed by the Permittee or the duly authorized representative of the Permittee. Minn. R. 7001.0150, subp. 2, item D. The person or persons that sign the DMRs, forms, reports or other documents must certify that he or she understands and complies with the certification requirements of Minn. R. 7001.0070 and 7001.0540, including the penalties for submitting false information. Technical documents, such as design drawings and specifications and engineering studies required to be submitted as part of a permit application or by permit conditions, must be certified by a registered professional engineer. (Minn. R. 7001.0540)

Chapter 9. Total Facility Requirements

1. General Requirements

1.25 Detection Level. The Permittee shall report monitoring results below the reporting limit (RL) of a particular instrument as "<" the value of the RL. For example, if an instrument has a RL of 0.1 mg/L and a parameter is not detected at a value of 0.1 mg/L or greater, the concentration shall be reported as "<0.1 mg/L." "Non-detected," "undetected," "below detection limit," and "zero" are unacceptable reporting results, and are permit reporting violations. (Minn. R. 7001.0150, subp. 2, item B)

Where sample values are less than the level of detection and the permit requires reporting of an average, the Permittee shall calculate the average as follows:

a. If one or more values are greater than the level of detection, substitute zero for all nondetectable values to use in the average calculation.

b. If all values are below the level of detection, report the averages as "<" the corresponding level of detection.

c. Where one or more sample values are less than the level of detection, and the permit requires reporting of a mass, usually expressed as kg/day, the Permittee shall substitute zero for all nondetectable values. (Minn. R. 7001.0150, subp. 2, item B)

1.26 Records. The Permittee shall, when requested by the Agency, submit within a reasonable time the information and reports that are relevant to the control of pollution regarding the construction, modification, or operation of the facility covered by the permit or regarding the conduct of the activity covered by the permit. (Minn. R. 7001.0150, subp. 3, item H)

1.27 Confidential Information. Except for data determined to be confidential according to Minn. Stat. Sec. 116.075, subd. 2, all reports required by this permit shall be available for public inspection. Effluent data shall not be considered confidential. To request the Agency maintain data as confidential, the Permittee must follow Minn. R. 7000.1300.

Noncompliance and Enforcement

1.28 Subject to Enforcement Action and Penalties. Noncompliance with a term or condition of this permit subjects the Permittee to penalties provided by federal and state law set forth in section 309 of the Clean Water Act; United States Code, title 33, section 1319, as amended; and in Minn. Stat. Sec. 115.071 and 116.072, including monetary penalties, imprisonment, or both. (Minn. R. 7001.1090, subp. 1, item B)

1.29 Criminal Activity. The Permittee may not knowingly make a false statement, representation, or certification in a record or other document submitted to the Agency. A person who falsifies a report or document submitted to the Agency, or tampers with, or knowingly renders inaccurate a monitoring device or method required to be maintained under this permit is subject to criminal and civil penalties provided by federal and state law. (Minn. R. 7001.0150, subp.3, item G., 7001.1090, subps. 1, items G and H and Minn. Stat. Sec. 609.671)

1.30 Noncompliance Defense. It shall not be a defense for the 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. (40 CFR 122.41(c))

Chapter 9. Total Facility Requirements

1. General Requirements

1.31 Effluent Violations. If sampling by the Permittee indicates a violation of any discharge limitation specified in this permit, the Permittee shall immediately investigate the cause of the violation, which may include but is not limited to, collecting additional samples and/or other investigative actions. The Permittee shall also take appropriate action to prevent future violations. If the permittee discovers that noncompliance with a condition of the permit has occurred which could endanger human health, public drinking water supplies, or the environment, the Permittee shall within 24 hours of the discovery of the noncompliance, orally notify the commissioner and submit a written description of the noncompliance within 5 days of the discovery. The written description shall include items a. through e., as listed below. If the Permittee discovers other non-compliance that does not explicitly endanger human health, public drinking water supplies, or the environment, the non-compliance shall be reported during the next reporting period to the MPCA with its Discharge Monitoring Report (DMR). If no DMR is required within 30 days, the Permittee shall submit a written report within 30 days of the discovery of the noncompliance. This description shall include the following information:

a. a description of the event including volume, duration, monitoring results and receiving waters;

b. the cause of the event;

c. the steps taken to reduce, eliminate and prevent reoccurrence of the event;

d. the exact dates and times of the event; and

e. steps taken to reduce any adverse impact resulting from the event.
(Minn. R. 7001.0150, subp. 3k)

1.32 Upset Defense. In the event of temporary noncompliance by the Permittee with an applicable effluent limitation resulting from an upset at the Permittee's facility due to factors beyond the control of the Permittee, the Permittee has an affirmative defense to an enforcement action brought by the Agency as a result of the noncompliance if the Permittee demonstrates by a preponderance of competent evidence:

a. The specific cause of the upset;

b. That the upset was unintentional;

c. That the upset resulted from factors beyond the reasonable control of the Permittee and did not result from operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or increases in production which are beyond the design capability of the treatment facilities;

d. That at the time of the upset the facility was being properly operated;

e. That the Permittee properly notified the Commissioner of the upset in accordance with Minn. R. 7001.1090, subp. 1, item I; and

f. That the Permittee implemented the remedial measures required by Minn. R. 7001.0150, subp. 3, item J.

Release

1.33 Unauthorized Releases of Wastewater Prohibited. Except for discharges from outfalls specifically authorized by this permit, overflows, discharges, spills, or other releases of wastewater or materials to the environment, whether intentional or not, are prohibited. However, the MPCA will consider the Permittee's compliance with permit requirements, frequency of release, quantity, type, location, and other relevant factors when determining appropriate action. (40 CFR 122.41 and Minn. Stat. Sec 115.061)

Chapter 9. Total Facility Requirements

1. General Requirements

1.34 Discovery of a release. Upon discovery of a release, the Permittee shall:

a. Take all reasonable steps to immediately end the release.

b. Notify the Minnesota Department of Public Safety Duty Officer at 1(800)422-0798 or (651)649-5451 (metro area) immediately upon discovery of the release. You may contact the MPCA during business hours at 1(800)657-3864 or (651)296-6300 (metro area).

c. Recover as rapidly and as thoroughly as possible all substances and materials released or immediately take other action as may be reasonably possible to minimize or abate pollution to waters of the state or potential impacts to human health caused thereby. If the released materials or substances cannot be immediately or completely recovered, the Permittee shall contact the MPCA. If directed by the MPCA, the Permittee shall consult with other local, state or federal agencies (such as the Minnesota Department of Natural Resources and/or the Wetland Conservation Act authority) for implementation of additional clean-up or remediation activities in wetland or other sensitive areas.

1.35 Sampling of a release. Upon discovery of a release, the Permittee shall:

a. Collect representative samples of the release. The Permittee shall sample the release for parameters of concern immediately following discovery of the release. The Permittee may contact the MPCA during business hours to discuss the sampling parameters and protocol. In addition, Fecal Coliform Bacteria samples shall be collected where it is determined by the Permittee that the release contains or may contain sewage. If the release cannot be immediately stopped, the Permittee shall consult with MPCA regarding additional sampling requirements. Samples shall be collected at least, but not limited to, two times per week for as long as the release continues.

b. Submit the sampling results on the Release Sampling Form (http://www.pca.state.mn.us/index.php/view-document.html?gid=18867). The Release Sampling Form shall be submitted to the MPCA with the next DMR or within 30 days whichever is sooner.

Bypass

1.36 Anticipated bypass. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if the bypass is for essential maintenance to assure efficient operation of the facility. The permittee shall submit prior notice, if possible at least ten days before the date of the bypass to the MPCA (40 CFR 122.41(m)(2) and 122.41(m)(3) and Minn. R. Ch. 7001.1090, subp. 1, J).

The notice of the need for an anticipated bypass shall include the following information:

a. The proposed date and estimated duration of the bypass;

b. The alternatives to bypassing; and

c. A proposal for effluent sampling during the bypass. Any bypass wastewater must enter waters of the state from outfalls specifically authorized by this permit. Therefore, samples shall be collected at the frequency and location identified in this permit or two times per week for as long as the bypass continues, whichever is more frequent.

Chapter 9. Total Facility Requirements

1. General Requirements

1.37 All other bypasses are prohibited. The MPCA may take enforcement action against the Permittee for a bypass, unless the specific conditions described in Minn. R. Ch. 7001.1090 subp. 1, K and 122.41(m)(4)(i) are met.

In the event of an unanticipated bypass, the permittee shall:

a. Take all reasonable steps to immediately end the bypass.

b. Notify the Minnesota Department of Public Safety Duty Officer at 1(800)422-0798 or (651)649-5451 (metro area) immediately upon commencement of the bypass. You may contact the MPCA during business hours at 1(800)657-3864 or (651)296-6300 (metro area). (Minn. Stat. Sec 115.061)

c. Immediately take action as may be reasonably possible to minimize or abate pollution to waters of the state or potential impacts to human health caused thereby. If directed by the MPCA, the Permittee shall consult with other local, state or federal agencies for implementation of abatement, clean-up, or remediation activities.

d. Only allow bypass wastewater as specified in this section to enter waters of the state from outfalls specifically authorized by this permit. Samples shall be collected at the frequency and location identified in this permit or two times per week for as long as the bypass continues, whichever is more frequent. The permittee shall also follow the reporting requirements for effluent violations as specified in this permit.

Operation and Maintenance

1.38 The Permittee shall at all times properly operate and maintain the facilities and systems of treatment and control, and the appurtenances related to them which are installed or used by the Permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. The Permittee shall install and maintain appropriate backup or auxiliary facilities if they are necessary to achieve compliance with the conditions of the permit and, for all permits other than hazardous waste facility permits, if these backup or auxiliary facilities are technically and economically feasible Minn. R. 7001.0150. subp. 3, item F.

1.39 In the event of a reduction or loss of effective treatment of wastewater at the facility, the Permittee shall control production or curtail its discharges to the extent necessary to maintain compliance with the terms and conditions of this permit. The Permittee shall continue this control or curtailment until the wastewater treatment facility has been restored or until an alternative method of treatment is provided. (Minn. R. 7001.1090, subp. 1, item C)

1.40 Solids Management. The Permittee shall properly store, transport, and dispose of biosolids, septage, sediments, residual solids, filter backwash, lime waste, screenings, oil, grease, and other substances so that pollutants do not enter surface waters or ground waters of the state. Solids should be disposed of in accordance with local, state and federal requirements. (40 CFR 503 and Minn. R. 7041 and applicable federal and state solid waste rules)

1.41 Scheduled Maintenance. The Permittee shall schedule maintenance of the treatment works during non-critical water quality periods to prevent degradation of water quality, except where emergency maintenance is required to prevent a condition that would be detrimental to water quality or human health. (Minn. R. 7001.0150. subp. 3, item F and Minn. R. 7001.0150. subp. 2, item B)

1.42 Control Tests. In-plant control tests shall be conducted at a frequency adequate to ensure compliance with the conditions of this permit. (Minn. R. 7001.0150. subp. 3, item F and Minn. R. 7001.0150. subp. 2, item B)

Changes to the Facility or Permit

Chapter 9. Total Facility Requirements

1. General Requirements

1.43 Except as provided under Minnesota Statutes, section 115.07, subdivisions 1 and 3, no person required by statute or rule to obtain a permit may construct, install, modify, or operate the facility to be permitted, nor shall a person commence an activity for which a permit is required by statute or rule until the agency has issued a written permit for the facility or activity. (Minn. R. 7001.0030)

Permittees that propose to make a change to a facility or discharge that requires a permit modification must follow Minn. R. 7001.0190. If the Permittee cannot determine whether a permit modification is needed, the Permittee must contact the MPCA prior to any action. It is recommended that the application for permit modification be submitted to the MPCA at least 180 days prior to the planned change.

1.44 Submittal of plans and specifications for MPCA approval is not required for routine maintenance work. Routine maintenance work means installation of new equipment to replace worn out or broken items, provided the new equipment is the same design size and has the same design intent. For instance, a broken sewer pipe, a worn out lift station pump, or a malfunctioning aerator or blower can be replaced with the same design-sized equipment (or pipe) without MPCA approval.

If the proposed construction is not expressly authorized by this permit, it may require a permit modification. If the construction project requires an Environmental Assessment Worksheet under Minn. R. 4410, no construction shall begin until a negative declaration is issued and all approvals are received or implemented.

1.45 Report Changes. The Permittee shall give advance notice as soon as possible to the MPCA of any substantial changes in operational procedures, activities that may alter the nature or frequency of the discharge, and/or material factors that may affect compliance with the conditions of this permit. (Minn. R. 7001.0150, subp. 3, item M)

1.46 Chemical Additives. The Permittee shall receive prior written approval from the MPCA before increasing the use of a chemical additive authorized by this permit, or using a chemical additive not authorized by this permit, in quantities or concentrations that have the potential to change the characteristics, nature and/or quality of the discharge.

The Permittee shall request approval for an increased or new use of a chemical additive at least 60 days, or as soon as possible, before the proposed increased or new use.

This written request shall include at least the following information for the proposed additive:

a. The process for which the additive will be used;
b. Material Safety Data Sheet (MSDS) which shall include aquatic toxicity, human health, and environmental fate information for the proposed additive. The aquatic toxicity information shall include at minimum the results of: a) a 48-hour LC50 or EC50 acute study for a North American freshwater planktonic crustacean (either Ceriodaphnia or Daphnia sp.) and b) a 96-hour LC50 acute study for rainbow trout, bluegill or fathead minnow or another North American freshwater aquatic species other than a planktonic crustacean;
c. A complete product use and instruction label;
d. The commercial and chemical names and Chemical Abstract Survey (CAS) number for all ingredients in the additive (If the MSDS does not include information on chemical composition, including percentages for each ingredient totaling to 100%, the Permittee shall contact the supplier to have this information provided); and
e. The proposed method of application, application frequency, concentration, and daily average and maximum rates of use. (Minn. R. 7001.0170)

Chapter 9. Total Facility Requirements

1. General Requirements

1.47 Upon review of the information submitted regarding the proposed chemical additive, the MPCA may require additional information be submitted for consideration. This permit may be modified to restrict the use or discharge of a chemical additive and include additional influent and effluent monitoring requirements.

Approval for the use of an additive shall not justify the exceedance of any effluent limitation nor shall it be used as a defense against pollutant levels in the discharge causing or contributing to the violation of a water quality standard.

1.48 MPCA Initiated Permit Modification, Suspension, or Revocation. The MPCA may modify or revoke and reissue this permit pursuant to Minn. R. 7001.0170. The MPCA may revoke without reissuance this permit pursuant to Minn. R. 7001.0180.

1.49 TMDL Impacts. Facilities that discharge to an impaired surface water, watershed or drainage basin may be required to comply with additional permits or permit requirements, including additional restriction or relaxation of limits and monitoring as authorized by the CWA 303(d)(4)(A) and 40 CFR 122.44.l.2.i., necessary to ensure consistency with the assumptions and requirements of any applicable US EPA approved wasteload allocations resulting from Total Maximum Daily Load (TMDL) studies.

1.50 Permit Transfer. The permit is not transferable to any person without the express written approval of the Agency after compliance with the requirements of Minn. R. 7001.0190. A person to whom the permit has been transferred shall comply with the conditions of the permit. (Minn. R., 7001.0150, subp. 3, item N)

1.51 Facility Closure. The Permittee is responsible for closure and post-closure care of the facility. The Permittee shall notify the MPCA of a significant reduction or cessation of the activities described in this permit at least 180 days before the reduction or cessation. The MPCA may require the Permittee to provide to the MPCA a facility Closure Plan for approval.

Facility closure that could result in a potential long-term water quality concern, such as the ongoing discharge of wastewater to surface or ground water, may require a permit modification or reissuance.

The MPCA may require the Permittee to establish and maintain financial assurance to ensure performance of certain obligations under this permit, including closure, post-closure care and remedial action at the facility. If financial assurance is required, the amount and type of financial assurance, and proposed modifications to previously MPCA-approved financial assurance, shall be approved by the MPCA. (Minn. Stat. Sec. 116.07, subd. 4)

Chapter 9. Total Facility Requirements

1. General Requirements

1.52 Permit Reissuance. If the Permittee desires to continue permit coverage beyond the date of permit expiration, the Permittee shall submit an application for reissuance at least 180 days before permit expiration. If the Permittee does not intend to continue the activities authorized by this permit after the expiration date of this permit, the Permittee shall notify the MPCA in writing at least 180 days before permit expiration.

If the Permittee has submitted a timely application for permit reissuance, the Permittee may continue to conduct the activities authorized by this permit, in compliance with the requirements of this permit, until the MPCA takes final action on the application, unless the MPCA determines any of the following (Minn. R. 7001.0040 and 7001.0160):

a. The Permittee is not in substantial compliance with the requirements of this permit, or with a stipulation agreement or compliance schedule designed to bring the Permittee into compliance with this permit;

b. The MPCA, as a result of an action or failure to act by the Permittee, has been unable to take final action on the application on or before the expiration date of the permit;

c. The Permittee has submitted an application with major deficiencies or has failed to properly supplement the application in a timely manner after being informed of deficiencies.

Submittals and Actions Checklist
Silver Bay Wastewater Treatment Facility

This checklist is intended to assist you in tracking the reporting requirements of your permit. However, it is only an aid. PLEASE CONSULT YOUR PERMIT FOR THE EXACT REQUIREMENTS.

Please note: This checklist only details submittal requirements for the next five years. DMRs, Annual Reports, and many other submittals are required even after the expiration date of this permit, and continue to be due until the permit is either reissued or terminated.

Submit eDMRs:
Submit eDMRs via the MPCA Online Services Portal at: https://netweb.pca.state.mn.us/private/

Submit other WQ reports to:
Attention: Submittals Center
Minnesota Pollution Control Agency
520 Lafayette Rd N
St. Paul, MN 55155

MPCA Staff Contacts:
For eDMR-related questions:
Belinda Nicholas at (651)757-2613
For other questions:
John Thomas at (218)302-6616

2015

- [ ] Submit DMR (due before Nov 22)
- [ ] Submit DMR (due before Dec 22)
- [ ] Submit plans and specifications (due before Dec 31) {Permit Req't. 1.2.6}

2016

- [ ] Submit DMR (due before Jan 22)
- [ ] Submit DMR (due before Feb 22)
- [ ] Submit an Annual Mercury Pollutant Minimization Plan (MMP) Update (due before Feb 29) {Permit Req't. 4.1.4}
- [ ] Submit DMR (due before Mar 22)
- [ ] Submit DMR (due before Apr 22)
- [ ] Submit DMR (due before May 22)
- [ ] Submit notice to proceed (due before Jun 1) {Permit Req't. 1.2.7}
- [ ] Submit DMR (due before Jun 22)
- [ ] Submit DMR (due before Jul 22)
- [ ] Submit DMR (due before Aug 22)
- [ ] Submit DMR (due before Sep 22)
- [ ] Complete construction (due before Oct 1) {Permit Req't. 1.2.8}
- [ ] Submit DMR (due before Oct 22)
- [ ] Submit DMR (due before Nov 22)
- [ ] Submit DMR (due before Dec 22)

2017

- [ ] Submit DMR (due before Jan 22)
- [ ] Submit a report (due before Jan 31) {Permit Req't. 1.2.9}
- [ ] Submit DMR (due before Feb 22)
- [ ] Submit an Annual Mercury Pollutant Minimization Plan (MMP) Update (due before Feb 28) {Permit Req't. 4.1.4}
- [ ] Attain compliance with final effluent limits (due before Mar 6) {Permit Req't. 1.2.10}
- [ ] Submit DMR (due before Mar 22)
- [ ] Submit DMR (due before Apr 22)
- [ ] Submit DMR (due before May 22)
- [ ] Submit DMR (due before Jun 22)
- [ ] Submit DMR (due before Jul 22)
- [ ] Submit DMR (due before Aug 22)
- [ ] Submit DMR (due before Sep 22)
- [ ] Submit DMR (due before Oct 22)
- [ ] Submit DMR (due before Nov 22)
- [ ] Submit DMR (due before Dec 22)

2018

- [ ] Submit DMR (due before Jan 22)
- [ ] Submit DMR (due before Feb 22)
- [ ] Submit an Annual Mercury Pollutant Minimization Plan (MMP) Update (due before Feb 28) {Permit Req't. 4.1.4}
- [ ] Submit DMR (due before Mar 22)
- [ ] Submit DMR (due before Apr 22)
- [ ] Submit DMR (due before May 22)

Submittals and Actions Checklist
Silver Bay Wastewater Treatment Facility

This checklist is intended to assist you in tracking the reporting requirements of your permit. However, it is only an aid. PLEASE CONSULT YOUR PERMIT FOR THE EXACT REQUIREMENTS.

Please note: This checklist only details submittal requirements for the next five years. DMRs, Annual Reports, and many other submittals are required even after the expiration date of this permit, and continue to be due until the permit is either reissued or terminated.

Submit eDMRs:
Submit eDMRs via the MPCA Online Services Portal at: https://netweb.pca.state.mn.us/private/

Submit other WQ reports to:
Attention: Submittals Center
Minnesota Pollution Control Agency
520 Lafayette Rd N
St. Paul, MN 55155

MPCA Staff Contacts:
For eDMR-related questions:
Belinda Nicholas at (651)757-2613
For other questions:
John Thomas at (218)302-6616

2018

- [ ] Submit DMR (due before Jun 22)
- [ ] Submit DMR (due before Jul 22)
- [ ] Submit DMR (due before Aug 22)
- [ ] Submit DMR (due before Sep 22)
- [ ] Submit DMR (due before Oct 22)
- [ ] Submit DMR (due before Nov 22)
- [ ] Submit DMR (due before Dec 22)

2019

- [ ] Submit DMR (due before Jan 22)
- [ ] Submit DMR (due before Feb 22)
- [ ] Submit an Annual Mercury Pollutant Minimization Plan (MMP) Update (due before Feb 28) {Permit Req't. 4.1.4}
- [ ] Submit DMR (due before Mar 22)
- [ ] Submit DMR (due before Apr 22)
- [ ] Submit DMR (due before May 22)
- [ ] Submit DMR (due before Jun 22)
- [ ] Submit DMR (due before Jul 22)
- [ ] Submit DMR (due before Aug 22)
- [ ] Submit DMR (due before Sep 22)
- [ ] Submit DMR (due before Oct 22)
- [ ] Submit DMR (due before Nov 22)
- [ ] Submit DMR (due before Dec 22)

2020

- [ ] Submit DMR (due before Jan 22)
- [ ] Submit DMR (due before Feb 22)
- [ ] Submit an Annual Mercury Pollutant Minimization Plan (MMP) Update (due before Feb 28) {Permit Req't. 4.1.4}
- [ ] Submit a Mercury Pollutant Minimization Plan (due before Mar 4) {Permit Req't. 4.1.3}
- [ ] Submit an application for permit reissuance (due before Mar 4) {Permit Req't. 9.1.52}
- [ ] Submit DMR (due before Mar 22)
- [ ] Submit DMR (due before Apr 22)
- [ ] Submit DMR (due before May 22)
- [ ] Submit DMR (due before Jun 22)
- [ ] Submit DMR (due before Jul 22)
- [ ] Submit DMR (due before Aug 22)

Appendix B: Public Hearing Presentation Material, Notice and Publication, and Comments*

*The public hearing presentation will be submitted at a later date after the public hearing.

Appendix C: Signed Resolution Adopting Facility Plan*

*The signed resolution will be submitted at a later date after the City Council Meeting to approve the Facility Plan.

Appendix D: SERP Mailing List

Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194

State Environmental Review Process (SERP) Mailing List Form

Clean Water State Revolving Fund Program

Minnesota Rules 7077.0272, subp. 2.a.A.
Minnesota Rules 7077.0277, subp. 3.B.

Doc Type: Wastewater Point Source

Instructions: This is the complete mailing list that the Minnesota Pollution Control Agency (MPCA) will use to public notice the Environmental Summary or other environmental review documents. Please type names and addresses on this form and return to the MPCA staff engineer. This list should be considered minimum. If a more substantial mailing list is available for the Public Participation Program, it should be added to this mailing list. **Please return this mailing list in MS Word format only.**

Example address blocks:

The Honorable Mark Anderson
Minnesota State Senator
135 State Office Building
St. Paul, MN 55113

Marv Johnson, City Administrator
City of Willmar
236 Oriole Avenue
Willmar, MN 55699

Municipality name: City of Silver Bay **Project number:**

Contact name: John Graupman **Phone number:** 507-380-0433
(person completing the form)

Public notice address information

1.	**The Honorable State Senator:**	**6.**	**City Administrator/Clerk:**
	Thomas Bakk Capital Office 95 University Avenue W. Minnesota Senate Bldg., Room 2221 St. Paul, MN 55155		Lana Fralich City Hall 7 Davis Drive Silver Bay, MN 55614
2.	**The Honorable State Representative:**	**7.**	**Engineering Consultant:**
	Rob Ecklund 311 State Office Building 100 Rev. Dr. Martin Luther King Jr. Blvd. St. Paul, MN 55155		John Graupman Bolton & Menk, Inc. 1960 Premier Drive Mankato, MN 56001
3.	**The Honorable County Board Chair:**	**8.**	**County Planning and Zoning Office:**
	Richard Hogenson 328 3rd Ave Two Harbors, MN 55616		Lake County Environmental Services/Planning & Zoning 601 3rd Avenue Two Harbors, MN 55616
4.	**The Honorable Mayor:**	**9.**	**Watershed District (if established):**
	Scott Johnson City Hall 7 Davis Drive Silver Bay, MN 55614		Dan Schutte (District Manager) 616 3rd Avenue Two Harbors, MN 55616
5.	**Township Board Clerk:***	**10.**	**Regional Development Commission:**

**Include if any portion of the project (including the facility, interceptor, influent or outfall lines) will be located in the township(s).*

To add rows, place your cursor in the last row of the second column and hit tab.

Interested citizens:	**Interested groups:** (i.e., homeowners associations, environmental, business, civic, etc., organizations)

To add rows, place your cursor in the last row of the second column and hit tab.

Property owners:

Property owner list should include all property owners of the site to be, or which has been previously acquired. For pond systems, include the property owner(s) of the pond site, spray irrigation site(s) and all property owners of homes within one-fourth mile of the pond site and any clusters of homes within one-half mile of the pond site.

Federal agencies:

ATTN: Field Supervisor
U.S. Fish and Wildlife Service
Twin Cities Field Office
4101 American Boulevard East
Bloomington, MN 55425-1665

ATTN: Environmental Compliance Chief
U.S. Army Corps of Engineers
St. Paul District
180 Fifth Street East, Suite 700
St. Paul, MN 55101-1678

ATTN: Regional Environmental Officer
Federal Emergency Management Agency
Region V Office
536 South Clark Street, 6th Floor
Chicago, IL 60605

State agencies:

ATTN: Environmental Review Supervisor
MN Department of Natural Resources
Division of Ecological and Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155 -4025

ATTN: Manager of Government Programs and Compliance
MN Historical Society
Minnesota Historic Preservation Office
345 West Kellogg Boulevard
St. Paul, MN 55102-1906

ATTN: Cultural Resource Director
MN Indian Affairs Council
161 St. Anthony Avenue, Suite 919
St. Paul, MN 55103

MPCA regional office(s):

Appendix E: Preliminary Effluent Limit Request

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Preliminary Effluent Limit Review Request

EAO Effluent Limits Unit

Doc Type: Effluent Limit Standards Review

Purpose: This form is required for all preliminary effluent limit requests for: 1) new facilities with a surface water discharge; 2) where the design flow, outfall location, or quality of the effluent is changing for an existing facility with a surface water discharge; or 3) changes to treatment type that would impact quality of the effluent.

Complete application by typing or printing in black ink.
Instructions on page 3.

MPCA Use Only
MN
Application number
Date received

Contact Information

1. **Engineer or consultant or requester** Employer/Company: Bolton & Menk, Inc.
   Name: John Graupman Title: Principal Environmental Engineer
   Mailing address: 1960 Premier Drive
   City: Mankato State: MN Zip code: 56001
   Phone: 507-380-0433 Fax: 507-625-4177 E-mail: johngr@bolton-menk.com
2. **Permittee or Facility**
   Name: Silver Bay Wastewater Treatment Plant County: Lake
   City: Silver Bay State: MN Zip code: 55614
   NPDES/SDS Permit #: MN0024899 *(complete only for existing permitted facilities)*
   Address of facility *(if known)*:

Facility Information (If more space is needed, attach additional page(s) to the request.)

3. **Reason for request:** *(Describe in detail: design flow, outfall locations, and/or changes to treatment type impacting the quality of the effluent.)*
   Design flows may increase above current design flows. AWW design flow will not change from previous design. The facility discharges to Lake Superior.
4. **Identify design flows and waste flow type for the proposed facility:**
   See the Minnesota Pollution Control Agency (MPCA) website regarding Design Flow and Loading Determination Guidelines for Wastewater Treatment Plants at: http://www.pca.state.mn.us/0agxb2d.

   For domestic wastewater facilities only
   Average Wet Weather Design Flow: 0.919 mgd (million gallons/day)
   Average Dry Weather Design Flow: 0.532 mgd (million gallons/day)
   Waste Flow Type: ☒ Continuous ☐ Controlled

   For industrial and other wastewater facilities only
   Maximum Daily Design Flow: _____ mgd (million gallons/day)
   Average Daily Design Flow: _____ mgd (million gallons/day)
   Waste Flow Type: ☐ Continuous ☐ Controlled ☐ Periodic/Seasonal ☐ Intermittent

Waste flow type: A description of the discharge type

Continuous: *Continuous, year-round discharge where flows occur without interruption throughout operating hours of the facility, except for infrequent shutdowns for maintenance, process changes, or other similar activities (40 CFR 122.2). Most domestic mechanical facilities are considered to have continuous discharges.*

Controlled: *Discharge permitted during pre-defined periods or windows which are generally during periods of higher receiving water flow and lower temperatures. For northern MN [MPCA regions I, II, III] these periods are 3/1-6/30 and 9/1-12/31. For southern MN [MPCA regions IV, V, Metro] these periods are 3/1-6/15 and 9/15-12/31. These discharges are almost exclusively stabilization ponds with controlled discharges in spring and fall.*

Intermittent: *Discharge that occurs sometimes, but not regularly (40CFR pt.122). Intermittent discharges occur infrequently and/or for short durations. Examples include water treatment plants with backwash discharge such as once every ten days or a few hours every week, and stormwater detention ponds with discharges that are precipitation dependent.*

Periodic/Seasonal: *Discharge that occurs regularly, but is not continuous all year, where discharge is intentional at specified times following treatment (e.g., monthly or seasonally) and of longer duration, as opposed to the short duration of intermittent discharges (40CFR 122). Examples include canning facilities that discharge process wastewater continuously during packing season (May-Sep or other months) and quarries and gravel mining operations. This excludes stabilization ponds with pre-defined discharge periods or windows.*

5. **Facility description:** *(Provide a description of the proposed wastewater treatment facility, including the type of treatment units.)*
Manual bar screen, grit chamber, comminuter, primary clarifiers, trickling filter, secondary clarification, disinfection (chlorination/dechlorination), tertiary solids contact clarifiers, heated anaerobic digesters.

6. **Wetland impacts:** *(For new or expanded discharges, will construction or operation of the proposed facility result in wetland filling, drainage, excavation, or permanent inundation?)* ☐ Yes ☒ No If yes, please provide the following information:
   a. Location of impacted wetland:
   b. Acreage of impacted wetland:
   c. Wetland type/classification:

   (See U.S. Fish and Wildlife Service National Wetlands Inventory at http://www.fws.gov/wetlands/index.html.)

7. **Is the facility located on tribal land?** ☐ Yes ☒ No
If yes, also contact U.S. Environmental Protection Agency (EPA) Region V, John Coletti 312-886-6106.

8. **Identify all wastewater facility locations for which preliminary effluent limits are requested:**

County: Lake		City/Township: Silver bay		
Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T56 N	R7 ☐E ☒W	32	SE	NE

County:		City/Township:		
Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T N	R ☐E ☐W			

County:		City/Township:		
Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T N	R ☐E ☐W			

Existing/Proposed Surface Water Discharge

9. **Identify all surface water discharge locations for which preliminary effluent limits are requested:**

Complete the table for each surface water discharge point. If this is an existing facility, refer to the current National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit for Station ID. For new facilities, enter as much information as available. If more space is needed for additional stations, attach additional pages.

The location of a surface water discharge is defined as the location where a wastewater discharge enters a surface water (not where the pipe leaves the wastewater facility structure). If a pipe extends out into a river or lake, the location is identified where the pipe leaves the shore and enters the body of water. If the discharge is to a tile line or storm sewer the location is identified where the tile line or storm sewer enters a surface water. If the discharge is into an open ditch or ravine, the location is identified as the point where the discharge leaves the pipe and enters the open ditch.

Station ID: SD 002

Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T50N	R7 ☐E ☒W	32	SE	NE
Latitude	Longitude	Datum	Coordinate Collection Method	
47 deg 17' 30"N	91 deg 14' 50" W	WGS84	Digitized	February 2017
Receiving Water Name: Lake Superior				

Station ID: SD

Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T N	R ☐E ☐W			
Latitude	Longitude	Datum	Coordinate Collection Method	
Receiving Water Name:				

Surface water discharge locations for which preliminary effluent limits are requested - *continued*:

Station ID: SD

Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T N	R ☐E ☐W			
Latitude	Longitude	Datum	Coordinate Collection Method	

Receiving Water Name:

Attachments

☒ Did you attach a map?

Attach a map, U.S. Geological Survey topographic map (7.5 minute series) or other map of comparable detail that shows surface water bodies, roads, and other pertinent landmarks. The map should show and label the exact location of the existing or proposed facility, and the location of all existing and proposed wastewater discharge points into receiving waters. Mark and label all surface water discharge locations at the point where the wastewater enters the receiving water. If the discharge is to a tile line or storm sewer, label the tile line or storm sewer and show its flow path to the receiving water.

Note: Please ensure this form and all applicable attachments are complete. **Please make a copy for your records.**

Application Fee

An application fee is required under Minn. Stat. § 116.07, subd. 4d (1990) and Minn. R. ch. 7002 (Permit Fee Rules). This application fee must be submitted with the application. The current application fee is $1,550 with the dollar amount determined by point assignments contained in the Permit Fee Rules. Please refer to the application fee table located at: http://www.pca.state.mn.us/index.php/water/water-permits-and-rules/water-permits-and-forms/mpca-water-quality-permit-fees.html.

Submittal

Requests that are submitted without the required fee and attachments will be returned. Please make your check payable to the Minnesota Pollution Control Agency. Send the completed request, attachments, and check to:

Attn: Fiscal Services – 6th floor
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Contact Information

If you have questions or need further assistance, contact Steven Weiss at 651-757-2814 or Carol Sinden at 651-757-2727 Effluent Limits Unit, Environmental Analysis and Outcomes Division.

Instructions

Surface water discharge location example:

Station ID: SD *1*

Township (26-71 or 101-168)	Range (1-51)	Section (1-36)	¼ Section (NW, NE, SW, SE)	¼ of ¼ Section (NW, NE, SW, SE)
T 109 N	*R 28 ☐E ☐W*	*5*	*NW*	*NW*
Latitude	Longitude	Datum	Coordinate Collection Method	
44.271062	*-94.180317*	*NAD83*	*DOQ (aerial photo)*	

Receiving Water: *County Ditch 4*

A datum for latitude/longitude should be specified. For latitude/longitude coordinates, this will either be NAD83 or WGS84 (the default on most GPS units). NAD83 is preferred.

For latitude/longitude indicate the method of collection and the date of collection. Methods of collection include:

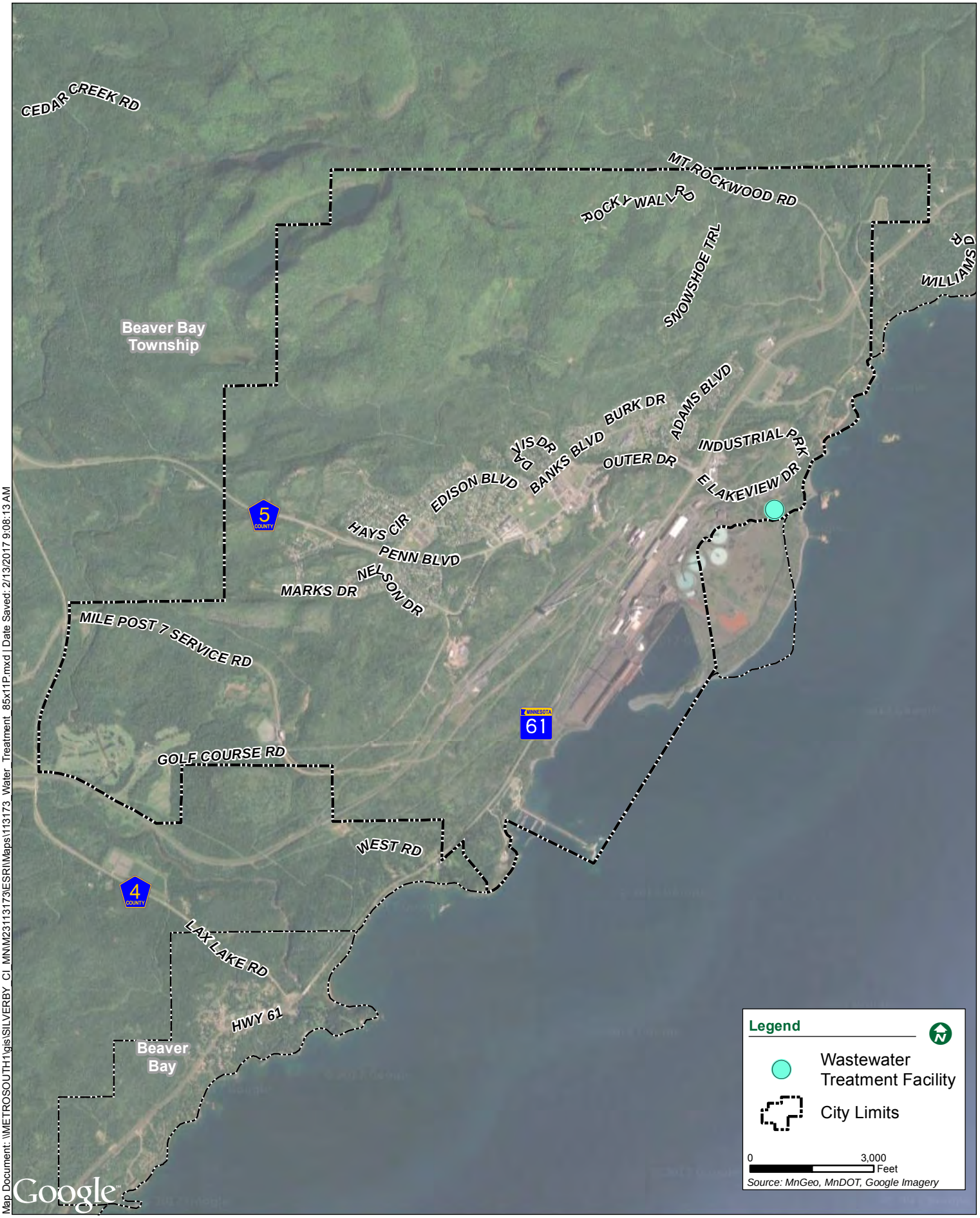
GPS – Survey Quality
GPS – Recreational Receiver WAAS enabled (Real Time Differential Corrected)
GPS – Recreational Receiver Uncorrected
GPS – Unknown
Digitized – Web Map Google / Yahoo / Microsoft
Digitized – Digital Raster Graph (DRG) (USGS 7.5 min topographic map 1:24,000 scale)
Digitized – Digital Ortho Quad (DOQ) (USGS aerial photo 1:24,000 scale)

Wastewater Treatment Facility

City of Silver Bay, MN

February 2017

BOLTON & MENK
Real People. Real Solutions.



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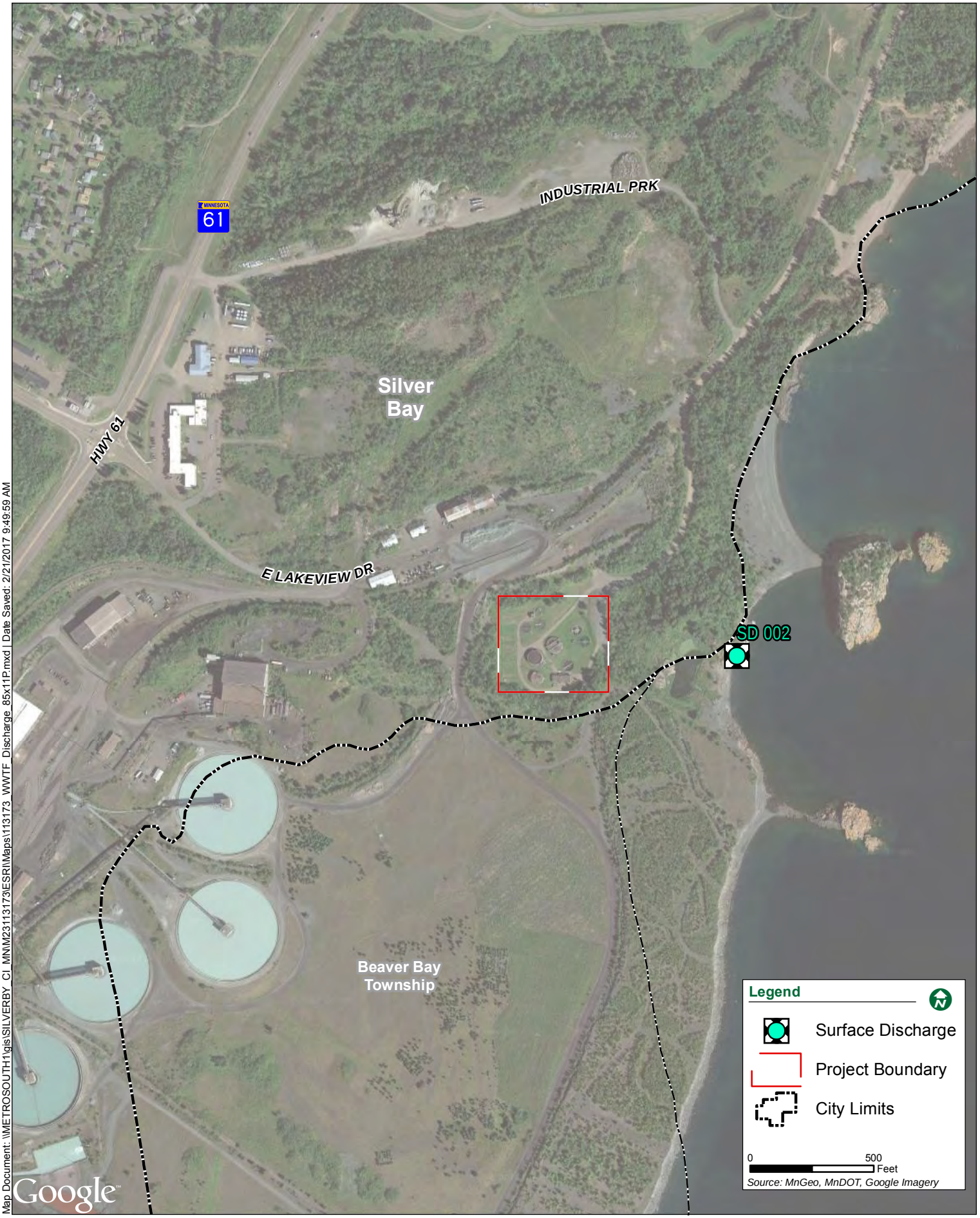
Wastewater Treatment Facility

City of Silver Bay, MN

Project Boundary & Discharge Location

February 2017

BOLTON & MENK
Real People. Real Solutions.



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Appendix F: SHPO Letter

BOLTON & MENK
Real People. Real Solutions.

7533 Sunwood Drive NW
Suite 206
Ramsey, MN 55303-5119

Ph: (763) 433-2851
Fax: (763) 427-0833
Bolton-Menk.com

Via Email

March 1, 2017

Mr. Thomas Cinadr
MN State Historic Preservation Office
345 Kellogg Boulevard West
St. Paul, MN 55102

RE: Silver Bay Wastewater Treatment Facility Improvements
Silver Bay, Lake County

Dear Mr. Cinadr:

The City of Silver Bay is planning to construct an expansion and add additional treatment technologies to the existing wastewater treatment facility. The expansion will be constructed on the site of the existing wastewater treatment facility, and the expansion will include improvements to the pretreatment facility and new tertiary filters for mercury removal. The treated effluent will continue to be discharged through the existing surface water discharge location into Lake Superior. The project will be funded in part by the Minnesota Pollution Control Agency and the Public Facilities Authority. We are requesting an historic database search in addition to a 106 Review.

As part of the construction project, a portion of the pre-treatment structure(s) will be rehabilitated and a new building will be constructed to house the pre-treatment processes. A new building will be constructed to house the tertiary filters. No other buildings will be altered or demolished.

Three maps have been enclosed. The maps indicate the project location within Lake County and the City of Silver Bay, and the third map shows the project boundary of the proposed project.

The wastewater treatment facility is located in Lake County Section 32, T56N, R.7W, NE ¼ of SE ¼. The GPS coordinates of the facility are 47° 17' 31.651" N and 91° 15' 0.484" W.

If you have any questions, please contact me at (218) 839-2303 or morgansa@bolton-menk.com.

Sincerely,

Morgan Salo

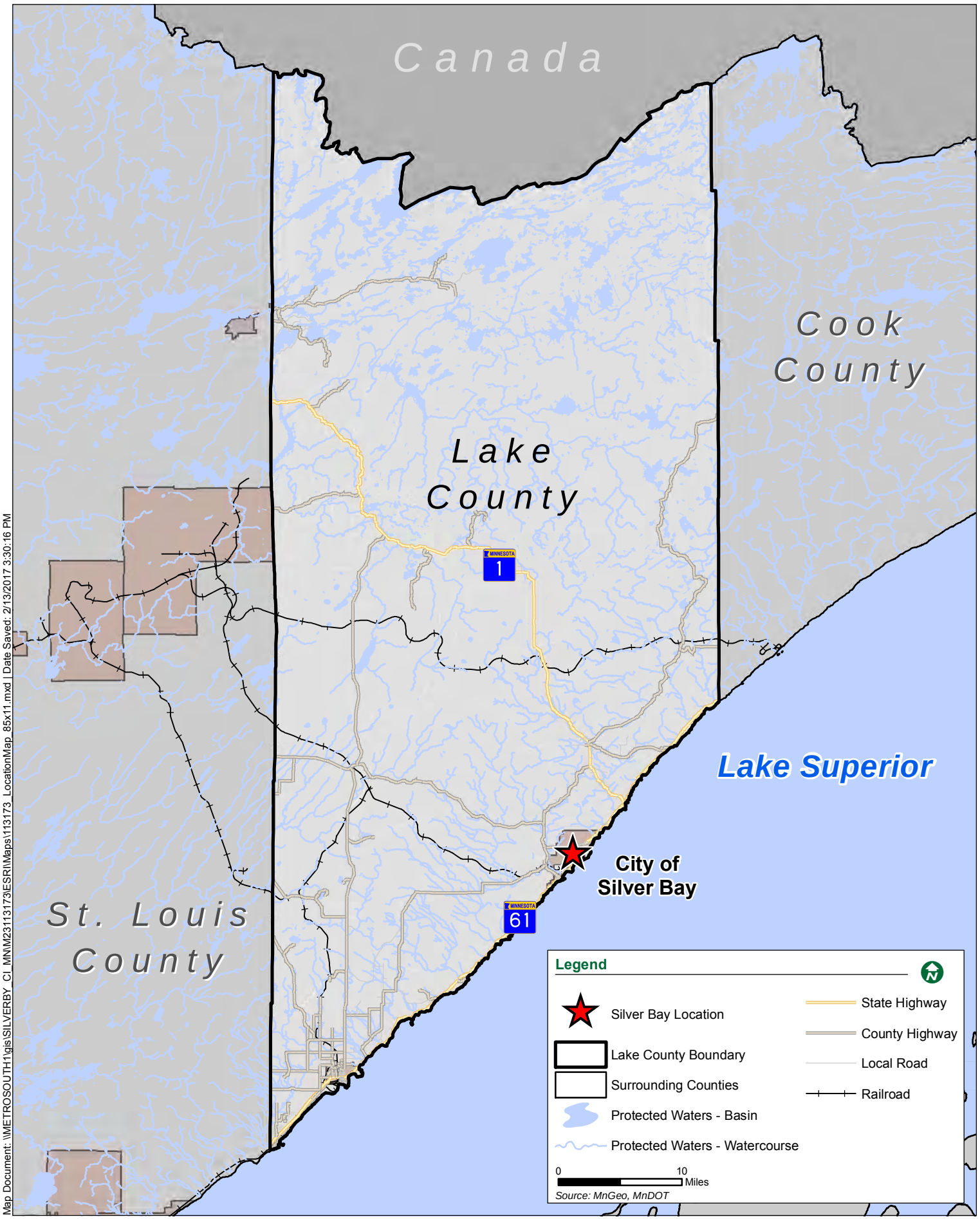
Morgan Salo, E.I.T.
Bolton & Menk, Inc.

Location Map

City of Silver Bay, MN

February 2017

BOLTON & MENK
Real People. Real Solutions.



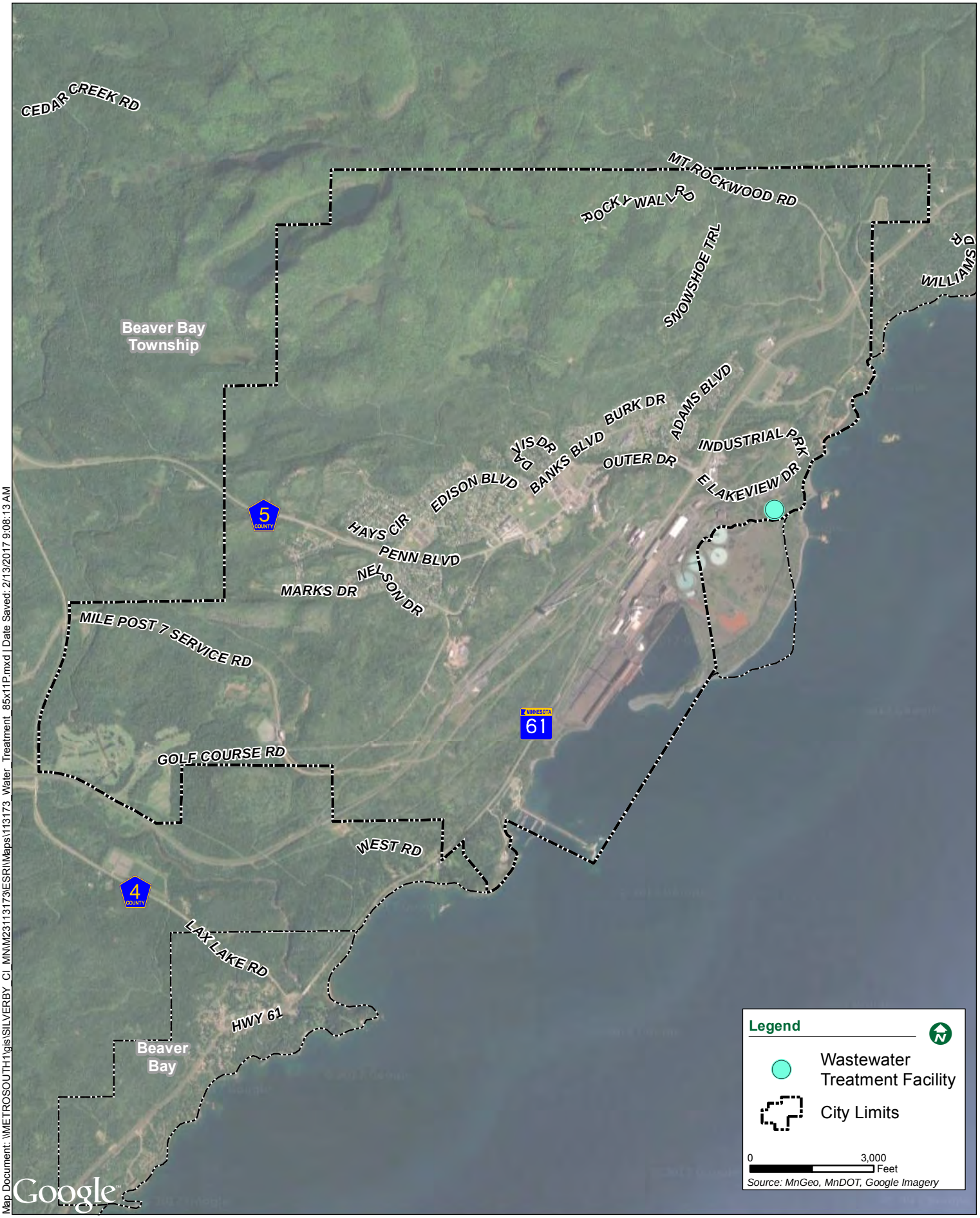
Map Document: \\METROSOUTH1\gis\SILVERBY_CI_MN\M23113173\ESRI\Maps\113173_LocationMap_85x11.mxd | Date Saved: 2/13/2017 3:30:16 PM

Wastewater Treatment Facility

City of Silver Bay, MN

February 2017

BOLTON & MENK
Real People. Real Solutions.



Map Document: \\METROSOUTH1\gis\SILVERBY_CI_MN\M23113173\ESRI\Maps\113173_Water_Treatment_85x11P.mxd | Date Saved: 2/13/2017 9:08:13 AM

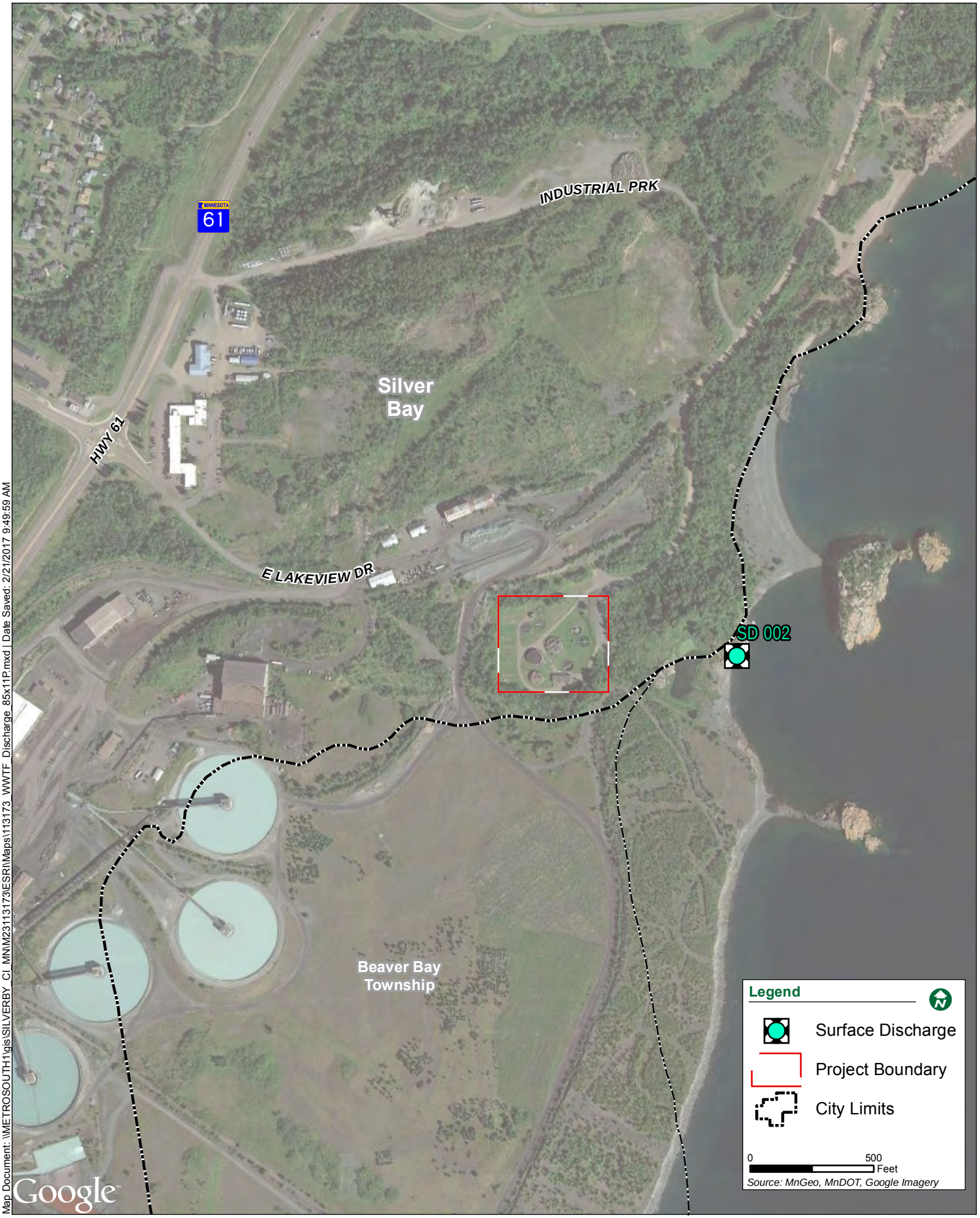
Wastewater Treatment Facility

City of Silver Bay, MN

Project Boundary & Discharge Location

February 2017

BOLTON & MENK
Real People. Real Solutions.



Map Document: \\METROSOUTH1\gis\SILVERBY_CI_MN\M23113173\ESRI\Maps\113173_WWTF_Discharge_85x11P.mxd | Date Saved: 2/21/2017 9:49:59 AM

Appendix G: Silver Bay Environmental Information Worksheet (EIW)

Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194

Environmental Information Worksheet (EIW) Form

Clean Water State Revolving Fund

Minnesota Rule Chapter 7077.0272, subp. 2.a.F.
Minnesota Rule Chapter 7077.0277, subp. 3.E.

Doc Type: Environmental Information Worksheet

Eligible applicants seeking funds for clean water (stormwater and wastewater) projects through the Clean Water State Revolving Fund (commonly referred to as the CWSRF Program) are required by Minn. R. ch. 7077.0272, subp. 2.a. F. and Minn. R. ch. 7077.0277, subp. 3.E., to complete an Environmental Information Worksheet (EIW). This information will be used to assess environmental impacts, if any, caused by the project.

For assistance with this worksheet, please visit the Minnesota Pollution Control Agency's website at http://www.pca.state.mn.us/publications/p-ear1-02.pdf for detailed instructions on completing this form.

1. Project title: Silver Bay Facility Plan

2. Proposer: City of Silver Bay

Contact person: John Graupman

Title: Principal Environmental Engineer

Address: 1960 Premeir Dr.

Mankato, MN 56001

Phone: 507-380-0433

Fax: 507-625-4177

3. Project location: County: Lake City/Twp: Silver Bay

NE 1/4 SE 1/4 Section: 32 Township: 56N Range: 7W

Tables, Figures, and Appendices attached to the EIW:

- County map showing the general location of the project;
- United States Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable);
- Site plan showing all significant project and natural features.

4. Description:

a. Provide a project summary of 50 words or less.

Rehabilitation of the preliminary treatment process at the WWTF and the addition of tertiary filters.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Rehabilitation of the existing preliminary treatment process including new mechanical fine screen equipment and new vortex grit removal equipment. A new building will be constructed to house the pre-treatment equipment in the same location as the existing grit removal building. The exsiting grit building will be demolished. The existing tertiary soilds contact clarifiers will receive aluminum covers. A new filtration building will be constucted to house filters for mercury removal. No other buildings will be demolished or added. Minor site work is required to accommodate the new buildings and improve site drainage.

c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Become compliant with the effluent mercury limit set in the NPDES permit and to improve preliminary treatment performance.

d. Are future stages of this development including development on any outlots planned or likely to happen? ☐ Yes ☒ No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No
If yes, briefly describe the past development, timeline and any past environmental review.

5. Project magnitude data

Total Project Area (acres) 3 or Length (miles) NA
Number of Residential Units: Unattached NA Attached NA maximum units per building
Commercial/Industrial/Institutional Building Area (gross floor space): total square feet
Indicate area of specific uses (in square feet):

Office	NA	Manufacturing	NA
Retail	NA	Other Industrial	NA
Warehouse	NA	Institutional	NA
Light Industrial	NA	Agricultural	NA

Other Commercial (specify) sf
Building height Greater than 10' If over 2 stories, compare to heights of nearby buildings

6. Permits and approvals required. List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans, and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.

Unit of government	Type of application	Status
MPCA	NPDES Permit	Approved
MPCA	Facility Plan Approval	To be submitted
Public Facilities Authority	Finacial Assistance	To be submitted

7. Land use. Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

The current lake use is City owned property which contains the WWTF. All construction will be conducted within the existing land used for the existing treatment facility. There are no known environmental hazards on or near the project site.

8. Cover types. Estimate the acreage of the site with each of the following cover types before and after development:

	Before	After		Before	After
Types 1-8 wetlands	0	0	Lawn/landscaping	2.5	2.5
Wooded/forest	0.5	0.5	Impervious Surfaces	0	0
Brush/grassland	0	0	Other (describe)	0	0
Cropland	0	0			
			Total	3	3

9. Fish, wildlife, and ecologically sensitive resources.

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Not Applicable

b. Are any state (endangered or threatened) species, rare plant communities or other sensitive ecological resources such as native prairie habitat, colonial waterbird nesting colonies or regionally rare plant communities on or near the site? ☐ Yes ☐ No
If yes, describe the resource and how it would be affected by the project. Indicate if a site survey of the resources has been conducted and describe the results. If the Minnesota Department of Natural Resources (DNR) Natural Heritage and Nongame Research program has been contacted give the correspondence reference number: _____
Describe measures to minimize or avoid adverse impacts.

A review request as been sent to the MN DNR and the review is pending.

10. Physical impacts on water resources. Will the project involve the physical or hydrologic alteration (dredging, filling, stream diversion, outfall structure, diking, and impoundment) of any surface waters such as a lake, pond, wetland, stream or drainage ditch? ☐ Yes ☒ No
If yes, identify water resource affected. Describe alternatives considered and proposed mitigation measures to minimize impacts. Give the DNR Protected Waters Inventory (PWI) number(s) if the water resources affected are on the PWI.

11. Water use. Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? ☐ Yes ☒ No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

12. Water-related land use management districts. Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? ☐ Yes ☒ No
If yes, identify the district and discuss project compatibility with district land use restrictions.

13. Water surface use. Will the project change the number or type of watercraft on any water body? ☐ Yes ☒ No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

14. Erosion and sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: **1** Acres: _____ cubic yards. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

Best management practices to control erosion and sedimentation will be employed where necessary.

15. Water quality – surface-water runoff.

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any storm water pollution prevention plans.

The quality and quantity of the site runoff will not change as there is not a signifnicant change in impervious surfaces from this project.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Site runoff will flow towards Lake Superior. There is no major impact from runoff on the quality of the receiving water since the volume of runoff will not significnly change.

16. Water quality – wastewater.

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

Silver Bay has domestic wastewater sources. The mining industry managnes the water they dischare and limits it to restroom and shower facilites. The facility expansion will be designed to treat a flow of 0.926 MGD.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies, and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

The proposed treatment facility expansion will be designed to remove mercury to below permitted limits. Part of the expansion includes improving preliminary treatment and solids removal. The receiving water body is Lake Superior.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Not applicable

d. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

Not Applicable

17. Geologic hazards and soil conditions.

a. Approximate depth (in feet) to Groundwater _____ minimum; *less than 17'* average.
Bedrock: _____ minimum; *less than 15* average.

Describe any of the following geologic site hazards to groundwater and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

None known

b. Describe the soils on the site, giving U.S. Soil Conservation Service (SCS) classifications, if known. Discuss soil granularity and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

18. Solid wastes, hazardous wastes, storage tanks.

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

Debris and screenings from the raw wastewater will collect in dumpsters and will need to be disposed of in a landfill. Additional solids will be produced from the filters.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

Not Applicable

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

Not Applicable

19. **Traffic.** Parking spaces added: *0* Existing spaces (if project involves expansion): *3*
Estimated total average daily traffic generated: *3-6 trips* Estimated maximum peak hour traffic generated (if known) and its timing: *Not Applicable* Provide an estimate of the impact on traffic congestion affected roads and describe any traffic improvements necessary. If the project is within the Twin Cities metropolitan area, discuss its impact on the regional transportation system.

Not Applicable

20. **Vehicle-related air emissions.** Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts. Note: If the project involves 500 or more parking spaces, consult *Environmental Assessment Worksheet (EAW) Guidelines* about whether a detailed air quality analysis is needed.

Vehicle related air emissions will increase slightly during construction due to the use of diesel powered equipment.

21. **Stationary source air emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing), any greenhouse gases (such as carbon dioxide, methane, and nitrous oxides), and ozone-depleting chemicals (chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

None

22. **Odors, noise, and dust.** Will the project generate odors, noise or dust during construction or during operation? ☒ Yes ☐ No

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

Noise will be generated during the construction process but limited to the work hours designated by the City of Silver Bay. Measures to mitigate dust will be applied when appropriate.

23. **Nearby resources.** Are any of the following resources on or in proximity to the site? Projects should search the State Historic Preservation Office's (SHPO) National Register of Historic Places database by calling 651-259-3453.

***Note:** Project proposers must contact the SHPO at Thomas.cinadr@mnhs.org or 651-259-3453 to request a database review to obtain information on any known historical or archaeological sites in the project area. Include a copy of correspondence with SHPO with the submittal of this EIW form.

a. Archaeological, historical, or architectural resources? ☐ Yes ☐ No
b. Prime or unique farmlands or land within an agricultural preserve? ☐ Yes ☐ No
c. Designated parks, recreation areas, or trails? ☐ Yes ☐ No
d. Scenic views and vistas? ☐ Yes ☐ No
e. Other unique resources? ☐ Yes ☐ No

If yes, describe the resource and identify any project-related impacts on the resources. Describe any measures to minimize or avoid adverse impacts.

The State HIstoric Preservation Office has been contacted and a review is pending on any historical or archeological sites in the area.

24. **Visual impacts**. Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? ☐ Yes ☒ No

If yes, explain.

25. **Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? ☒ Yes ☐ No

If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

The project will occur at the existing WWTF site. This project is compatible with planned land uses for the project location.

26. Impact on infrastructure and public services. Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? ☐ Yes ☒ No

If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

27. Cumulative impacts. Minn. R. 4410.1700, subp. 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative impacts. Describe the nature of the cumulative impacts and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative impacts (or discuss each cumulative impact under appropriate item(s) elsewhere on this form).

None

28. Other potential environmental impacts. If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

Not applicable

29. Summary of issues. List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

Not applicable

Appendix H: Silver Bay Preliminary Phase I Report

BOLTON & MENK

Real People. Real Solutions.

Phase I Final Report

Silver Bay Mercury Removal Full-Scale Pilot Studies

BMI Project No. M25.113173

Submitted by:

Bolton & Menk, Inc.
7533 Sunwood Drive NW
Ramsey, MN 55303
P: 763-433-2851
F: 763-427-0833

Certification

Phase I Final Report

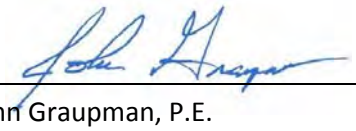
for

Silver Bay Mercury Removal Full Scale Pilot

Silver Bay, MN
BMI Project No. M25.113173

January 2017

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

By: 

John Graupman, P.E.
License No. 26868

Date: January 30, 2017

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Appendix

I. Introduction

A. Background

The City of Silver Bay, MN owns and operates a Wastewater Treatment Facility (WWTF) that discharges into Lake Superior. The WWTF has a current NPDES permit (No. MN0024899) that was issued on September 4, 2015 and will expire August 31, 2020. See Appendix A for a copy of the permit. Within the permit are requirements for mercury monitoring and effluent limits. In accordance with the Great Lakes Initiative, the permit includes both interim and final effluent limits on total mercury. The interim limits are 3.8 nanograms per liter (ng/L) calendar month average and 7.0 ng/L daily maximum. The final limits are 1.9 ng/L calendar month average and 3.5 ng/L daily maximum. The City must comply with the final limits no later than March 31, 2020. The permit also includes a monitor only requirement for dissolved mercury and a requirement to collect total suspended solids (TSS) and mercury at the same time. With the limits set by the Minnesota Pollution Control Agency (MPCA) in the City's NPDES permit, the City must evaluate if the WWTF can meet the mercury limits with the current treatment process, or if additional construction is necessary to upgrade the facility for mercury removal.

If the study results show that additional mercury treatment is necessary, a Facility Plan must be submitted to the Minnesota Pollution Control Agency (MPCA) by March 6, 2017 detailing options and costs for improving the existing facility to remove mercury to below permitted limits.

B. Purpose of Report

The purpose of this report is to evaluate the effectiveness of mercury removal by using the tertiary solids contact clarifiers, coupled with chemcial addition, for sustainable mercury removal below permitted limits set forth in the NPDES permit. The objective of the full-scale pilot study was to sample and evaluate mercury concentrations from the solids contact clarifiers. The report will detail mercury-testing data from the effluent waste stream and provide conclusions and recommendations based on the data.

C. Report Organization

This report is organized into four sections:

1. Introduction
2. WWTF Background
3. Mercury Testing Results and Discussion
4. Recommendations and Conclusion

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II. WWTF Background

A. Overview

The City of Silver Bay owns and operates a mechanical wastewater treatment facility that has a continuous discharge to Lake Superior. A process flow schematic and aerial photo of the treatment plant are shown in Figures 2.1 and 2.2, respectively. Pre-treatment processes include a manual bar screen, a high flow diversion structure to bypass the bar screen and grit removal chamber, and a comminuter. Primary treatment includes two primary clarifiers, one 60-foot diameter trickling filter with rock media, and a secondary clarifier. Tertiary treatment was originally constructed to aid in phosphorus removal, using chemical addition, and includes two tertiary solids contact clarifiers. A chlorination/dechlorination unit provides disinfection. Biosolids are processed in two heated anaerobic digesters. The treated wastewater flows through a manhole and finally to the outfall where it is discahrged into Lake Superior. The pilot study results for using the solids contact clarifiers for mercury removal are discussed in section three of this report.

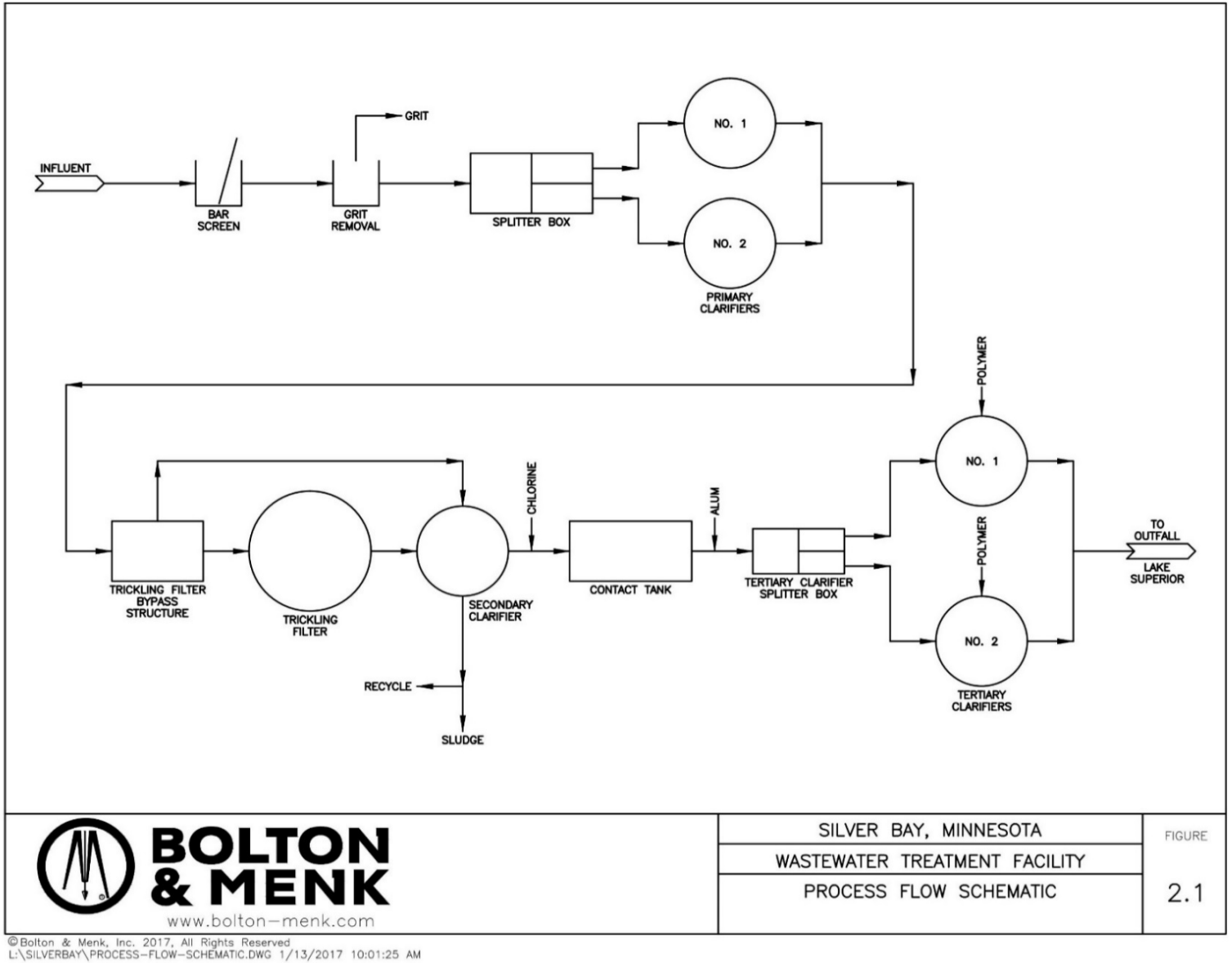

Figure 2.1: Silver Bay WWTF Process Schematic

Figure 2.2: Aerial View of Silver Bay WWTF

B. Solids Contact Clarifiers (Tertiary Clarifiers)

As discussed earlier in this report, the City has two tertiary clarifiers that were originally designed to reduce effluent phosphorus loads, but are also currently being used to test the effectiveness of reducing mercury levels with chemical addition in a full-scale pilot study. Tertiary clarifier number one was constructed in 1975 and is 40 feet in diameter with a sidewater depth of 11 feet. Four sludge hoppers collect the settled sludge where it is pumped to the anaerobic digesters. A second clarifier was added in 1994 and is 45 feet in diameter with a sidewater depth of 10.8 feet. The second clarifier has a sloped floor that conveys settled sludge to one centralized sludge hopper. Clarifier number one can be seen in Figure 2.3 while clarifier number two is shown in Figure 2.4.

Figure 2.3: Solids Contact Clarifier No. 1

Figure 2.4: Solids Contact Clarifier No. 2

Solids contact clarifiers operate on a similar basis to conventional clarifiers. The overall goal is to remove solids from the wastewater. However, unlike conventional clarifiers, chemical addition, mixing, flocculation, and settling are all done in the clarifier. There are three zones within a solids contact clarifier. The first one is the rapid mix zone where chemicals, such as alum and polymer, are typically added and completely mixed. The second zone is the flocculation zone where chemicals are given time to form flocs heavy enough to settle in the third zone, the settling zone. In the settling zone, flocs produced in the flocculation zone are settled to the bottom of the clarifier and removed in the sludge hopper. Effluent collector troughs with V-notch weirs run from the outside of the clarifier to the center to a main collection trough.

The clarifiers act as tertiary treatment since a majority of the treatment for $CBOD_5$ and total suspended solids (TSS) occurs in the trickling filter and secondary clarifier. However, the tertiary clarifiers are being used to serve a dual purpose to polish the effluent wastewater by removing phosphorus and mercury with chemical addition.

1. Chemical Addition for Pollutant Removal

   Chemical addition is an effective way at removing pollutants, such as phosphorus or mercury. Alum is typically added in tertiary treatment to destabilize colloidal particles in the water and promote floc formation. The clarifiers allow time for good heavy, fast settling flocs to form and settle. The application point is critical for the effectiveness of alum. Environmental conditions, such as air temperature, wastewater temperature, sun, wind, and pH, can all affect the reaction rate and effectiveness of the chemical. Colder temperatures slow down the kinetics of the chemical reaction. When the chemical reaction slows down, there is less energy to form precipitates in the wastewater. Longer detention times and more chemical are needed for precipitates to form in cold conditions.

   The clarifiers at the Silver Bay WWTF are not covered. Freezing temperatures in the winter historically have caused ice to form in the clarifiers. Colder wastewater temperatures and ice formation could cause the alum to be less effective in forming precipitates, thus reducing the removal efficiency of phosphorus and mercury.

   Polymer is added to help bind the flocs together and keep them together so they do not break apart and re-suspend. Similar to alum, cold temperatures slow the down the kinetics of the chemical reaction of the polymer. With uncovered clarifiers, chemical addition in the winter months could be less effective. This leads towards increased chemical usage (which increases costs), and poor removal efficiency. Details on process changes used by the City to investigate different coagulants and strategies for mercury removal are provided in section three of this report.

C. Clarifier Rehabilitation Project

To improve mercury removals, the City conducted a rehabilitation project on the tertiary clarifiers in 2016. Solids contact clarifier number one was rehabilitated with new equipment and a new coating, while clarifier number two received only a new coating. In the compliance schedule in the permit, the construction for the rehabilitation of the clarifiers was to be completed by October 1, 2016. However, due to unexpected delays, construction on the project was started after the original starting date and was not completed until December of

2016, three months after the original final completion date. This in turn, delayed the start of the full-scale pilot study for using the clarifiers for mercury removal. The delays were noted by the City in a letter that is attached in Appendix E. Because of these unexpected delays, the City missed three months of critical data collection. Data collection during pilot studies is critical to determine the effectiveness of the proposed system.

With the mercury limits set forth in the NPDES permit, the City is evaluating the effectiveness that the rehabilitated tertiary clarifiers have on mercury removal with chemical addition. In the compliance schedule in the City's NPDES permit, it is required to submit a report to the MPCA by January 31, 2017, which evaluates if the tertiary clarifiers can sustain mercury removal to levels below permitted limits. If not, then the City must submit a Facility Plan by March 6, 2017 that will describe upgrades to the facility for mercury removal beyond the solids contact clarifiers. Details on the pilot study and mercury testing data are provided in the next section.

III. Mercury Testing Results and Discussion

A. Background

In accordance with the NPDES permit, mercury sampling and analysis began in June of 2014. The following presents a summary of WWTF operations related to mercury removal since that time.

In 2014, chemical dosing included alum fed to the tertiary clarifier splitter box at a dose of 125 mg/L, and Hawkins Inc. polymer (AH937) fed to the center feedwell of clarifier number two. Tertiary clarifier number one was not in use at the time in the treatment process. The City was collecting influent and effluent total and dissolved mercury samples during this period. Future sampling will continue with the collection of grab samples of TSS and temperature at the same time and location as the mercury samples. With limited historical mercury and TSS data, a correlation cannot be made between mercury levels and TSS levels during this period.

Evaluation of historic mercury sampling is provided in Table 3.1. The City has data going back to 2014 for mercury sampling.

Table 3.1 – Historical Mercury Data

Sample Date	Influent		Effluent				WWTF Flow (MGD)	Total Mercury Percent Removal
	Total Mercury (ng/L)	Dissolved Mercury (ng/L)	Clarifier No. 1 Total Mercury (ng/L)*	Clarifier No. 1 Dissolved Mercury (ng/L)*	Clarifier No. 2 Total Mercury (ng/L)	Clarifier No. 2 Dissolved Mercury (ng/L)		
June 18, 2014	26.2				2.07		0.433	92.1%
Oct. 22, 2014	65.4	2.32			3.19	1.95	0.215	95.1%
Nov. 9, 2014					1.42		0.23	
Jan. 14, 2015	43.2				0.7	<0.5	0.128	98.4%
Feb. 4, 2015					0.661	<0.5	0.165	
April 1, 2015	74.8	3.46			2.68	0.907	0.244	96.4%
May 31, 2015	51.1				3.07	2.18	0.448	94.0%
Sep. 30, 2015	25.8	1.76			5.56	1.4	0.525	78.4%
Jan 6, 2016	62.6	2.09			0.656	<0.5	0.317	99.0%
May 18, 2106	194				1.55	0.822	0.324	99.2%
May 31, 2016	159				1.88	<0.5	0.636	98.8%
July 6, 2016	35.1	1.72			4.95	1.04	0.342	85.9%
Oct. 18, 2016	12.2		2.12				0.532	82.6%
Oct. 27, 2016	55.5		2.98	0.723			0.301	94.6%
Average	67.1	2.3	2.55	0.723	2.36	1.0	0.346	93.0%

- Clarifier number one was out of service until August 25, 2016 and came online on August 26, 2016 when renovations began on tertiary clarifier number two.
- Both clarifiers became operational on November 14, 2016.

The average influent total mercury concentration over this reporting period is 67.1 ng/L with an average dissolved concentration of 2.3 ng/L. While clarifier number one was offline for a majority of the period of historical data, clarifier two had a long-term average effluent total mercury concentration of 2.36 ng/L and an average dissolved concentration of approximately 1.0 ng/L. When clarifier one came back online after it was rehabilitated, clarifier two was shut down for renovations. The average effluent total mercury concentration in tertiary clarifier number one was 2.55 ng/L with an average dissolved concentration of 0.723 ng/L. Historically, the clarifiers have been removing approximately 93% of the influent mercury.

Although the treatment facility has achieved a high percentage of mercury removal, historical effluent mercury concentrations have exceeded final limits of 1.9 ng/L for a calendar month average and 3.5 ng/L for a daily maximum set forth in the permit.

To be proactive with mercury removal, the City took a two-pronged approach to improving mercury removals in the tertiary clarifiers. They first conducted bench-scale jar tests to optimize mercury removal through chemical addition and rehabilitated the tertiary clarifiers to improve solids removal. In 2015, the City worked with Hawkins to conduct a series of bench-scale jar tests to evaluate the impact of various chemical coagulants on settling and mercury removal. The report from Hawkins is provided in Appendix B. The bench tests performed by Hawkins focused mainly on improving settling rates and building a more dense sludge blanket. Based on this testing, Hawkins recommended replacing the alum and polymer combination with AH5167 (a poly aluminum chloride). No mercury data was collected during the Hawkins tests to determine the level of mercury removal associated with an improved sludge bed.

The City requested approval from the MPCA for use of the AH5167 chemical to aid in mercury removal in June of 2015, prior to the current permit becoming active. The letter to the MPCA asking for approval is attached in Appendix C. In January 2016, the MPCA approved use of AH5167 in the City's WWTF. This approval letter is found in Appendix D. AH5167 was fed solely starting on May 6, 2016 through August 26, 2016. At this point, the City went back to feeding regular alum and polymer to tertiary clarifier number two. The City performed another trial run with AH5167 starting on October 20, 2016 and ran until December 3, 2016. There appeared to be no significant mercury removal improvement from using AH5167 over regular alum and polymer. From December 3 until the date of this report, the City is adding a combination of alum plus polymer. Clarifier renovations occurred during 2016 and both clarifiers were operational beginning approximately December 6, 2016. After rehabilitation of the clarifiers, an operational change was made to feed alum in the splitter box upstream of the clarifiers and polymer to the center of each clarifier. December 6, 2016 is considered the official "start" of the full-scale pilot study.

A preliminary Phase I report was submitted to the MPCA detailing a process description and a description of the rehabilitation of the clarifiers that was to be completed. This report is provided in Appendix F. This present Phase I Final report will be used to help determine if the full-scale pilot study, using the tertiary clarifiers with chemical addition for mercury removal, can sustainably remove mercury to below final permitted limits.

B. Full-Scale Pilot Study

The main goal of the pilot study was to evaluate performance of the solids contact clarifiers ability to remove total mercury levels to below permitted limits. Historically, the Silver Bay WWTF has met all limits set forth in the NPDES permit for everything except mercury.

The process behind using the clarifiers for mercury removals includes chemical mixing to form flocs (zone one), directing the water down to the bottom of the clarifier where the sludge settles (zone two), rising of the flow through the sludge blanket, separation of solids and water through settling (zone three), and collection of the wastewater in the effluent troughs.

City staff have been taking mercury samples from each clarifier on a weekly basis on the same day each week, at the same time each day. If environmental conditions are not

favorable, the City will wait until optimal environmental conditions. Mercury sampling and analysis follows the United States Environmental Protection Agency (EPA) Method 1631E. It is important to take great care not to contaminate the sample from outside sources when sampling for low-level mercury, especially from outside environmental sources. Environmental conditions can play a key role in low-level mercury sampling and cause significant error. It is critical to evaluate field blank samples to see if there has been any contamination. Mercury sampling for the pilot study started in December of 2016 after the rehabilitation project on the clarifiers was completed and both clarifiers were operational. The City is continuing to sample for mercury weekly. Mercury analysis is done by North Shore Analytical, Inc. located in Duluth, MN. Some of the laboratory data is provided in Appendix G.

C. Pilot Testing Mercury Sampling Results

Table 3.2 summarizes the mercury testing results for the full-scale pilot study at the Silver Bay WWTF. Two sample dates (December 21, 2016 and January 11, 2017) show results from when the mercury concentrations from each individual clarifier were tested. All other sampling results represent the concentration of the combined samples from clarifiers one and two. Future testing results will show the mercury concentration from each individual clarifier. .

An operational change was made on January 10, 2017. The alum feed point was moved from the splitter box to the center of each of the clarifiers. The polymer is still being fed into the center well. Dedicated chemical feed pumps were installed to allow each clarifier to be fed chemical independently.

After the alum dose point was changed, staff found a plug in the alum feed line into tertiary clarifier number two. There is potential that with that line being plugged, alum that would have normally been fed to tertiary clarifier number two was most likely fed to tertiary clarifier number one, leading to the higher mercury levels in tertiary clarifier number two.

In Table 3.2, mercury results prior to January 11 correspond to operations in which alum was fed in the upstream splitter box, and mercury results from January 11 and later correspond to operations where alum was fed in the center well of each clarifier.

Table 3.2 – Full-Scale Mercury Pilot Data								
Sample Date	Influent		Effluent				WWTF Flow (MGD)	Total Mercury Percent Removal
	Total Mercury (ng/L)	Dissolved Mercury (ng/L)	Clarifier No. 1 Total Mercury (ng/L)	Clarifier No. 2 Total Mercury (ng/L)	Average Effluent Total Mercury (ng/L) (1)	Average Effluent Dissolved Mercury (ng/L)		
Dec. 7, 2016	11.9	1.42			2.47	< 0.5	0.645	79.2%
Dec. 13, 2016	43.9	--			1.43	--	0.317	96.7%
Dec. 21, 2016	35.5	2.68	1.44	6.34	3.89	< 0.5	0.207	89.0%
Dec. 28, 2016	20.7	1.63			2.92	< 0.5	0.184	85.9%
Jan. 4, 2017	24.6	2.51			3.00	< 0.5	0.170	87.8%
Jan. 11, 2017 (2)	31.4	--	1.58	5.34	3.46	--	0.162	89.0%
Jan. 18, 2017 (3)								
Jan. 25, 2017 (3)								

(1) Average effluent total mercury concentrations are the average mercury concentrations between samples taken from tertiary clarifier number one and tertiary clarifier number two.

(2) Alum feed point was moved to the center of each tertiary clarifier shortly before this date. All samples after this date correspond to samples taken with the Alum feed point in the center of each clarifier.

(3) Mercury testing results for these dates were not available at the time this report was written and submitted.

The average monthly effluent total mercury concentrations for December 2016 and January 2017 are 2.67 ng/L and 3.23 ng/L, respectively. Average influent concentrations of total mercury for December 2016 and January 2017 are 28.0 ng/L and 28.0 ng/L, corresponding to removals of 90% and 88%, respectively. The permitted calendar month average total mercury limit is 1.9 ng/L with a daily maximum limit of 3.5 ng/L. Based on the data above, effluent monthly average total mercury concentrations exceed permitted final limits.

On the two dates where mercury sampling results for each individual clarifier are shown, it can be seen that clarifier number one has much lower effluent mercury concentrations than clarifier number two. The poor removals in clarifier number two could be one reason why the average monthly effluent mercury concentration for the combined samples, is above permitted final limits. Reasons for poor removals in clarifier number two could be due to underfeeding of alum or poor mixing of the coagulant, or from flocs breaking apart in the mixing area of the clarifier. Even though some single data points of the combined or individual samples are below the limits, it is important to average the entire month's data and compare to the permitted limit since it is based on a calendar month average.

Currently, the WWTF must meet the interim limits in the permit for mercury concentrations in the effluent until final limits must be met. Based on the interim limits of 3.8 ng/L for a calendar month average and a daily maximum of 7.0 ng/L, and the data provided in Table 3.1, the WWTF has met or exceeded these interim permitted limits.

There is no limit on dissolved mercury in the permit. The dissolved mercury concentration in the influent waste stream has averaged less than 3 ng/L with effluent concentrations less than 0.5 ng/L. Historically, the dissolved mercury concentration has remained low and it is predicted that this trend will continue.

Environmental conditions can have a significant impact on mercury levels in the effluent waste stream. One important item to note is that the tertiary clarifiers are not covered. Generally, it is a good idea to have clarifiers covered to prevent outside environmental

contamination, especially when testing for ultra-low level mercury concentrations. During the winter months, staff at the WWTF has observed the clarifiers forming ice on the surface. This can affect the performance of the clarifier and the performance for mercury removal. As discussed earlier, when the clarifiers have a layer of ice on them, the kinetics of the chemical reactions to form precipitates decreases, reducing the overall efficiency of chemical addition for pollutant removal.

The data provided in Table 3.2 is only from the winter months when temperatures are cold and the wastewater flows are generally low. With the current length of the study (less than 2 months), there is not enough data to accurately gauge how much increased wastewater flows, temperature, and outside environmental factors affect mercury removal with the clarifiers being un-covered. Rainfall in the spring and summer could affect mercury removals as well as snowmelt in the spring. Sampling into the summer may help provide enough data to gauge how well the clarifiers remove mercury and to what levels.

D. Operational Processes

One aspect of the process the City has been focusing on to try and help facilitate more mercury removal is fine-tuning the mixer variable frequency drives (VFDs) and optimizing the chemical feed dose and feed location of alum and polymer in the tertiary clarifiers. By fine-tuning the chemical feed and adjusting the mixing, it may be possible to achieve a level of mercury removal below permitted limits.

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IV. Recommendations and Conclusions

A. Summary

Using the tertiary clarifiers for mercury removal, with the assistance of coagulant and flocculants chemistries, shows significant mercury removal is possible as compared to the influent mercury concentrations. The City has consistently met the interim calendar month average and daily maximum discharge limits for mercury of 3.8 ng/L and 7.0 ng/L, respectively, since mercury monitoring began in 2014. Bench-tests with alternative coagulants were conducted to determine which one would work best to increase the density of the sludge blanket to optimize mercury removal. Trial runs using the alterative chemical did not show increased removals over adding alum plus a polymer.

Upon completion of the clarifier renovation project in December of 2016, the City began a full-scale pilot study using alum and polymer feed into the tertiary clarifiers. The goal of this pilot study is to determine if the existing treatment system can consistently meet final mercury limits for calendar month average and daily maximum limits of 1.9 ng/L and 3.5 ng/L, respectively.

Based on the first six weeks of data from the full-scale pilot, the effluent has not consistently met final limits. The average total mercury in the effluent in December 2016 was 2.27 ng/L, and in January 2017, it was 3.23 ng/L. Because of the short operating time of the full-scale pilot, there is not sufficient data to conclude that the current system can remove mercury to meet the final limits.

B. Recommendation and Conclusion

It is recommended to continue the full-scale pilot to optimize the tertiary clarifiers for mercury removal. Multiple approaches may be considered when optimizing tertiary treatment systems to meet mercury effluent limits. It is important to take a methodical approach to any changes being made to the system in order to accurately track the impact of each change. It is recommended to extend the current full-scale pilot study into June of 2017 and collect the following additional data from the system:

- TSS data from the mercury grab sample
- Temperature data at the time of mercury sampling
- Operation during various environmental conditions
- Use of Hawkins AH5167 chemistry for an extended period at various dosing rates with and without polymer
- Tertiary filter mixing operations and speed adjustments
- Additional monitoring and evaluation of influent mercury concentration spikes to identify additional pollution prevention measures.

During this period, it is also recommended to conduct bench-scale testing on chemical options and chemical feed rates to provide insight into optimizing the existing system and other types of treatment that could be pilot tested. Bench testing allows for the studying of additional settling options in a controlled, ideal environment. Data gathered from alterations to chemical feed rates and settling times could then be used to implement changes in the full-

scale pilot. This would also provide an opportunity to test mercury scavenger chemistries that have been successfully used at other facilities to meet similar low-level mercury limits. It is recommended the bench-scale tests include mercury testing to provide some insight regarding the level of mercury removal that is possible. If this testing indicates an inability to meet the final limits with chemical and settling alone, additional polishing may be needed to consistently meet final limits.

Analysis of the mercury sampling data and observations of the clarifiers show that the findings of the study are inconclusive. Therefore, more data is needed before it can be concluded that the tertiary clarifiers can be used as the primary mercury removal process at the WWTF.

Since current data is insufficient to prove the solids contact clarifiers can achieve effluent limits for mercury, a facility plan will be written and submitted to the MPCA by March 6, 2017 detailing alternative technologies for mercury removal. If sampling data by June 2017 indicates the contact clarifiers are able to sustain mercury removal to a level below permitted limits, then an amendment will be added to the Facility Plan stating the solids contact clarifiers with chemical addition will be the primary mercury removal process and additional treatment for mercury removal will not be required.

Appendix I: PPL Application and Worksheet

Minnesota Pollution
Control Agency

520 Lafayette Road North
St. Paul, MN 55155-4194

Cost and Effectiveness Certification Form

State Revolving Fund

Federal Water Pollution Control Act Section 602(b)(13)
and Minn. R. 7077.0272, subp. 2.D. or 7077.0277, subp. 2.C.

Instructions: The project representative must check both boxes below and the form must be signed by both the project representative and the professional engineer for the project.

☒ 1) The municipality has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which the assistance is sought under the Clean Water Revolving Fund (Minnesota Statute 446.07); and

☒ 2) The municipality has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account:

a) The cost of constructing the project or activity.
b) The cost of operating and maintaining the project or activity over the life of the project or activity.
c) The cost of replacing the project or activity.

Project Information

Municipality name: City of Silver Bay

Project number: _____

Certification

We certify that the project has completed both requirements (1) and (2) as checked above.

Project Representative

Print name: LANA FRALICH

Signature: Lana R Fralich

Date (mm/dd/yyyy): 3/3/17

Professional Engineer

Print name: John ~~Graupler~~ GRAUPMAN

Signature: John Graupman

Date (mm/dd/yyyy): ~~3/6/2017~~ 3/3/17

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Project Priority List (PPL)

Wastewater Application

1. **Applicant name:** City of Silver Bay
   Project area: City of Silver Bay
   Town/city: City of Silver Bay
   Population:
   County: Lake

2. **Contact person:** Lana Fralich
   Address: 7 Davis Drive Silver Bay, MN 55614
   Phone: (218) 226-4408 Fax: (218) 226-4068
   E-mail: lanaf@silverbay.com

3. **Project consultants/Firm name (if applicable):** Bolton & Menk, Inc.
   Contact name: John Graupman
   Address: 1960 Premeir Drive Mankato, MN 56001
   Phone: (507) 380-0433 Fax:
   E-mail: johngr@bolton-menk.com

4.

Project area description:	☒ **Sewered:**	☐ **Unsewered** (submit map of project area)
a. Number of existing households:	839	
b. Number of non-residential users:	26	

Need or problem project addresses: (Check all that apply)

- ☐ Failing on-site systems # of failing systems:
- ☐ Connection to an existing system
- ☒ Rehab of an existing facility
- ☐ Rehab collection system
- ☒ Expansion of existing treatment plant
- ☐ New treatment and/or collection system
- ☒ Advanced treatment

5. **Please indicate if this project may be a Green Project Reserve (GPR) which are wastewater projects that are either categorical or non-categorical and have components or the entire project is applying to be determined GPR eligible.**

The U.S. Environmental Protection Agency (EPA) provided a guidance document listing examples of projects that will qualify for Green Project Reserve dollars. Below is a list of those examples. If the proposed project matches one or more of the examples, check the box next to the example that describes the project. For more information, see *CW Green Guidance* at http://www.pca.state.mn.us/water/wastewater-financial.html.

Categorical eligible project types

☐ 1. **Water Efficiency**

- ☐ a. Installation of water meters (applies only to drinking water distribution systems – contact the Minnesota Department of Health)
- ☐ b. Retrofit or replacement of water using fixtures, fittings, equipment or appliances
- ☐ c. Efficient landscape or agricultural irrigation equipment
- ☐ d. Systems to recycle gray water
- ☐ e. Reclamation, recycling, and reuse of existing rainwater, condensate, degraded water, stormwater, and/or wastewater streams.
- ☐ f. Collection system leak detection equipment
- ☐ g. Development and initial distribution of public education materials

☐ **2. Energy Efficiency**

- ☐ a. Energy efficient retrofits and upgrades to pumps and treatment processes
- ☐ b. Leak detection equipment for treatment works
- ☐ c. Producing clean power for 212 treatment works on site (wind, solar, hydroelectric, geothermal, biogas powered combined heat and power)
- ☐ d. Pro-rata share of capital costs for offsite publicly owned clean energy facilities that provide power to a treatment works.

☐ **3. Green Infrastructure**

- ☐ a. Implementation of comprehensive street tree or urban forestry programs, including expansion of tree box sizes to manage additional stormwater and enhance tree health.
- ☐ b. Implementation of green streets (combinations of green infrastructure practices in transportation rights-of-ways), for either new development, redevelopment or retrofits
- ☐ c. Implementation of water harvesting and reuse programs or projects, where consistent with state and local laws and policies.
- ☐ d. Implementation of wet weather management systems for parking areas which include: the incremental cost of porous pavement, bioretention, trees, green roofs, and other practices that mimic natural hydrology and reduce effective imperviousness at one or more scales.
- ☐ e. Establishment and restoration of riparian buffers, floodplains, wetlands and other natural features.
- ☐ f. Downspout disconnection to remove stormwater from combined sewers and storm sewers.
- ☐ g. Comprehensive retrofit programs designed to keep wet weather out of all types of sewer systems using green infrastructure technologies and approaches.

☐ **4. Environmentally Innovative Projects**

- ☐ a. Green Infrastructure/Low Impact development stormwater projects
- ☐ b. Decentralized wastewater treatment and/or reuse projects that reduce energy consumption, recharge aquifers and reduce water withdrawals and treatment costs
- ☐ c. Projects that employ development and redevelopment practices that preserve or restore site hydrologic processes through sustainable landscaping and site design.
- ☐ d. Projects that use water balance approaches (water budgets) at the project, local or state level that preserve site, local or regional hydrology. Such an effort could pilot and show-case efforts to plan and manage in a concerted manner, surface and groundwater withdrawals, stream base flow (aquatic species protection), wetland and floodplain storage, groundwater recharge and regional or local reuse and harvesting strategies using a quantified methodology.
- ☐ e. Projects that demonstrate the energy savings and climate change implications of sustainable site design practices and the use of green infrastructure such as green roofs, increased tree canopy, reduced water consumption and potable water use due to sustainable site designs, rainwater harvesting and reuse and reductions in hard or infrastructure needed to manage stormwater and Combined Sewers Overflow (CSOs).
- ☐ f. Projects that demonstrate the differential uses of water based on the level of treatment and potential uses as a means to reducing the costs of treating all water to potable water standards.
- ☐ g. Projects that identify and quantify the benefits of using integrated water resources management approaches.

☐ **5. Non-categorical (describe)**

_____

_____

6. **Possible solution and cost estimates (if known):** Rehabilitation and improved pre-treatment process with the addition of tertiary filters for mercury removal.
7. **Current project status:** Ready to begin permitting and design
8. **Desired construction start date, if financing is available (month/year):** June 2018

NOTE: Required attachments for unsewered area projects. A map of the project service area which has an identifiable scale, identifies all the structures with wastewater flows, and has the maximum impact zone clearly encircled.

On behalf of an eligible project as their authorized authority, I hereby submit this application for placement on the PPL:

Print Authorized Representaive Name: Lana Fralich

Signature: Lana R Fralich

Title: City Administrator

Date: 3/3/17

For more information, contact:

Bill Dunn, Clean Water Revolving Fund Coordinator at 651-757-2324 or bill.dunn@state.mn.us

www.pca.state.mn.us/water/wastewater-financial.html

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

PPL Wastewater Existing Facility Improvements Scoring Worksheet

Project Priority List (PPL)
Minnesota Rule Chapter 7077.0117

Doc Type: PPL Points Determination

MPCA Use Only

Project Number
Staff Engineer
Total Points
Date

Facility Information (please print)

Project name: Silver Bay WWTF Upgrades
Applicant name (if different):
Contact name: Lana Fralich Title: City Administrator
E-mail address: lanaf@silverbay.com Phone: (218) 226-4408

Instructions: This worksheet is used to score all requests for state financial assistance for wastewater improvement projects for Minnesota Pollution Control Agency (MPCA) permitted facilities. Scoring is based on the environmental criteria contained in Minnesota Rule Chapter 7077. The result of scoring is a ranked list called the Project Priority List (PPL) from which projects will be selected for funding.

Applicants must complete their sections of the worksheet and submit it with their requests for placement on the PPL. As part of completing the worksheet, the applicant must provide sufficient documentation to support the award of points. Complete application information is located on the MPCA website at http://www.pca.state.mn.us/ppl.

Complete this form if your proposal includes improvements to wastewater collection and/or treatment facilities that have an existing National Pollutant Discharge Elimination System (NPDES) Permit or a State Disposal System (SDS) Permit.

For more information, contact: Bill Dunn, Clean Water Revolving Fund Coordinator at 651-757-2324, Fax 651-297-8324, or bill.dunn@state.mn.us.

Applicant completes questions 15-40 and 85; MPCA completes 45-80, 90-95

Points

[15] Existing and proposed stabilization ponds located in karst areas and SDS facilities with high ground water table [subp. 6]

15.1 Does this project replace or rehabilitate stabilization ponds located over karst areas? ☐ Yes ☒ No

15.2 Does this project replace or rehabilitate wastewater treatment facilities having a disposal site (spray irrigation, rapid infiltration, etc.) with less than three feet of vertical separation from the treated wastewater discharge point to the seasonally high ground water table or to bedrock? ☐ Yes ☒ No

If Yes to either 15.1 or 15.2, enter 20 points ____

[20] Existing facility at or above 85% capacity [subp. 1]

Complete 20.1 *if project improves only the treatment facility or improves both the treatment facility and the collection facilities.*

20.1 Is this treatment facility at or above 85% of either its permitted hydraulic flow or organic loading capacity as determined by the last 12 month average wet weather flow (AWW) or average annual discharge, **and** will the project proposal appropriately resolve capacity issues either through expansion of treatment capacity or reduction of loadings? ☐ Yes ☒ No

Permitted hydraulic and/or organic loading capacity: _____

Actual hydraulic and/or organic loading capacity: _____

Complete 20.2 *if project improves only the collection facilities.*

20.2 Is this collection facility at or above 85% of the design peak instantaneous wet weather flow (PIWW) or provide documentation of other physical conditions, such as by-passing to show the peak flow has exceeded the design PIWW, **and** will the project proposal appropriately resolve capacity issues through expansion of collection facility capacity? ☐ Yes ☒ No

Design PIWW: _____

Documented peak flow: _____

If Yes to either 20.1 or 20.2, enter 5 points ____

[25] Existing age of treatment or collection facilities within the proposed project service area [subp. 2]
(*Age is determined by the construction year of all or a substantial portion of the existing facility addressed by project.)*

25.1 Last significant construction year of treatment or collection facilities, which are proposed to be repaired or replaced within the service area? ☒ Yes ☐ No

Enter Year: 1995

25.2 Are the facilities 20 years or more old? If yes, attach documentation of last significant construction year. ☒ Yes ☐ No

If Yes, enter 20 points **20**

[30] Existing excessive infiltration/inflow (i/i) with proposed reduction plan [subp. 3]

30.1 Does this facility have excessive infiltration or inflow? (Minn. R. 7077.0105, subp. 12 and 13)

Calculate infiltration: 242 gallon/capita/day Greater than 120 gallon/capita/day? ☒ Yes ☐ No

Calculate inflow: 1,452 gallon/capita/day Greater than 275 gallon/capita/day? ☒ Yes ☐ No

30.2 Does the proposal include measures to correct excessive infiltration or inflow? ☐ Yes ☒ No

If Yes to both 30.1 and 30.2, enter 15 points

[35] Existing or proposed land (including sub-surface) discharge [subp. 4]

35.1 Does the facility currently land discharge treated wastewater effluent, will it continue to land discharge, **and** not create or contribute to known ground water nitrate levels over 10 mg/L? ☐ Yes ☒ No

35.2 Does the proposed alternative call for the consumptive use (nitrogen or volume) spray irrigation or on-land disposal systems, that are required by permit to denitrify (nitrate limit)? ☐ Yes ☒ No

If Yes to either 35.1 or 35.2, enter 20 points

[40] Existing stringent limit that exceeds secondary treatment [subp. 5]

40.1 Is the existing facility currently subject to CBOD or TSS permit limits that are more stringent than secondary treatment (25 mg/l and 30 mg/l), or has an ammonia, total nitrogen or phosphorus limit? (Minn. R. 7050.0211) Exclude facilities discharging to Class 7 waters that are subject to 15 CBOD. ☒ Yes ☐ No

If Yes, enter 10 points **10**

[45] Existing effluent discharge violations *(Enforcement staff)* [subp. 7]

45.1 Is the existing facility on the Significant Noncompliance List (CFR, title 40, section 123.45, appendix A) **and** would the proposed project designed to eliminate the problem? ☐ Yes ☒ No

If Yes, enter 5 points

[50] Existing repeated facility failures *(Enforcement staff)* [subp. 8]

50.1 Has the existing treatment or collection facility experienced bypasses, overflows and/or surcharges during two or more storm events within a 12-month period when operating at less than "peak instantaneous wet weather flow" **and** is the proposed project designed to eliminate such failures? ☐ Yes ☒ No

If Yes, enter 10 points

[55] Existing discharge to outstanding resource value water (ORVW) or impaired water (*Effluent Limits Coord.)* [subp. 9]

55.1 Does the existing facility currently discharge into an ORVW or Impaired water? ☒ Yes ☐ No

If Yes, enter 5 points **5**

55.2 If yes, does the existing facility also have existing acute/chronic effluent discharge standards violations? (see question 45.1 or subp. 7)? ☐ Yes ☒ No

If Yes to both 55.1 and 55.2, enter 5 points

55.3 If yes, does the existing facility also have existing chronic failures? (see question 50.1 or subp. 8) ☐ Yes ☒ No

If Yes to 55.1, 55.2, and 55.3, enter 5 points

[60] Existing discharge near potable water intake (*Effluent Limits Coordinator)* [subp. 10]

60.1 Is there potable water intake within 25 miles downstream of the existing facility discharge? ☒ Yes ☐ No

If Yes, enter 5 points **5**

[65] Existing endangered or threatened species (*Effluent Limits Coordinator)* [subp. 11]

65.1 Does the receiving water downstream from the existing facility discharge support any endangered or threatened species? ☒ Yes ☐ No

If Yes, enter 5 points **5**

[70] Proposed introduction of more stringent discharge limits for an existing facility (*Effluent Limits Coordinator)* [subp. 12]
Does this existing treatment facility need to meet more intensive and/or extensive wastewater treatment standards because of:

70.1 More stringent facility discharge limits as incorporated into MPCA permit revisions? ☒ Yes ☐ No

70.2 Discontinuation of an existing permit variance? ☐ Yes ☒ No

70.3 Need to treat additional hydraulic or organic loading capacities without increasing either the permitted frozen effluent mass limit or concentration of discharges to the receiving waters? ☒ Yes ☐ No

If Yes to 70.1, 70.2 or 70.3, enter 10 points **10**

[75] Existing receiving water classification *(Effluent Limits Coordinator)* [subp. 13]

Only the most strict classification can be used, 7 points maximum

75.1 Receiving water classification is 2A ☒ Yes ☐ No

If Yes to 75.1, enter 7 points **7**

75.2 Receiving water classification is 1, 2Bd ☐ Yes ☒ No

If No to 75.1 and Yes to 75.2, enter 5 points

75.3 Receiving water classification is 2B, 2C, 2D ☐ Yes ☒ No

If No to 75.1 and 75.2 and Yes to 75.3, enter 3 points

75.4 Receiving water classification is 7 ☐ Yes ☒ No

If No to 75.1, 75.2 and 75.3 and Yes to 75.4, enter 1 point

[80] Project facility effluent to stream impact dilution ratio *(Effluent Limits Coordinator)* [subp. 14]

*For all discharges to rivers, streams, or ditches (flowing receiving water), calculate the facility effluent low flow by averaging the influent flow reported on the monthly discharge monitoring reports (DMRs) for the three consecutive months with the lowest **influent** flow in three climatic years, April 1 to March 31.*

80.1 What is the ratio of the **influent** low flow of the facility to the 7Q10 flow of the receiving water?

Dilution Ratio* = Wastewater Treatment Facility (WWTF) Low Flow (million gallons per day [mgd]) / Receiving water low flow (mgd)

(_____ mgd/ _____ mgd = Dilution Ratio) Dilution Ratio = ☐

*For all "Dilution Ratios" greater than 1.0 or if the 7Q10 receiving water flow = 0 mgd set dilution ratio = 1.0

Note: Round up calculated value for dilution ratio to the next whole number (e.g., 8.3 = 9). 15 x dilution ratio =

[85] Proposed project implements corrective measures (*Effluent Limits Coordinator)* [subp. 15]

85.1 Will the project implement corrective measure(s) for problems identified in a study, such as: ☐ Yes ☒ No

- Clean Water Partnership Project
- Impaired Water Study
- EPA-approved Watershed Restoration Action Strategy
- Equivalent (other) study, e.g., County Water Plan

Type of Study: *Attach supporting documentation and identify relevant sections.*

If Yes, enter 5 points

[90] Proposed project helps meet a total maximum daily load (TMDL) for a receiving water *(Effluent Limits Coord)* [subp. 16]

90.1 Does this project contribute to the achievement of a TMDL by being designed to reduce the discharge of pollutants as required by an Agency approved TMDL implementation plan or does the project require an National Pollutant Discharge Elimination System (NPDES) Permit or State Disposal System (SDS) Permit that will require the reduced discharge of pollutants based on a TMDL? ☐ Yes ☒ No

If Yes, enter 20 points

[95] Propose project points reduction for new/expanded discharges into specified waters *(Effluent Limits Coord)* [subp. 17]

95.1 Does the proposed project involve a new or expanded discharge* to one or more of the following specified waters? ☐ Yes ☒ No

a) Outstanding Resource Value Waters (Minn. R. 7050.0180)

b) Impaired waters (Section 303(d) of the Clean Water Act)

c) Classification 2A, lake, or wetland that exceeds 200,000 gallons per day

* If new permit requirements include frozen effluent mass limits from the existing permit, the facility is not defined as expanding and negative points will not be assigned.

If Yes, enter minus 5 points

[100] Project includes wastewater reuse

100.1 Does the project include the beneficial use of treated wastewater effluent that will reduce or replace the use of a groundwater, surface water, or potable water source? ☐ Yes ☒ No

100.2 Do the project components needed to beneficially use treated wastewater effluent account for at least 20% of the total eligible project cost? ☐ Yes ☒ No

100.3 Does the project receive points under item 35 (Minn. R. 7077.0117, subp. 4) for land discharge? ☐ Yes ☒ No

If Yes to both 100.1 and 100.2, enter 30 points

Total **62**