Wastewater Treatment
Facility Plan
Dale Sanitary District
Outagamie County, Wisconsin
June 2018
(Revised January 2019)

For:
Dale Sanitary District
W9611 Wheeler Road
Dale, WI 54931

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Wastewater Treatment Facility Plan
For the Dale Sanitary District
Outagamie County, Wisconsin

Executive Summary

EXECUTIVE SUMMARY

A. GENERAL

The Dale Sanitary District No. 1, located in Outagamie County, Wisconsin, owns and operates an aerated lagoon wastewater treatment facility constructed in the early 1970's. The wastewater treatment facility currently operates under the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit No. WI-0030830-07-0 from the Wisconsin Department of Natural Resources (WDNR) that became effective on October 1, 2017. The new WPDES permit includes ammonia effluent limits that the existing Dale Wastewater Treatment Facility is unable to meet on a consistent basis.

The Dale Sanitary District wastewater treatment facility was designed to treat an average daily flow of 60,000 gallons per day (gpd). Average daily flow to the plant from 2013 through 2017 was 32,700 gallons per day, and the plant currently serves approximately 478 people.

The WPDES permit requires that the Dale Sanitary District submit a Wastewater Treatment Facility Plan to the Wisconsin Department of Natural Resources by September 30, 2018 to provide the necessary information regarding the Sanitary District's Wastewater Treatment Facility so that they can establish priorities, plan, fund and implement required future wastewater treatment facility improvements to meet the new WPDES ammonia effluent limits.

B. DESIGN PARAMETERS

In accordance with Wisconsin Administrative Code Guidelines, the planning period for this study is 20 years. The design year for this study will be 2040 with proposed improvements to be constructed in 2020.

Projected population, wastewater flow and wastewater loadings presented in this study for the design year 2040 are as follows.

Design Year 2040 Projections

Population	561 people
Average Daily Wastewater Flow	60,000 gallons per day
CBOD5 Wastewater Loading	81 pounds per day
TSS Wastewater Loading	78 pounds per day
NH3-N Wastewater Loading	17 pounds per day

C. METHODS CONSIDERED

A number of wastewater treatment alternatives were considered and discussed in this study, including a mechanical treatment plant, regionalization with nearby wastewater treatment facilities, construction of a new pond for added storage during winter months, establishment of a new outfall location, upgrading the existing aeration system and providing lagoon covers, pretreatment of wastewater, tertiary treatment of wastewater, and converting the existing aerated treatment lagoon.

Many of these alternatives were determined to not be practical or cost effective, and were not considered further. Four treatment alternatives analyzed in greater detail included the NitrOx System and the OPTAER System proposing tertiary treatment following the existing lagoon system, the FAST System proposing pretreatment prior to the existing lagoon system, and the LemTec System proposing to convert one the existing lagoon cells to a two-cell aerobic treatment process.

Capital construction costs, additional operation and maintenance costs, advantages and disadvantages are provided for each of the alternatives. To determine the cost effectiveness of the alternatives, equivalent annual costs are calculated for each of the four alternatives. The interest rate and time period utilized in the cost effectiveness analysis is 4 percent and 20 years.

Results of the cost effective analysis are as shown below.

Cost Summary for Wastewater Treatment Alternatives – Total Annual Cost

Alternative	Alternative No. 1 NitrOx System	Alternative No. 2 OPTAER System	Alternative No. 3 FAST System	Alternative No. 4 LemTec System
Capital Cost	$625,000	$689,400	$1,156,300	$656,300
Equivalent Annual Cost	$46,000	$50,700	$85,100	$48,300
Additional OM&R Cost	$19,600	$4,200	$23,300	$8,500
Total Annual Cost	$65,600	$54,900	$108,400	$56,800

D. CONCLUSIONS

Based on results of the cost-effective analysis, construction of the OPTAER tertiary treatment system alternative proposed by Nexom is the recommended wastewater treatment alternative to meet the WPDES permit ammonia effluent limits.

To adequately assess the needs and desires of the community, public comments must be received. A public hearing should be held to discuss the contents of this Wastewater Treatment Facility Plan.

In order to make the wastewater improvements affordable for the citizens within the study area, some form of financial assistance program or method of financing the improvements will be necessary. A few of the options available are discussed in the study, including available debt options, Community Development Block Grant funds, the Clean Water Fund Program, and USDA Rural Development funds.

WDNR has set the following deadlines for Ammonia Effluent Limit Facility Modifications in the current WPDES permit.

1. Submit Facilities Plan for WDNR Review	September 30, 2018
2. Submit Plans and Specifications for WDNR Review	March 31, 2019
3. Initiate Actions (Begin Construction)	October 1, 2019
4. Complete Actions (Complete Construction)	September 31, 2020

It is recommended that the Dale Sanitary District submit an Intent to Apply for WDNR Clean Water Funds by the October 31, 2018 deadline and submit a WDNR Clean Water Fund Application by the June 30, 2019 application deadline to receive State Fiscal Year 2020 funds.

SECTION 1

Introduction

SECTION 1

INTRODUCTION

A. PURPOSE

The Dale Sanitary District encompasses approximately 300 acres of land entirely within the Town of Dale in the southwestern part of Outagamie County, Wisconsin.

The Dale Sanitary District wastewater treatment facility operates under a Wisconsin Pollutant Discharge Elimination System (WPDES) Permit from the Wisconsin Department of Natural Resources (WDNR) that became effective in October of 2017. The permit includes ammonia effluent limits that the existing Dale Wastewater Treatment Facility will be unable to meet on a consistent basis. The permit also includes a schedule of proposed steps needed to plan for and implement wastewater treatment facility improvements to meet the ammonia effluent limits.

The purpose of the Wastewater Treatment Facility Plan is to provide the Dale Sanitary District with necessary information regarding the Sanitary District's Wastewater Treatment Facility so that they can establish priorities, plan, fund and implement required future wastewater treatment facility improvements to meet WPDES limits. The plan is prepared in accordance with Wisconsin Administrative Code Section NR 110 governing wastewater treatment facility planning. After the Sanitary District has reviewed and approved this report, a copy of the report will be submitted to the Wisconsin Department of Natural Resources for review and approval prior to the WDNR September 30, 2018 deadline.

B. REPORT ORGANIZATION

To adequately meet the purpose of this study described above, the report is organized into six sections. A description of the existing facilities is presented in Section 2. Section 3 presents the design considerations and parameters used in the evaluation. Section 4 presents a description of wastewater treatment alternatives. The costs of the different alternatives are presented in Section 5. Section 6 presents conclusions and an implementation plan.

SECTION 2

Existing Facilities

SECTION 2

EXISTING FACILITIES

A. GENERAL

The Dale Sanitary District currently serves the unincorporated community of Dale within the Town of Dale in the southwestern part of Outagamie County, Wisconsin. The District collects wastewater from approximately 172 residential users, 26 businesses, and 4 public users, and transports it to its wastewater treatment facility through a collection system comprised primarily of 8-inch sanitary sewers constructed in the early 1970's.

The predominant land use within the Dale Sanitary District is single family residential homes with a small downtown commercial area located along State Highway 96. Alzena Subdivision, constructed in the early 1990's is located southeast of the community of Dale, and includes 17 of the current 172 residential users within the Dale Sanitary District. The subdivision is served by 8-inch gravity sewers, a lift station and forcemain.

B. EXISTING WASTEWATER TREATMENT FACILITY

The Dale Sanitary District No. 1 owns and operates an aerated lagoon wastewater treatment facility. The wastewater treatment facility currently operates under the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit No. WI-0030830-07-0 which became effective on October 1, 2017.

The Dale Sanitary District wastewater treatment facility was designed to treat an average daily flow of 60,000 gallons per day (gpd). Average daily flow to the plant from 2013 through 2017 was 32,700 gallons per day.

The system includes raw sewage pumping to the first of two aerated ponds, followed by one polishing pond. Each of the aerated ponds operate at a depth of 14 feet, with a volume of approximately 103,977 cubic feet (777,750 gallons) in each pond. The polishing pond operates at a depth of 5 feet, and has a volume of 65,258 cubic feet (488,130 gallons). Together, these three ponds provide 34 days of hydraulic detention time at the design average daily flow of 60,000 gallons per day, and approximately 62 days at the current average flow.

Discharge from the system is on a continuous basis to a tributary of the Rat River. Effluent flows by gravity sewer west from the treatment plant, then south down Depot Street to the outfall location. Sludge is removed from the lagoon system periodically and land applied.

The aeration diffusers and associated piping within the two aerated lagoon cells were updated in 2009. However the 4-inch ductile iron pipe between the blower building and the ponds was constructed with the plant in the early 1970's and needs to be replaced.

C. EXISTING WASTEWATER SAMPLING AND EFFLUENT LIMITS

A copy of the current WPDES permit for the Dale Wastewater Treatment Facility is included as Appendix A to this report. The permit includes effluent limits for CBOD, total suspended solids, dissolved oxygen, pH, chloride, total phosphorus, acute WET, chronic WET and Total Ammonia Nitrogen as shown in Table 2.1 below.

Table 2.1 Existing WPDES Wastewater Effluent Limits

Parameter	Limit Type	Limit and Units
CBOD5	Weekly Average Monthly Average	25 mg/L 16 mg/L
Total Suspended Solids	Monthly Average	60 mg/L
Dissolved Oxygen	Daily Minimum	4.0 mg/L
pH Field	Daily Minimum Daily Maximum	6.0 su 9.0 su
Chloride	Weekly Average	510 mg/L (Interim Limit)
Total Phosphorus	6-Month Average Monthly Average	0.075 mg/L and 0.038 lb/day 0.225 mg/L Effective 2026
Acute WET	Daily Maximum	1.0 TUa
Chronic WET	Monthly Average	2.6 TUc
Total Ammonia Nitrogen	Daily Maximum Weekly Average Monthly Average	Limits Vary Effective 2020

The current WPDES permit requires sampling and testing as summarized in Table 2.2.

Table 2.2 Existing WPDES Monitoring Requirements

Parameter	Sampling Point	Sample Frequency
Flow Rate	Influent	Daily
BOD5, Total	Influent	Weekly
Suspended Solids, Total	Influent	Weekly
Flow Rate	Effluent	Daily
CBOD5	Effluent	Weekly
Suspended Solids, Total	Effluent	Weekly
Dissolved Oxygen	Effluent	Weekly
pH Field	Effluent	3/Week
Chloride	Effluent	Weekly
Phosphorus, Total	Effluent	Monthly
Acute WET	Effluent	Quarterly
Chronic WET	Effluent	Quarterly
Nitrogen, Ammonia (NH3-N) Total	Effluent	Weekly

D. EXISTING WASTEWATER FLOW DATA

Tables 2.3 and 2.4 that follow show the average monthly influent flow, and the maximum daily flow observed at the Dale Sanitary District Wastewater Treatment Facility from 2013 through 2017. Note that the average peak factor for average monthly to maximum daily flow for the peak months for 2013 through 2017 is 3.0.

Table 2.3 Average Influent Wastewater Flow

Month	Monthly Average Influent Flow Year 2013	Monthly Average Influent Flow Year 2014	Monthly Average Influent Flow Year 2015	Monthly Average Influent Flow Year 2016	Monthly Average Influent Flow Year 2017
January	0.0307	0.0249	0.0296	0.0338	0.0304
February	0.0302	0.0238	0.0262	0.0299	0.0275
March	0.0417	0.0356	0.0275	0.0542	0.0342
April	0.0754	0.0590	0.0362	0.0474	0.0405
May	0.0376	0.0464	0.0299	0.0303	0.0335
June	0.0392	0.0372	0.0354	0.0398	0.0261
July	0.0375	0.0289	0.0269	0.0273	0.0230
August	0.0335	0.0284	0.0251	0.0252	0.0199
September	0.0314	0.0302	0.0377	0.0327	0.0206
October	0.0235	0.0309	0.0271	0.0294	0.0234
November	0.0306	0.0300	0.0321	0.0263	0.0204
December	0.0269	0.0349	0.0573	0.0287	0.0205
Average	**0.0365**	**0.0342**	**0.0326**	**0.0338**	**0.0267**

Table 2.4 Daily Maximum Influent Wastewater Flow

Month	Daily Maximum Influent Flow Year 2013	Daily Maximum Influent Flow Year 2014	Daily Maximum Influent Flow Year 2015	Daily Maximum Influent Flow Year 2016	Daily Maximum Influent Flow Year 2017
January	0.0659	0.0292	0.0368	0.0480	0.0384
February	0.0450	0.0279	0.0369	0.0406	0.0332
March	0.0826	0.0739	0.0340	0.1544	0.0422
April	**0.1614**	**0.1610**	0.0643	**0.1647**	0.0674
May	0.0454	0.1040	0.0498	0.0408	**0.0870**
June	0.0475	0.0888	0.0478	0.1046	0.0431
July	0.0423	0.0359	0.0315	0.0305	0.0342
August	0.0396	0.0449	0.0308	0.0308	0.0308
September	0.0380	0.0394	0.1058	0.0632	0.0305
October	0.0277	0.0447	0.0334	0.0347	0.0363
November	0.0388	0.0339	0.0428	0.0353	0.0345
December	0.0309	0.0473	**0.2258**	0.0350	0.0282
Average	**0.0554**	**0.0609**	**0.0616**	**0.0656**	**0.0422**

E. EXISTING WASTEWATER EFFLUENT DATA

Appendix B includes a summary of influent and effluent CBOD and Total Suspended Solids data collected from 2013 through 2017.

The plant consistently meets the current CBOD effluent limits of 25 mg/L weekly average and 16 mg/L monthly average. From 2013 through 2017, the monthly average effluent CBOD value averages 4.3 mg/L. Review of maximum weekly values from 2013 to 2017 indicates that maximum recorded effluent CBOD values average 6.2 mg/L

In addition, the plant consistently meets the current TSS monthly average effluent limit of 60 mg/L, with a monthly average effluent TSS value averaging 9.9 mg/L from 2013 through 2017.

The plant has experienced some trouble in meeting the WPDES weekly average interim effluent chloride level of 510 mg/L during the winter months and is currently following chloride reduction measures to reduce chlorides in their sanitary sewer system, as proposed in the Chloride Progress Report submitted to WDNR in March of 2017. From 2013 through 2017, the plant would have failed to meet the current weekly average interim effluent chloride limit of 510 mg/L 10% of the time. In the last two years (2016 and 2017), the plant would have failed to meet the current weekly average interim effluent chloride limit of 510 mg/L 3% of the time. Appendix C includes a summary of chloride effluent data.

The current WPDES permit requires the facility to monitor ammonia in the wastewater effluent on a weekly basis. Appendix D includes a summary of weekly average, monthly average and daily maximum effluent ammonia NH3-N values compared to WPDES Limits for 2013 through 2017. Table 2.5 below summarizes the number of times that the current WPDES limits would have been exceeded in each of the years 2013 through 2017.

Table 2.5 Number and Percentage of Times WPDES Permit Effluent NH3-N Limit Was Exceeded

	Weekly Average		Monthly Average		Daily Maximum	
	# Times	% of Time	# Times	% of Time	# Times	% of Time
2013	4	8%	4	33%	3	6%
2014	9	19%	4	33%	6	13%
2015	7	15%	5	42%	5	10%
2016	3	6%	5	42%	4	8%
2017	4	8%	3	25%	6	13%
Total	27	11%	21	9%	24	10%

Note that in the five years that were evaluated, late February, March and April were the months when ammonia effluent limits were exceeded the most.

SECTION 3

Design Considerations and Parameters

SECTION 3

DESIGN CONSIDERATIONS AND PARAMETERS

A. PLANNING PERIOD

It is generally not feasible to make numerous changes in the capacity of wastewater treatment facilities. Therefore, in accordance with Wisconsin Administrative Code Section 110, a wastewater treatment facility is typically designed to handle projected flows and loadings 20 years into the future. The design year for this study will be 2040 with proposed improvements to be constructed in 2020, as set forth in the schedule provided in WPDES Permit No. WI-0030830-07-0.

B. POPULATION PROJECTIONS

Table 3.1 that follows summarizes the parameters used to project population for the design year 2040 for the Dale Sanitary District. Note that the estimated population within the Dale Sanitary District for the current year 2018 is 432, and that the projected population for the Dale Sanitary District for the Design Year 2040 is 507 people.

Table 3.1 Population Projections for Dale San. District for Design Year 2040

Parameter	Value
Number of Current Customers, year 2018	172 residential customers 4 public buildings 26 businesses
Persons Per Household - Based on U.S. Census Data for Town of Dale	2.78 persons per household
Estimated Current 2018 Population within the Dale Sanitary District	478 people = 172 residential cust. x 2.78 pple/household
Estimated Additional Homes within Dale Sanitary District Boundary During Study Period	30 additional homes
Estimated Population Growth During Study Period	83 people = 30 additional homes x 2.78 pple/household
2040 Population Projection for Facility Planning	**561 people** = 478 people + 83 people

In summary, note that the population projection of 561 people is to be used for the Dale Sanitary District for facility planning for the design year 2040.

For 20-year planning purposes, this Plan uses the same Planning Area and Sewer Service Area as the Dale Sewer Service Area Plan previously approved by the East Central Regional Planning Commission in 2003.

C. WASTEWATER FLOW PROJECTIONS

The average daily design flow for the existing wastewater treatment facility is 60,000 gallons per day. Wastewater flows for design year 2040 calculated as shown in Table 3.2 below are less than 60,000 gallons per day. Therefore, the average daily design wastewater flow for year 2040 to be used for this study will remain at 60,000 gallons per day.

Table 3.2 Wastewater Flow Projections for Dale San. District for Design Year 2040

Parameter	Value
Existing Gallon per Capita per Day (gpcd) Usage	68 gallons per capita per day = 32,700 gpd (Avg 2013-2017 ADF) / 478 pple
WDNR Code Gallon per Capita per Day Usage	60-70 gallons per capita per day
2040 Population Projection for the Dale Sanitary District	561 people
Year 2040 Average Daily Wastewater Flow Projection Based on Current Usage	38,200 gallons per day = 0.0382 MGD
Year 2040 Average Daily Wastewater Flow Projection Based on WDNR Code Guidelines	36,500 gallons per day = 0.0365 MGD (65 gpcd)
Year 2040 Maximum Daily Wastewater Flow Projection Based on Flow Data from 2013-2017	114,600 gpd = 0.1146 MGD = (38,200 gpd x Peak Factor of 3.0)

Note that Wisconsin Department of Administration population projections for the Town of Dale indicate that the Town will grow approximately 18% between 2020 and 2040. The projections above also show an increase of approximately 17% for the Dale Sanitary District from 2018 to 2040. Therefore projecting 30 additional homes for the Dale Sanitary District appears to be reasonable.

D. WASTEWATER LOADING PROJECTIONS

Table 3.3 below summarizes estimated current and projected wastewater loadings for the Dale Sanitary District for 2040 to be used for facility planning.

Current loadings are based the average actual influent BOD and TSS loadings for 2013-2017, and the estimated current 2018 population of 478 people (Table 3.1). Design loadings are based on the lb./capita/day values shown in Table 3.3 based on WI Admin. Code NR 110.15(4)(b)(2) and the 2040 Population Projection of 561 people (Table 3.1).

Table 3.3 Wastewater Loading Projections for Dale Sanitary District for Design Year 2040

Parameter	Current Loading (2013-2017) Pounds per Day	Additional Future Loading lb./capita/day	Additional Future Loading Pounds per Day	Design Loadings Year 2040 Pounds per Day
CBOD5	67	0.17	14	81
TSS	61	0.20	17	78
NH3-N	14	0.03	3	17

E. WASTEWATER EFFLUENT LIMITS

Table 3.4 that follows summarizes the effluent limits included in WPDES Permit No. WI-0030830-07-0 governing the Dale Sanitary District Wastewater Treatment facility.

Table 3.4 WPDES Permit Wastewater Effluent Limits

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	6 month Average
CBOD5			25 mg/L	16 mg/L	
Total Suspended Solids				60 mg/L	
Dissolved Oxygen		4.0 mg/L			
pH	9.0 su	6.0 su			
Chloride			510 mg/L Interim Limit with Variance		
Total Phosphorus Effective 2026					0.075 mg/L 0.038 lb/day
Acute WET	1.0 TUa				
Chronic WET				2.6 TUc	
Ammonia Nitrogen NH3-N					
Nov. – March Effective 2020			33 mg/L	13 mg/L	
April Effective 2021			6.8 mg/L	2.7 mg/L	
May – June Effective 2021			7.4 mg/L	3.0 mg/L	
July - September Effective 2021			7.5 mg/L	3.0 mg/L	
October Effective 2020			20 mg/L	7.9 mg/L	
Daily Limits Variable pH Dependent Effective Oct. 2020					

Table 3.5 that follows summarizes the Daily Maximum Ammonia Nitrogen effluent limits included in the current WPDES permit that become effective in October of 2020.

Table 3.5 WDNR Daily Maximum Ammonia Nitrogen Limits

Effluent pH (su)	NH3-N Limit mg/L
<7.1	>46
7.1 – 7.2	46
7.2 – 7.3	40
7.3 – 7.4	35
7.4 – 7.5	31
7.5 – 7.6	26
7.6 – 7.7	22
7.7 – 7.8	19
7.8 – 7.9	16
7.9 – 8.0	13
8.0 – 8.1	11
8.1 – 8.2	8.8
8.2 – 8.3	7.3
8.3 – 8.4	6.0
8.4 – 8.5	4.9
8.5 – 8.6	4.1
8.6 – 8.7	3.4
8.7 – 8.8	2.8
8.8 – 8.9	2.4
8.9 – 9.0	2.0

It is important to note that ammonia in water exists in two forms, the ammonium ion (NH4+), and the unionized ammonia (NH3). At a high pH, most of the ammonia in solution is in the unionized form (NH3), whereas at a low pH, the ammonia is mostly in the ionic form (NH4+). The unionized form (NH3) is most toxic to the aquatic organisms in the receiving body of water, and therefore, the daily maximum effluent permit limits issued by WDNR for ammonia are more stringent when the effluent pH is higher.

F. AMMONIA NITROGEN EFFLUENT LIMITS

The current Dale Sanitary District WPDES permit requires wastewater effluent be monitored weekly for total ammonia nitrogen (NH3-N) through September of 2020. It also requires that weekly average, monthly average and daily maximum limits be met by 2020 or 2021 as summarized in Tables 3.4 and 3.5 above. Compliance to these limits shall be in accordance with the following schedule set forth in the permit, summarized in Table 3.6

Table 3.6 Total Ammonia Effluent Limit Compliance Schedule

Facility Plan Amendment	September 30, 2018
Plans and Specifications	March 31, 2019
Initiate Actions	October 1, 2019
Complete Actions	September 30, 2020

Included in Appendix D are tables showing effluent monitoring results from 2013 through 2017 compared to the current WPDES Ammonia NH3-N effluent limits. Those results that would not have been in compliance with current WPDES effluent limits are highlighted yellow.

This Wastewater Treatment Facility Plan focuses on improvements needed to meet the WPDES ammonia effluent limits in compliance with the WDNR schedule summarized in Table 3.6 above.

G. PHOSPHORUS EFFLUENT LIMITS

Phosphorus Discharges to Waterways

Phosphorus has been recognized as the controlling factor in plant and algae growth in Wisconsin lakes and streams. Small increases in phosphorus can fuel substantial increases in plant and algae growth, which in turn can reduce recreational use, property values, and public health. Phosphorus entering our lakes and streams comes from point sources such as municipal and industrial wastewater treatment plants. Phosphorus also comes from non-point or runoff pollution occurring when heavy rains and melting snow wash over farm fields and feedlots and carry fertilizer, manure and soil into lakes and streams, or carry phosphorus containing contaminants from urban streets and parking lots.

Wisconsin's Phosphorus Water Quality Standards for surface waters were adopted on December 1, 2010 to create water quality standards and set procedures to implement the phosphorus standards. Any permit reissued by WDNR after December 2010 has been evaluated for phosphorus water quality based effluent limits.

Dale Sanitary District Wastewater Treatment Facility Phosphorus Effluent Limits

Dale Sanitary District WPDES Permit No. WI-0030830-07-0 includes final water quality based effluent limits for phosphorus of 0.075 mg/L and 0.038 lb/day as 6-month averages and 0.225 mg/L as a monthly average. Final effluent limits become effective on October 1, 2026. Compliance to these limits shall be in accordance with the following schedule set forth in the permit, summarized in Table 3.7.

Table 3.7 Total Phosphorus Effluent Limit Compliance Schedule

Operational Evaluation Report	September 30, 2018
Compliance Alternatives, Source Reduction, Improvements and Modifications Status	September 30, 2019
Preliminary Compliance Alternatives Plan	September 30, 2020
Final Compliance Alternatives Plan	September 30,2021
Progress Report on Plans and Specifications	September 30, 2022
Final Plans and Specifications	September 30, 2023
Treatment Plan Upgrade to Meet Effluent Limits – Begin Construction	December 31, 2023
Construction Upgrade Progress Report #1	December 31, 2024
Construction Upgrade Progress Report #2	December 31, 2025
Complete Construction	September 30, 2026
Final Effluent Limits Become Effective	October 1, 2026

Prior to 2026, the Dale Wastewater Treatment facility will operate under an interim phosphorus effluent limitation defined as "The facility shall be operated such that the amount of phosphorus discharged on an annual basis does not increase over the permit term, and that the discharge of phosphorus is reduced over time through operational optimization." Optimization is a reduction in discharge levels that can be achieved through minimization and minor additions or optimization of the existing wastewater treatment facility.

It must also be noted that WDNR is developing a Total Maximum Daily Load (TMDL) for the Upper Fox and Wolf River basins to address phosphorus and suspended solids water quality impairments within the TMDL area. This TMDL will likely result in limitations for phosphorus and total suspended solids that will be included in the WPDES permit which may be different than those included in the current WPDES permit. TMDL derived limits may be included in lieu of or in addition to the current limits once the TMDL has been approved by the USEPA.

Alternate Approaches to Phosphorus Effluent Limit Compliance – Water Quality Trading and Adaptive Management

As an alternate approach to upgrading the wastewater treatment facility to comply with phosphorus effluent limits, Dale Sanitary District may implement Water Quality Trading or Adaptive Management programs. Water Quality Trading allows point sources to offset their pollution load, and comply with phosphorus limits, by acquiring pollutant reductions from other sources in the watershed. Similar to water quality trading, Adaptive Management allows a point source to reduce other sources of phosphorus pollution within a watershed to achieve compliance with phosphorus requirements. Unlike water quality trading, Adaptive Management focuses on improving water quality, rather than simply offsetting a permit limit. In order to implement these alternate compliance approaches, the WPDES permit would be modified or reissued.

Alternate Approaches to Phosphorus Effluent Limit Compliance –Variance

In April of 2014, the Wisconsin Legislature authorized the concept of phosphorus variances to effluent limits through the approval of Act 378. Act 378 required that the Department of Administration (DOA), in consultation with the Wisconsin Department of Natural Resources (DNR), make a determination as to whether attaining the water quality standard for phosphorus through compliance with effluent limitations by point sources that cannot achieve compliance without major facility upgrades is not feasible because it would cause substantial and widespread adverse social and economic impacts on a statewide basis. The conclusion of DOA's analysis is that complying with phosphorus limits would cause substantial and widespread social and economic impacts to Wisconsin. Therefore, WDNR developed a phosphorus effluent limit variance program.

The Economic Impact Analysis prepared in 2015 as a result of Act 378 as discussed above includes capital cost and operation and maintenance cost estimates to implement WWTP improvements to meet phosphorus limits less than 0.1 mg/L. For a lagoon system with a design flow of 0.1 Million Gallons per Day, the estimated capital cost to upgrade the WWTP would be $2,370,000, and the estimated annual O&M cost would be $48,000.

If the Sanitary District proves to the WDNR that compliance options are too costly and would result in an economic hardship to the community, they can request an economic variance that will allow the community to take economically viable steps toward compliance. Under the multi-discharger variance program, instead of pursuing a costly upgrade to the wastewater treatment facility, the municipality would make payments to a local land and water conservation department that would be spent on non-point source improvements to lower phosphorus discharges to the watershed. County participation in the multi-discharger variance program is voluntary. If the Dale Sanitary District Wastewater Treatment Facility meets the eligibility requirements and requests a variance, their WPDES permit will, upon approval, be modified and reissued.

Consideration of Phosphorus Effluent Limit Compliance in Facility Planning

In order to achieve total phosphorus limits less than or equal to 0.1 mg/L, wastewater treatment typically includes multi-point chemical precipitation with clarification and dual-stage sand filtration. These are expensive improvements that are not the same as the treatment methods used to meet ammonia effluent limits. In addition, it is likely that the District will evaluate alternate approaches of Water Quality Trading, Adaptive Management and variances to meet phosphorus limits.

This Wastewater Treatment Facility Plan does not address the WPDES phosphorus limits, but rater focuses on improvements needed to meet the ammonia effluent limits. However, each alternative will be reviewed for its ability to assist in phosphorus removal and those offering this benefit will be noted.

H. CHLORIDE EFFLUENT LIMITS

Table 3.4 above shows that the current WPDES permit includes an interim chloride effluent limit of 510 mg/L with a chloride variance. As noted in Section 2 of this report, the Dale Sanitary District Wastewater Treatment Plant has experienced some trouble in meeting this WPDES weekly average interim effluent chloride limit during the winter months, and is currently following chloride reduction measures to reduce chlorides in their sanitary sewer system, as proposed in the Chloride Progress Report submitted to WDNR in March of 2017.

Removing chlorides from wastewater requires a specialized and expensive means of treatment such as reverse osmosis. Disposing of the waste stream with even more concentrated chlorides also poses a problem. Managing sources of chlorides before they get into the wastewater influent is the best means to handle this issue, and the Dale Sanitary District will continue to follow identified reduction measures. This Wastewater Treatment Facility Plan does not address the WPDES chloride limits, but rater focuses on improvements needed to meet the ammonia effluent limits.