

Permit Fact Sheet

General Information

Permit Number:	WI-0003883-11-0
Permittee Name:	MAPLE ISLAND, INC.
Address:	335 S Wisconsin Ave
City/State/Zip:	Medford WI 54451
Discharge Location:	East bank of the Black River approximately ¼ mile downstream of the County Highway O bridge (NE¼ NW¼ of Section 2; T30N-R1E)
Receiving Water:	The Black River (WBIC 1676700) within the Black and Little Black Rivers Watershed in the Black, Buffalo, and Trempealeau Rivers Drainage Basin in Taylor County
StreamFlow (Q _{7,10}):	The effluent limits for this discharge are based on a minimum river flow of 12 cfs. The permittee cannot discharge if the stream flow is below 12 cfs.
Stream Classification:	The Black River is classified as a warm water sport fishery (WWSF) community. Non-public water supply
Wild Rice Impacts: <i>(no specific wild rice standards exist at this time)</i>	No impacts identified. No wild rice waters inventoried near the outfall. (Evaluation completed March 2017)
Discharge Type:	Existing intermittent (emergency discharges only)

Facility Description

Maple Island, Inc. is a food processing facility that blends, agglomerates and packages food powders, primarily dairy powders. They process approximately 18 million pounds of powder annually.

The process wastewater comes from washing equipment, wet scrubber cleaning, boiler water, and agglomeration water. Most of the wastewater comes from the two wet scrubbers that collect waste powder lost during the production processes. The wet scrubbers use fresh water on a timed basis to thin the re-circulated slurry collecting the waste powder.

Maple Island operates a three-stage wastewater treatment facility consisting of two stabilization ponds followed by a holding pond. Effluent is normally transferred to the Medford Wastewater Treatment Facility for additional treatment and then discharged. However, the facility maintains the capability to discharge to the Black River through Outfall 001. Discharges via outfall 001 are permitted only when flows in the Black River exceed 12 cfs. The minimum flow requirement assures adequate waste assimilation capacity exists in the river for discharges from both Maple Island and the City of Medford's wastewater treatment facility. Solids that periodically accumulate in settling tanks and transmission lines are transferred by truck, when necessary, to the city of Medford WWTF for treatment as well.

Substantial Compliance Determination

Enforcement During Last Permit: All conditions and standard requirements of the current permit are being met. There have been a couple minor violations of effluent limits prior to 2020. However, the facility has taken the necessary steps to correct their actions and nothing further is required.

The facility has met all of the previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, compliance schedule items, and a site visit on 05/16/24, by Arthur Ryzak, WDNR, Maple Island WWTF has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	Influent An average of 18,074 gallons per day (2019-2023 data)	Representative samples shall be collected at the influent wetwell on the same days wash water is coming into the wet well.
001	Effluent An average of 0.287 MGD during discharge which ranged 15 to 22 days per year. Discharges have not occurred since March 2021. (2019-2023 data)	Representative samples shall be collected from the end of the storage pond discharge pipe during discharge to the Black River.
610	Receiving Water Sample point is used only to measure river flow.	Representative samples of flow shall be taken from the Black River immediately prior to and during periods of discharge from the pond system to the Black River through Outfall 001.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Daily	Total Daily	
BOD5, Total		mg/L	Weekly	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Influent limitations and monitoring requirements were re-evaluated for the proposed permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit.

Explanation of Limits and Monitoring Requirements

The parameters and monitoring frequency are appropriate for a food processor with stabilization pond system.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT TO SURFACE WATER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Total Daily	
BOD5, Total	Monthly Avg	50 mg/L	3/Week	Grab	
Suspended Solids, Total		mg/L	3/Week	Grab	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Phosphorus, Total	Monthly Avg	0.225 mg/L	2/Week	Grab	
Phosphorus, Total	6-Month Avg	0.075 mg/L	2/Week	Grab	Compliance is evaluated every six-months on April 30 and October 31. Record the sample result on the eDMR on the last day of the month.
Phosphorus, Total	6-Month Avg	0.2 lbs/day	2/Week	Calculated	Compliance is evaluated every six-months on April 30 and October 31. Record the sample result on the eDMR on the last day of the month.
Chloride		mg/L	3/Week	Grab	
Acute WET		TUa	See Permit Note	Grab	See the WET Testing section for more information.
Chronic WET		TUc	See Permit Note	Grab	See the WET Testing section for more information.

Changes from Previous Permit

Effluent limitations and monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit. See additional explanation of limits under “Explanation of Limits and Monitoring Requirements” below.

The **Chloride** sampling frequency has increased to 3/week.

Explanation of Limits and Monitoring Requirements

More information on categorical and water quality based limits (WQBEL) is found in the “Water Quality-Based Effluent Limitations for Maple Island Inc. (WI-0003883-11-0)” memo dated June 19, 2024.

Discharges – In 2021 Maple Island Inc. connected directly to the City of Medford’s collection system. Effluent is normally transferred to the Medford Wastewater Treatment Facility for additional treatment and discharge, although the facility also maintains the capability to discharge to the Black River through Outfall 001. Two types of effluent limits are included in this permit: water quality based limits necessary to protect the receiving water and categorical limits necessary to comply with EPA national production based limits. In the 1980's, the Department modeled the Black River and developed water quality based limits for both Maple Island and the City of Medford. A base stream flow of 12 cfs was assigned to the City to allow assimilation of its discharge in the River. Therefore, Maple Island cannot discharge its wastewater when the river flow is below 12 cfs. **Monitoring for all parameters is required only during periods of discharge.**

BOD5 – The 50 mg/L BOD limit remains the same and is included to ensure that waste treatment is provided and to reduce shock loading to the receiving water.

pH – Surface water criteria for pH are required per ch. NR 102(4)(c).

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in NR 102 (water quality standards) and NR 217, Wis. Adm. Code (effluent standards and limitations for phosphorus). Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a water quality-based effluent limit (WQBEL) determined by stream criteria and a WQBEL based on a Total Daily Maximum Daily Load (TMDL) allocation.

In the case of Maple Island Inc:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 60 pounds per month 12-month rolling average (NR 217 Wis. Adm. Code). The limit memo determined that the facility discharges less than the threshold; therefore, a TBEL is not applicable this permit term.
- Based on the size and classification of the stream, the categorical water quality criterion for the Black River is 75 ug/L. This criterion and instream background phosphorus data are used to calculate the stream criteria-based WQBELs. The calculated WQBELs are 0.225 mg/L (monthly average), 0.075 mg/L (6-month average) and 0.2 lbs/day (6-month average). *(Please note: compliance with the 6-month average is measured each April and October.)*
- The facility does not lie within the boundaries of any approved total maximum daily load (TMDL) area, thus a phosphorus WQBEL based on a TMDL allocation is likewise not required during this permit term.

Chloride - To get a more representative snapshot of the true effluent concentration, monitoring will take place with a sample frequency of 3/week. This requires that samples be collected on three consecutive days each week.

WET Testing – Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wi.gov/topic/wastewater/wet.html>.)

Based on historical WET test data and reasonable potential factor (RPF) calculations WET tests are required this permit term, but limits are not needed. A WET Checklist was prepared to determine the number of WET tests that are needed. As toxicity potential increases, more points accumulate, and more monitoring is required to assure toxicity is not occurring over the short (acute) and long (chronic) term. Based on the total points accumulated and Chapter 1.3 of the WET Guidance Document two sets of Acute/Chronic WET Tests are required this permit term during a period of discharge.

Sampling Frequencies - The “Monitoring Frequencies for Individual Wastewater Permits” guidance document (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to

ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department has determined at this time that the facility meets the guidance and no additional changes in the monitoring frequency is required this permit term.

Sample Point Number: 610- RECEIVING WATER

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow River		cfs	Daily	Calculated	

Changes from Previous Permit

Limitations and monitoring requirements were re-evaluated for the proposed permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit.

Explanation of Limits and Monitoring Requirements

Discharges are allowed only when the flow of the Black River is at or above 12 cfs. The flow of the Black River shall be monitored immediately prior to, and daily, during periods of discharge from the lagoon. The flow shall be determined by measuring the stream stage height at the iron pipe reference point of the abandoned U.S.G.S. gaging station located north of Division Street and entering the value in the associated U.S.G.S. Rating Table. If the accuracy of the Rating Table no longer appears acceptable, the Department may, in writing, require Maple Island to have the gaging station recalibrated.

3 Schedules

Explanation of Schedules

A schedule is not required this permit term.

Attachments:

Water Flow Schematic update August 2024

“Water Quality-Based Effluent Limitations for Maple Island Inc. (WI-0003883-11-0)” memo dated June 19, 2024

Expiration Date:

September 30, 2029

Justification Of Any Waivers From Permit Application Requirements

N/A

Prepared By: Sheri A. Snowbank Wastewater Specialist

Date: July 16, 2024

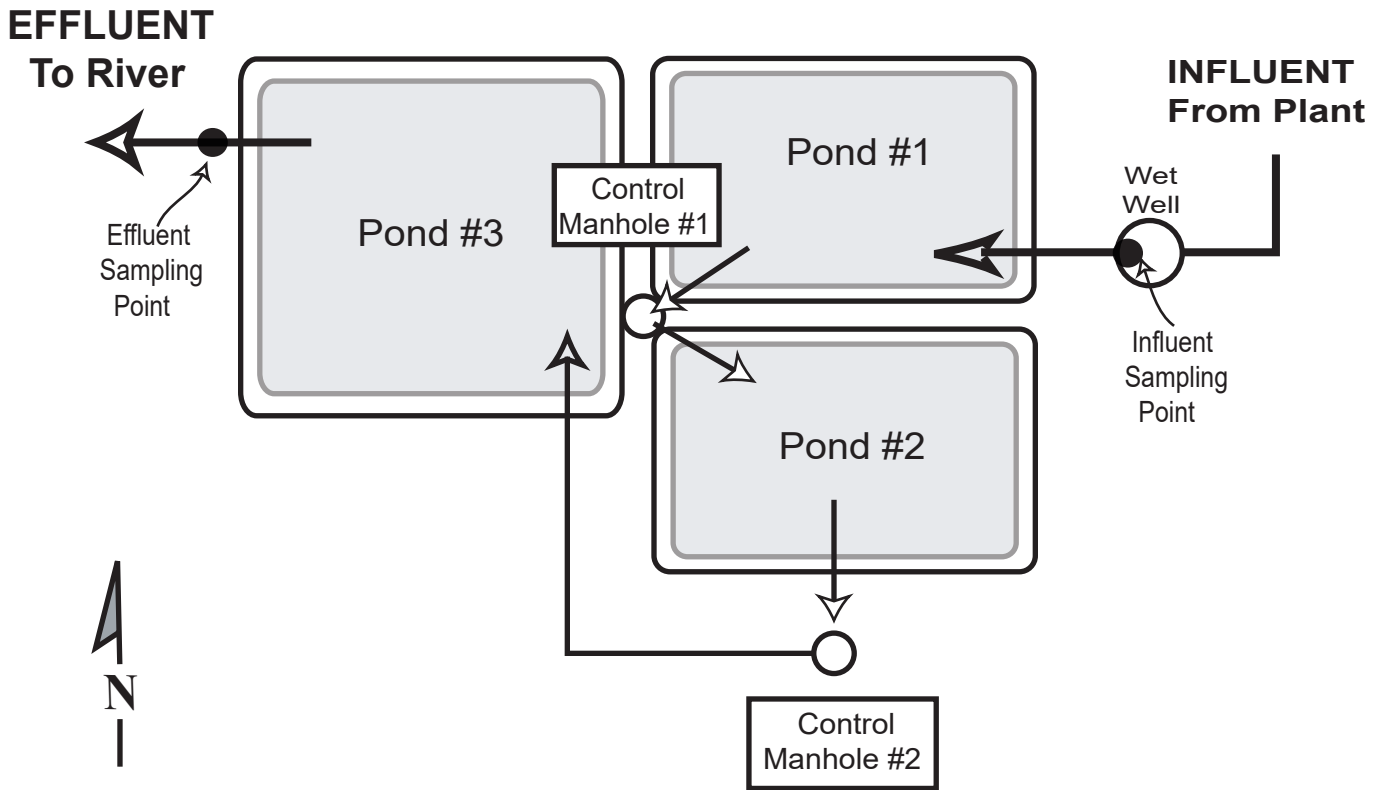
Date updated based on Factcheck comments: No comments received (August 15, 2024)

Date updated based on public notice comments:

Notice of reissuance was published in The Star News, PO Box 180, Medford, WI 54451-0180.

MAPLE ISLAND, INC. Wastewater Treatment Facility

The Maple Island food processing facility treats process wastewater from washing equipment, wet scrubber cleaning, boiler water, and agglomeration water. The three stage wastewater treatment facility consists of two stabilization ponds followed by a holding pond. Normally effluent is transferred to the City of Medford, but can be discharged via Outfall 001 to the Black River. The facility diagram indicates approximate sampling locations.



● Represents Sample Points

NOT TO SCALE

CORRESPONDENCE/MEMORANDUM

DATE: June 19, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center *Michael Polkinghorn*

SUBJECT: Water Quality-Based Effluent Limitations for Maple Island Inc.
 WPDES Permit No. WI-0003883-11-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from Maple Island Inc. in Taylor County. This secondary industrial facility discharges to the Black River, located in the Black and Little Black Rivers Watershed in the Black River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Monthly Average	Six-Month Average	Footnotes
Flow Rate					1
BOD ₅			50 mg/L		1, 2
TSS					1, 2
pH	9.0 s.u.	6.0 s.u.			1
Phosphorus			0.225 mg/L	0.075 mg/L 0.20 lbs/day	1
Chloride					3
Acute WET					4, 6
Chronic WET					5, 6

Footnotes:

1. No changes from the current permit.
2. No discharge is allowed when river flows are below 12 cfs. The permit includes categorical limits of 1,488 lbs/yr for BOD and 2,232 lbs/year for TSS. Daily BOD discharge quantities are also limited by these formulas:
 - a. When river temperatures are $\leq 15^{\circ}\text{C}$, $\text{BOD (lbs/day)} = 26 \times (\text{river flow} - 12 \text{ cfs})$
 - b. When river temperatures are $> 15^{\circ}\text{C}$, $\text{BOD (lbs/day)} = 13 \times (\text{river flow} - 12 \text{ cfs})$
3. Monitoring at a frequency of 3x/wk is recommended during the reissued permit term should a discharge occur.
4. Two acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests.
5. Two chronic WET tests are recommended during the reissued permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 10%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Black River upstream of the confluence with Outfall 001 and the discharge from the City of Medford.

6. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Due to the emergency basis of the discharge, 1x acute and chronic WET tests are recommended per year when a discharge occurs, up to the maximum recommended monitoring for the permit term. Tests should continue after the permit expiration date (until the permit is reissued).

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, discharge area map, & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Arthur Ryzak, Wastewater Engineer – NOR/Ladysmith Service Center
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, Environmental Toxicologist – WY/3
Nathaniel Willis, Wastewater Engineer – WY/3

**Water Quality-Based Effluent Limitations for
Maple Island Inc.**

WPDES Permit No. WI-0003883-11-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

Maple Island, Inc. is a food processing facility that mixes powdered milk into various instant beverages. They process approximately 20 million pounds of powder annually. All the powders are food grade, mainly for the food and dairy industry. The mixing involves blending powdered milk with flavoring ingredients which requires the addition of water as an agglomeration aid. The process wastewater comes from washing equipment, wet scrubber cleaning, boiler water, and agglomeration water. The frequency of equipment washing is variable and depends on changes in production. The majority of the wastewater discharged to the ponds comes from the two wet scrubbers that collect waste powder lost during the production processes. The wet scrubbers use fresh water on a timed basis to thin the re-circulated slurry collecting the waste powder.

Maple Island operates a three-stage wastewater treatment facility consisting of two stabilization ponds followed by a holding pond. Since October 2020, effluent is transferred to the City of Medford wastewater treatment facility (WWTF) on a continuous basis but the surface water discharge (Outfall 001) is being retained in the permit as an emergency discharge. Outfall 001 is located on the east bank of the Black River, approx. 0.25 mi downstream of the County Hwy O Bridge. Before regionalization with the City of Medford, discharges at Outfall 001 would occur once or twice a year during spring and fall over 3 – 10 days per occurrence. For reference, 6 discharges have occurred at Outfall 001 during the current permit term from April 2019 – March 2021 with 4 – 12 days per occurrence.

Effluent limitations based on a combined discharge are considered for this evaluation because Outfall 001 of Maple Island and Outfall 001 of the Medford WWTF, approx. 0.9 mi upstream, share assimilative capacity in the Black River. Emergency discharges via Outfall 001 are authorized by this permit only when flows in the Black River exceed 12 cubic feet per second (cfs). The minimum flow requirement assures adequate waste assimilation capacity exists in the river for discharges from both Maple Island and Medford WWTF. Therefore, this evaluation will assume emergency discharges to the Black River will occur at least 4 days per occurrence at any time during the year and evaluate the need of combined discharge limits with respect to the Medford WWTF.

Attachment #2 is a discharge area map of Outfall 001.

Existing Permit Limitations

The current permit, expired on 03/31/2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Monthly Average	6-Month Average	12-Month Rolling Average	Footnotes
Flow Rate						1
BOD ₅			50 mg/L			2, 3
TSS						2, 3
pH	9.0 s.u.	6.0 s.u.				3
Phosphorus						
Interim					2.0 mg/L	4
Final			0.225 mg/L	0.075 mg/L 0.2 lbs/day		
Chloride						1
Acute WET						5
Chronic WET						5

Footnotes:

- Monitoring only.
- No discharge is allowed when river flows are below 12 cfs. The permit includes categorical limits of 1,488 lbs/yr for BOD and 2,232 lbs/year for TSS. Daily BOD discharge quantities are also limited by these formulas:
 - When river temperatures are $\leq 15^{\circ}\text{C}$, $\text{BOD (lbs/day)} = 26 \times (\text{river flow} - 12 \text{ cfs})$
 - When river temperatures are $> 15^{\circ}\text{C}$, $\text{BOD (lbs/day)} = 13 \times (\text{river flow} - 12 \text{ cfs})$
- These limitations are not being evaluated as part of this review. With the increase in the receiving water flow rate the calculated limits would be less restrictive than the limits in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR 207.04 Wis. Adm. Code, **the current limits must be continued in the reissued permit.**
- Final phosphorus limits became effective in the permit on 04/01/2021.
- Acute and chronic whole effluent toxicity (WET) testing is required at 2 tests each during a discharge event. If a discharge does not occur, monitoring is not required. The IWC for chronic WET was 14%.

Receiving Water Information

- Name: Black River
- Waterbody Identification Code (WBIC): 1676700
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm water sport fish (WWSF) community, non-public water supply.
- Low Flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from the USGS monthly low-flow memorandum for the Medford WWTF (January 2021) for Station #05380807, low-flow ID BK-2, Lat: 45.130431°, Long: -90.344997°, approx. 0.9 mi upstream of Outfall 001.
 - 7-Q₁₀ = 2.8 cubic feet per second (cfs)
 - 7-Q₂ = 5.0 cfs

$$Q_{avg} = 34 \text{ cfs}$$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q ₁₀ (cfs)	4.0	3.8	5.2	18	9.5	5.8	3.9	3.5	3.3	5.0	7.7	5.6
7-Q ₂ (cfs)	7.4	7.3	13	33	17	12	8.1	7.3	8.0	11	14	9.6

Harmonic Mean Flow = 11.7 cfs using a drainage area of 48.1 mi²

The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

- The 7-Q₁₀ and 7-Q₂ low flows representative of the Black River before the updated USGS low flows were:
 - 7-Q₁₀ = 0.86 cfs
 - 7-Q₂ = 3 cfs
- The September 1994 limit evaluation determined that 12 cfs of river flow would allow sufficient assimilative capacity for the BOD₅ loads between the Medford WWTF and Maple Island and included a formula to calculate BOD₅ limits using any assimilative capacity beyond 12 cfs. Therefore, 12 cfs will be used for limit calculations.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%.
- Source of background concentration data: Chloride data from the Black River at Medford is used for this evaluation. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations.
- Multiple dischargers: As discussed earlier, when Maple Island does discharge to the Black River, the mixing zone is expected to overlap with Outfall 001 of Medford WWTF. Therefore, a combined discharge will be considered for limits.
- Impaired water status: The Black River (stream mi 145.24 – 180.98) is on the Clean Water Act Section 303(d) list for mercury contaminated fish tissue and phosphorus impairments.

Effluent Information

- Flow rate(s):
 - Maximum monthly average = 0.320 million gallons per day (MGD)
 - For reference, the overall average flow rate is 0.287 MGD during April 2019 – March 2021 excluding days discharge did not occur. The maximum monthly average flow rate of 0.320 MGD is used instead of a 365-day maximum annual average flow rate to account for the noncontinuous nature of the discharge. This evaluation will continue the use of the combined discharge flow with the Medford WWTF because both discharges share the assimilative capacity in the Black River. The sum of the annual average design flow of the Medford WWTF (1.45 MGD) and the maximum monthly average flow of Maple Island, will be used to be consistent with limit evaluations for municipal and industrial discharges statewide respectively. Therefore, the representative combined effluent flow is $1.45 + 0.320 = 1.77$ MGD.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water supply: City of Medford.
- Additives: Maple Island utilizes 3 additives in their process from the permit application and are listed below:

Attachment #1

- o Kriss BWT-600 Co-Polymer Dispersent – Boiler water treatment.
- o Kriss BWT-447 Powdered Oxygen Scavenger – Boiler water treatment.
- o Kriss BWT-845 Steamline Treatment – Boiler water treatment.
- o An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. In this case all additives would be discharged on an emergency or infrequent basis where effluent that would be discharged is transferred to the Medford WWTF instead. The best professional judgment reasoning is that the toxicity from any additive would be minimized and limits or use restrictions other than the proposed dosage and use frequency are not needed.

Therefore, an additive review is not needed at this time.

- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code. However, permit application samples are not available at this time since the last discharge at Outfall 001 occurred in March 2021.
- Effluent data from the Medford WWTF during April 2019 – April 2024 will be used to calculate flow-weighted concentrations of substances for the combined discharge with Maple Island. This effort will only be evaluated for substances both facilities have sampled for during the current permit term. If 11 or more detectable samples are available for a given substance from both discharges (and if substance effluent data shows nondetectable concentrations for a facility), P₉₉ statistic concentrations will be used to calculate the combined discharge concentration. Otherwise, the overall average concentrations from both discharges will be used. Effluent flows used in the mass balance for Maple Island and the Medford WWTF are 0.320 and 1.45 MGD respectively. The flow-weighted concentrations are shown in the tables below, along with the facility-specific effluent data. Facility-specific effluent data and calculated flow-weighted data for other substances will also be shown in their respective parts in this evaluation.

Chloride Effluent Data

Sample Date	Maple Island (mg/L)	Medford WWTF (mg/L)
04/17/2019	250	
05/15/2019	140	
11/07/2019	130	
11/11/2019	130	
04/08/2020	130	
04/15/2020	130	
11/10/2020	150	
03/11/2021	200	
03/16/2021	200	
01/03/2024		428
02/12/2024		486
03/03/2024		489
04/28/2024		545
Mean	162	487
Combined Discharge Mean	428	

Attachment #1

The following table presents the average concentrations and loadings at Outfall 001 from April 2019 – March 2021 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement*	Average Mass Discharged*
BOD ₅	19.4 mg/L	
pH field	7.9 s.u.	
Phosphorus	3.83 mg/L	9.24 lbs/day

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
 if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C_s = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

Attachment #1

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Maple Island and the limits are set based on two times the acute toxicity criteria.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 9.6 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chloride (mg/L)	757	1,514	303	428

* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q₁₀ flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 3.0 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chloride (mg/L)	395	9.0	818	164	428

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

The effluent characterization did not include any effluent sampling results for substances for which Human Threshold Criteria exist.

Monthly Average Limits based on Human Cancer Criteria (HCC)

The effluent characterization did not include any effluent sampling results for substances for which Human Cancer Criteria exist.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations may be required for chloride**. Limits and/or monitoring recommendations are made in the paragraphs below:

Chloride – The calculated combined discharge mean of chloride data from Maple Island and the Medford WWTF is 428 mg/L. This value exceeds 1/5th of the calculated daily maximum and weekly average chloride WQBELs, which indicate limits may be needed for Maple Island, Medford WWTF, or both. Considering available effluent data from Maple Island (April 2019 – March 2021), the mean effluent concentration is 162 mg/L. This value is below the calculated chloride WQBELs; **therefore, chloride limits are not recommended during the reissued permit term. Chloride monitoring at a frequency**

of 3x/wk is recommended during the reissued permit term should a discharge occur. This monitoring frequency may be altered depending on the future plans with the facility but any monitoring scheme should result in at least 11 samples available at the next permit reissuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Considering available effluent data from the Medford WWTF (January 2024 – April 2024), the mean effluent concentration is 487 mg/L. This value exceeds 1/5th of the calculated daily maximum and weekly average chloride WQBELs, which indicate the majority of the chloride loading is from the Medford WWTF in the combined discharge scenario with Maple Island and limits would likely be needed. Considering any discharge from Maple Island to the Black River is on an emergency or infrequent basis where effluent is transferred to the Medford WWTF instead, **chloride limits are also not recommended for the Medford WWTF.** This can change if Maple Island chooses to utilize Outfall 001 outside of emergency purposes or reasonable potential for chloride WQBELs is found specifically for Medford WWTF’s chloride discharge to the Black River for their own permit.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Available well monitoring sample data from the Medford Waterworks (PWS ID: 86101257) is provided in the table below:

Water Supply PFAS Data

Sample Date	Sample ID	Well #	PFOS (ng/L)	PFOA (ng/L)
04/16/2024	CC04098-09	BH043	1.1	3.4
06/05/2023	CB05908-03	BH044	0	0.56
06/05/2023	CB05908-01	BH043	1	3.4
Average =			0.7	2.5

These results are less than one fifth of the respective criteria for each substance. Based on the type of discharge, known levels of PFOS/PFOA in the source water, and the emergency basis of the discharge, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Maple Island has the monthly average and 6-month average phosphorus WQBELs of 0.225 mg/L and 0.075 mg/L, respectively, effective in the current permit since April 2021. These limits are more stringent than the 12-month rolling average limit of 1.0 mg/L. **Therefore, a technology-based limit is not recommended during the reissued permit term.**

Water Quality-Based Effluent Limits (WQBEL)

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule

revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

The current permit has the phosphorus WQBELs of 0.225 mg/L as a monthly average and 0.075 mg/L as a 6-month average. These limits became effective in the current permit on 04/01/2021 and are the most stringent limits the Department can implement to a discharge based on a unidirectional flow surface waterbody. **Therefore, these limits do not need to be reevaluated at this time and are recommended to continue during the reissued permit term.** The mass-based phosphorus WQBEL of 0.2 lbs/day as a 6-month average will be reevaluated because it has the potential to change based on the representative effluent flow.

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the Black River has a phosphorus impairment. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.320 MGD = 0.20 lbs/day expressed as a 6-month average.**

Effluent Data

Effluent phosphorus concentration and mass data are shown in the table below from April 2019 – March 2021 for informational purposes.

Phosphorus Effluent Data

Statistics	Conc. (mg/L)	Mass Discharge (lbs/day)
1-day P ₉₉	7.74	17.21
4-day P ₉₉	5.56	12.80
30-day P ₉₉	4.40	10.44
Mean	3.83	9.24
Std	1.28	2.69
Sample Size	18	18
Data Range	2.24 - 5.93	5.87 - 14.159
Date Range	April 2019 – March 2021	

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. For days where the combined discharge is present, the sum of the actual flows reported between Maple Island (April 2019 – March

2021) and the Medford WWTF (April 2019 – March 2021) are used to calculate the combined discharge temperature limits.

The table below summarizes the calculated temperature limits for the combined discharge. The complete thermal calculation table is included as attachment #3.

Monthly Temperature Effluent Data & Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)
MAR	72	120
APR	60	97
MAY	77	120
NOV	65	120

Since this facility provides hydraulic detention times of approx. 6 months, elevated effluent temperatures are unlikely and discharge temperatures are expected to be similar to ambient conditions. The facility uses a fill and draw method of operation with effluent discharges occurring only during the cool weather periods in spring and fall when ambient temperatures are less than 60 deg. F. This condition is expected to increase in effect since regionalization with the Medford WWTF and emergency use status of Outfall 001. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term.**

PART 5 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (2022)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The

Attachment #1

IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 10% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$\text{IWC (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

- Q_e = annual average flow = 0.320 MGD = 0.496 cfs
- f = fraction of the Q_e withdrawn from the receiving water = 0
- Q_s = ¼ of the 7-Q₁₀ = 12 cfs ÷ 4 = 3 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, only WET tests from June 2005 to present are shown in the table below:

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
11/05/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

Acute Reasonable Potential = [(TU_a effluent) (B)(AMZ)]
 Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Attachment #1

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUA and TUC effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC₅₀, IC₂₅ or IC₅₀ ≥ 100%).

Acute Reasonable Potential = 0 < 1.0, **reasonable potential is not shown, and a limit is not required.**

Chronic Reasonable Potential = 0 < 1.0, **reasonable potential is not shown, and a limit is not required.**

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: <https://dnr.wisconsin.gov/topic/Wastewater/WET.html>.

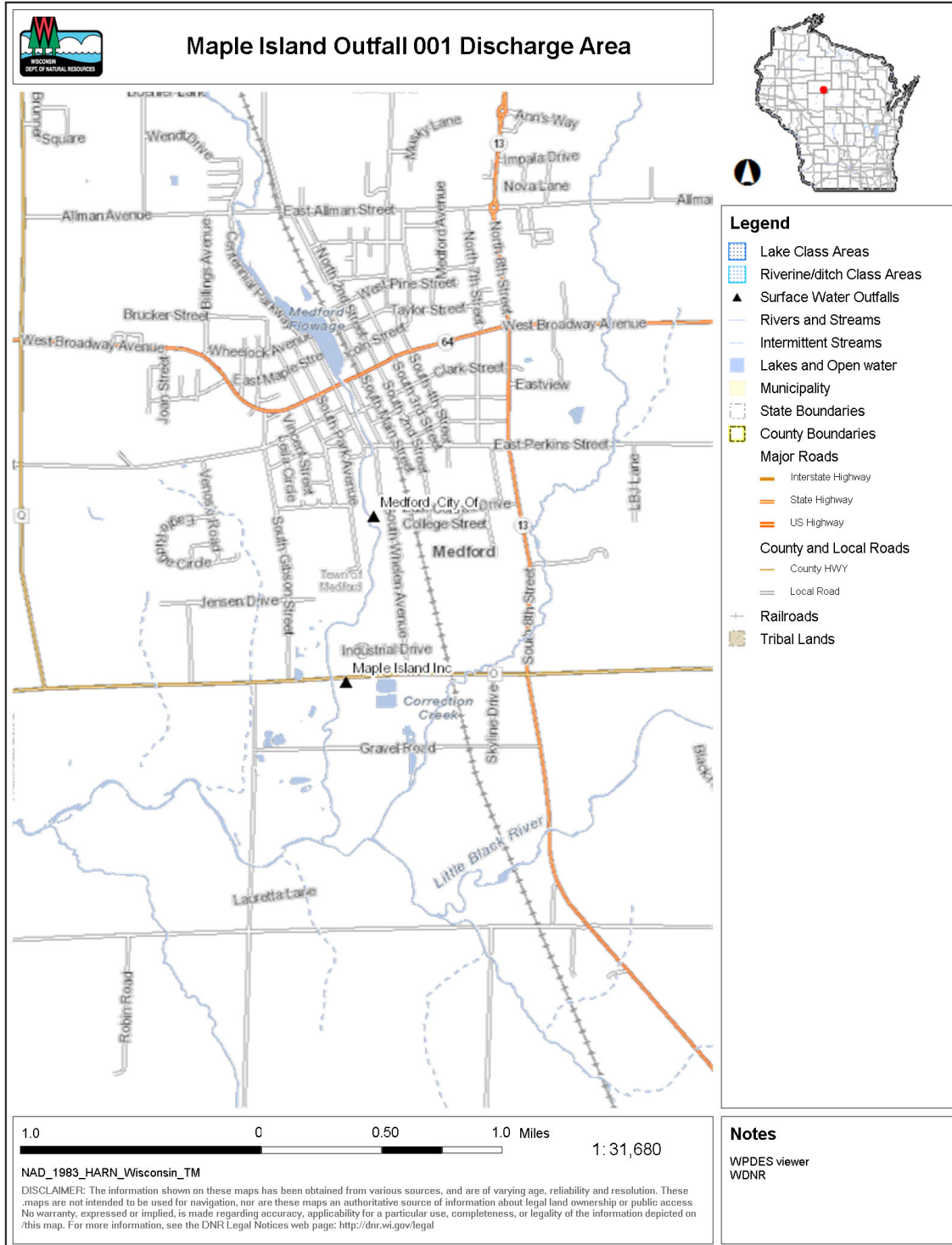
WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not applicable. 0 Points	IWC = 10%. 0 Points
Historical Data	One test used to calculate RP. No tests failed. 0 Points	One test used to calculate RP. No tests failed. 0 Points
Effluent Variability	BOD ₅ and pH limit violation in April 2019 and May 2019 respectively. Discharges made to protect dike integrity. Otherwise little variability, no violations or upsets, consistent WWTF operations. 5 Points	Same as acute. 5 Points
Receiving Water Classification	WWSF community. 5 Points	Same as acute. 5 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC; chloride detected. Additional Compounds of Concern: No. 1 Point	No reasonable potential for limits based on CTC; chloride detected. Additional Compounds of Concern: No. 1 Point
Additives	No biocides and 3 water quality conditioners used. 3 Points	All additives used more than once per 4 days. 3 Points
Discharge Category	Food processor. 5 Points	Same as acute. 5 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as acute. 0 Points
Downstream Impacts	Impacts contributed to by discharger. 5 Points	Same as acute. 5 Points
Total Checklist Points:	24 Points	24 Points

Attachment #1

	Acute	Chronic
Recommended Monitoring Frequency (from Checklist):	Two acute tests during permit term.	Two chronic tests during permit term.
Limit Required?	No.	No.
TRE Recommended? (from Checklist)	No.	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above **2x acute and chronic WET tests are recommended in the reissued permit. Due to the emergency basis of the discharge, 1x acute and chronic WET tests are recommended per year when a discharge occurs, up to the maximum recommended monitoring for the permit term.** WET testing should continue after the permit expiration date (until the permit is reissued).



Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	Maple Island Inc	7-Q₁₀:	12.00	cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%		Start:	NA	End:	04/16/19
Date Prepared:	6/5/2024	f:	0		End:	NA		03/17/21
Design Flow (Qe):	1.77 MGD	Stream type:	Small warm water sport or forage fish co					
Storm Sewer Dist.	0 ft	Qs:Qe ratio:	1.1	:1				
		Calculation Needed?	YES					

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Qesl) (MGD)	Daily Maximum Flow Rate (Qea) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
MAR	38	52	77	12	1.35	1.54	0			72	120
APR	48	55	79	12	2.55	3.40	0			60	97
MAY	58	65	82	12	1.15	1.18	0			77	120
NOV	40	49	77	12	1.11	1.26	0			65	120