

2025 PERMIT REISSUANCE FACT SHEET

Virginia Pollutant Discharge Elimination System (VPDES) Individual Permit No. VA0060500
Waterford Wastewater Treatment Plant, Loudoun County, Virginia

This document provides the pertinent information concerning the legal basis, scientific rationale and justification for the reissuance of the VPDES permit referenced herein. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.058 million gallons per day (MGD) wastewater treatment plant (WWTP). The effluent limitations and special conditions contained in this permit will maintain the Virginia Water Quality Standards (WQS) (effective April 18, 2023) of 9VAC25-260 et seq.

Section A - Permit Summary

1. Facility Information

Facility Address:	40024 Old Wheatland Rd. Waterford, VA 20197		
SIC Code:	4952 (WWTP)	☐ Private ☒ POTW ☐ Federal ☐ State	
NAICS Code:	221320 Sewage Treatment Facilities	VA Environmental Excellence Program Status:	☐ E2 ☐ E3 ☐ E4 ☒ N/A
Licensed Operator Requirements: (per 18VAC160-30-360.B; 9VAC25-31-200.C)	Class	☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ Not applicable	
Reliability Class (per 9VAC25-790):	Class	☐ 1 ☒ 2 ☐ 3	
Other Permits Associated with this Facility:	☐ Nutrient GP ☐ ISWGP ☐ VPA ☐ Other VPDES ☐ NEC (No Exposure Certification) ☐ Air ☐ VWP ☐ Solid Waste ☐ Hazardous Waste ☒ None		

2. Contact Information

	Facility	Permittee/Owner	Operator
Name:	Waterford Wastewater Treatment Plant	Loudoun County Sanitation Authority d/b/a Loudoun Water	Loudoun Water
Contact Name/Title:	Ann Zimmerman - Manager, Community Systems	Brian Carnes - General Manager	Brian Carnes - General Manager
Phone Number:	571-541-7991	571-291-7927	571-291-7927
Email Address:	amzimmerman@loudounwater.org	bcarnes@loudounwater.org	bcarnes@loudounwater.org
Mailing Address:	44865 Loudoun Water Way Ashburn, VA 20147	44865 Loudoun Water Way Ashburn, VA 20147	44865 Loudoun Water Way Ashburn, VA 20147

3. Revisions to Permit from Previous Version

	New	Revised	Removed	None	See Following Section(s) of Fact Sheet for Details of Revision(s)
Effluent Limit(s):	☒	☒	☐	☐	Section C.3 (TSS Percent Removal, BOD ₅ Percent Removal, and Ammonia as N)
Monitoring:	☒	☐	☐	☐	Section C.3 (TSS Influent and BOD ₅ Influent)
Special Condition(s):	☒	☐	☐	☒	Section 1.F (Demonstration of Secondary Treatment, Permit Maintenance Fee, Compliance Schedule)
New Compliance Schedule:	☒ Yes		☐ No		Section C.6

4. Statutory and/or Regulatory Basis* for the Permit and Permit Characterization

☐	Financial Assurance Required	☐	Groundwater Monitoring
☐	Possible Interstate Effect	☒	Pretreatment Program
☐	Interim Limit(s)	☐	Whole Effluent Toxicity (WET) Program
☒	TMDL Wasteload Allocation	☐	Variance

*Those identified are in addition to State Water Control Law and VPDES Regulation

5. Processing Summary

Permit Application Received:	July 19, 2024		Permit Drafted By:	Samantha Sifre	
Permit Application Complete:	July 23, 2024		Reviewed by:	Office	Date
Permit Admin. Continued:	☐ No ☒ Yes	Previous Exp. Date: ☐ N/A	Susan Mackert	NRO	1/10/25
Public Comment Period:	Start: End:		Sarah Sivers	NRO	1/17/25
Permit Effective:					

6. Wastewater Treatment Units Description

The collection system consists of one influent pump station and gravity sewer lines. The wastewater treatment plant consists of two lagoons, two clarifiers, chlorination, dechlorination, and post-aeration.

Wastewater enters the headworks, is screened by a bar screen, and enters Lagoon 1. At design flow, Lagoon 1 has a detention time of approximately 8.25 days. At the end opposite from where the wastewater enters the lagoon, there is an 8-inch outlet that allows wastewater to flow to Lagoon 2. At design flow, Lagoon 2 also has a detention time of 8.25 days. Aeration in the lagoons is provided by air diffusion through a grid of ½-inch, slotted, polyethylene tubing laid in rows across the lagoon bottom. Each lagoon has a water surface of 194ft x 120ft x 10ft. The lagoons have sloped sides and were designed with a bentonite clay bottom.

Typically, the lagoons operate in series. However, operators are able to pump all of the water from Lagoon 2 back into Lagoon 1, and vice versa. This allows for maintenance to be completed on a lagoon, without wastewater being discharged.

From the Lagoon 2, the wastewater flows by gravity and is split between two secondary clarifiers. Each clarifier is a 10ft x 10ft square with a hopper bottom and provides approximately 4.2 hours of detention time. Solids that settle in the hopper bottoms are drained to the influent pump station. Periodically, the clarifiers are drained completely, and solids are removed by a vacuum truck and hauled offsite.

Following clarification, the wastewater is disinfected with chlorine. This is achieved by a 4-tube, tablet feed system that allows calcium hypochlorite tablets to dissolve into the wastewater as it flows through the feeder. The tanks are fitted with over/under baffles to prevent short-circuiting. The effluent is then dechlorinated, aerated, and discharged. Discharge is intermittent, but when occurring, typically lasts from Monday to Friday.

The Waterford Wastewater Treatment Plant is currently in the process of being fully replaced. The current lagoon facility will be replaced with a new influent pump station and a sequencing batch reactor (SBR) facility consisting of a headworks with influent screening, influent EQ basin, two-train ICEAS SBR, post EQ, tertiary filtration, UV disinfection, post aeration and sludge holding tank. Proposed plant upgrades will not result in a change to the existing design flow of 0.058 MGD. The WWTP will transition from a forced/controlled discharge that is intermittent to a continuous discharge. The existing outfall will be reused. Project completion is expected by December 2027.

Outfall Number and Latitude/Longitude	Discharge Sources	Treatment	Design Flow
001 39° 11' 28.9" N 77° 36' 56.9" W	Domestic and Commercial Wastewater	Current facility: Bar screen Aeration Lagoons Clarifiers Tablet chlorination Dechlorination Post aeration After facility upgrades: EQ Basin SBR Post EQ Tertiary Filtration UV disinfection	0.058 MGD

See **Attachment 1** for a facility schematic/diagram.

See **Attachment 2** for the topographic map of Waterford (215A)

See **Attachment 3** for most recent Site Inspection Report.

Table 1: Chemical Storage

Chemical	Volume Stored	Spill/Stormwater Prevention Measures
D-chlor Tablets (sodium sulfite)	Twenty-Five 5-gallon buckets	Dry storage, spill kit
Chlorine Tablets	Twenty-Five 5-gallon buckets	Dry storage, spill kit
Hydrated Lime	One 25-gallon bucket	Dry storage, spill kit
DELPAC (polyaluminum chloride)	Two 55-gallon drums	Drum storage platform/containment, spill kit

Section B – Receiving Stream Information

1. Receiving Stream Classification and Flow Frequencies

Receiving Stream:	South Fork Catoctin Creek		
Stream Basin:	Potomac River	River Mile:	1.63
Subbasin:	Potomac River	Stream Class:	III
Section:	10b	Stream Code:	1ASOC
Antidegradation (9VAC25-260-30):	☒ Tier 1 ☐ Tier 2 ☐ Tier 3	6 th Order HUC:	PL02
Special Standards:	None		
Tidal:	☐ Yes ☒ No		
	Low Flow	High Flow December - May	
7Q10 (MGD):	0.15 MGD	1.91 MGD	
1Q10 (MGD):	0.12 MGD	1.48 MGD	
30Q10 (MGD):	0.35 MGD	3.03 MGD	
30Q5 Flow (MGD):	0.61 MGD		
Harmonic Mean Flow (MGD):	2.54 MGD		

See **Attachment 4** for Flow Frequency Determination.

See **Attachment 5** for Permit Planning Statement.

2. Ambient Water Quality Information

This facility discharges to South Fork Catoctin Creek. The nearest DEQ ambient monitoring station is 1ASOC001.66, which is located on South Fork Catoctin Creek at the Rt. 698 bridge crossing, approximately 0.04 miles upstream of Outfall 001. The following is the water quality summary for this segment of South Fork Catoctin Creek, as taken from the 2022 Integrated Report:

DEQ monitoring stations located in this segment of South Fork Catoctin Creek:

- ambient water quality monitoring station 1ASOC001.66 at Route 698
- freshwater probabilistic monitoring station 1ASOC002.93, at 1.2 miles upstream from Route 698

The aquatic life use is assessed as impaired based on benthic macroinvertebrate bioassessment and observed effects are noted due to previous monitoring for mercury in sediment and total phosphorus. The recreation use is assessed as impaired based on *E. coli* data; this impairment is included in the Catoctin Creek bacteria TMDL for the Lower South Fork Catoctin Creek watershed and the Catoctin Creek bacteria TMDL Implementation Plan is complete. The wildlife use is considered fully supporting. There are insufficient water metals data to assess the fish consumption use.

3. Impaired Use Status Evaluation and 303(d) Listed Segments (TMDL)

The facility was addressed in the Catoctin Creek Bacteria TMDL, which was approved by the EPA on May 31, 2002. The facility received an annual *E. coli* wasteload allocation of 1.01E+11 cfu/year based on a design flow of 0.058 MGD. An *E. coli* limitation of 126N/100mL is assigned in the permit and demonstrates compliance with the TMDL wasteload allocation.

This facility discharges to the South Fork Catoctin Creek within the Chesapeake Bay Watershed. The receiving stream has been addressed in the Chesapeake Bay TMDL, approved by the EPA on December 29, 2010. The TMDL addresses dissolved oxygen (DO), chlorophyll a, and submerged aquatic vegetation (SAV) impairments in the mainstem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source waste load allocations (WLAs) for Total Nitrogen (TN),

Total Phosphorus (TP) and Total Suspended Solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185 and 9VAC-25-260-310.

Implementation of the Chesapeake Bay TMDL is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP), approved by EPA on December 29, 2010, Virginia's Phase II WIP, submitted to EPA on March 20, 2012, and Virginia's Phase III WIP, submitted to EPA on August 23, 2019. The approved WIPs recognize the "General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia" (9VAC25-820) as controlling the nutrient allocations for non-significant Chesapeake Bay dischargers. The WIPs state that for nonsignificant Municipal and Industrial facilities, nutrient WLAs are to be consistent with Code of Virginia procedures, which set baseline WLAs to 2005 permitted design capacity nutrient load levels. In accordance with the WIPs, TN and TP WLAs for non-significant facilities are considered aggregate allocations and will not be included in individual permits. The WIPs also consider TSS WLAs for non-significant facilities to be aggregate allocations, but TSS limits are to be included in individual VPDES permits in conformance with the technology-based requirements of the Clean Water Act. However, the WIPs recognize that as long as the aggregated TSS permitted loads for all dischargers is less than the aggregated TSS load in the WIPs, the individual permit will be consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. This facility is classified as a non-significant Chesapeake Bay discharger because it has a permitted design capacity flow, or equivalent load, of less than 500,000 gallons per day into non-tidal waters. This facility has not made application for a new or expanded discharge since 2005 and proposed plant upgrades will not result in a change to the existing design flow of 0.058 MGD. It is therefore covered by rule under the 9VAC25-820 regulation. In accordance with the WIPs, TN and TP load limits are not included in this individual permit but are consistent with the TMDL because the current nutrient loads are in conformance with the facility's 2005 permitted design capacity loads. This individual permit includes TSS limits of 30 mg/L monthly average and 45 mg/L weekly average that are in conformance with technology-based requirements and, in turn, are consistent with the Chesapeake Bay TMDL. Proposed plant upgrades will not result in a change to the existing design flow of 0.058 MGD.

Table 2: Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Year First Listed as Impaired	TMDL completed	WLA	Basis for WLA
South Fork Catoctin Creek	Aquatic Life	Benthic Macro-invertebrate Bioassessment	2008	No	---	---
	Recreation	<i>E. coli</i>	1996	Catoctin Creek Bacteria 05/31/2022	1.60E+11 cfu/year fecal coliform 1.01E+11 cfu/year <i>E. coli</i> *	200 cfu/100ml fecal coliform 126 cfu/100 ml <i>E. coli</i> * --- 0.058 MGD

* The WLA is expressed in the Catoctin Creek Bacteria TMDL as cfu/year fecal coliform bacteria.

4. Antidegradation (9VAC25-260-30):

Tier: ☒ 1 ☐ 2 ☐ 3

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9VAC25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. South Fork Catoctin Creek, in the immediate vicinity of the discharge, is determined to be a Tier 1 water based on data collected from the monitoring station immediately upstream of the outfall. Therefore, it is staff's professional judgement that the receiving stream be classified as Tier 1.

Section C – Effluent Screening, Limitation Development and Additional Requirements

1. Effluent Data Suitability Analysis

The suitability of effluent data must first be evaluated prior to calculating wasteload allocations (WLAs) and developing water-quality based effluent limits. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated. In addition, all pollutants where the laboratory QL exceeded the agency accepted QL were evaluated as if they were observed at the reported laboratory QL.

Effluent data obtained from Discharge Monitoring Reports has been reviewed and determined to be suitable for evaluation. Please see **Attachment 7** for a summary of effluent data. Reasonable potential analyses were performed for the parameters described in **Table 3** below.

2. Reasonable Potential Analysis

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. A reasonable potential analysis is conducted to compare the calculated WLA values with available effluent data to determine the need for effluent limitations. A limitation evaluation begins by determining chronic and acute wasteload allocations (WLAs) using the MSTRANTI computer application. See **Attachments 7, 8, 9, 10, and 11** for effluent data submitted in the Discharge Monitoring Reports (DMRs) and the permit application, explanation of MSTRANTI source data, MSTRANTI results, MIX, and STATs results.

If it is determined that a pollutant does or may exist in effluent, a Reasonable Potential Analysis must be conducted in order to determine if it is statistically probable that the effluent may cause or contribute to a violation of the instream acute and chronic criteria contained in the Virginia Water Quality Standards (9VAC25-260 et seq.). The first step of the analysis is determining the maximum concentration that will maintain the abovementioned criteria. This concentration is known as a wasteload allocation (WLA). The WLA is calculated in a DEQ computer application called MSTRANTI, which calculates WLAs from receiving stream and effluent data for flow, water quality, and mixing during critical low flow conditions. The second step of the analysis requires inserting the acute and chronic WLAs and pollutant concentration data submitted by the permittee into another computer application called STATs. Based on the entered effluent data, STATs calculates the daily, 4-day, and/or 30-day 97th percentiles from the lognormal distribution of the data and compares them to the WLAs. The 97th percentile value is used to determine if there is reasonable potential to cause water quality standards violations, and the appropriate limitation to prevent those violations, if necessary. This limitation is calculated by STATs based on EPA-guidelines for the control of toxic pollutants.

Additionally, the DEQ mixing zone analysis program MIX was utilized to establish that for an effluent discharge of 0.058 MGD. Complete mixing assumptions are valid for the 7Q10 and 30Q10 low flow conditions but only valid at 44.07 % of the 1Q10 low flow condition. This mixing information was entered into the wasteload allocation analysis described above.

Effluent limitations are needed if:

- 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation; or,
- 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation.

A summary of the reasonable potential analyses is presented in Table 3 below. The limitations presented in Table 4 are those resulting from Reasonable Potential Analysis and are not necessarily final or all-inclusive permit limitations.

Table 3. Reasonable Potential Analysis for Outfall 001

Parameter	Analysis Value	WLA _a	WLA _c	HH	Limit?
Ammonia (mg/L)	9.0 ^a	9.48 ^c	9.18 ^c	-	Yes
TRC (mg/L)	0.20 ^b	4 ^d	4 ^d	-	Yes

^a 9.0 mg/L was used to force a limitation per Guidance Memorandum 00-2011.

^b 0.20 mg/L was carried forward from the previous reissuance.

^c These values are DEQ Statistically Derived Permit Limits. See **Attachment 10** for details.

^d These values are DEQ Statistically Derived Permit Limits. See **Attachment 11** for details.

3. Effluent Limitations and Monitoring Requirements

Table 4. Basis for limitations Outfall 001 – Interim and Final Limits - Design Capacity: 0.058 MGD

PARAMETER	BASIS FOR LIMIT	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		MONTHLY AVG	WEEKLY AVG	MIN	MAX	FREQUENCY	SAMPLE TYPE
001 - Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
002 - pH (S.U.)	1, 2	NA	NA	6.0	9.0	1/day	Grab
007 - Dissolved Oxygen	2, 4	NA	NA	6.8 mg/L	NA	1/day	Grab
003 –BOD ₅ , Effluent	2, 4	24 mg/L 5.3 kg/d	36 mg/L 7.9 kg/d	NA	NA	1/week	4HC
004 - Total Suspended Solids, Effluent	1, 3	30 mg/L 6.6 kg/d	45 mg/L 9.9 kg/d	NA	NA	1/week	4HC
165 - Total Residual Chlorine	5	0.017 mg/L	0.019 mg/L	NA	NA	3/day	Grab
157 - Total Residual Chlorine *	3	NA	NA	1.0 mg/L	NA	3/day	Grab

PARAMETER	BASIS FOR LIMIT	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		MONTHLY AVG	WEEKLY AVG	MIN	MAX	FREQUENCY	SAMPLE TYPE
120 - <i>E. coli</i> ^{a, b}	2, 6, 7	126** (N/100ml)	NA	NA	NA	1/quarter	Grab (10am-4pm)
312 - Ammonia as N (Jun – Nov), Interim	5	12 mg/L	18 mg/L	NA	NA	1/week	4HC
312 - Ammonia as N (Jun – Nov), Final	5	6.6 mg/L	9.7 mg/L	NA	NA	1/week	4HC
313 - Ammonia as N (Dec – May)	5	NL mg/L	NA	NA	NA	1/quarter	4HC
354 - BOD ₅ , Influent	1	NL mg/L	NA	NA	NA	1/year	Grab
979 - BOD ₅ Percent Removal	1	NA	NA	85%	NA	1/year	Calculated
625 - TSS, Influent	1	NL mg/L	NA	NA	NA	1/year	Grab
064 - TSS Percent Removal	1	NA	NA	85%	NA	1/year	Calculated

NA = Not applicable NL = No limitation, monitoring required

TIRE = Totalizing, Indicating & Recording Equipment

4 HC = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 4-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of 4 (four) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum 4 (four) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15 minutes.

*Parameter Code 157 - TRC samples are taken prior to dechlorination (they are not final effluent)

**Geometric mean

^a Samples shall be collected between 10:00 a.m. and 4:00 p.m.

^b The permittee shall collect four (4) samples during one month within each quarterly monitoring period as defined below. The results shall be reported as the geometric mean.

The quarterly monitoring periods shall be January through March, April through June, July through September and October through December. The DMR shall be submitted no later than the 10th day of the month following the monitoring period.

Should any of the quarterly monitoring results for *E. coli* exceed 126 n/100 mL, reported as the geometric mean, the monitoring frequency shall revert to once per week for the remainder of the permit term.

The basis for the limitation codes are:

1. Federal Effluent Guidelines - Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Standards
3. Professional Judgement
4. Stream Model – **Attachment 12**
5. Water Quality Based Effluent Limitation
6. Planning Statement – **Attachment 5**
7. DEQ Disinfection Guidance

pH:

The Federal Effluent Guidelines (FEGs) for Secondary Treatment (40 CFR 133.102) require that pH be maintained between 6.0-9.0 SU. The Virginia Water Quality Standards (WQS), 9VAC25-260-50 also require that pH be maintained between 6.0-9.0 SU for Nontidal Waters.

DO:

The DO minimum limitation of 6.8 mg/L is carried forward from the 2020 permit reissuance. The limitation is based on the stream modeling conducted in October 1973. This limitation is expected to maintain consistency with the dissolved oxygen numerical criteria (MIN of 4.0 mg/L and Daily AVG of 5.0 mg/L) for Class III waters, Non-tidal Waters (Coastal and Piedmont Zones), 9VAC 25-260-50.

BOD₅ and TSS:

The BOD₅ limitations of 24 mg/L (monthly average) and 36 mg/L (weekly average), and the TSS limitations of 30 mg/L (monthly average) and 45 mg/L (weekly average), are carried forward from the 2020 permit reissuance. BOD₅ limitations are based on the stream modeling conducted in October 1973 (**Attachment 12**) and are set to meet the water quality criteria for DO in the receiving stream.

Percent Removal and Influent Monitoring for BOD₅ and TSS:

This VPDES permit requires 85% removal of BOD₅ and TSS in accordance with the federal effluent guidelines for Secondary Treatment included in 40 CFR § 133.102.

E. coli:

All sewage discharges must be disinfected to achieve applicable bacterial concentrations in accordance with Virginia Water Quality Standards, 9VAC25-260-170. *E. coli* is the bacterial indicator for sewage effluents to freshwater. The facility is located within the study area for the Catoctin Creek Bacterial TMDL, which was approved by the EPA on 05/31/2002. The plant was assigned an *E. coli* wasteload allocation of 1.01e+11 cfu/year. An *E. coli* limit of 126 N/100 mL (monthly geometric mean) is included in this permit and addresses the Virginia Water Quality Standard and the 1.01e+11 cfu/year wasteload allocation from the Catoctin Creek TMDL.

Total Residual Chlorine:

Because chlorination is used for disinfection, a concentration of 0.20 mg/L was carried forward from the 2020 reissuance and was entered into STATs to generate a limit. The reasonable potential analysis resulted in a monthly average limitation for TRC of 0.017 mg/L and a weekly average limitation of 0.019 mg/L. These limits are as stringent as the 2020 permit limitations and will be carried forward with the 2025 permit reissuance.

Upon completion of plant upgrades, UV will be used for disinfection. Therefore, TRC limits will no longer be required.

Ammonia:

As described in DEQ Guidance Memo GM00-2011, ammonia is a pollutant known to be present in municipal effluents and evaluations should be conducted with a default value of 9.00 mg/L. Ammonia WLAs are affected by pH and temperature. The permit has historically included annual and wet weather limits for ammonia. For this reissuance, the revised ammonia freshwater criteria (9VAC25-260-155 subsections B and C) were used to calculate the ammonia limits. Temperature has a significant effect on

the reasonable potential analysis for ammonia, therefore the permittee provided supplemental daily temperature data from April 2022 – April 2024 that was used for this Reasonable Potential Analysis.

June-November (Low Flow/Annual):

Reasonable potential analysis indicated that monthly average and weekly average Ammonia limitations of 6.62 mg/L and 9.68 mg/L, respectively, are needed for the low flow months based on chronic toxicity. These limits are more stringent than the 2020 permit limitations and will be included in this permit reissuance.

According to the DMR data (**Attachment 7**), the permittee may be unable to meet the more stringent ammonia limitations until the upgrade is completed. Therefore, a three-year compliance schedule is included in the permit. See Section F. Part 1.F of the Fact Sheet for additional information

December-May (High Flow/Winter):

Reasonable potential analysis indicated that no limit is needed for the high flow months based on chronic toxicity. This is consistent with the 2020 permit and no limits are proposed.

Aluminum:

Virginia adopted aluminum criteria on June 25, 2024. In conjunction with this, implementation guidance will be developed to establish effluent monitoring and reasonable potential analysis requirements and procedures for total recoverable aluminum, and parameters known to effect aluminum concentrations. These processes need to be done concurrently and will allow for consistent monitoring and application throughout the Commonwealth. Aluminum implementation guidance for the VPDES program will include procedures for reasonable potential analysis and establishment of effluent limits where reasonable potential exists.

While guidance is under development, municipal and industrial categories that have been identified by EPA as possible significant sources of aluminum are encouraged to voluntarily sample total recoverable aluminum at a frequency of three times per year and Dissolved Organic Carbon on a monthly basis. Sampling and analysis shall be conducted utilizing 40 CFR Part 136 methods. Once implementation guidance is finalized, the monitoring language will be added to permits during their next reissuance cycle. Additional monitoring may be required by permits prior to reissuance, which may result in permits being administratively continued for a short period of time. The need for this will be evaluated on a case-by-case basis.

Nutrients Total Nitrogen (TN) and Total Phosphorus (TP):

This facility is classified as a nonsignificant Chesapeake Bay discharger because it has a permitted design capacity (PDC), or equivalent load of less than 0.1 MGD. Nonsignificant dischargers are subject to aggregate wasteload allocations for Total Nitrogen (TN), Total Phosphorus (TP), and sediments under the Total Maximum Daily Load (TMDL) for the Chesapeake Bay.

The 2020 permit includes quarterly monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus. The monitoring was needed to protect the Chesapeake Bay Water Quality Standards and verify assumptions made while developing the Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL. The monitoring set forth in accordance with Guidance Memo No. 14-2011, Nutrient Monitoring for “Nonsignificant” Discharges to the Chesapeake Bay Watershed was only required for one permit term, so this monitoring shall be removed with the 2025 reissuance.

If this facility were to expand to discharge 40,000 gallons or more per day, the owner would be required to obtain coverage under 9VAC25-820 General VPDES Watershed Permit as stated in Code of Virginia §62.1-44.19:15.A.3, New or Expanded Facilities. The owner shall demonstrate to the Department that he has acquired wasteload allocations sufficient to offset his delivered total nitrogen and total phosphorus loads. Those loads are based on the permitted design capacity (PDC) prior to July 1, 2005, or in this case, 0.058 MGD.

PDC means the allowable load (lb/year) of total nitrogen and total phosphorus assigned to an existing facility that is a non-significant discharger (less than 0.1 MGD with a discharge below the fall line and less than 0.5 MGD above the fall line) that does not have a wasteload allocation listed in the Water Quality Management Plan Regulation 9VAC25-720.

Facilities that have installed secondary wastewater treatment technology intended to achieve a BOD₅ and TSS monthly average of 30 mg/L are assumed to achieve an annual average total nitrogen effluent concentration of 18.7 mg/L and an annual average total phosphorus concentration of 2.5 mg/L.

The PDC for the Waterford Wastewater Treatment Plant at the 0.058 MGD design flow was calculated using the following equation:

$$\text{PDC} = \text{Existing Flow (MGD)} \times \text{Nutrient Concentration (mg/L)} \times 365 \text{ (days per year)} \times 8.345 \text{ (conversion factor)}$$

Total Nitrogen PDC = 0.058 MGD x 18.7 mg/L x 365 x 8.345 = 3303.6.7 lbs/year

Total Phosphorus PDC = 0.058 MGD x 2.5 mg/L x 365 x 8.345 = 441.6 lbs/year

4. Monitoring Frequencies:

All sampling frequencies were selected based on the recommendations of the VPDES Permit Writer's Manual (Version 1.02 revised February 11, 2025).

5. Antibacksliding:

All limits in the 2025 permit are at least as stringent as in the 2020 permit.

6. Compliance Schedules:

The VPDES Permit Regulation, 9VAC25-31-250 allows use of Compliance Schedules to allow facilities sufficient time for operational or structural changes to meet newly established effluent limits. The permit contains newly established limits for Ammonia, as N. Because the facility was not designed to meet these limits and the facility is in the process of being upgraded, a schedule of compliance is required to provide the permittee time to meet these new limits. The permittee shall achieve compliance with the final limits specified in Part 1.A.1. of the VPDES permit in accordance with the following schedule as contained in Part I.G of the permit:

Ammonia Compliance Schedule	
Action	Date to be Completed
Submit progress reports to DEQ annually	No later than November 1, commencing November 1, 2026
Complete facility upgrades	By December 31, 2027
Achieve compliance with final Ammonia, as N limits	By August 1, 2028

7. Variances/Alternate Limits or Conditions:

None.

8. Regulations of Users (9VAC25-31-280 B 9):

Not applicable, this facility is a POTW.

Section D: Sludge Use and Disposal Requirements:

1. Sewage Sludge Management:

The settled digested sludge is hauled from the sludge digester to the Broad Run Water Reclamation Plant for disposal, VPDES permit number VA0091383. The Broad Run Water Reclamation Plant disposes of the sludge through Contract Land Disposal (Class B Sludge) or it may be hauled to the King George County Landfill for disposal.

2. Basis for Sludge Use and Disposal Requirements:

Not applicable as this facility does not land apply sludge. There are no limits or monitoring requirements associated with sludge use or disposal beyond compliance with the Sludge Management Plan approved with the reissuance of the permit.

Section E: Lagoon System Closure

During the development of the 2020 permit, the DEQ's Groundwater Program Coordinator reviewed the groundwater monitoring data and well installation logs and current monitoring plan within the context of the *Guidance Memo for VPDES Permits with Groundwater Monitoring Requirements* (GM18-2013). The full review is included in the correspondence file for the 2020 reissuance; however, the major conclusions were:

- i. Based on the drilling information and scan of the lagoon design, it appears the lagoon is located near the top of the bedrock. In such cases, any release from the lagoon will dominantly drain into the bedrock, rather than through the soil profile on top of the bedrock.
- ii. The installed wells are very shallow, and are prone to influences (ex. road salt, animal/agriculture, etc.), making it hard to interpret the data gathered.
- iii. Bedrock wells, completed within a water bearing fracture zone, would be better able to determine if the lagoon is impacting the underlying aquifer. Four such wells would be able to determine if impacts are occurring, and if so, any leaks have traveled towards the receiving stream.

It was staff's professional judgement that the groundwater monitoring data collected by the facility may not accurately characterize the site and any potential impacts as a result of treatment operations. Because of the facility upgrade and lagoon removal, it was staff's professional judgement that removal of the lagoons as the potential source of groundwater contamination would alleviate the need to perform groundwater monitoring and evaluation of the lagoon system integrity. Accordingly, the groundwater monitoring requirements were modified to allow Loudoun Water to submit a plan and schedule for removing the lagoon system during the 2020 permit term thereby negating the need for updating the groundwater monitoring plan in accordance with the *Guidance Memo for VPDES Permits with Groundwater Monitoring Requirements* (GM18-2013).

Due to a project delay, Loudoun Water met with DEQ staff on June 18, 2024 to discuss the schedule to upgrade the treatment works, closure of the lagoon system and to request an extension to the approved Source Removal Plan and Schedule. Because of the delays encountered for lagoon system closure did not occur during the 2020 permit term. As such, it is staff's professional judgement that the 2025 permit include a requirement to submit an updated Source Removal Plan and Schedule for review and approval within 90 days of the effective date of the permit (Month – Day, 2025) in lieu of updating the groundwater monitoring plan. Loudoun Water has indicated that the lagoons will be closed by December 31, 2027. Should that not occur, the permit may be reopened to evaluate the need for groundwater monitoring requirements.

Section F: Rationale for Special Conditions and Other Requirements

Part I.B Additional TRC and *E. coli* Limitations and Monitoring Requirements

Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790 and Water Quality Standards 9VAC25-260-170, Bacteria; Other Recreational Waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

Part I.C.1 Compliance Reporting

Rationale: Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limitation or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

Part I.D.1 95% Capacity Reopener

Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits.

Part I.D.2 Materials Handling/Storage

Rationale: 9VAC25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

Part I.D.3 Operation and Maintenance (O&M) Manual Requirement

Rationale: Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790. VPDES Permit Regulation, 9VAC25-31-190 E.

Part I.D.4 Licensed Operator Requirement

Rationale: The VPDES Permit Regulation, 9VAC25-31-200 C and the Code of Virginia § 54.1-2300 et seq., Waterworks and Wastewater Works Operators Licensing Regulations (18VAC160-30), require licensure of operators.

Part I.D.5 Reliability Class

Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790 for all municipal facilities.

Part I.D.6 Certificate to Construct (CTC)/Certificate to Operate (CTO) Requirement

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790.

Part I.D.7 Treatment Works Closure Plan

Rationale: This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure treatment works are properly closed so that the risk of untreated wastewater discharge, spills, leaks and exposure to raw materials are eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from the discharge on the quality of state waters, or such other information as may be necessary to accomplish the purpose of the State Water Control Law.

Part I.D.8 Reopeners

Rationale:

- Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
- The VPDES Permit Regulation at 9VAC25-31-220 D requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need

for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

- 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.
- 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- Required by VPDES Permit Regulation, 9VAC25-31-220 C for all permits issued to treatment works treating domestic sewage.

Part I.D.9 Permit Maintenance Fees

Rationale: Fees for Permits and Certificates at 9VAC25-20-60.A.4 requires the payment of permit maintenance fee(s) by October 1 of each calendar year. Permits will not be reissued or administratively continued without payment of the required fee(s).

Part I.D.10 Sludge Use and Disposal

Rationale: VPDES Permit Regulation, 9VAC25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

Part I.D.11 Demonstration of Secondary Treatment

Rationale: Influent monitoring added to verify compliance with 85 percent removal of BOD₅ and TSS in accordance with 40 CFR 133.102(a)(3) and 40 CFR 133.102(b)(3).

Part I.E Pretreatment Program Requirements

Rationale: VPDES Permit Regulation, 9VAC25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulation.

This facility is a POTW with a design flow of 0.058 MGD; owned and operated by Loudoun Water. The Loudoun County Sanitation Authority d.b.a. Loudoun Water developed its pretreatment legal authority through its Broad Run Water Reclamation Facility; VPDES Permit VA0091383. This pretreatment program was approved by DEQ on May 17, 2019. The approved pretreatment program requirements are applicable to all POTWs that are owned and operated by the same authority. Therefore, Loudoun Water will be required to conduct an industrial user survey of the collection system and submit the results to DEQ for review.

Part I.F Schedule of Compliance for Ammonia, as N

Rationale: 9VAC25-31-250 allows schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them.

The permit contains newly established limits for Ammonia, as N. Because the facility was not designed to meet these limits and the facility is in the process of being upgraded, a schedule of compliance is required to provide the permittee time to meet these new limits.

In this case, a three-year compliance schedule is granted to provide the permittee with sufficient time to collect data, and if applicable, install treatment to meet the new monthly and weekly average ammonia effluent limitations. See Section C.6 of the Fact Sheet for specific information regarding components of the compliance schedule.

Part I.G Lagoon System Closure

Rationale: Loudoun Water is in the process of upgrading this treatment works, which includes the closure of the lagoon system. See Section E of the Fact Sheet for further details.

Part II, Conditions Applicable to All VPDES Permits

Rationale: The VPDES Permit Regulation at 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

Section F: Public Notice Information

Public Notice Information Required by 9VAC25-31-290:

- Comment Period: 07/12/2025 – 08/11/2025
- Publication Dates: 07/11/2025 and 07/18/2025
- Publishing Newspaper: *Loudoun Times Mirror*

All pertinent information is on file and may be inspected or copied by contacting Susan Mackert at:

Virginia Department of Environmental Quality (DEQ)
Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193
Telephone Number: 571-866-6514
Email: NRO.VPDESPermits@deq.virginia.gov

Persons may comment in writing (hand-delivery, email, or postal mail) to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, mailing address or email address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Department will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Northern Regional Office by appointment.

Section G: Additional Comments

1. **Previous Department Action (s):** None
2. **Staff comments:**
 - (a) Planning conformance statement: The discharge is in conformance with the existing planning documents for the area.
 - (b) Controversial Permit Assessment: This permit is not expected to be controversial.
 - (c) Fees: Permit maintenance fees are up to date, last paid on September 1, 2024.
 - (d) Financial Assurance (9VAC25-650-10): Financial assurance does not apply to this facility because it is a publicly owned treatment works.

Section H: Application and Draft Permit Coordination:

1. **Agency Coordination and Comments:**
 - (a) EPA comments: EPA has categorically waived the right to comment on draft permits for minor facilities that: a) do not have limits based on a TMDL; or b) have limits based on a bacterial TMDL.
 - (b) VDH comments were not received within 14 days.

2. **Owner Comments:** Received March 28, 2025. DEQ response to comments sent June 16, 2025. See Attachment 13.
3. **Public Comments:**
4. **Local Government Notification of Public Notice:** Local government officials were notified of the public comment period on July 10, 2025. In accordance with the Code of Virginia §62.1-44.15:01, the following individuals received the notification: Loudoun County Board of Supervisors, Loudoun County Executive, and the Northern Virginia Regional Commission.

Section I: Fact Sheet Attachments

Attachment 1 – Facility Schematic
Attachment 2 – Topographic Map of Waterford (215A)
Attachment 3 – Site Inspection Report
Attachment 4 – Flow Frequency Determination
Attachment 5 – Planning Statement
Attachment 6 – Effluent Data: Ambient pH and Temperature Data
Attachment 7 – Effluent Data: DMR and Effluent pH and Temperature Data
Attachment 8 – Water Quality Criteria / Wasteload Allocation Analysis
Attachment 9 – Mix analysis
Attachment 10 – Limit analysis for Ammonia
Attachment 11 – Limit Analysis for Total Residual Chlorine
Attachment 12 – Dissolved Oxygen Modeling, October 1973
Attachment 13 – Owner Comments and DEQ Response