

Oak Orchard Wastewater Treatment Plant Minor Facility Registration Application

Prepared for
Onondaga County Department of Water Environment Protection (OCDWEP)
October 10, 2025

FINAL



5795 Widewaters Parkway, Suite 2A
Dewitt, NY, 13214
T: 315.401.3640

Table of Contents

List of Tables	iii
List of Abbreviations	iv
1. Introduction and Facility Description	1-1
1.1 Proposed Project.....	1-1
1.1.1 Municipal Wastewater Treatment Train.....	1-2
1.1.2 Industrial Treatment Train	1-4
2. Regulatory Review.....	2-1
2.1 Permitting.....	2-1
2.2 Attainment Status and Ozone Transport Region	2-1
2.3 New Source Review and Facility Classification.....	2-1
2.3.1 Source Determination	2-1
2.3.2 Facility Classification	2-2
2.4 Emission Calculations	2-2
2.4.1 Combustion Devices.....	2-3
2.4.2 Wastewater Treatment.....	2-5
2.4.3 Greenhouse Gas Emissions Estimates	2-5
2.4.4 Emissions Estimate Summary	2-5
3. Applicable Regulations	3-1
3.1 Applicable State Regulations	3-1
3.2 6 CRR-NY 211.1 Air Pollution Prohibited	3-1
3.2.1 6 CRR-NY 211.2 Visible Emission Standards.....	3-1
3.2.2 6 CRR-NY 212 Process Operations	3-1
3.2.3 6 CRR-NY 227-1 Stationary Combustion Installations.....	3-3
3.2.4 6 CRR-NY 231.12 Air Quality Impact Analysis	3-3
3.2.5 6 CRR-NY 257 Air Quality Standards	3-4
3.2.6 Climate Leadership and Community Protection Act (CLCPA)	3-4
3.3 Applicable Federal Requirements.....	3-5
3.3.1 NSPS (40 CFR Part 60)	3-5
3.3.2 NESHAPs (40 CFR Part 61).....	3-5
3.3.3 NESHAPs for Source Categories (40 CFR Part 63)	3-6
3.3.4 Chemical Accident Prevention Provisions (40 CFR Part 68)	3-6
3.3.5 Mandatory GHG Reporting (40 CFR Part 98 and 6 NYCRR 253).....	3-7
4. Summary and Requests	4-1
Appendix A: Process Flow Diagrams	A-1
Appendix B: Registration Form and Emissions Calculations.....	B-1
Appendix C: Toxchem Modeling Report	C-1

Appendix D: Air Dispersion Modeling Protocol D-1

List of Tables

Table 1-1. Oak Orchard Municipal Treatment Plant Source Inventory1-3

Table 1-2. Industrial Wastewater Treatment Plant Source Inventory1-4

Table 2-1. Permit Classification Thresholds in Tons per Year2-2

Table 2-2. Emissions Sources2-3

Table 2-3. Digester Gas Production2-5

Table 2-4. Summary of Emissions Estimate Tables2-6

Table 3-1. Significant Project Thresholds3-3

List of Abbreviations

AGC	Annual guidance concentration	OCDWEP	Onondaga County Department of Water Environment Protection
ASF	Air State Facility Permit	OSHA	Occupational Safety and Health Administration
BACT	Best Available Control Technology	OTR	Ozone Transport Region
CJWG	Climate Justice Working Group	PBT	Persistent, bioaccumulative, or toxic
CLCPA	Climate Leadership and Community Protection Act	PM	Particulate Matter
CO	Carbon monoxide	POTW	Publicly owned treatment works
CO ₂	Carbon dioxide	ppm	Parts per million
CO _{2e}	Carbon dioxide equivalent	PSD	Prevention of Significant Deterioration
CRR-NY	New York Codes, Rules and Regulations	PTE	Potential to emit
DAR	Department of Air Resources	PSL	Primary sludge
DAC	Disadvantaged community	RMP	Risk Management Plan
ER	Environmental rating	scfm	Standard cubic feet per minute
ERP	Emission rate potential	SGC	Short-term guidance concentration
FAB	Fabrication	SO ₂	Sulfur dioxide
GHG	Greenhouse Gas	TAC	Toxic air contaminant
HAP	Hazardous Air Pollutant	TIA	Toxic Impact Assessment
HTAC	High Toxicity Air Contaminant	UV	Ultraviolet light
ITT	Industrial wastewater treatment train	VOC	Volatile organic compounds
lb	pound	WRF	Water reclamation facility
IWWTP	Industrial Wastewater Treatment Plant	WAS	Waste activated sludge
MBR	Membrane bioreactor	WWTP	Wastewater treatment plant
MMBtu/hr	Million British thermal units per hour		
MGD	Million gallons per day		
MMSCF	Million standard cubic feet		
MOPO	Maintenance of plant operations		
MTT	Municipal wastewater treatment train		
MWe	Megawatts of electricity		
NAAQS	National Ambient Air Quality Standard		
NESHAP	National Emission Standards for Hazardous Air Pollutants		
NSPS	New Source Performance Standard		
NSR	New Source Review		
N ₂ O	Nitrous oxide		
NO _x	Oxides of nitrogen		
NYSDEC	New York State Department of Environmental Conservation		
OOWWTP	Oak Orchard Wastewater Treatment Plant		

Section 1

Introduction and Facility Description

Brown and Caldwell is submitting this Minor Facility Registration Application on behalf of the Onondaga County Department of Water Environment Protection (OCDWEP) for expanded operations at the Oak Orchard Wastewater Treatment Plant (OOWWTP or plant) located at 4200 Oak Orchard Road in Clay, New York (Facility).

OCDWEP owns and operates the OOWWTP which was constructed in 1981 and has a design flow of 10 million gallons per day (MGD). The plant provides advanced secondary treatment of wastewater using an activated sludge process. OOWWTP's emissions are regulated by Air Facility Certificate ID No. 7-3124-00018/02000 (OOWWTP Registration) that includes sources of odor and associated odor controls.

1.1 Proposed Project

The Proposed Project includes the following two components.

First, OCDWEP is proposing to upgrade and expand the existing municipal wastewater treatment train (MTT) to accommodate flow from planned growth in the service area while replacing aging equipment to create an operator-friendly, energy-efficient facility. The OOWWTP Upgrade and Biosolids Facility project is part of the larger OOWWTP Expansion Program to expand and improve the MTT, provide regional solids processing, and generate recycled water for industrial users.

Second, OCDWEP is proposing to construct and operate an industrial wastewater treatment train (ITT) to be co-located at the OOWWTP site to accept industrial process wastewater from the proposed Micron Technology, Inc. (Micron) facility. Micron is planning to construct a semiconductor manufacturing campus in the Town of Clay, New York, at the White Pine Commerce Park. The campus will include a total of four fabrication facilities: FAB1, FAB2, FAB3, and FAB4, to be built in two phases. FAB1 and FAB2 will be constructed in Phase 1, while FAB3 and FAB4 will be constructed in Phase 2. The Micron Campus will be constructed over an approximate 15-year period (2026-2041). FAB1 through FAB4 are expected to be fully constructed and operational by Q2 2028, Q4 2030, Q4 2035, and Q3 2041, respectively.

The scope of this Minor Facility Registration application is for an initial permitting action for construction activities over the next 10 years including MTT upgrades and the ITT construction to receive industrial wastewater discharges from Micron's first phase. Process flow diagrams for the proposed MTT and ITT upgrades are included in **Appendix A**.

A Minor Facility Registration Form is included in **Appendix B**.

Note: ITT modifications to accommodate Phase 2 (i.e., Fabs 3 and 4) and associated emissions will occur outside the initial ten-year window and will therefore be addressed within subsequent, future permitting actions and are not included in this Project.

1.1.1 Municipal Wastewater Treatment Train

OCDWEP is increasing the MTT capacity to accommodate additional sanitary wastewater volume and adding water reclamation facilities to provide recycled water, as requested by Micron. Recycled water for ultrapure water makeup may be provided to Micron as early as August 2029. The existing MTT unit processes will remain operational through late 2030.

The existing MTT generates primary sludge (PSL) from the primary clarifiers and waste activated sludge (WAS) from the secondary clarifiers. The PSL and WAS are combined and sent to two gravity thickeners. Thickened sludge is trucked to the Metropolitan Syracuse Wastewater Treatment Plant. Supernatant from the gravity thickeners is returned to the head of the MTT. This operating scenario will continue until the proposed biosolids upgrade is constructed onsite and attains operational status, currently projected to for late 2033.

The proposed upgrades to MTT will be completed in two stages; the liquid train will be upgraded first, followed by the solids treatment process approximately 3 - 4 years later. The maintenance of plant operations (MOPO) project (described below) will be downstream from the existing treatment process, with the exception that discharge from the MOPO will continue to be conveyed through the existing chlorination/dechlorination facility until the new liquid train is built.

The following describes upgrades to MTT in more detail.

MOPO Project

The MOPO project (downstream from the existing treatment facility) will be constructed to operate in early 2028 including tankage configured as a moving bed bioreactor. The MOPO will replace treatment currently provided by the OOWWTP lagoons and provide winter nitrification to allow for water reclamation. The MOPO project is needed for the following reasons:

1. To treat increased flow from Micron construction and startup flows and expected residential and commercial growth prior to completion of the OOWWTP Liquid train and solids handling upgrades.
2. To meet required influent water quality parameters for the reuse facility and to maintain permit compliance in wet weather operating mode once the lagoons have been removed from service.

Liquid Train

Liquid train upgrades to meet the future flow and water quality effluent requirements, as well as modifications to the existing processes include the following:

1. A complete overhaul of the headworks facility to upgrade and expand coarse screening and grit removal with a more automated system including screenings handling.
2. Addition of two new primary clarifiers that match the four existing units.
3. Replacement of the high purity oxygen activated sludge secondary process with a membrane bioreactor (MBR) secondary treatment process. New fine screens to screen the primary clarifier effluent (upstream of the bioreactors) to protect the membranes.
4. Replacement of the existing chlorination and dechlorination disinfection system with closed vessel ultraviolet light (UV) disinfection.
5. Odor control for the new headworks and primary clarifier weir and effluent channels.
6. New ancillary equipment, chemical storage, flow distribution, and blower and electrical buildings.
7. New administration building.

8. New water reuse facility with ultra filtration and reverse osmosis (initially until the MTT liquid train is upgraded).

Biosolids Treatment

The proposed Biosolids Facility includes:

1. Demolition of the existing gravity thickeners.
2. High-strength waste receiving station.
3. Municipal solids receiving station.
4. Blend tanks for high-strength waste and trucked-in municipal solids.
5. Gravity thickeners for PSL.
6. In-line sludge screening units for PSL.
7. Gravity belt thickeners for WAS, located in the new Thickening/Dewatering Building.
8. Three anaerobic digesters, digested sludge storage tank, and digester heating system.
9. Dewatering centrifuges located in the new thickening/dewatering building.
10. Sludge dryer located in a proposed dryer building.
11. Biogas storage, biogas conditioning, and waste gas flare.
12. Odor control for new thickening/dewatering and dryer buildings.
13. Return pump station.
14. New ancillary equipment, chemical feed systems, chemical storage, and electrical rooms/buildings.

Table 1-1 summarizes the proposed emissions sources, whether the source's emissions is directed to odor control, type of pollutants emitted from the Source, and if the Source is Trivial or Exempt. Trivial sources are identified in 6 CRR-NY 201-3.3. Exempt sources are identified in 6 CRR-NY 201-3.2. A conceptual site plan is presented in **Error! Reference source not found.C-101** in Attachment A. Emissions calculations are addressed in Section 2.4.

Table 1-1. Oak Orchard Municipal Treatment Plant Source Inventory			
Source	Directed to Odor Control?	Pollutants Emitted	Trivial or Exempt?
MOPO Project	No	Negligible	No
Headworks, primary clarifier effluent weir/effluent channels	Yes	Odorous Compounds	No
Primary clarifier	No	Negligible	No
Membrane bioreactor	No	Negligible	No
Sludge thickener	Yes	Odorous Compounds	No
High strength waste receiving and handling	Yes	Odorous Compounds	No
Digesters Max Week: 235 scfm Instantaneous Peak: 305 scfm Annual Average: 180 scfm	No	NA	No
Natural gas / biogas boilers (3) 2 Duty, 1 standby 5 MMBtu/hr each	No	Criteria, Hazardous Air Pollutant (HAP)	No
Flare (305 scfm estimated name plate capacity)	No	Criteria, HAP, TAC	No

Table 1-1. Oak Orchard Municipal Treatment Plant Source Inventory

Source	Directed to Odor Control?	Pollutants Emitted	Trivial or Exempt?
NG/DG Sludge Dryer 7,300 wet lb/hr	No	Criteria, HAP	No
Natural gas-fired roof top heating and cooling units	No	Criteria, HAP	Yes, 201-3.2(c)(1)(i)

1.1.2 Industrial Treatment Train

The ITT component of Phase 1 will ultimately consist of a 16.5 MGD industrial wastewater treatment facility, 2-4 MGD advanced treatment water reuse facility, solids handling facilities, and a river outfall to be combined with OOWWTP's existing outfall. The ITT will be designed and built to primarily treat industrial wastewater from the proposed Micron facility as well as other industries that could be located at the White Pines Industrial Park adjacent to the Micron-Campus. Note: The Part 212 compliance evaluation will be updated prior to introducing industrial process wastewater from additional industrial dischargers.

Incoming industrial wastewater from Micron will flow through the following unit processes in sequence, as summarized Figure D-1 (included in Attachment A): Equalization, screens, biological treatment (anoxic and aerobic reactors), MBR, and UV disinfection. During anoxic treatment, the nitrates in the wastewater will be denitrified. The effluent from the anoxic tank will flow by gravity to the aerobic tank where organics will be degraded and ammonia will be nitrified. Emissions of ammonia-nitrogen from the ITT are expected to be negligible given the near neutral pH and low aeration rate. Steam for process heat will be generated by natural gas-fired boilers.

Based on a review of the proposed wastewater discharge from Micron, one HAP (i.e., methanol) and volatile organic compound (VOC) constituents were identified, but no High Toxicity Air Contaminants (HTACs) were identified. Possible sources of VOC and HAP emissions from the IWWTP are summarized in Table 1-2 below.

Table 1-2. Industrial Wastewater Treatment Plant Source Inventory

Source	FAB	Pollutants Emitted	Exempt or Trivial?
Equalization	FAB 1	VOC, TAC	No
Screens	FAB 1	Negligible	No
Anoxic biotreatment (nitrification)	FAB 1	VOC, TAC	No
Aerobic biotreatment (denitrification)	FAB 1	N ₂ O, VOC, TAC	No
Membrane bioreactor	FAB 1	Negligible	No
UV disinfection	FAB 1	Not applicable (NA), no emissions	Yes
Solids handling	FAB 1	Odorous compounds including H ₂ S (directed to odor control)	No
Roof top building heat and cooling - natural gas	FAB 1	Criteria	Yes, 201-3.2(c)(1)(i)
Ion exchange	FAB 2	NA, no emissions	Yes
Decarbonization stripper	FAB 2	CO ₂	No
Reverse Osmosis (RO)	FAB 2	NA, no emissions	Yes

Table 1-2. Industrial Wastewater Treatment Plant Source Inventory

Source	FAB	Pollutants Emitted	Exempt or Trivial?
Natural gas-fired Cleaver Brooks boilers (3 @ 5.5 MMBtu/hr heat input)	FAB2	Criteria Pollutants, VOC, HAP	No

1. *Criteria Pollutants include carbon monoxide, sulfur dioxide, oxides of nitrogen, particulate matter less than 10 microns in diameter, ozone (not directly emitted and regulated as precursors VOC and oxides of nitrogen (NOx)). TAC is Toxic air contaminant.*
2. *Exempt and trivial activities are defined in 6 CRR-NY 201-3.2 and 6 CRR-NY 201-3.3, respectively.*

Section 2

Regulatory Review

This review includes both treatment plants: ITT and MTT located at OOWWTP.

2.1 Permitting

The Facility is subject to air permitting regulations under the Official Compilation of Codes, Rules and Regulations of the State of New York, Title 6, Chapter III, Subchapter A, Part 201, (6 CRR-NY 201). Under the rules, activities that are not exempt or trivial under 6 CRR-NY Subpart 201-3 must either register with or apply for an air permit from the New York State Department of Environmental Conservation (NYSDEC). NYSDEC provides the following categories of air registration / permits:

- **Minor Facility Registration:** A facility may obtain a registration from the NYSDEC if the following thresholds are met:
 - Actual emissions are less than 50 percent of the federal major source thresholds.
 - Actual emissions are less than the NYSDEC thresholds for persistent, bioaccumulative or toxic (PBT) compounds listed in Table 1 of Subpart 201-9.
- **Air State Facility Permit (ASF Permit):** An ASF Permit is required if potential emissions are less than the Major Source thresholds and actual emissions are greater than 50 percent the Federal Major Source Thresholds.
- **Title V Operating Permit:** A Title V Permit is required if potential emissions equal or exceed Federal Major Source Thresholds.

The Project will not emit PBTs or HTACs and, as summarized in **Table B-1**, in **Appendix B**, potential and actual emissions from the Proposed Project are less than 50 percent of the Major Source thresholds. As such, the facility is a natural minor source, intends to remain a minor source, and is applying for a Minor Facility Registration.

2.2 Attainment Status and Ozone Transport Region

The Facility is located in Onondaga County, New York which is currently designated as unclassified or in attainment for all criteria pollutants. New York is located in the Ozone Transport Region (OTR). The OTR is not considered a nonattainment area; however, the area does contribute to regional ozone pollution and therefore stricter requirements apply to ozone precursor emissions (NO_x and VOC) for facilities in the OTR.

2.3 New Source Review and Facility Classification

2.3.1 Source Determination

NYSDEC's Prevention of Significant Deterioration (PSD) permitting program applicability is set forth in 6 CRR-NY 231 and applies to major stationary sources, defined in 6 CRR-NY 201-2.1(b) 21 as a stationary source or any group of stationary sources, any source or any group of sources, or any facility or any group of facilities, that are:

1. Located on one or more contiguous or adjacent properties.
2. Under common control.

3. Belonging to a single major industrial grouping and that are described in subparagraph (i), (ii), (iv) or (v) of 6 CRR-NY 201-2.1(b) 21.

For the purposes of this definition, “a stationary source, source, or facility or group of stationary sources, sources, or facilities” shall be considered part of a single industrial grouping if all of the air pollutant or air contaminant emitting activities at such stationary source, source, or facility, or any group of stationary sources, sources, or facilities on contiguous or adjacent properties belong to the same major group (i.e., all have the same two-digit code, as described in the *Standard Industrial Classification Manual*, 1987).

The Oak Orchard property is owned and operated by OCDWEP and classified under Standard Industrial Code (SIC) 4952 (sewerage systems), defined as establishments primarily engaged in the collection and disposal of wastes conducted through a sewer system, including such treatment processes as may be provided. As such, applicability of the PSD program was evaluated including both the MTT and the ITT. As discussed in Section 2.1 above, the proposed facility is a Natural Minor Source, and as such, not subject to PSD permitting.

2.3.2 Facility Classification

Since Onondaga County is classified as in attainment or unclassified for all pollutants, PSD would potentially apply (as opposed to nonattainment New Source Review) to the Facility if PSD applicability emissions thresholds were exceeded. Since the entire state of New York is included in the OTR, the PSD major source permitting thresholds for NO_x and VOC are reduced. Permit classification thresholds are summarized in Table 2-1, below.

Table 2-1. Permit Classification Thresholds in Tons per Year						
Permit Type	VOC	NO _x	CO	SO ₂	PM	HAP
Registration	Not exempt or trivial, high toxicity air contaminant less than thresholds in Table 1 (Subpart 201-9), and not subject to State Facility Permit or Title V Permit (i.e., actual emissions less than 50% major source thresholds)					
State Facility Permit	25 (actual)	50 (actual)	50 (actual)	50 (actual)	50 (actual)	10/25 (potential)
Title V Permit	50 (potential)	100 (potential)	100 (potential)	100 (potential)	100 (potential)	10/25 (potential)
PSD Permit	50 (potential)	100 (potential)	250 (potential)	250 (potential)	250 (potential)	10/25 (potential)

As discussed in Section 2.1 above and as summarized in **Table B-1**, in **Appendix B**, the proposed project is a Natural Minor Source, and as such, not subject State Facility Permitting, Title V Permitting, or PSD permitting.

2.4 Emission Calculations

The Facility includes combustion devices, a waste gas burner (i.e., flare), sources of odorous emissions, and sources of volatile organic compounds (VOC) and TACs. These emission sources are summarized in Table 2-2 below. A summary of the emission calculation methodologies follows.

Table 2-2. Emissions Sources

Emission Unit	Fuel	Capacity	Pollutants Emitted
ITT Duty Boiler #1	Natural gas	5.5 MMBtu/hr	Criteria, HAP
ITT Duty Boiler #2	Natural gas	5.5 MMBtu/hr	Criteria, HAP
ITT Back up Boiler	Natural gas	5.5 MMBtu/hr	Criteria, HAP
MTT Duty Boiler #1	Dual Fuel fired (natural gas and digester gas)	5.0 MMBtu/hr	Criteria, HAP
MTT Duty Boiler #2	Dual Fuel fired (natural gas and digester gas)	5.0 MMBtu/hr	Criteria, HAP
MTT Back up Boiler	Dual Fuel fired (natural gas and digester gas)	5.0 MMBtu/hr	Criteria, HAP
MTT Flare (Waste digester gas burner)	Digester gas (3 digesters)	305 scfm	Criteria, HAP, TAC
MTT Sludge Dryer	Dual Fuel fired (natural gas and digester gas)	10.0 MMBtu/hr	Criteria, HAP
ITT Building Heat Equipment	Natural gas	20.5 MMBtu/hr	Criteria, HAP
MTT Building Heat Equipment	Natural gas	12.282 MMBtu/hr	Criteria, HAP
Industrial Wastewater Treatment Train	Electric	16.5 MGD	Odorous Compounds, VOC, TAC, HAP
Municipal Wastewater Treatment Train	Electric	31.46 MGD Peak Day (20-year projection)	Odorous Compounds

2.4.1 Combustion Devices

2.4.1.1 Natural Gas-Fired Combustion Devices

The proposed ITT includes three boilers—two operating as duty, one for back up. However, potential emissions are conservatively estimated based on all three boilers operating 8,760 hours per year. While the estimate is based on all three ITT boilers operating all year while firing natural gas, during typical operation, only two of the three ITT boilers will be operated at any single time. Natural gas-fired boiler emissions of criteria pollutants and HAPs were calculated based on the maximum design heat input for each device, 8,760 operating hours per year, and AP-42 emission factors. All boilers will be equipped with low-NO_x burners; therefore, emission factors for low NO_x burners from AP-42 Table 1.4-1 were used estimates. When final boiler selection is complete, this estimate will be updated based on vendor specifications.

Building heat will be provided by natural gas-fired heating ventilation and air conditioning (HVAC) units. Emissions from building heat are based on the total estimated peak natural gas demand provided by the respective design teams, emission factors from AP-42, and 8,760 hours per year. While the units are not expected to operate at peak demand year-round, potential emissions are conservatively based on operating at peak demand all year. Actual natural gas combustion for heating and cooling is expected to be less.

2.4.1.2 Dual Fuel-Fired Combustion Devices (Natural Gas and Digester Gas)

The MTT digester solids will be conditioned with ferric chloride feed system to reduce H₂S in the digester gas (OOWWTP UPGRADE AND BIOSOLIDS BODR, page 72). Ferric chloride also binds with orthophosphates which reduces the phosphorus available for struvite formation. The Facility will also be equipped with a digester gas conditioning system that will remove impurities from the biogas to protect downstream end-use equipment (i.e., the boilers). It will consist of H₂S removal via lead/lag

media vessels, moisture removal via heat exchange with a chilled glycol solution, and pressurization via duty/standby blowers (Refer to OOWWTP UPGRADE AND BIOSOLIDS BODR, page 72).

While ferric chloride addition will reduce H₂S generation and gas conditioning is proposed to protect the equipment (i.e., not as an emission control technology), Facility-wide emissions were estimated at worst case conditions (i.e., flaring 100% of unconditioned digester gas), not taking credit for the H₂S reduction. This was done to demonstrate that even under hypothetical worst-case conditions, the facility is a natural minor source of air emissions.

Emissions of criteria pollutants and HAPs from dual fuel-fired combustion devices were estimated based on the maximum design heat input for each device and 8,760 operating hours per year. Emission factors for natural gas-fired use were from AP-42 and emission factors for digester gas-fired use were obtained from the San Diego Air Pollution Control District “B11 Boiler, Digester Gas Fired, Uncontrolled”, except for SO₂ which is discussed below. All boilers will be equipped with low-NO_x burners. Emissions factors for low NO_x boilers from AP-42 Table 1.4-1 were used for emissions estimates. When final device selection is complete, this estimate will be updated based on vendor specifications. The proposed MTT includes three dual-fueled boilers—two operating as duty, one for back up. However, potential emissions are conservatively estimated based on all three boilers operating 8,760 hours per year.

SO₂ emissions from digester gas combustion in the dual fuel-fired boilers are estimated based on an expected maximum H₂S concentration of 50 parts per million (ppm) in the biogas following treatment and conditioning and 100% conversion of H₂S to SO₂. However, facility-wide SO₂ emissions are based on combusting 100% of the unconditioned digester gas generated annually in the flare and all dual fuel-fired equipment operating solely on natural gas for the entire year. This is a very conservative estimate, since preferentially combusting conditioned digester gas in the boilers results in significantly reduced SO₂ emissions (digester gas is not conditioned prior to flaring).

2.4.1.3 Flare

The digester gas will be preferentially combusted in the dual-fueled boilers (where additional benefit will be gained by replacing the need for natural gas to produce heat), limiting the volume of digester gas combusted by the flare. Digester gas burned in the flare will be limited to situations when other combustion devices are not available, periods when digester gas generation exceeds the demand (e.g., during periods of elevated summer temperatures when boilers are not needed), and when maintenance is being performed on the boilers. As such, the actual amount of digester gas flared will be significantly less than the annual average digester generation rate. Despite that, potential emissions from the flare conservatively assume that 100% of the digester gas produced will be flared.

SO₂ emissions from flared biogas were conservatively calculated based on the maximum H₂S content in digester gas (3,000 ppm), disregarding the reduction that will be achieved through ferric chloride addition (maximum expected H₂S content is expected to be less than 2,500 ppm). In addition, actual SO₂ emissions are expected to be significantly lower because the majority of the digester gas generated will be combusted in the dual fuel-fired boilers (not the flare) which only combust conditioned biogas.

The instantaneous peak digester gas generation rate (total for three digesters) is expected to reach 305 scfm, the weekly maximum generation rate is expected to be 235 scfm, the monthly maximum generation rate is expected to be 202 scfm, and the annual average is expected to be 180 scfm. The instantaneous peak generation rate, weekly maximum generation rate, and monthly maximum generation rate cannot be sustained long term and therefore, the annual average generation rate of 180 scfm (94.6 million standard cubic feet (MMSCF)/year) is the most representative generation rate to use for estimating the maximum annual digester gas production. As a conservative approach,

the annual emissions estimate for SO₂ is based on the annual average digester gas generation rate of 180 scfm, 24 hours per day, and 365 days per year (OOWWTP UPGRADE AND BIOSOLIDS BODR). While the flare has not yet been selected, the nameplate capacity is expected to reflect the maximum instantaneous peak generation rate of 305 scfm.

Table 2-3 summarizes digester gas generation rates for the Proposed Project.

Table 2-3. Digester Gas Production		
Time Period	Generation Rate (scfm)	Generation Rate
Instantaneous	305	0.007 MMSCF / hour
Maximum Weekly	235	2.4 MMSCF / week
Maximum Monthly	202	8.7 MMSCF / month
Annual Average	180	94.6 MMSCF / year

Source: Carollo, BODR Table 4.30

2.4.2 Wastewater Treatment

2.4.2.1 Municipal Treatment Train

Odorous compounds emitted from the MTT include H₂S (rated as medium toxicity in DAR-1) and NH₃ (low toxicity). Emissions of odorous compounds will be captured and controlled, removing at least 99% from the exhaust stream. Emissions were calculated using the maximum expected H₂S concentration in the foul air (i.e., 15 ppm), the design exhaust flow rate, and a 99% control efficiency (OOWWTP UPGRADE AND BIOSOLIDS BODR, page 14).

2.4.2.2 Industrial Treatment Train

VOC and TAC emissions from the ITT were predicted using Toxchem, (Hydromantis 2021), a compound fate model. Toxchem is a widely accepted alternative to Water 9 for estimation of wastewater treatment emissions. Emissions of VOC are included in the Facility-wide emission summary, and the emissions of toxics are included in the Part 212 compliance evaluation, discussed below in Section 3.1.2. A Toxchem modeling report is included in Appendix C.

2.4.3 Greenhouse Gas Emissions Estimates

Direct greenhouse gas emissions were calculated for fuel burning equipment, biological wastewater treatment, and physical/chemical wastewater treatment. Carbon dioxide (CO₂) emissions from the MTT (including CO₂ generated as a result of combusting digester gas produced by the plant) is considered biogenic. Therefore, these emissions were excluded.

A summary of the Proposed Project's emission calculations included Attachment B are summarized below in **Table 2-4**.

2.4.4 Emissions Estimate Summary

Table 2-4 provides a summary of the emissions estimates tables provided in Appendix B.

Table 2-4. Summary of Emissions Estimate Tables

Table	Pollutants	Contents
B-1	Criteria pollutants, HAP, GHG	Facility-Wide Potential to Emit
B-2	NA	Equipment Summary and Table Crosswalk
B-3	Criteria Pollutants	Natural Gas Combustion Units Potential Emissions
B-4	Criteria Pollutants	Dual Fuel-Fired Combustion Units Potential Emissions
B-5	Criteria Pollutants	Flare Potential Emissions
B-6	HAP	Natural Gas Combustion Units Potential Emissions
B-7	HAP	Dual-Fired (i.e., natural gas and biogas) Combustion Units Potential Emissions
B-8	HAP/TAC	Flare Potential Emissions and 212 Compliance Evaluation
B-9	VOC / TAC	Industrial Treatment Train Maximum Emissions
B-10	VOC / TAC	Industrial Treatment Train 212 Compliance Summary
B-11	Odor/TAC	Municipal Treatment Train Emissions Summary
B-12	Criteria, TAC	Dispersion Model Output
B-13	Criteria / TAC	Dispersion Model Source Parameters
B-14	Criteria / TAC	Summary of Dispersion Model Predicted Impacts
B-15	Criteria	Flare 212 Compliance Summary
B-16	GHG	Industrial Treatment Train
B-17	GHG	Municipal Treatment Train
B-18	GHG	Fuel Combustion Devices

Section 3

Applicable Regulations

3.1 Applicable State Regulations

3.2 6 CRR-NY 211.1 Air Pollution Prohibited

In accordance with 3.1 6 CRR-NY 211.1, “Emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property are prohibited under 6 CRR-NY 211.1. Notwithstanding the existence of specific air quality standards or emission limits, this prohibition applies, but is not limited to, any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emission, either alone or in combination with others.” The Facility is designed to comply with all applicable air pollution control regulations.

3.2.1 6 CRR-NY 211.2 Visible Emission Standards

Emissions having an opacity equal to or greater than 20 percent (six-minute average) except for one continuous six-minute period per hour of not more than 57 percent opacity are prohibited under 6 CRR-NY 211.2. The Facility is designed to comply with the visible emission standard.

3.2.2 6 CRR-NY 212 Process Operations

A Part 212 Air Toxics Compliance Evaluation is required for process emission sources that are not excepted under Section 212-1.4. Sources that are included in the Part 212 evaluation for the Proposed Project are discussed further below.

1. Combustion installations are not subject to the requirements of Part 212. Under 6 NYCRR 212-1.2(18), a process operation does not include the operation of a combustion installation defined under 6 NYCRR Part 200.1(l) as “an installation, consisting of a single furnace, device, engine or turbine in which fossil fuel, wood, and/or other solid, liquid, or gaseous fuel is burned with air or oxygen and the air contaminant emissions include only those products resulting from:
 - (1) Combustion of the fuel
 - (2) Additives or impurities in the fuel
 - (3) Material introduced for the purpose of altering air contaminant emissions.”

DAR-1 further explains that process emission sources do not include equipment that combust fuel for electricity or space heating for commercial, industrial plants or residential heating. Therefore, boilers and heating and cooling equipment are not required to be included in the Part 212 compliance evaluation and therefore were not included in the model.

2. Flare emissions are subject to the requirements of Part 212. The proposed flare associated with the MTT is subject to the control requirements of 6 NYCRR 212-2.3, Table 3 for criteria

air pollutants and Table 4 for non-criteria pollutants (i.e., HAPs and TACs). Based on the Emission Rate Potential (ERP) and the Environmental Rating (ER) for each pollutant, compliance was evaluated using dispersion modeling. The Modeling Protocol is included in Appendix D.

Criteria Pollutants: Using the worst-case projected H₂S concentration in the digester gas (3,000 ppm), assuming complete conversion to SO₂ and the maximum instantaneous digester gas generation rate (305 cubic feet per minute), the maximum expected SO₂ emission rate from the flare is 9.1 pounds per hour. Maximum emission rates for all other criteria pollutants are less than 1 pounds per hour; therefore, compliance with the degree of cleaning required will be established by demonstrating that ambient air concentrations are less than the relevant NAAQS standard through air dispersion modeling.

Maximum 1-hour, 3-hour, 8-hour and 24-hour emission rates are based on the maximum instantaneous digester gas generation rate (305 cubic feet per minute).

Annual emission rates are based on the annual average digester gas generation rate (180 cubic feet per minute).

A compliance summary is included in Table B-15.

Toxic Air Contaminants: Emission rates were estimated based on the maximum instantaneous digester production rate of 305 cfm and, except for H₂S, emission factors from the San Joaquin Valley Air Pollution Control District (SJVAPCD Sewage Gas-Fired External Combustion (WWTP), Flare). Potential H₂S emissions are based on the maximum H₂S content in raw digester gas and a 98% conversion to SO₂ (i.e., 2% emitted as H₂S). Based on the EPR (i.e., all less than 0.1 lb/hr) and ER for the TAC identified compliance is evaluated with dispersion modeling. A compliance evaluation is presented in Table B-8.

3. TAC emissions from the ITT are subject to the requirements of Part 212. TAC emissions were predicted using Toxchem, (Hydromantis 2021), a compound fate model. [Toxchem](#) is a widely accepted alternative to Water 9 for estimation of wastewater treatment emissions. A Toxchem modeling report is included in Appendix C.

Based on the predicted ERP (from Toxchem) and the applicable Environmental Rating (ER) for each TAC identified in the influent wastewater (presented in Table B-9 in Appendix B, compliance with ambient air toxics standards was evaluated with air dispersion modeling (i.e., AERMOD). No HTAC Contaminants were identified in the proposed wastewater discharge and therefore the Persistent and Bioaccumulative (PB) trigger does not apply to the Environmental Rate Potential. In accordance with DAR-1, Section V.A, non-HTAC toxics with an annual loading to the ITT of less than 100 pounds per year were not included in the Part 212 evaluation. A compliance evaluation for TAC emissions from ITT is included in Table B-10. The Air Dispersion Modeling Protocol (Modeling Protocol) is included in Appendix D.

4. Odorous compounds emitted from the MTT, including H₂S (medium toxicity, ER of "B") and ammonia (low toxicity, ER of "C"), are subject to the requirements of Part 212. Emissions of odorous compounds will be captured and controlled removing at least 99% from the exhaust stream, which is greater than the most stringent control requirement of 90% provided in Table 4 of 6 CRR-NY 212-2.3(b) for a pollutant with an environmental rating of "B." Compliance with Part 212 for odorous compounds will be demonstrated using control technology, therefore air dispersion modeling is not required. As such, the modeling analysis will not include odorous compounds. The exhaust concentrations of H₂S are less than both the American Conference of Governmental Industrial Hygienists (ACGIH) recommended

threshold limit value (TLV) of 1 ppm as an 8-hour time weighted average (TWA), and the short-term exposure limit (STEL) of 5 ppm. A summary of odor emissions from MTT is included in Table B-11.

5. Nitrous oxide (N₂O) and carbon dioxide (CO₂) will be emitted from ITT and MTT process operations. Since there are no control devices for emissions from the process operations and there are no ERs established for these TACs, the maximum offsite concentration was established through air dispersion modeling.

3.2.3 6 CRR-NY 227-1 Stationary Combustion Installations

6 CRR-NY 227-1 establishes requirements for stationary combustion installations; however, the rule does not apply to units subject to New Source Performance Standards (NSPS) and/or National Emission Standards for Hazardous Air Pollutants (NESHAP) where the particulate matter (PM) emission standard for the NESHAP is as or more stringent than that in Part 227.

The natural gas-fired boilers and dual-fuel boilers located at the facility will not be subject to NSPS or a NESHAP, so rule 227 will apply to the boilers. However, gas-fired boilers are not subject to the requirements of this part and therefore the PM standard in Part 227-1.3 does not apply.

3.2.4 6 CRR-NY 231.12 Air Quality Impact Analysis

Proposed new major stationary sources in attainment areas must demonstrate that allowable emission increases from a proposed facility will not, at a minimum, cause or contribute to air pollution in violation of the following:

1. Any NAAQS in any air quality control region.
2. Any applicable maximum allowable PSD increment increase over the baseline concentration in any area, as defined in 6 CRR-NY 231-12.2 (c)(3).
3. Quantified air quality related values including visibility for the applicable Federal class I areas.

Under 6 CRR-NY 231-12.3, any new facility that would have the potential to emit (PTE) in an amount equal to or greater than the applicable significant project threshold in Table 6 of 6 CRR-NY 231-13 is required to provide an analysis of air quality monitoring data in the area that the proposed new facility would affect for each regulated NSR contaminant.

As summarized in Table 3-1, the Facility is a natural minor source of air emissions and the Facility-wide PTE for all criteria pollutants is less than the associated Significant Project Threshold. Since the Proposed Project PTE does not exceed the Significant Project Thresholds, NAAQS modeling is not required and therefore not included in the Minor Facility Registration application.

Table 3-1. Significant Project Thresholds

Contaminant	Facility-Wide Potential To Emit (tons/year)	Significant Project Threshold ¹ / Significant Net Emission Increase Threshold (tons/year)
Carbon monoxide	26.88	100
Nitrogen oxides	25.26	40
Sulfur dioxide	23.79	40
Particulate matter	2.99	25
Particulate matter: PM-10 emissions ²	2.99	15
Particulate matter: PM-2.5 emissions ²	2.99	10

¹ Project emission potential threshold.

² Both filterable and condensable fractions are to be included (see definitions of PM-10 and PM-2.5 in 6 CRR-NY Part 200).

3.2.5 6 CRR-NY 257 Air Quality Standards

Under 6 CRR-NY 257-1.4 emissions of contaminants that cause or contribute to contravention of air quality standards are not allowed. Additionally, emissions of odorous, toxic, or deleterious substances in concentrations, or of such duration, which will affect human health or well-being, or unreasonably interfere with the enjoyment of property, or unreasonably and adversely affect plant or animal life shall not be permitted. Standards of this part include sulfur dioxide, particulate matter, and hydrogen sulfide.

Potential emissions from the flare were modeled, model results were compared to applicable standards from Part 257, and are summarized in Table B-15, in Appendix B.

3.2.6 Climate Leadership and Community Protection Act (CLCPA)

The goal of New York's CLCPA is to achieve net zero greenhouse gas (GHG) emissions. Interim goals are to achieve a 40% reduction from 1990 levels by 2030 and an 85% reduction by 2050. NYSDEC has begun to (and will continue to) prepare policy documents which provide guidance to facilities permitting new equipment or modifying or renewing an existing air permit application. Two existing policy documents potentially apply to the project: DAR-21 (implementing CLCPA 7(2)) and DEP 24-1 (implementing CLCPA 7(3)). The applicability of these policies to the Proposed Project is discussed below.

DAR-21: The Climate Leadership and Community Protection Act and Air Permit Applications

DAR-21 is a policy document issued by the NYSDEC establishing requirements for new, modified, or renewed ASF, Title V permit applications, and certain registrations (at the discretion of DEC) to quantify direct, upstream, downstream, and indirect GHG emissions associated with the project. This policy requires the NYSDEC to consider whether approval of an air permit application is consistent with, or will interfere with, the attainment of the statewide GHG emissions goals established by the CLCPA.

The Proposed Project is a new facility that is intended to be permitted as a natural minor source under a Minor Facility Registration. While Minor Facility Registrations are not typically subject to the requirements of the CLCPA, direct potential and projected actual GHG emission estimates from the Project have been included in Tables B-16 through B-18 in Appendix B. Additional analysis as summarized in DAR-21 will be provided to NYSDEC in a subsequent submittal.

DEP 24-1. Permitting and Disadvantaged Communities

DEP 24-1 is a policy document issued by NYSDEC that implements Section 7(3) of the CLCPA effective January 1, 2020. In accordance with Section 7(3) of the CLCPA, state agencies, offices, authorities, and divisions must not disproportionately burden disadvantaged communities (DACs) and must prioritize reductions of GHG emissions and emissions of co-pollutants in DACs when issuing permits, licenses, and other administrative approvals and decisions.

The permit application review process described in DEP-24-1 applies to all major permit applications that involve sources and activities that result in direct or indirect GHG or co-pollutant emissions. Under this policy, co-pollutants are defined as HAPs produced by sources of GHG emissions; for this Proposed Project, those units which combust fuel and the wastewater treatment processes would result in co-pollutant emissions. As defined in 6 CRR-NY 621.2 (t), major project means any action requiring a permit identified in section 621.1 of this Part, which is specifically defined as major, or which is not specifically defined as minor in paragraph (u) of section 621.2 of this Part. 6 CRR-NY 621.4(f)(2) identifies PSD permit

applications, Title V permit applications, projects requiring emission reduction credits, and projects requiring the use of a federally enforceable emission cap (i.e., synthetic minor permits) as major projects. Since this project can be permitted as a natural minor source under a Minor Facility Registration, this policy does not apply and review under the policy is not required.

Emissions sources which directly or indirectly impact DACs are subject to more stringent standards under this policy. DACs are defined in the CLCPA as communities that bear burdens of negative public health effects, environmental pollution, impacts of climate change, and possess certain socioeconomic criteria, or comprise high-concentrations of low- and moderate- income households. The criteria which identify DAC for CLCPA purposes were finalized by the Climate Justice Working Group (CJWG) on March 27, 2023.

The CJWG established DACs within the State of New York based on geographic, public health, environmental hazard, and socio-economic criteria. Areas established as DACs are reviewed and updated periodically and are available to view in graphical format online (<https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria>). The area where the plant is proposed to be located was identified as census tract 36067011300 using the online interface. This tract is not identified as a DAC and is approximately five miles from the nearest identified DAC. Although DEP 24-1 states that air dispersion modeling results could be utilized to identify whether a project would impact DACs more than one-half mile away, the maximum distance for which impacts would be analyzed is not specified.

Since this project is not major and not located proximate to a DC, the requirements of DEP 24-1 (CLCPA 7(3)) do not apply to the Project.

3.3 Applicable Federal Requirements

3.3.1 NSPS (40 CFR Part 60)

3.3.1.1 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)

This subpart applies to steam generating units constructed after June 9, 1989, with a heat input capacity of 29 MW (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The proposed boilers have a maximum heat capacity less than 10 MMBtu/hr and are therefore not subject to this part. In addition, since the sludge dryer is not a steam generating unit, the subpart does not apply to the dryer.

3.3.2 NESHAPs (40 CFR Part 61)

3.3.2.1 Subpart E National Emission Standard for Mercury

The provisions of this subpart are set forth in 40 CFR 61.50 and are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.

Sludge dryer is defined in 40 CFR 61.51(m) and means a device used to reduce the moisture content of sludge by heating to temperatures above 65 °C (ca. 150 °F) directly with combustion gases.

The proposed ITT does not include a sludge dryer or incinerator. The proposed MTT biosolids management process includes a sludge dryer. However, as stated in the BODR, the recommended heat source will be a boiler equipped with a heat exchanger to avoid direct heating with exhaust gas. Therefore, the proposed sludge dryer does not meet the definition of Sludge Dryer in Subpart E.

Subpart E does not apply to the Proposed Project because the Facility will not process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge in a sludge dryer as defined in Subpart E.

3.3.3 NESHAPs for Source Categories (40 CFR Part 63)

3.3.3.1 Subpart VV Publicly Owned Treatment Works

As set forth in 40 CFR 63.1580, Publicly Owned Treatment Works (POTWs) regulated under Subpart VV include Group 1 POTWs (which includes both area and major sources) and Group 2 POTWs (which includes major sources of HAPs) that are either required to develop and implement a pretreatment program as defined by [40 CFR 403.8](#), or meet the general criteria for development and implementation of a pretreatment program. Group 1 and Group 2 POTWs are defined under 40 CFR 63.1595 as follows:

- *Group 1 POTW* is defined as a POTW that accepts a waste stream from an industrial user that is regulated by another NESHAP and provides treatment and controls as an agent for the industrial user. The industrial user complies with its NESHAP by using the treatment and controls located at the POTW. For example, an industry which discharges its benzene-containing waste stream to a POTW for treatment to comply with [40 CFR part 61, Subpart FF](#)—National Emission Standard for Benzene Waste Operations. This definition does not include POTWs treating waste streams not specifically regulated under another NESHAP.
- *Group 2 POTW* is defined as a POTW that does not meet the definition of a Group 1 POTW. A Group 2 POTW can treat a waste stream that is either:
 - Not specifically regulated by another NESHAP, or
 - From an industrial user that complies with the specific wastewater requirements in their applicable NESHAP prior to discharging the waste stream to POTW.

OCDWEP's intent is to permit the Oak Orchard Wastewater Treatment Facility as an area source (i.e., a true minor source of HAP) and not a major source of HAP. OCDWEP does not intend to provide treatment and controls as an agent for any industrial user who will comply with any NESHAP by using the treatment and controls located at the POTW. Therefore, Subpart VV does not apply to this facility, as proposed.

3.3.3.2 Subpart JJJJJ—Industrial, Commercial, and Institutional Boilers Area Sources

This part applies to industrial, commercial, and institutional boilers located at an area source of HAP. Section 40 CFR 63.11195(e) of Subpart JJJJJ exempts gas-fired boilers. This subpart defines gas-fired boilers as any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel. Since the proposed boilers all meet the definition of gas-fired boilers, this subpart does not apply to the proposed boilers.

3.3.4 Chemical Accident Prevention Provisions (40 CFR Part 68)

Applicability of the provisions under this program is defined at 40 CFR 68.10 as including any stationary source that has more than a threshold quantity of a regulated substance in a process. Table 1 in 40 CFR 68.130 provides a list of regulated substances (including methane) with associated threshold quantities. If a regulated substance exceeds a threshold quantity in any process, then the stationary source must determine the Program Level (Program 1, 2, or 3) of each affected process. Regardless of the program level of the processes, a five-year accident history must be completed for each process, and a Risk Management Plan (RMP) must be submitted that covers all applicable processes. Depending on the program level of each of the processes, additional

requirements must be complied with (varying levels of hazard assessment, prevention and emergency response, and management requirements).

A flammable substance listed in 40 CFR 68.130 is excluded from these regulations if the substance is used as a fuel or held for sale as a fuel at a retail facility (40 CFR 68.126). U.S. EPA coordinates with the Occupational Safety and Health Administration (OSHA) in interpreting and applying the definition of “fuel” for the purposes of this subpart and in the applicability of the subpart. For example, the Clean Air Act does not define the term “fuel,” but OSHA has given “fuel” its ordinary meaning in applying its fuel-related exemptions under its Process Safety Management program. Webster’s Ninth New Collegiate Dictionary (1990) defines fuel as “a material used to produce heat or power by burning.” U.S. EPA uses this common definition of the term when deciding whether the exclusion at 40 CFR Part 68.126 applies to a process. Therefore, methane contained in digester gas generated and combusted on-site in boilers, engines, and sludge dryers is exempt from the RMP requirements.

OCDWEP is proposing to generate digester gas on-site specifically for use as fuel to provide process heat that would otherwise be provided by natural gas combustion, consistent with the fuel exemption. OCWEP is requesting NYSDEC’s concurrence regarding the exemption status under the RMP.

3.3.5 Mandatory GHG Reporting (40 CFR Part 98 and 6 NYCRR 253)

Mandatory GHG reporting under 40 CFR Part 98 is required for any facility located in the United States that meets any of the following requirements:

- A facility which contains any source category listed in Table A-3 of Part 98.
- Facilities listed in Table A-4 of the subpart which emit 25,000 metric tons CO₂e or more per year in combined emissions from stationary fuel combustion units, miscellaneous uses of carbonate, and all applicable source categories that are listed in Table A-3 and Table A-4.
- A facility that meets the following:
 - The facility does not meet the requirements of either of the bullets above.
 - The aggregate maximum rated heat input capacity of the stationary fuel combustion units at the facility is 30 MMBtu/hr or greater.
 - The facility emits 25,000 metric tons CO₂e or more per year in combined emissions from all stationary fuel combustion sources.

The Facility will not contain any source categories listed in Table A-3 of the subpart; however, the proposed ITT project is one of the categories listed in Table A-4 of the subpart, industrial wastewater treatment. If the facility’s actual GHG emissions exceed the 25,000 metric ton CO₂e threshold, the Facility will be required to provide an annual GHG report that covers stationary fuel combustion sources, miscellaneous use of carbonates, and the ITT. It should be noted that per 98.30(b), “stationary fuel combustion sources” does not include emergency generators or flares, and thus these sources should not be included in the threshold evaluation or annual GHG report (if required).

In addition to the federal GHG reporting requirements, NYSDEC has proposed more stringent GHG reporting thresholds (6 NYCRR Part 253). Under this proposed Regulation, facilities with actual GHG emissions of 10,000 metric tons CO₂e or more would be required to report their emissions to the State of New York.

While potential emissions exceed the reporting thresholds, actual emissions may remain below them. OCDWEP will quantify GHG emissions and report for those years exceeding the reporting thresholds.

Section 4

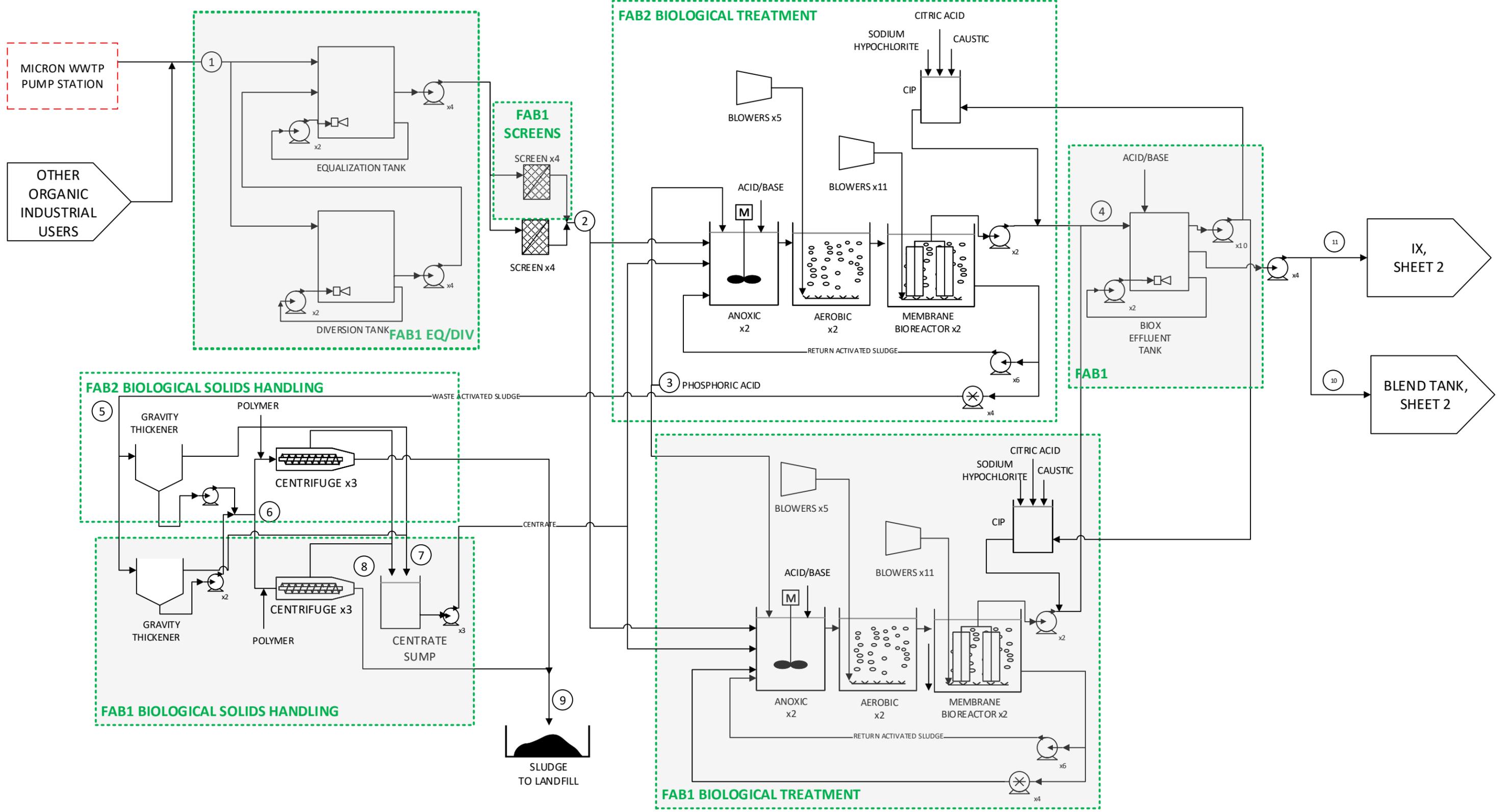
Summary and Requests

OCDWEP is applying for a Minor Facility Registration. Based on the emissions estimates included in the application the facility is classified as a True Minor Source of Air Emissions. Compliance with emissions standards were demonstrated based on Maximum Potential Emissions and therefore OCDWEP is not requesting any emissions limits or operational limits with this application. This application has been prepared based on preliminary engineering (i.e., Basis of Design Reports previously submitted to NYSDEC and subsequent value engineering). As design progresses through completion and additional information becomes available (e.g., equipment specification information), OCDWEP will provide NYSDEC with updated information and application contents, if necessary. However, as discussed above, OCDWEP is requesting the following:

1. Based on OCDWEP's proposed use of digester gas for fuel to provide process heat, OCDWEP believes that the use of digester gas as proposed by the facility is exempt under the RMP. OCDWEP is requesting NYSDEC's concurrence regarding the exemption status under 40 CFR Part 68, Chemical Accident Prevention Provisions.
2. Several chemicals emitted from ITT do not have an established Annual Guidance Concentration (AGC) Short Term Guidance concentration. According to DAR-1, air contaminants that currently do not have an AGC assigned to them should be evaluated based upon a de minimis concentration of $0.1 \mu\text{g}/\text{m}^3$ predicted at the fence line. The $0.1 \mu\text{g}/\text{m}^3$ concentration is to be used as a first-time conservative approach to evaluate the dispersion of the air contaminant.

Maximum predicted concentrations of TACs are below the established AGC or the de minimis AGC. OCDWEP requests that NYSDEC forward the air contaminants' CAS registry numbers to the Air Toxics Section, within the DAR, for the development of an AGC where necessary.

Appendix A: Process Flow Diagrams



PRELIMINARY NOT FOR CONSTRUCTION RECORDATION, CONVEYANCE, SALES, OR PERMIT ISSUANCE

NOTES:
1. NOT TO SCALE

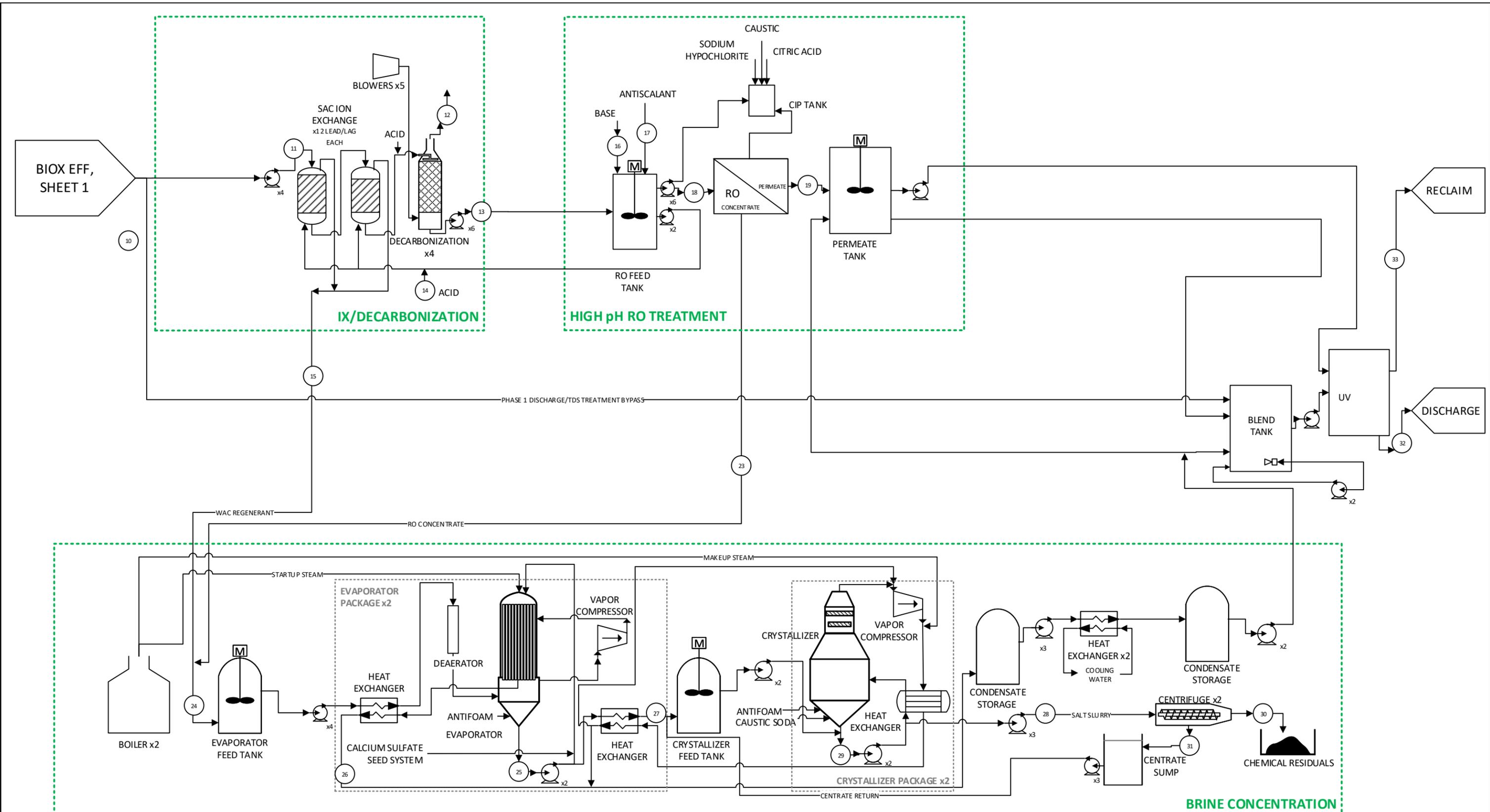
REV	DATE	DESCRIPTION	DRAWN/ENG	CHECKED	APPROVED
0	01/16/2025	CONCEPT FOR DISCUSSION			
1	05/19/2025	REVISED FOR CONCEPT DEVELOPMENT			



Onondaga County Water Redevelopment Corporation

Industrial Wastewater Treatment and Water Redamation Facility (IWWTPWRF)
 FIGURE D-1: CONCEPTUAL ALTERNATIVE 11 SIMPLIFIED PROCESS FLOW DIAGRAM

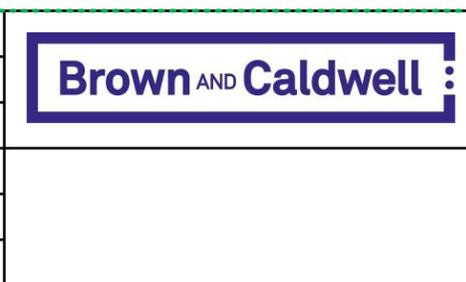
SHEET 1 **REV**
 1



PRELIMINARY NOT FOR CONSTRUCTION RECORDATION, CONVEYANCE, SALES, OR PERMIT ISSUANCE

NOTES:
1. NOT TO SCALE

REV	DATE	DESCRIPTION	DRAWN/ENG	CHECKED	APPROVED
0	01/16/2025	CONCEPT FOR DISCUSSION			
1	05/19/2025	REVISED FOR CONCEPT DEVELOPMENT			



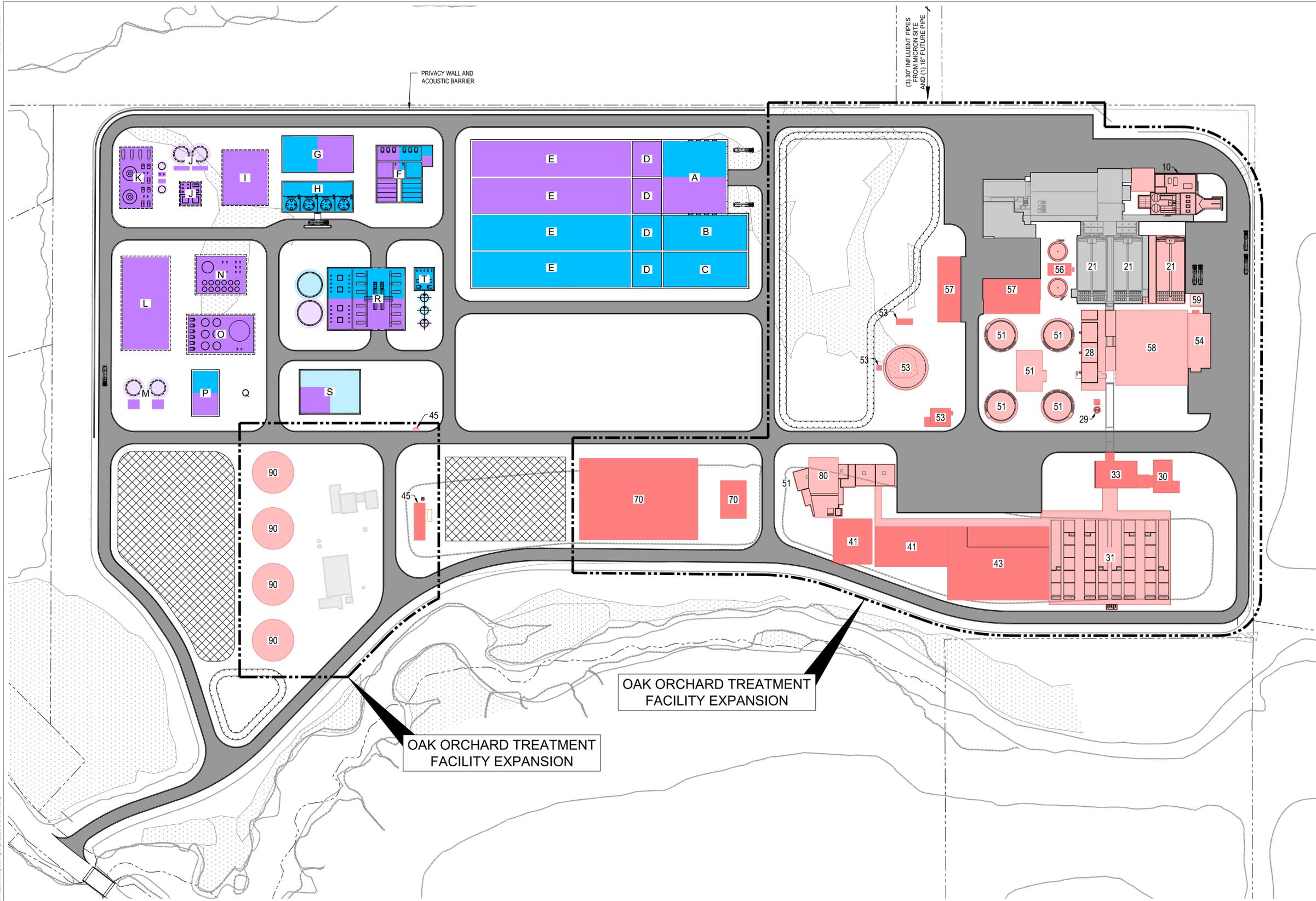
Onondaga County Water Redevelopment Corporation

Industrial Wastewater Treatment and Water Redamation Facility (IWWTPWRF)
 FIGURE D-1: CONCEPTUAL ALTERNATIVE 11 SIMPLIFIED PROCESS FLOW DIAGRAM

SHEET 2	REV
	1

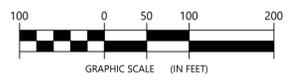
05/25/2025 12:53 PM

05/25/2025 12:53 PM



OAK ORCHARD TREATMENT FACILITY EXPANSION	
AREA CODE	AREAS
10	HEADWORKS
21	PRIMARY CLARIFIERS
28	ODOR CONTROL
30	FINE SCREENING
31	BIOREACTORS
33	BLOWER BUILDING
41	REUSE FACILITY (RO BUILDING), TEMPORARY UF
43	MEMBRANE BUILDING
45	RECYCLED WATER PUMP STATION
51	DIGESTER COMPLEX
53	GAS STORAGE AND GAS FLARE
54	THICKENING/DEWATERING
56	PS GRAVITY THICKENING
57	HSW AND MS RECEIVING AND BLENDING
58	SOLIDS HAULING, DRYER BUILDING
70	NATIONAL GRID CONNECTION, NATIONAL GRID SUBSTATION
80	EXISTING ADMIN BUILDING, ADMIN BUILDING
90	BRIDGING PROJECT MBR TANKS, FUTURE RECYCLED WATER STORAGE, BRIDGING MBR BLOWER BUILDING

WHITE PINES INDUSTRIAL WASTEWATER TREATMENT FACILITY	
LEGEND	
	EQUIPMENT FOR TREATING FAB - 1 WASTEWATER
	EQUIPMENT FOR TREATING FAB - 2 EXPANSION WASTEWATER
	OAK ORCHARD TREATMENT FACILITY EXPANSION
	PAVED ROAD
	EXISTING STRUCTURE
	CONTRACTOR STAGING AREA
	PRIVACY WALL ACOUSTIC BARRIER
	LIMIT OF WORK BY OTHERS
	FAB - 1 STRUCTURE OR AREA
	FAB - 2 EXPANSION STRUCTURE OR AREA
	INFLUENT SCREENING BUILDING
	EQUALIZATION TANK
	DIVERSION TANK
	ANOXIC TANKS
	AERATION TANKS
	MEMBRANE FILTRATION BUILDING
	BLOWER BUILDING
	CHEMICAL BUILDING
	EVAPORATION SYSTEM BUILDING
	CONDENSATE / EFFLUENT STORAGE AREA
	CRYSTALLIZER SYSTEM BUILDING
	HIGH PH RO BUILDING
	HIGH PH RO PERMEATE AND FEED TANKS
	ION EXCHANGE BUILDING
	DECARBONATION BUILDING
	UV DISINFECTION BUILDING
	RECYCLED WATER PUMP STATION
	DEWATERING BUILDING
	MOTOR CONTROL BUILDING
	ODOR CONTROL AREA



GENERAL ARRANGEMENT SITE PLAN
Scale: 1" = 20'



©2025 Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C.
The following is paraphrased from the New York Education Law, Article 145, Section 7209 and Chapter 11, Section 79-1.4, and applies to this drawing. It is a violation of this law for any person unless he is acting under the direction of a licensed professional engineer, licensed landscape architect or licensed land surveyor to alter in any way, if an item bearing the seal of an engineer, landscape architect or land surveyor is altered, the altering engineer, landscape architect or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration and a specific description of the alteration.

CLIENT / SUBCONSULTANT:

EDR
a better environment

Environmental Design & Research,
Landscape Architecture, Engineering & Environmental Services, P.C.
395 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **WHITE PINES INDUSTRIAL WWTP**
PROJECT LOCATION: **OAK ORCHARD ROAD**
CLIENT: **ONONDAGA COUNTY**
DRAWING TITLE: **GENERAL ARRANGEMENT SITE PLAN**

DRAWINGS ISSUED FOR / REVISIONS		
NO.	DATE	ISSUED FOR / REVISION
1		
2		
3		
4		
5		
6		

BY	CHK	APP	DATE
			05/25
			AS NOTED
			JDF
			JDF

CONTRACT NO. _____

DRAWING NUMBER: **C-101**

Appendix B: Registration Form and Emissions Calculations

**New York State Department of Environmental Conservation
Air Facility Registration Application**



**Department of
Environmental
Conservation**

DEC ID											
7	-	3	1	2	4	-	0	0	0	1	8

Application Type	
<input type="checkbox"/> New Facility	<input checked="" type="checkbox"/> Notification of Changes <input type="checkbox"/> Renewal

Sheet ____ of ____

Facility Information

Name Oak Orchard Wastewater Treatment Plant			
Location Address 4300 Oak Orchard Road			
City Clay	County Onondaga	Township Town of Clay	Zip 13214

Facility Owner (Individual/Firm)			Taxpayer ID			
Name Onondaga County Department of Water Environmental Protection (OCDWEP)						
Street Address 650 Hiawatha Blvd. West						
City Syracuse	State/Province New York	Country USA	Zip 13214			

Facility Contact

Name Odean Dyer, PE			
Street Address 650 Hiawatha Boulevard West			
City Syracuse	State/Province Onondaga	Country USA	Zip 13214
E-mail OdeanDyer@ongov.net		Phone (312) 435-2260	Fax N/A

Facility Description		Number of Emission Points: 22		<input type="checkbox"/> Continuation Sheet(s)	
SIC Code(s)	4952	NAICS Code(s)	221320		

Onondaga County is proposing to upgrade the Oak Orchard Wastewater Treatment Plant (OOWWTP) with changes to the Municipal Treatment Train (MTT) and solids management process, as well as construct and operate an Industrial Wastewater Treatment Train (ITT). The basis for this project is to expand and upgrade the MTT and provide industrial process wastewater treatment and reclaimed water in support of industrial clients within Onondaga County's service area.

Source Classification Codes Continuation Sheet(s)

2630020010	2102006001	50100410		

New York State Department of Environmental Conservation
Air Facility Registration Application



Department of Environmental Conservation

DEC ID											
7	-	3	1	2	4	-	0	0	0	1	8

Sheet ____ of ____

Applicable Federal and New York State Regulations at the Subpart Level					<input type="checkbox"/> Continuation Sheet(s)
200	201-4	201-4	211.1	211.2	
212-1	212-2	257-1	257-2	257-3	

Auto Body Shops	
gallons of coatings/month: NA	gallons of solvents/month: NA

Facility Emissions Summary				
Criteria Pollutants				
CAS Number	Contaminant Name	Cap by Rule	Actual (lbs/yr)	PTE (lbs/yr)
000630-08-0	Carbon Monoxide	<input type="checkbox"/>	SEE	
0NY998-00-0	Total Volatile Organic Compounds (VOC)	<input type="checkbox"/>	ATTACHED	
0NY210-00-0	Oxides of Nitrogen	<input type="checkbox"/>	TABLES	
0NY075-00-0	Total Particulate Matter (PM-10 and PM-2.5)	<input type="checkbox"/>		
007446-09-5	Sulfur Dioxide	<input type="checkbox"/>		
0NY100-00-0	Total Hazardous Air Pollutants (HAP)	<input type="checkbox"/>		
007439-92-1	Lead	<input type="checkbox"/>		
0NY750-00-0	Carbon Dioxide Equivalents	<input type="checkbox"/>		

Individual Hazardous Air Pollutants					<input type="checkbox"/> Continuation Sheet(s)
CAS Number	Contaminant Name	Cap by Rule	Actual (lbs/yr)	PTE (lbs/yr)	
		<input type="checkbox"/>	SEE		
		<input type="checkbox"/>	ATTACHED		
		<input type="checkbox"/>	TABLES		
		<input type="checkbox"/>			
		<input type="checkbox"/>			

Other Air Contaminants					<input type="checkbox"/> Continuation Sheet(s)
CAS Number	Contaminant Name	HTAC	Actual (lbs/yr)		
		<input checked="" type="checkbox"/>	SEE		
		<input type="checkbox"/>	ATTACHED		
		<input type="checkbox"/>	TABLES		
		<input type="checkbox"/>			
		<input type="checkbox"/>			

Certification	
I certify the truth, accuracy, and completeness of the information contained in this application.	
Responsible Official Odean Dyer, PE	Title Commissioner
Signature	Date 10.10.2025

Table B-1
 Facility Wide Emissions Summary
 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Pollutant	Potential Emissions (ton/yr)									Permitting and Modeling Thresholds		
	MTT HVAC Equipment	ITT HVAC Equipment	ITT NG Boilers (x3)	MTT Dual Fuel Boilers (x3)	MTT Sludge Dryer NG Burner	Flare	ITT Wastewater Treatment	MTT Wastewater Treatment	Total Potential	State Facility Permit Threshold (tpy)	Major Source Threshold (tpy)	Significant Project Threshold (tpy)
NO _x	5.27	8.80	3.54	3.22	2.15	2.27	-	-	25.26	50	100	40
CO	4.43	7.39	5.95	5.41	3.61	0.09	-	-	26.88	50	100	100
PM ₁₀ / PM _{2.5}	0.40	0.67	0.54	0.49	0.33	0.57	-	-	2.99	50	100	25
SO ₂	0.03	0.05	0.04	0.04	0.03	23.59	-	-	23.79	50	100	40
VOC	0.29	0.48	0.39	0.35	0.24	0.57	1.58	-	3.90	25	50	-
HAPs ³	0.10	0.17	0.13	0.23	0.15	0.74	1.58	-	3.10	10/25	10/25	-
CO ₂	6,292.80	10,503.38	8,453.94	7,685.40	5,123.60	36.58	17,388.42	-	55,484.12	-	-	-
CH ₄	0.12	0.20	0.16	0.61	0.41	0.20	0.00	0.00	1.69	-	-	-
N ₂ O	0.01	0.02	0.02	0.10	0.07	0.04	43.20	10.95	54.40	-	-	-
CO ₂ e (20-yr)	6,306	10,525	8,472	7,763	5,176	63	28,792.62	2,891	69,988	-	-	-

NOTES:

1. The maximum instantaneous digester gas production rate is 305 standard cubic feet per minute (scfm). The max week digester gas production is 230 scfm. The maximum monthly gas generation is 202 scfm. The annual average digester gas production is 180 scfm. The instantaneous peak generation rate, weekly maximum generation rate, and monthly maximum generation rate cannot be sustained long term and therefore, the annual average generation rate of 180 scfm (94.6 MMSCF/year) is the most representative generation rate to use for estimating annual digester gas production. As a conservative approach, the annual emissions estimate for SO₂ is based on the annual average digester gas generation rate of 180 scfm, 24 hours per day (hpd), and 365 days per year.
2. The digester gas will be preferentially burned in the boilers where additional benefit will be gained by offsetting the need for natural gas to produce heat, limiting the volume of digester gas combusted by the flare. Digester gas burned in the flare will be limited to emergency situations when other combustion devices are not available, periods when the generation exceeds the demand (e.g., during periods of elevated summer temperatures), and when maintenance is being performed on the boilers. As such, the actual amount of digester gas flared will be significantly less than the annual average digester generation rate.
3. SO₂ emissions from flared biogas were conservatively calculated based on the maximum H₂S content in digester gas (3,000 ppm), not accounting for the reduction achieved by ferric chloride addition to the digester (maximum expected H₂S content is expected to be less than 2,500 ppm). Using a maximum H₂S content in digester gas of 3,000 ppm is a conservative estimate because the flared gas is expected to have an H₂S concentration less than 3,000 ppm based on the addition of ferric chloride to the digesters. Actual SO₂ emissions are expected to be significantly lower because the majority of the digester gas generated will be combusted in the dual fuel-fired equipment which receive conditioned biogas.
4. The major source threshold for HAPs is 10 tpy for any single HAP compound or 25 tpy for combined HAP emissions. Since total HAP emissions are less than the 10 tpy threshold for a single compound, only total (combined) HAP emissions are presented.

Table B-2
Equipment Summary and Table Crosswalk
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Equipment	Plant^a	Heat Input	Fuel	Criteria	HAP/TAC	GHG
Duty Boiler #1	ITT	5.5 MMBtu/hr	Natural Gas	Table B-3	Table B-6	Table B-18
Duty Boiler #2	ITT	5.5 MMBtu/hr	Natural Gas	Table B-3	Table B-6	Table B-18
Back up Boiler	ITT	5.5 MMBtu/hr	Natural Gas	Table B-3	Table B-6	Table B-18
Duty Boiler #1	MTT	5.0 MMBtu/hr	Natural Gas & Digester Gas	Table B-4	Table B-7	Table B-18
Duty Boiler #2	MTT	5.0 MMBtu/hr	Natural Gas & Digester Gas	Table B-4	Table B-7	Table B-18
Back up Boiler	MTT	5.0 MMBtu/hr	Natural Gas & Digester Gas	Table B-4	Table B-7	Table B-18
Flare	MTT	305 scfm	Digester Gas	Table B-5	Table B-8	Table B-18
Sludge Dryer	MTT	10.0 MMBtu/hr	Natural Gas & Digester Gas	Table B-4	Table B-7	Table B-18
HVAC Equipment	MTT	12.282 MMBtu/hr	Natural Gas	Table B-3	Table B-6	Table B-18
HVAC Equipment	ITT	20.5 MMBtu/hr	Natural Gas	Table B-3	Table B-6	Table B-18
Municipal Wastewater Treatment Train	MTT	NA	NA	NA	Table B-11	Table B-17
Industrial Wastewater Treatment Train	ITT	NA	NA	NA	Table B-10	Table B-16

a. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train

Table B-3

Natural Gas Combustion Units - Potential Emissions Estimates for Criteria Pollutants
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

EMISSION FACTORS	Pollutant and unit of Measure	NO _x lb/MMscf	CO lb/MMscf	PM ₁₀ /PM _{2.5} lb/MMscf	SO ₂ lb/MMscf	VOC lb/MMscf
	Factor	100 (Uncontrolled)	84	7.6	0.6	5.5
		50 (Low NO _x)				
AP-42 Table		1.4-1, 1998	1.4-1, 1998	1.4-2, 1998	1.4-2, 1998	1.4-2, 1998

EXTERNAL COMBUSTION DEVICE	HEAT INPUT (BTU/hr)	MAXIMUM FUEL CONSUMPTION (MMscf/yr)	NO _x EMISSIONS (tpy)	CO EMISSIONS (tpy)	PM EMISSIONS (tpy)	SO ₂ EMISSIONS (tpy)	VOC EMISSIONS (tpy)
ITT Boiler- Duty 1	5,500,000	47	1.18	1.98	0.18	0.01	0.13
ITT Boiler- Duty 2	5,500,000	47	1.18	1.98	0.18	0.01	0.13
ITT Boiler- Back up	5,500,000	47	1.18	1.98	0.18	0.01	0.13
ITT - Facility Heat	20,500,000	176	8.80	7.39	0.67	0.05	0.48
MTT - Facility Heat	12,282,000	105	5.27	4.43	0.40	0.03	0.29
MAXIMUM TOTAL (tpy)			17.6	17.8	1.61	0.13	1.16

Notes:

- Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1.
- Boiler emissions estimates are based on AP-42 as a conservative estimate. When final boiler selection is complete, this estimate will be updated based on vendor specifications. The industrial wastewater treatment plant intends to install three boilers--two operating as duty, one for back up. However, potential emissions are based on three boilers operating 8,760 hours per year.
- Low NO_x burners are being used in all natural gas-fired boilers. Emissions factors for low NO_x boilers from AP-42 Table 1.4-1 were used.
- Oak Orchard Wastewater Treatment Plant (OOWTP) municipal treatment train (MTT) and industrial treatment train (ITT) total HVAC heat input rating is based on the estimated peak natural gas demand for building heat of 15,042 and cubic feet per hour (ITT) and 12,282 MBH (MTT). Potential emissions are based on operating at this demand 8,760 hours per year. Actual natural gas combustion for heating is expected to be less.
- The SO₂ emission factor for natural gas combustion is based on 100% conversion of fuel sulfur to SO₂ and assumes sulfur content is natural gas of 2,000 grains/10⁶ scf. (per AP-42 Chapter 1.4).
- Abbreviations include Oxides of Nitrogen (NO_x), Carbon monoxide (CO), Particulate Matter (PM), Sulfur Dioxide (SO₂), Volatile Organic Compounds (VOC), million (MM), British Thermal Unit (Btu), Standard Cubic Feet (scf), pound per year (lb/yr), tons per year (tpy).

Table B-4
Dual Fuel Combustion Units Combustion Units - Potential Emissions Estimates for Criteria Pollutants
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

FUEL	HEAT CONTENT (Btu/scf)		POLLUTANT	NO _x lb/MMscf	CO lb/MMscf	PM ₁₀ /PM _{2.5} lb/MMscf	SO ₂ lb/MMscf	VOC lb/MMscf
Natural Gas	1020		Factor	50 (Low NO _x)	84	7.6	0.6	5.5
			AP-42 Table	1.4-1, 1998	1.4-1, 1998	1.4-2, 1998	1.4-2, 1998	1.4-2, 1998
DUAL FUEL COMBUSTION DEVICE	HEAT INPUT (BTU/hr)	MAX FUEL USE (MMscf/hr)	MAXIMUM FUEL USE (MMscf/yr)	NO _x EMISSIONS (tpy)	CO EMISSIONS (tpy)	PM EMISSIONS (tpy)	SO ₂ EMISSIONS (tpy)	VOC EMISSIONS (tpy)
MTT Digester Boiler 1 - Duty	5,000,000	0.0049	43	1.07	1.80	0.16	0.01	0.12
MTT Digester Boiler 2 - Duty	5,000,000	0.0049	43	1.07	1.80	0.16	0.01	0.12
MTT Digester Boiler 3 - Stand by	5,000,000	0.0049	43	1.07	1.80	0.16	0.01	0.12
MTT Sludge Dryer	10,000,000	0.0098	86	2.15	3.61	0.33	0.03	0.24
MAXIMUM TOTAL (tpy)				5.37	9.02	0.82	0.06	0.59
FUEL	HEAT CONTENT (Btu/scf)		POLLUTANT	NO _x lb/MMscf	CO lb/MMscf	PM lb/MMscf	SO ₂ lb/MMscf	VOC lb/MMscf
Biogas	600		Factor	29.4	49.41	4.47	8.1	3.24
			Source	SDACPD B11 Boiler Digester Gas Fired Uncontrolled (except SO ₂ , calculated below)				
DUAL FUEL COMBUSTION DEVICE	HEAT INPUT (BTU/hr)	Maximum Daily DG Fuel Use (MMscf/hr)	MAXIMUM FUEL USE (MMscf/yr)	NO _x EMISSIONS (tpy)	CO EMISSIONS (tpy)	PM EMISSIONS (tpy)	SO ₂ EMISSIONS (tpy)	VOC EMISSIONS (tpy)
MTT Digester Boiler 1 - Duty	5,000,000	0.0083	73	1.1	1.8	0.16	0.30	0.12
MTT Digester Boiler 2 - Duty	5,000,000	0.0083	73	1.1	1.8	0.16	0.30	0.12
MTT Digester Boiler 3 - Stand by	5,000,000	0.0083	73	1.1	1.8	0.16	0.30	0.12
MTT Sludge Dryer	10,000,000	0.0167	146	2.1	3.6	0.33	0.59	0.24
MAXIMUM TOTAL (tpy)				5.4	9.0	0.82	1.5	0.59
H ₂ S	CONCENTRATION (ppm)	GAS CONSTANT (ft ³ -atm / lbmol-R)	MOLECULAR WEIGHT (lb/lb-mol)	TEMPERATURE (Rankine)	H ₂ S GAS CONTENT (lb/MMSCF)	EMISSION FACTOR (lb/MMSCF as SO ₂)	EMISSION FACTOR (lb SO ₂ / hr)	
Raw	3,000	0.7302	34.08	527.67	265	499	9.13	
Conditioned	50	0.7302	34.08	527.67	4	8.1	0.15	

NOTES:

- Three boilers are proposed for the Municipal Treatment Train (MTT), two duty and one standby. However, Potential to Emit (PTE) was estimated based on all 3 operating 8,760 hours per year.
- Facility-wide PTE was estimated based on combusting each fuel (i.e., natural gas or digester gas) at maximum capacity and selecting the worst case emissions, except Sulfur dioxide (SO₂).
 - SO₂ emissions from digester gas combustion is estimated above based on an expected maximum hydrogen sulfide (H₂S) concentration in the biogas following treatment / conditioning of 50 parts per million (ppm), 68°F (per NYDES), and 100% conversion of H₂S to SO₂, as a conservative estimate.
 - The digester solids will be conditioned with ferric chloride feed system to reduce H₂S in the digester gas (OOWWTP UPGRADE AND BIOSOLIDS BODR, page 72). Ferric chloride also binds with orthophosphates which reduces the phosphorus available for struvite formation.
 - The facility will also be equipped with a digester gas conditioning system will remove impurities from the biogas to protect downstream end-use equipment (i.e., the boilers). It will consist of hydrogen sulfide removal via lead/lag media vessels, moisture removal via heat exchange with a chilled glycol solution, and pressurization via duty/standby blowers (OOWWTP UPGRADE AND BIOSOLIDS BODR, page 72). As a conservative estimate, an expected hydrogen sulfide concentration following conditioning of 50 ppm was used in the emission calculations above. However, worst case facility-wide emissions presented in Table 1 are based on flaring 100% of the digester gas produced and an unconditioned H₂S concentration of 3,000 ppm. This is a very conservative estimate because the flared gas is expected to have an H₂S concentration less than 3,000 ppm based on the addition of ferric chloride and the amount of digester gas flared is expected to be significantly less than the annual average generation (95 million cubic feet per year).
- While ferric chloride addition and gas conditioning are included in the design to improve the process and protect the equipment (i.e., not as emission control technology), facility wide emissions were estimated at worst case conditions (i.e., flaring 100% of unconditioned digester gas) not taking credit for the H₂S reduction to demonstrate that process or emissions limitations are not necessary to qualify for a Minor Facility Registration.
- Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1. Digester gas Higher Heating Value is 600 Btu/scf per SDACPD Emission Factors for Digester Gas.
- lb/mmcsf = [ppm] / [(lbmol-R/atm-ft³) x (lb/lbmol) x (R / atm)] x [106 scf / mmcsf]

Table B-5
Potential Emissions - Criteria - Flare
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Natural Gas - Pilot Light		Digester Gas		Instantaneous Maximum	Annual Average
Fuel Content - HHV (Btu/scf)	1,020	Fuel Content - HHV (Btu/scf)		600	600
Maximum Fire Rate (SCF/hr)	70	Digester Gas Generation (scfm)		305	180
Maximum Fuel Consumption (MMBTU/yr)	625.46	Maximum Digester Gas Generation (MMscf/hr)		0.0183	0.0108

Emissions Calculations

Pollutant	Pilot - Natural Gas ⁽⁹⁾				Digester Gas ⁽¹⁰⁾				
	Emission Factor	Emission Factor Source	Maximum Emission Rate		Emission Factor	Emission Factor Source	Maximum hourly emission rate	Annual Emission Rate	
	lb/MMBTU		lb/yr	ton/yr				lb/MMscf	lb/hr

Criteria Pollutant

NO _x	0.068	AP-42 Table 13.5-1	42.53	0.02	48.00	SDAPCD Emission Factor Tables F02: Flares, Digester Gas Fired, Enclosed; Rev 2021 (except SO ₂)	0.88	0.52	2.27
CO	0.37		231.4	0.12	1.80		0.033	0.019	0.09
SO _x	0.0005	See Footnote 8	0.3294	1.65E-04	499		9.13	5.39	23.6
PM	0.02	AP-42 Table 2.4-5 Rev. Aug 2024 ⁽⁷⁾	10.42	0.00521	12.00		0.22	0.13	0.57
PM	0.017		10.42	0.00521	12.00		0.22	0.13	0.57
PM	0.017		10.42	0.00521	12.00		0.22	0.13	0.57
VOC	0.00388	AP-42 Table 13.5-1	2.43	0.00121	12.10		0.22	0.13	0.57

NOTES:

1. Natural gas Higher Heating Value is 1020 British Thermal Units per standard cubic foot (Btu/scf) per AP-42 Table 1.4-1. Digester gas Higher Heating Value is 600 Btu/scf per SDAPCD Emission Factors for Digester Gas.
2. The instantaneous peak digester gas generation rate is 305 standard cubic feet per minute (scfm), the weekly maximum generation rate is 235 scfm, the monthly maximum generation rate is 202 scfm, and the annual average is 180 scfm. The instantaneous peak generation rate, weekly maximum generation rate, and monthly maximum generation rate cannot be sustained long term and therefore, the annual average generation rate of 180 scfm is the most representative generation rate to use for estimating annual digester gas production. As a conservative approach, the annual emissions estimate for criteria pollutants is based on the annual average digester gas generation rate of 180 scfm, 24 hours per day (hpd), and 365 days per year. While the flare has not yet been selected, the name plate capacity is expected to match the maximum instantaneous peak digester gas generation rate.
3. Sulfur Dioxide (SO₂) emissions were estimated based on a maximum expected hydrogen sulfide (H₂S) content in digester gas [3,000 parts per million (ppm)] not accounting for the reduction achieved by ferric chloride addition to the digester, flaring 100% of the maximum annual average gas generation (i.e., 95 million cubic feet per year), complete conversion from H₂S to SO₂, and the ratio of molecular weights for H₂S to SO₂. See Table B-4 for the conversion from 3,000 ppm H₂S to 499 lb SO₂/million standard cubic feet (MMSCF). This is a very conservative estimate because the flared gas is expected to have an H₂S concentration less than 3,000 ppm based on the addition of ferric chloride to the digesters, the amount of digester gas flared is expected to be significantly less than the annual average biogas generation rate (95 MMSCF), and the preferential combustion of digester gas in the boilers which will be further conditioned resulting in significantly lower emissions.
4. The maximum natural gas consumption for the pilot is based on the maximum fuel consumption rate of 70 standard cubic feet per hour (scf/hr) (based on the EPA Flares Cost Manual, Chapter 7 (August 2019 edition) Section 1.3.5 Pilot Gas Requirement), 8,760 hours per year and the heat content of the fuel.
7. The particulate matter (PM₁₀) emission factor for the natural-gas-fired pilot is from AP-42 chapter 2, Table 2.4-5; (May 2025). The factor, 17 pounds per million standard cubic feet (lb/MMSCF) was converted to pounds per million British Thermal Units (lb/MMBTU) based on the heat content of the fuel.
8. The SO₂ emission factor for natural gas is based on the expected upper range of sulfur content in pipeline quality natural gas (i.e., 2,000 grains H₂S/ 10⁶ cubic feet natural gas).
9. Potential flare emission calculations do not include emissions associated with the natural gas-fired pilot because the calculations assume the flare combusts digester gas 8,760 hours/year and the pilot will not continue to burn once the flare is lit and actively burning digester gas. Therefore, the flare emissions cited in the Facility Wide Emissions Summary are based on the combustion of digester gas only.

Table B-6

Potential Emissions - Hazardous Air Pollutant - Natural Gas External Combustion Devices
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

FUEL INFORMATION		HEAT INPUT (MMBtu/hr)				
		ITT Duty Boiler	ITT Duty Boiler	ITT Duty Boiler	ITT Building Heat	MTT Building Heat
Fuel	Natural Gas	5.5	5.5	5.5	20.5	12.3
Fuel Higher Heating Value (Btu/scf) ⁽²⁾	1,020					
Operating Hours (hr/yr)	8,760					

Hazardous Air Pollutant Emissions from Natural Gas Combustion									
Pollutant	CAS	Emission Factor	Emission Factor Reference	IWTP Duty Boiler	IWTP Duty Boiler	IWTP Back Up Boiler	IWTP Building Heat	MTT Building Heat	
		lb/MMscf		ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	
2-Methyl-naphthalene	91-57-6	2.40E-05	AP-42 Table 1.4-3 Rev. July 1998	5.67E-07	5.67E-07	5.67E-07	2.11E-06	1.27E-06	
3-Methyl-cholanthrene	56-49-5	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
7,12-Dimethyl-benz(a)-anthracene	POM	1.60E-05		3.78E-07	3.78E-07	3.78E-07	1.41E-06	8.44E-07	
Acenaphthene	83-32-9	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Acenaphthylene	203-96-8	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Anthracene	120-12-7	2.40E-06		5.67E-08	5.67E-08	5.67E-08	2.11E-07	1.27E-07	
Benz(a)-anthracene	56-55-3	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Benzene	71-43-2	2.10E-03		4.96E-05	4.96E-05	4.96E-05	1.85E-04	1.11E-04	
Benzo(a)pyrene	50-32-8	1.20E-06		2.83E-08	2.83E-08	2.83E-08	1.06E-07	6.33E-08	
Benzo(b)-fluoranthene	205-99-2	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Benzo(g,h,i)-perylene	191-24-2	1.20E-06		2.83E-08	2.83E-08	2.83E-08	1.06E-07	6.33E-08	
Benzo(k)-fluoranthene	207-08-9	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Chrysene	218-01-9	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Dibenzo(a,h)-anthracene	53-70-3	1.20E-06		2.83E-08	2.83E-08	2.83E-08	1.06E-07	6.33E-08	
Dichloro-benzene	25321-22-6	1.20E-03		2.83E-05	2.83E-05	2.83E-05	1.06E-04	6.33E-05	
Fluoranthene	206-44-0	3.00E-06		7.09E-08	7.09E-08	7.09E-08	2.64E-07	1.58E-07	
Fluorene	86-73-7	2.80E-06		6.61E-08	6.61E-08	6.61E-08	2.46E-07	1.48E-07	
Formaldehyde	50-00-0	7.50E-02		1.77E-03	1.77E-03	1.77E-03	6.60E-03	3.96E-03	
Hexane	110-54-3	1.80E+00		4.25E-02	4.25E-02	4.25E-02	1.58E-01	9.49E-02	
Indeno (1,2,3-cd) pyrene	193-39-5	1.80E-06		4.25E-08	4.25E-08	4.25E-08	1.58E-07	9.49E-08	
Naphthalene	91-20-3	6.10E-04		1.44E-05	1.44E-05	1.44E-05	5.37E-05	3.22E-05	
Phenanthrene	85-01-8	1.70E-05		4.02E-07	4.02E-07	4.02E-07	1.50E-06	8.97E-07	
Pyrene	129-00-0	5.00E-06		1.18E-07	1.18E-07	1.18E-07	4.40E-07	2.64E-07	
Toluene	108-88-3	3.40E-03	8.03E-05	8.03E-05	8.03E-05	2.99E-04	1.79E-04		

Table B-6

Potential Emissions - Hazardous Air Pollutant - Natural Gas External Combustion Devices
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

FUEL INFORMATION		HEAT INPUT (MMBtu/hr)							
		ITT Duty Boiler	ITT Duty Boiler	ITT Duty Boiler	ITT Building Heat	MTT Building Heat			
Fuel	Natural Gas								
Fuel Higher Heating Value (Btu/scf) ⁽²⁾	1,020	5.5	5.5	5.5	20.5	12.3			
Operating Hours (hr/yr)	8,760								
Hazardous Air Pollutant Emissions from Natural Gas Combustion									
Pollutant	CAS	Emission Factor	Emission Factor	IWTP Duty Boiler	IWTP Duty Boiler	IWTP Back Up Boiler	IWTP Building Heat	MTT Building Heat	
		lb/MMscf	Reference	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Arsenic	7440-38-2	2.00E-04	AP-42 Table 1.4-4 Rev. July 1998	4.72E-06	4.72E-06	4.72E-06	1.76E-05	1.05E-05	
Beryllium	7440-41-7	1.20E-05		2.83E-07	2.83E-07	2.83E-07	1.06E-06	6.33E-07	
Cadmium	7440-43-9	1.10E-03		2.60E-05	2.60E-05	2.60E-05	9.68E-05	5.80E-05	
Chromium	7440-47-3	1.40E-03		3.31E-05	3.31E-05	3.31E-05	1.23E-04	7.38E-05	
Cobalt	7440-48-4	8.40E-05		1.98E-06	1.98E-06	1.98E-06	7.39E-06	4.43E-06	
Lead	7439-92-1	5.00E-04	AP-42 Table 1.4-2 Rev. July 1998	1.18E-05	1.18E-05	1.18E-05	4.40E-05	2.64E-05	
Manganese	7439-96-5	3.80E-04	AP-42 Table 1.4-4 Rev. July 1998	8.97E-06	8.97E-06	8.97E-06	3.35E-05	2.00E-05	
Mercury	7439-97-6	2.60E-04		6.14E-06	6.14E-06	6.14E-06	2.29E-05	1.37E-05	
Nickel	7440-02-0	2.10E-03		4.96E-05	4.96E-05	4.96E-05	1.85E-04	1.11E-04	
Selenium	7782-49-2	2.40E-05		5.67E-07	5.67E-07	5.67E-07	2.11E-06	1.27E-06	
Total HAPs:				0.04	0.04	0.04	0.17	0.10	

Notes:

1. Three boilers are being installed at the ITT, one duty and one standby . However, PTE is based on both operating 8,760 hours per year.
2. Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1.

Table B-7
 Potential Emissions - Hazardous Air Pollutant - Dual Fired External Combustion
 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Fuel		Dual-fired: Natural Gas & Digester Gas		Heat Input (MMBtu/hr)		5	5	5	10
Natural Gas Higher Heating Value (Btu/scf)		1,020		Operating Hours (hr/yr)		8,760	8,760	8,760	8,760
Digester Gas Higher Heating Value (Btu/scf)		600							

Pollutant	CAS	Natural Gas			Digester Gas			MAXIMUM Emission Factor	EMISSIONS				
		Emission Factor Reference	Emission Factor lb/MMscf	Emission Factor lb/MMBtu	Emission Factor Reference	Emission Factor lb/MMscf	Emission Factor lb/MMBtu		Emission Factor lb/MMBtu	MTT Boiler - Duty	MTT Boiler - Duty	MTT Boiler Stand By	MTT Sludge Dryer
										lb/yr	lb/yr	lb/yr	lb/yr
2-Methyl-naphthalene	91-57-6	AP-42 Table 1.4-3 Rev. July 1998	2.40E-05	2.35E-08	SDAPCD B11 Boiler Digester Gas Fired Uncontrolled	-	-	2.35E-08	1.03E-03	1.03E-03	1.03E-03	2.06E-03	
3-Methyl-cholanthrene	56-49-5		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
7,12-Dimethyl-benz(a)-anthracene	POM		1.60E-05	1.57E-08		-	-	1.57E-08	6.87E-04	6.87E-04	6.87E-04	1.37E-03	
Acenaphthene	83-32-9		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Acenaphthylene	203-96-8		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Ammonia	7664-41-7		-	-		4.80E-03	8.00E-06	8.00E-06	3.50E-01	3.50E-01	3.50E-01	7.01E-01	
Anthracene	120-12-7		2.40E-06	2.35E-09		-	-	2.35E-09	1.03E-04	1.03E-04	1.03E-04	2.06E-04	
Benz(a)-anthracene	56-55-3		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Benzene	71-43-2		2.10E-03	2.06E-06		2.59E-02	4.32E-05	4.32E-05	1.89E+00	1.89E+00	1.89E+00	3.78E+00	
Benzo(a)pyrene	50-32-8		1.20E-06	1.18E-09		-	-	1.18E-09	5.15E-05	5.15E-05	5.15E-05	1.03E-04	
Benzo(b)-fluoranthene	205-99-2		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Benzo(g,h,i)-perylene	191-24-2		1.20E-06	1.18E-09		-	-	1.18E-09	5.15E-05	5.15E-05	5.15E-05	1.03E-04	
Benzo(k)-fluoranthene	207-08-9		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Chlorobenzene	108-90-7		-	-		2.00E-04	3.33E-07	3.33E-07	1.46E-02	1.46E-02	1.46E-02	2.92E-02	
Chrysene	218-01-9		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04	
Dibenzo(a,h)-anthracene	53-70-3		1.20E-06	1.18E-09		-	-	1.18E-09	5.15E-05	5.15E-05	5.15E-05	1.03E-04	
Dichloro-benzene	25321-22-6		1.20E-03	1.18E-06		1.80E-03	3.00E-06	3.00E-06	1.31E-01	1.31E-01	1.31E-01	2.63E-01	
Ethylbenzene	100-41-4		-	-		1.00E-03	1.67E-06	1.67E-06	7.30E-02	7.30E-02	7.30E-02	1.46E-01	
Ethylene Dichloride	107-06-2	-	-	1.40E-03	2.33E-06	2.33E-06	1.02E-01	1.02E-01	1.02E-01	2.04E-01			
Fluoranthene	206-44-0	3.00E-06	2.94E-09	-	-	2.94E-09	1.29E-04	1.29E-04	1.29E-04	2.58E-04			
Fluorene	86-73-7	2.80E-06	2.75E-09	-	-	2.75E-09	1.20E-04	1.20E-04	1.20E-04	2.40E-04			

Table B-7
 Potential Emissions - Hazardous Air Pollutant - Dual Fired External Combustion
 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Fuel		Dual-fired: Natural Gas & Digester Gas		Heat Input (MMBtu/hr)		5	5	5	10			
Natural Gas Higher Heating Value (Btu/scf)		1,020		Operating Hours (hr/yr)		8,760	8,760	8,760	8,760			
Digester Gas Higher Heating Value (Btu/scf)		600										
Pollutant	CAS	Natural Gas			Digester Gas			MAXIMUM Emission Factor	EMISSIONS			
		Emission Factor Reference	Emission Factor lb/MMscf	Emission Factor lb/MMBtu	Emission Factor Reference	Emission Factor lb/MMscf	Emission Factor lb/MMBtu		MTT Boiler - Duty	MTT Boiler - Duty	MTT Boiler Stand By	MTT Sludge Dryer
Formaldehyde	50-00-0	AP-42 Table 1.4-3	7.50E-02	7.35E-05	SDAPCD B11 Boiler Digester Gas Fired Uncontrolled	1.35E-01	2.25E-04	2.25E-04	9.86E+00	9.86E+00	9.86E+00	1.97E+01
Hexane	110-54-3		1.80E+00	1.76E-03		6.47E-02	1.08E-04	1.76E-03	7.73E+01	7.73E+01	7.73E+01	1.55E+02
Hydrogen Chloride	7647-01-0		-	-		6.46E-01	1.08E-03	1.08E-03	4.72E+01	4.72E+01	4.72E+01	9.43E+01
Hydrogen Sulfide	7783-06-4		-	-		8.84E-02	1.47E-04	1.47E-04	6.46E+00	6.46E+00	6.46E+00	1.29E+01
Indeno (1,2,3-cd) pyrene	193-39-5		1.80E-06	1.76E-09		-	-	1.76E-09	7.73E-05	7.73E-05	7.73E-05	1.55E-04
Methylene Chloride	75-09-2		-	-		1.00E-04	1.67E-07	1.67E-07	7.30E-03	7.30E-03	7.30E-03	1.46E-02
Naphthalene	91-20-3		6.10E-04	5.98E-07		-	-	5.98E-07	2.62E-02	2.62E-02	2.62E-02	5.24E-02
Perchloroethylene	127-18-4		-	-		5.00E-04	8.33E-07	8.33E-07	3.65E-02	3.65E-02	3.65E-02	7.30E-02
Phenanthrene	85-01-8		1.70E-05	1.67E-08		-	-	1.67E-08	7.30E-04	7.30E-04	7.30E-04	1.46E-03
Pyrene	129-00-0		5.00E-06	4.90E-09		-	-	4.90E-09	2.15E-04	2.15E-04	2.15E-04	4.29E-04
Toluene	108-88-3		3.40E-03	3.33E-06		1.29E-01	2.15E-04	2.15E-04	9.42E+00	9.42E+00	9.42E+00	1.88E+01
1,1,1-Trichloroethane	71-55-6		-	-		1.00E-04	1.67E-07	1.67E-07	7.30E-03	7.30E-03	7.30E-03	1.46E-02
Trichloroethylene	79-01-6		-	-		3.00E-04	5.00E-07	5.00E-07	2.19E-02	2.19E-02	2.19E-02	4.38E-02
Xylenes	1330-20-7		-	-		4.50E-03	7.50E-06	7.50E-06	3.29E-01	3.29E-01	3.29E-01	6.57E-01
Beryllium	7440-41-7	AP-42 Table 1.4-4, Rev. July 1998	1.20E-05	1.18E-08	-	-	1.18E-08	5.15E-04	5.15E-04	5.15E-04	1.03E-03	
Cadmium	7440-43-9		1.10E-03	1.08E-06	-	-	1.08E-06	4.72E-02	4.72E-02	4.72E-02	9.45E-02	
Chromium	7440-47-3		1.40E-03	1.37E-06	-	-	1.37E-06	6.01E-02	6.01E-02	6.01E-02	1.20E-01	
Cobalt	7440-48-4		8.40E-05	8.24E-08	-	-	8.24E-08	3.61E-03	3.61E-03	3.61E-03	7.21E-03	
Lead	7439-92-1	AP-42 Table 1.4-2 Rev. July 1998	5.00E-04	4.90E-07	-	-	4.90E-07	2.15E-02	2.15E-02	2.15E-02	4.29E-02	
Manganese	7439-96-5	AP-42 Table 1.4-4, Rev. July 1998	3.80E-04	3.73E-07	-	-	3.73E-07	1.63E-02	1.63E-02	1.63E-02	3.26E-02	
Mercury	7439-97-6		2.60E-04	2.55E-07	-	-	2.55E-07	1.12E-02	1.12E-02	1.12E-02	2.23E-02	
Nickel	7440-02-0		2.10E-03	2.06E-06	-	-	2.06E-06	9.02E-02	9.02E-02	9.02E-02	1.80E-01	
Selenium	7782-49-2		2.40E-05	2.35E-08	-	-	2.35E-08	1.03E-03	1.03E-03	1.03E-03	2.06E-03	
TOTAL (tpy):									0.08	0.08	0.08	0.15

NOTES:

1. Three boilers will be installed--two duty and one standby. However, Potential to Emit (PTE) is based on all three operating 8,760 hours per year.
2. Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1.
3. Digester gas Higher Heating Value is 600 Btu/scf per SDAPCD Emission Factors for Digester Gas.
4. SDAPCD emission factors included a factor for arsenic. However it was not used because it is based on a Landfill gas guidance document which is derived from haut road landfill sampling and is not representative of digester gas.
5. The hydrogen sulfide emission factor is based on the conditioned digester gas concentration (i.e., 50 parts per million) and 98% conversion to sulfur dioxide.

Table B-8
 Potential Emissions - Hazardous and Toxic Air Pollutant - Flare
 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Fuel	Dual-fired: Natural Gas & Digester Gas	Operating Parameters	DG - Max Hour	DG - Annual Average	NG	Maximum Predicted Hourly Unit Impacts	Maximum Predicted Annual Unit Impacts
Natural Gas Higher Heating Value (Btu/scf)	1,020	Operating Hours (hr/yr)	8,760	8,760	8,760	(ug/m3)/ (lb/hr):	(ug/m3)/ (lb/hr):
Digester Gas Higher Heating Value (Btu/scf)	600	Flow rate (scfm)	305	180	1	22.42	0.93
		Gas flow (mmscf/hr)	0.018	0.011	0.0001		

Hazardous Air Pollutant Emissions Calculations										Guidance Concentrations		Complies with SGC/AGC ?		
Pollutant	CAS	Natural Gas		Digester Gas		Emissions				SGC	AGC			
		Emission Factor Reference	Emission Factor lb/MMscf	Emission Factor Reference	Emission Factor lb/MMscf	DG - Max hour Emissions lb/hr	NG Combustion lb/hr	Max 1-hour impact ug/m ³	Max Annual Impact ug/m ³					
PAH	1-15-1				1.80E-03	3.29E-05		7.39E-04	3.08E-05					
Formaldehyde	50-00-0		7.50E-02		7.01E-01	1.28E-02	5.25E-06	2.88E-01	1.20E-02	30	6.0E-02	YES		
Benzo(a)pyrene	50-32-8		1.20E-06				8.40E-11	1.88E-09	7.85E-11		1.0E-03	YES		
Dibenzo(a,h)-anthracene	53-70-3		1.20E-06				8.40E-11	1.88E-09	7.85E-11		1.0E-03	YES		
3-Methyl-cholanthrene	56-49-5		1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES		
Benz(a)-anthracene	56-55-3		1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES		
Benzene	71-43-2		2.10E-03		9.54E-02	1.75E-03	1.47E-07	3.91E-02	1.63E-03	2.7E+01	1.3E-01	YES		
Acetaldehyde	75-07-0				2.58E-02	4.72E-04		1.06E-02	4.41E-04	4.7E+02	4.5E-01	YES		
Methylene Chloride	75-09-2				1.00E-04	1.83E-06		4.10E-05	1.71E-06	1.4E+04	4.6E+01	YES		
1,1,2 Trichloroethane	79-00-5				1.00E-04	1.83E-06		4.10E-05	1.71E-06		1.4E+00	YES		
Trichloroethylene	79-01-6				3.00E-04	5.49E-06		1.23E-04	5.13E-06	2.0E+01	2.1E-01	YES		
Acenaphthene	83-32-9		1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES		
Phenanthrene	85-01-8		1.70E-05				1.19E-09	2.67E-08	1.11E-09		1.0E-01	YES		
Fluorene	86-73-7		2.80E-06				1.96E-10	4.39E-09	1.83E-10		1.0E-01	YES		
Naphthalene	91-20-3	AP-42 Table 1.4-3 Rev. July 1998	6.10E-04	SJVAPCD Sewage Gas Fired External Combustion (WWTP), Flare	6.60E-03	1.21E-04	4.27E-08	2.71E-03	1.13E-04	7.9E+03	3.0E+00	YES		
2-Methyl-naphthalene	91-57-6		2.40E-05				1.68E-09	3.77E-08	1.57E-09		7.1E+00	YES		
Ethylbenzene	100-41-4					8.67E-01	1.59E-02		3.56E-01	1.48E-02		1.0E+03	YES	
Dichlorobenzene	106-46-7					1.80E-03	3.29E-05		7.39E-04	3.08E-05		9.1E-02	YES	
Acrolein	107-02-8					6.00E-03	1.10E-04		2.46E-03	1.03E-04	2.6E+00	3.5E-01	YES	
Ethylene Dichloride	107-06-2					1.40E-03	2.56E-05		5.74E-04	2.39E-05		3.8E-02	YES	
Toluene	108-88-3				3.40E-03		3.48E-02	6.37E-04	2.38E-07	1.43E-02	5.95E-04	3.7E+04	5.0E+03	YES
Chlorobenzene	108-90-7						2.00E-04	3.66E-06		8.21E-05	3.42E-06		6.0E+01	YES
Hexane	110-54-3				1.80E+00		1.74E-02	3.18E-04	1.26E-04	7.14E-03	2.98E-04		7.0E+02	YES
Propylene	115-07-1						1.46E+00	2.67E-02		5.99E-01	2.50E-02		3.0E+03	YES
Anthracene	120-12-7				2.40E-06				1.68E-10	3.77E-09	1.57E-10		1.0E-01	YES
Perchloroethylene	127-18-4						5.00E-04	9.15E-06		2.05E-04	8.55E-06	3.0E+02	3.8E+00	YES
Pyrene	129-00-0				5.00E-06				3.50E-10	7.85E-09	3.27E-10		1.0E-01	YES
Benzo(g,h,i)-perylene	191-24-2				1.20E-06				8.40E-11	1.88E-09	7.85E-11		1.0E-01	YES
Indeno (1,2,3-cd) pyrene	193-39-5				1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-02	YES
Acenaphthylene	203-96-8				1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES

Hazardous Air Pollutant Emissions Calculations										Guidance Concentrations		Complies with SGC/AGC ?	
Pollutant	CAS	Natural Gas		Digester Gas		Emissions				SGC	AGC		
		Emission Factor Reference	Emission Factor	Emission Factor Reference	Emission Factor	DG - Max hour Emissions	NG Combustion	Max 1-hour impact	Max Annual Impact				
												lb/MMscf	lb/MMscf
Benzo(b)-fluoranthene	205-99-2	AP-42 Table 1.4-3 Rev. July 1998	1.80E-06	SJVAPCD Sewage Gas Fired External Combustion (WWTP), Flare (Except for H2S)			1.26E-10	2.83E-09	1.18E-10		1.0E-02	YES	
Fluoranthene	206-44-0		3.00E-06				2.10E-10	4.71E-09	1.96E-10		1.0E-01	YES	
Benzo(k)-fluoranthene	207-08-9		1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES	
Chrysene	218-01-9		1.80E-06				1.26E-10	2.83E-09	1.18E-10		1.0E-01	YES	
Xylenes	1330-20-7				2.19E-02	4.01E-04			8.99E-03	3.75E-04		1.0E-01	YES
Lead	7439-92-1	AP-42 Table 1.4-2 Rev. July 1998	5.00E-04					3.50E-08	7.85E-07	3.27E-08		3.8E-02	YES
Manganese	7439-96-5	AP-42 Table 1.4-4 Rev. July 1998	3.80E-04					2.66E-08	5.96E-07	2.49E-08		5.0E-02	YES
Mercury	7439-97-6		2.60E-04					1.82E-08	4.08E-07	1.70E-08	6.0E-01	3.0E-01	YES
Nickel	7440-02-0		2.10E-03					1.47E-07	3.30E-06	1.37E-07	2.0E-01	4.2E-03	YES
Arsenic	7440-38-2		2.00E-04					1.40E-08	3.14E-07	1.31E-08		2.3E-04	YES
Beryllium	7440-41-7		1.20E-05					8.40E-10	1.88E-08	7.85E-10		4.2E-04	YES
Cadmium	7440-43-9		1.10E-03					7.70E-08	1.73E-06	7.20E-08		2.4E-04	YES
Chromium	7440-47-3		1.40E-03					9.80E-08	2.20E-06	9.16E-08		4.5E+01	YES
Cobalt	7440-48-4		8.40E-05					5.88E-09	1.32E-07	5.50E-09		1.0E-03	YES
Hydrogen Chloride	7647-01-0		AP-42 Table 1.4-3 Rev. July 1998				6.46E-01	1.18E-02		2.65E-01	1.10E-02	2.1E+03	2.0E+01
Ammonia	7664-41-7								0.00E+00	0.00E+00	2.4E+03	5.0E+02	YES
Selenium	7782-49-2	AP-42 Table 1.4-4 Rev. July 1998	2.40E-05				1.68E-09	3.77E-08	1.57E-09		2.0E+01	YES	
Hydrogen Sulfide	7783-06-4	AP-42 Table 1.4-3 Rev. July 1998			5.31E+00	9.71E-02		2.18E+00	9.08E-02		2.0E+00	YES	
Dichlorobenzene	25321-22-6		1.20E-03				8.40E-08	1.88E-06	7.85E-08		1.0E-01	YES	
7,12-Dimethyl-benz(a)-anthracene	POM		1.60E-05				1.12E-09	2.51E-08	1.05E-09		1.0E-01	YES	

Annual emissions (tpy): 0.74 5.79E-04

NOTES:

1. Even though the pilot (natural gas) will not be fired concurrent with digester gas (DG), the emissions calculations above are based in both DG and natural gas combusted 8,760 hour/year.
2. Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1.
3. Digester gas Higher Heating Value is 600 Btu/scf per SDAPCD Emission Factors for Digester Gas.
4. Hydrogen sulfide (H₂S) emissions from digester gas are calculated based in the maximum DG H₂S content (3,000 parts per million) and 98% oxidation to SO₂ (i.e., 2% emitted as H₂S)
4. The maximum unit impact was based on a unit emission rate of 1 pound per hour. The facility-wide impact was calculated by summing the product of the calculated emission rate by either the predicted hourly or annual unit impact.

Table B-9
ITT Emissions Summary
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

CAS No.	Compound number	Compound	Predicted Compound Air Emissions Summary for Each WWTP Unit Operation (lb/d)						Combined Total Air Emissions	ERP (lb/hr)	ER	
			EQ1	Combined screens	AS - Anoxic	AS-Diffused	MBR	BIOX Effl tank				
75-59-0	1	Tetramethylammonium hydroxide (TMAH)	4.7E-10	-	-	-	-	-	4.7E-10	7.9E-11	A	
67-63-0	2	Isopropyl Alcohol	2.8E+00	1.1E-02	2.2E-01	1.1E+00	8.4E-02	1.0E-02	4.3E+00	7.1E-01	B	
56-40-6	3	Glycine	1.7E-04	4.1E-07	2.0E-06	5.1E-07	1.0E-08	1.8E-09	1.7E-04	2.9E-05	B	
56539-66-3	4	3-methoxy,3methyl,1-Butanol	8.5E-03	2.5E-05	2.0E-04	1.5E-04	5.7E-06	9.1E-07	8.8E-03	1.5E-03	B	
25322-68-3	5	Polyethylene glycol	1.7E-10	-	-	-	-	-	1.7E-10	2.8E-11	B	
182211-02-5	6	Methyloxirane polymer with oxirane	This is a polymer. Emissions are expected to be negligible.									B
288-88-0	7	1,2,4-Triazole	2.8E-02	7.9E-05	4.3E-04	1.6E-04	4.1E-06	6.7E-07	2.9E-02	4.8E-03	A	
141-43-5	8	Ethanolamine(Mono-)	1.5E-05	3.5E-08	1.3E-06	4.8E-06	3.5E-07	6.3E-08	2.2E-05	3.6E-06	B	
929-06-6	9	2-(2-Aminoethoxy)ethanol	7.0E-08	1.9E-10	1.2E-08	7.4E-08	5.9E-09	9.8E-10	1.6E-07	2.7E-08	A	
617-48-1	10	DL-Malic acid	-	-	-	-	-	-	-	-	-	
6915-15-7	11	Malic acid	-	-	-	-	-	-	-	-	-	
64-19-7	12	Acetic Acid	2.6E-04	7.4E-07	4.9E-06	2.6E-06	8.1E-08	1.2E-08	2.6E-04	4.4E-05	B	
110-16-7	13	Maleic Acid	-	-	-	-	-	-	-	-	-	
150-77-6	14	N,N,N,N-Tetraethylethyleneamine	6.8E-06	2.2E-08	4.7E-06	4.4E-05	3.6E-06	5.5E-07	5.9E-05	9.9E-06	B	
9004-62-0	15	CELLULOSE, 2-HYDROXYETHYL ETHER	This is a solid. Emissions are expected to be negligible.									-
107-21-1	16	Ethylene Glycol	9.2E-06	2.1E-08	8.4E-07	3.3E-06	2.5E-07	4.4E-08	1.4E-05	2.3E-06	B	
25704-18-1	17	Benzenesulfonic acid, 4-ethenyl-, sodium salt, homopolymer	This is a solid. Emissions are expected to be negligible.									-
77-92-9	18	Citric acid	-	-	-	-	-	-	-	-	-	
2592-95-2	19	1-Hydroxybenzotriazole	1.2E-05	3.4E-08	8.4E-06	7.4E-05	6.1E-06	1.0E-06	1.0E-04	1.7E-05	C	
9003-11-6		Oxirane, methyl	-	-	-	-	-	-	-	-	-	
26353-67-3	20	2-Naphthalenesulfonic acid, polymer with formaldehyde	This is a polymer. Emissions are expected to be negligible.									
55866-85-8	21	Poly(oxy-1,2-ethanediyl), .alpha.-sulfo-.omega.-(2-propen-1-yloxy)-, ammonium salt (1:1)	Based on a Gelest SDS, this material is >98% solids and therefore emissions are expected to be negligible.									
2594-38-3	22	Polyanionic Electrolyte	As an anionic electrolyte, emissions are expected to be negligible.									
25751-21-7	23	2-propenoic acid, 2-methyl	-	-	-	-	-	-	-	-	-	
3458-72-8	24	Triammonium citrate	-	-	-	-	-	-	-	-	-	
9002-89-5	25	Polyvinyl alcohol	-	-	-	-	-	-	-	-	-	
71888-87-4	26	Cellulose, 2-hydroxyethyl ether, reaction products with glyoxal	This is a solid. Emissions are expected to be negligible.									
594-61-6	27	2-Hydroxy-2-methylpropionic acid	1.9E-04	5.1E-07	1.3E-04	1.1E-03	9.5E-05	1.6E-05	1.6E-03	2.6E-04	B	
67-56-1	28	Methanol	1.0E-03	2.4E-06	4.6E-06	4.3E-07	3.5E-09	5.8E-10	1.0E-03	1.7E-04	B	
Total FAB 1 Emissions (lb/day)			2.85	0.01	0.23	1.14	0.08	0.01	4.32			
Total FAB 1 + Fab 2 Emissions (lb/day)			5.70	0.02	0.45	2.29	0.17	0.02	8.65			
Total FAB 1 + Fab 2 Emissions (lb / year)			2,079	8.1	164	835	62	7.5	3,156			

Table B-9
ITT Emissions Summary
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

NOTES:

1. The list of compounds is a summary of the expected chemical constituents in the proposed discharge as provided by Micron. For Part 212, compounds with emissions less than 100 pounds per year do not need to be included in the compliance evaluation. Accordingly, emissions were calculated for compounds with predicted annual loading to the ITT greater than 100 pounds per year. Certain metals are expected to be present in the influent wastewater. However, based on the nature of the process, emissions of metals are expected to be negligible.
2. Compound fate modeling was conducted using Toxchem (Hydromantis 2021) to estimate air emissions for the new Onondaga County Industrial wastewater treatment plant (IWWTP) in support of project permitting work. The ITT details including unit operation characteristics, influent flowrates and loading conditions, and operating conditions were derived from the Brown & Caldwell (BC) concept design report (BC 2025). The Micron facility's projected compound discharge loads were applied to establish influent compound concentrations. Compound properties were obtained from the Toxchem compound properties database, U.S. EPA EpiSuite, U.S. EPA WATER9, and online compound databases including the U.S. NIH PubChem and the European Chemical Agency (ECHA) websites.
3. The FAB 1 and Fab 2 wastewater will be treated in two identical 8.25 million gallons per day (MGD) parallel treatment trains (total 16.5 MGD). Dashes above indicate where Toxchem predicted zero emissions.
4. Emissions were estimated based on the expected annual chemical loading from Micron's Fab 1 treated in one to the two identical 8.25 MGD treatment trains. A second train with identical loading will be installed to treat wastewater from Micron's Fab 2. To estimate total annual emissions for both trains, the emissions from the one train modeled was doubled.
5. The Environmental Rating and Emission Rate Potential are presented above. In accordance with Part 212, compliance with the short term guidance concentration (SGC) and annual guidance concentration is demonstrated using dispersion modeling.

Table B-10
ITT 212 Compliance Evaluation
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

CAS No.	MICRON Compound number	Compound	Predicted Compound Air Emissions Summary for Each WWTP Unit Operation (lb/d)										COMPLIES WITH SGC/AGC?		
			EQ	Combined screens	AS - Anoxic	AS-Diffused (Aeration)	Membrane (MBR and BIOX)	Decarbonization Units ⁷	Facility-Wide 24-Hour Impact	Facility-Wide Annual Impact	SGC	AGC			
			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	(ug/m ³)	(ug/m ³)	(ug/m ³)	(ug/m ³)			
Hourly Maximum Predicted Unit Impacts (ug/m3)/(lb/hr):			173.77	929.98	191.54	118.52	968.08	302.74							
Annual Maximum Predicted Unit Impacts (ug/m3)/(lb/hr):			5.08	44.61	4.80	4.56	45.72	3.29							
75-59-0	1	TMAH-micron	3.9E-11	-	-	-	-	-	-	6.8E-09	2.0E-10		0.10	YES	
67-63-0	2	Isopropyl Alcohol	2.3E-01	9.2E-04	1.9E-02	9.5E-02	7.9E-03	-	-	6.4E+01	2.1E+00	7,000	98,000	YES	
56-40-6	3	Glycine-micron	1.4E-05	3.4E-08	1.7E-07	4.3E-08	1.0E-09	-	-	2.5E-03	7.5E-05		0.10	YES	
56539-66-3	4	3-methoxy,3methyl,1-Butanol-micron	7.1E-04	2.1E-06	1.7E-05	1.2E-05	5.5E-07	-	-	1.3E-01	3.8E-03		0.10	YES	
25322-68-3	5	Polyethylene glycol-micron	1.4E-11	-	-	-	-	-	-	7.1E-11			0.10	YES	
182211-02-5	6	Methyloxirane polymer with oxirane	This is a polymer. Emissions are expected to be negligible												
288-88-0	7	1,2,4-Triazole-micron	2.3E-03	6.6E-06	3.6E-05	1.4E-05	4.0E-07	-	-	4.2E-01	1.2E-02		0.10	YES	
141-43-5	8	Ethanolamine(Mono-)	1.3E-06	2.9E-09	1.1E-07	4.0E-07	3.5E-08	-	-	3.2E-04	1.0E-05	1,500	18	YES	
929-06-6	9	2-(2-Aminoethoxy)ethanol-micron	5.9E-09	1.6E-11	9.7E-10	6.2E-09	5.7E-10	-	-	2.5E-06	8.9E-08		0.10	YES	
617-48-1	10	DL-Malic acid-micron	-	-	-	-	-	-	-					NA	
6915-15-7	11	Malic acid-micron	-	-	-	-	-	-	-					NA	
64-19-7	12	Acetic Acid	2.1E-05	6.1E-08	4.1E-07	2.1E-07	7.8E-09	-	-	3.9E-03	1.1E-04	3,700	60	YES	
110-16-7	13	Maleic Acid	-	-	-	-	-	-	-					NA	
150-77-6	14	N,N,N,N-Tetraethylethyleneamine-micron	5.6E-07	1.9E-09	3.9E-07	3.6E-06	3.5E-07	-	-	9.4E-04	3.7E-05		0.10	YES	
9004-62-0	15	CELLULOSE, 2-HYDROXYETHYL ETHER	This is a solid. Emissions are expected to be negligible.												
107-21-1	16	Ethylene Glycol	7.6E-07	1.7E-09	7.0E-08	2.8E-07	2.4E-08	-	-	2.0E-04	6.7E-06	1,000	400	YES	
25704-18-1	17	Benzenesulfonic acid, 4-ethenyl-, sodium salt, homopolymer	This is a solid. Emissions are expected to be negligible.												
77-92-9	18	Citric acid - micron	-	-	-	-	-	-	-					NA	
2592-95-2	19	1-Hydroxybenzotriazole-micron	1.0E-06	2.8E-09	7.0E-07	6.1E-06	5.9E-07	-	-	1.6E-03	6.4E-05		0.10	YES	
9003-11-6		Oxirane, methyl - micron	-	-	-	-	-	-	-					NA	
26353-67-3	20	2-Naphthalenesulfonic acid, polymer with formaldehyde	This is a polymer. Emissions are expected to be negligible.												
55866-85-8	21	Poly(oxy-1,2-ethanediyl), .alpha.-sulfo-.omega.-(2-propen-1-yloxy)-, ammonium salt (1:1)	Based on a Gelest SDS, this material is >98% solids and therefore emissions are expected to be negligible.												
2594-38-3	22	Polyanionic Electrolyte	As an anionic electrolyte, emissions are expected to be negligible.												
25751-21-7	23	2-propenoic acid, 2-methyl - micron	-	-	-	-	-	-	-					NA	
3458-72-8	24	Triammonium citrate - micron	-	-	-	-	-	-	-					NA	
9002-89-5	25	Polyvinyl alcohol - micron	-	-	-	-	-	-	-					NA	
71888-87-4	26	Cellulose, 2-hydroxyethyl ether, reaction products with glyoxal	This is a solid. Emissions are expected to be negligible.												
594-61-6	27	2-Hydroxy-2-methylpropionic acid - micron	1.6E-05	4.3E-08	1.1E-05	9.6E-05	9.2E-06	-	-	2.5E-02	1.0E-03		0.10	YES	
67-56-1	28	Methanol	8.3E-05	2.0E-07	3.8E-07	3.5E-08	3.4E-10	-	-	1.5E-02	4.4E-04	33,000	4,000	YES	
124-38-9		Carbon dioxide	-	-	51.35	3918.61			144				18,588	21,000	YES
10024-97-2		Nitrous oxide	-	-	0.19	9.67			-				45.01	210	YES

Table B-10
ITT 212 Compliance Evaluation
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

NOTES:

1. The list of compounds is a summary of the expected organic chemical constituents in the proposed discharge as provided by Micron. For Part 212, compounds with emission less than 100 pounds per year do not need to be included in the compliance evaluation. Accordingly, emissions were calculated for compounds with predicted annual loading greater than 100 pounds per year. Certain metals are expected to be present in the influent wastewater. However, based on the nature of the process, emissions of metals are expected to be negligible.
2. Compound fate modeling was conducted using Toxchem (Hydromantis 2021) to estimate air emissions for the new Onondaga County Industrial wastewater treatment plant (IWWTP) in support of project permitting work. The ITT details including unit operation characteristics, influent flowrates and loading conditions, and operating conditions were derived from the Brown & Caldwell (BC) concept design report (BC 2025). The Micron facility's projected compound discharge loads were applied to establish influent compound concentrations. Compound properties were obtained from the Toxchem compound properties database, U.S. EPA EpiSuite, U.S. EPA WATER9, and online compound databases including the U.S. NIH PubChem and the European Chemical Agency (ECHA) websites. Note, the emissions calculations that are included above are intended to inform facility classification for permitting purposes.
3. Dashes in the indicate that Toxchem does not predict emissions of this compound. A Part 212 evaluation will be included in the Air Registration Application.
4. The maximum predicted unit impact was based on a unit emission rate of 1 pound per hour. The facility-wide impact was calculated by summing the product of predicted unit impact for each source and the predicted emission rate (via Toxchem) for that source.
5. The MBR and Biox are both located inside the membrane building. The combined emission rates were together modeled as a volume source.
6. Public access will be restricted to the facility and the facility and therefore no receptors were placed inside the property boundary.
7. Since only three units will run at any single time, values were taken as the result of a group of the three decarbonization units which resulted in the highest individual concentrations.

Table B-11
Emissions Summary Odorous Compounds Municipal Treatment Train
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Odor Control Location	Pollutant	Concentration	Gas Constant	Molecular Weight	Temperature	Exhaust Rate	Uncontrolled Exhaust Rate	Uncontrolled Exhaust Rate	Control Technology	Control Efficiency	Controlled Exhaust Rate	In Stack Concentration	In stack Concentration
		(ppm)	(ft ³ -atm / lbmol-R)	(lb/lb-mol)	(Rankine)	(cfm)	(lb/hr)	tons / year		(%)	(lb/hr)	(ug/m ³)	ppm
Preliminary Screening and Headworks	H ₂ S	15	0.7302	34.08	527.67	35,000	2.79	0.51	Carbon	99%	0.03	213	0.15
Fine Screening	H ₂ S	10.0	0.7302	34.08	527.67	8,200	0.44	0.08	Carbon	99%	0.004	142	0.10
Solids handling (includes Primary Clarifier foul air)	H ₂ S	20.0	0.7302	34.08	527.67	48,000	5.09	0.93	Two-stage treatment consisting of an Ammonia Wet Scrubber followed by Biological (biofilter) odor control treatment filter	99%	0.051	283	0.20
	Ammonia	50.0	0.7302	17.031	527.67	48,000	6.37	1.16		99.5%	0.032	177	0.50

Notes:

1. The odor control system layout is presented in the OOWWTP Upgrade and Biosolids BODR, Figure 3.1 (page 21).
2. Preliminary screening and Headworks odor control includes influent diversion box, screening channels, grit channels, screening handling and grit dumpster room. (Drawings included in BODR Appendix A)
3. Primary clarifier odor control includes the new primary clarifier and effluent channels. HVAC is not required for the primary clarifiers. Odor control will be required for the covered effluent weirs. Due to the primary clarifiers proximity to the solids odor control system, the foul air ventilation of the primary clarifier effluent weirs will be treated in the solids handling odor control facility.
4. Fine screening odor control includes the fine screen building, inlet, outlet, and screen channels.
5. Odor control for solids handling includes the new thickening/dewatering and dryer buildings.
6. Potential exists for odors in the industrial treatment train (ITT) solids handling building due to the use of sulfur reducing agents in the upstream Micron operations to ensure longevity of equipment, minimize pipe corrosion, and minimize semiconductor wafer contamination. Vapor phase scrubbers will be used to provide odor control in the solids handling building, allowing for multiple air changes to reduce odor. A determination will be made in the next phase of the design whether a bio scrubber or a carbon scrubber for vapor phase will be used for this application. The scrubbers may be determined to be unnecessary if lime or other stabilization techniques are used in the solids handling process.
7. Odors will be captured and controlled with a 99% control efficiency. Maximum hourly concentrations in the exhaust following control exceeds the State's 1-hour standard (14 ug/m3) and the annual guidance concentration of 2 ug/m3. However, off-site concentrations are likely to be below both based on an assumed dilution factor of 250 (based on Env-A 1404.05(c)).
8. The exhaust concentrations of H₂S are less than both the American Conference of Governmental Industrial Hygienists (ACGIH) recommended threshold limit value (TLV^v) of 1 ppm as an 8-hour time weighted average (TWA), and the short-term exposure limit (STEL) of 5 ppm.

Table B-12 AERMOD Model Output Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)												
Model	Pollutant	Average	Group	Rank	Conc/Dep	East (X)	North (Y)	Elev	Hill	Flag	Time	Met File
AERMOD 24142	CO	1-HR	FLREHR	1ST	0.73991	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	CO	1-HR	FLREHR	2ND	0.72797	401911.1	4783623	119.9	119.9	0	23101320	SYR2024.SFC
AERMOD 24142	CO	1-HR	FLREANN	1ST	0.73991	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	CO	1-HR	FLREANN	2ND	0.72797	401911.1	4783623	119.9	119.9	0	23101320	SYR2024.SFC
AERMOD 24142	CO	8-HR	FLREHR	1ST	0.353	401903.9	4783803	120.82	120.82	0	22073008	SYR2024.SFC
AERMOD 24142	CO	8-HR	FLREHR	2ND	0.33054	401906.3	4783735	121.37	121.37	0	22070608	SYR2024.SFC
AERMOD 24142	CO	8-HR	FLREANN	1ST	0.353	401903.9	4783803	120.82	120.82	0	22073008	SYR2024.SFC
AERMOD 24142	CO	8-HR	FLREANN	2ND	0.33054	401906.3	4783735	121.37	121.37	0	22070608	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	AERATION	1ST	17784.20308	401897.2	4783985	125.04	125.12	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	ANOXIC	1ST	376.37239	401899	4783939	123.72	124.51	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	FLREHR	1ST	1178.09209	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	FLREHR	2ND	53.55097	401887.1	4784222	117.48	127.09	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	DECARB2	1ST	47.47653	401886	4784246	116.87	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	DECARB3	1ST	49.57788	401886	4784246	116.87	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	DECARB4	1ST	47.95669	401889.1	4784175	123.88	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	FLREANN	1ST	695.26747	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	CO2	1-HR	AERATION	1ST	496994.2366	401902.3	4783848	120.25	120.25	0	24081304	SYR2024.SFC
AERMOD 24142	CO2	1-HR	ANOXIC	1ST	16320.79521	401899.8	4783916	122.4	122.4	0	21021510	SYR2024.SFC
AERMOD 24142	CO2	1-HR	FLREHR	1ST	28261.08514	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	CO2	1-HR	DECARB1	1ST	4571.56653	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	CO2	1-HR	DECARB2	1ST	5002.3204	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	CO2	1-HR	DECARB3	1ST	4978.63073	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	CO2	1-HR	DECARB4	1ST	4514.4046	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	CO2	1-HR	FLREANN	1ST	16678.67326	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.43742	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.43742	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	NO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	17.0807	401911.1	4783623	119.9	119.9	0	5 YEARS	SYR2024.SFC
AERMOD 24142	NO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	17.0807	401911.1	4783623	119.9	119.9	0	5 YEARS	SYR2024.SFC
AERMOD 24142	NO2	8TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	14.36712	401912.1	4783600	119.31	119.31	0	5 YEARS	SYR2024.SFC
AERMOD 24142	NO2	8TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	14.36712	401912.1	4783600	119.31	119.31	0	5 YEARS	SYR2024.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.12151	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.12151	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREHR	1ST	1.86324	401557.8	4783700	113.03	118.14	0	21100424	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREHR	6TH	1.47775	401557	4783724	111.58	118.14	0	21122424	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREHR	8TH	1.35231	401557	4783724	111.58	118.14	0	23122324	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREANN	1ST	1.86324	401557.8	4783700	113.03	118.14	0	21100424	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREANN	6TH	1.47775	401557	4783724	111.58	118.14	0	21122424	SYR2024.SFC
AERMOD 24142	PM	24-HR	FLREANN	8TH	1.35231	401557	4783724	111.58	118.14	0	23122324	SYR2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	196.9025	401911.1	4783623	119.9	119.9	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	196.9025	401911.1	4783623	119.9	119.9	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	175.07015	401912.1	4783600	119.31	119.31	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	175.07015	401912.1	4783600	119.31	119.31	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	5.03784	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	5.03784	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	SO2	3-HR	FLREHR	1ST	152.61407	401909.2	4783668	120.93	120.93	0	24040624	SYR2024.SFC
AERMOD 24142	SO2	3-HR	FLREHR	2ND	125.31256	401790.6	4783529	117.73	117.73	0	22022806	SYR2024.SFC
AERMOD 24142	SO2	3-HR	FLREANN	1ST	152.61407	401909.2	4783668	120.93	120.93	0	24040624	SYR2024.SFC
AERMOD 24142	SO2	3-HR	FLREANN	2ND	125.31256	401790.6	4783529	117.73	117.73	0	22022806	SYR2024.SFC
AERMOD 24142	SO2	24-HR	FLREHR	1ST	77.32443	401557.8	4783700	113.03	118.14	0	21100424	SYR2024.SFC
AERMOD 24142	SO2	24-HR	FLREHR	2ND	67.81138	401557.8	4783700	113.03	118.14	0	21102924	SYR2024.SFC
AERMOD 24142	SO2	24-HR	FLREANN	1ST	77.32443	401557.8	4783700	113.03	118.14	0	21100424	SYR2024.SFC
AERMOD 24142	SO2	24-HR	FLREANN	2ND	67.81138	401557.8	4783700	113.03	118.14	0	21102924	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	4.24102	401897.2	4783985	125.04	125.12	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.417	401899	4783939	123.72	124.51	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	4.72019	401900.6	4783893	122.01	122.01	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	41.1549	401892.1	4784104	125.9	125.9	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	40.43297	401899.8	4783916	122.4	122.4	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	0.93466	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	M_MEMBRN	1ST	28.49812	401557.8	4783700	113.03	118.14	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.11402	401887.1	4784222	117.48	127.09	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	0.98765	401886	4784246	116.87	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	1.03137	401886	4784246	116.87	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	0.99764	401889.1	4784175	123.88	127.07	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	0.93466	401903.9	4783803	120.82	120.82	0	5 YEARS	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	118.51877	401902.3	4783848	120.25	120.25	0	24081304	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	191.53615	401899.8	4783916	122.4	122.4	0	21021510	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	172.27701	401901.4	4783871	121.49	121.49	0	21092822	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	968.08145	401892.1	4784104	125.9	125.9	0	21021502	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	929.97832	401899.8	4783916	122.4	122.4	0	21021502	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	22.42153	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	M_MEMBRN	1ST	427.43247	401557.8	4783677	113.77	118.14	0	21123010	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	95.10228	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	104.06325	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	103.57043	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	93.91314	401888.1	4784199	119.96	127.09	0	23080503	SYR2024.SFC
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	22.42153	401911.1	4783623	119.9	119.9	0	24110719	SYR2024.SFC
AERMOD 24142	CO2	ANNUAL	AERATION	1ST	17384.72696	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	ANOXIC	1ST	368.25757	401920	4783920	122.18	123.22	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	FLREHR	1ST	1183.92104	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	DECARB1	1ST	52.60865	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	DECARB2	1ST	46.97616	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	DECARB3	1ST	49.12531	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2020.SFC

Table B-12 AERMOD Model Output Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)												
Model	Pollutant	Average	Group	Rank	Conc/Dep	East (X)	North (Y)	Elev	Hill	Flag	Time	Met File
AERMOD 24142	CO2	ANNUAL	DECARB4	1ST	46.99103	401889.1	4784175	123.88	127.07	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	FLREANN	1ST	698.7075	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	ANNUAL	ALLDCARB	1ST	144.01301	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	AERATION	1ST	446684.8174	401920	4783850	121.24	121.24	0	20051703	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	ANOXIC	1ST	14289.20509	401920	4783920	122.18	123.22	0	20091123	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	FLREHR	1ST	27294.58014	401911.1	4783623	119.9	119.9	0	20020408	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	DECARB1	1ST	4511.80748	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	DECARB2	1ST	4932.31605	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	DECARB3	1ST	4913.47527	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	DECARB4	1ST	4462.42057	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	FLREANN	1ST	16108.27866	401911.1	4783623	119.9	119.9	0	20020408	SYR2024_2020.SFC
AERMOD 24142	CO2	1-HR	ALLDCARB	1ST	14357.5988	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.43959	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.43959	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.12211	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.12211	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	197.70768	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	197.70768	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	179.31971	401914	4783555	118.05	118.05	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	179.31971	401914	4783555	118.05	118.05	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	5.06277	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	5.06277	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	4.14576	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.32176	401920	4783920	122.18	123.22	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	4.66019	401900.6	4783893	122.01	122.01	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	40.15167	401892.1	4784104	125.9	125.9	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	39.61499	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	0.93929	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	M_MBBR	1ST	27.95024	401557.8	4783700	113.03	118.14	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.09442	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	0.97724	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	1.02195	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	0.97755	401889.1	4784175	123.88	127.07	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	0.93929	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	ANNUAL	ALLDCARB	1ST	2.9959	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	106.52143	401920	4783850	121.24	121.24	0	20051703	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	167.69399	401920	4783920	122.18	123.22	0	20091123	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	167.70017	401902.3	4783848	120.25	120.25	0	20091921	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	929.26237	401892.1	4784104	125.9	125.9	0	20022505	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	927.63929	401899.8	4783916	122.4	122.4	0	20051706	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	21.65473	401911.1	4783623	119.9	119.9	0	20020408	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	M_MBBR	1ST	410.37283	401557.8	4783700	113.03	118.14	0	20051106	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	93.85911	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	102.60695	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	102.215	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	92.83172	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	21.65473	401911.1	4783623	119.9	119.9	0	20020408	SYR2024_2020.SFC
AERMOD 24142	UNIT	1-HR	ALLDCARB	1ST	298.68107	401888.1	4784199	119.96	127.09	0	20072401	SYR2024_2020.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.45844	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.45844	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.12735	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.12735	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	196.40798	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	196.40798	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	183.30589	401912.1	4783600	119.31	119.31	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	183.30589	401912.1	4783600	119.31	119.31	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	5.27995	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	5.27995	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	4.49363	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.80406	401899	4783939	123.72	124.51	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	5.07032	401900.6	4783893	122.01	122.01	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	44.74293	401892.1	4784104	125.9	125.9	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	43.91591	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	0.97958	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	M_MBBR	1ST	28.41849	401557.8	4783700	113.03	118.14	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.13617	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	1.0257	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	1.07375	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	1.00662	401889.1	4784175	123.88	127.07	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	0.97958	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	ANNUAL	ALLDCARB	1ST	3.14625	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	94.92676	401892.1	4784104	125.9	125.9	0	21112324	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	191.53615	401899.8	4783916	122.4	122.4	0	21021510	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	173.76662	401901.4	4783871	121.49	121.49	0	21092822	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	968.08145	401892.1	4784104	125.9	125.9	0	21021502	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	929.97832	401899.8	4783916	122.4	122.4	0	21021502	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	21.51237	401911.1	4783623	119.9	119.9	0	21050622	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	M_MBBR	1ST	427.43247	401558.7	4783677	113.77	118.14	0	21123010	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	73.34177	401780	4784410	117.24	121.09	0	21070106	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	76.12497	401780	4784410	117.24	121.09	0	21070106	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	75.01951	401780	4784340	116.72	116.72	0	21070106	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	73.55035	401780	4784410	117.24	121.09	0	21070106	SYR2024_2021.SFC

Table B-12 AERMOD Model Output Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)												
Model	Pollutant	Average	Group	Rank	Conc/Dep	East (X)	North (Y)	Elev	Hill	Flag	Time	Met File
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	21.51237	401911.1	4783623	119.9	119.9	0	21050622	SYR2024_2021.SFC
AERMOD 24142	UNIT	1-HR	ALLDCARB	1ST	223.51191	401780	4784410	117.24	121.09	0	21070106	SYR2024_2021.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.42212	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.42212	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.11726	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.11726	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	199.6385	401912.1	4783600	119.31	119.31	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	199.6385	401912.1	4783600	119.31	119.31	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	181.44175	401913	4783577	118.65	118.65	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	181.44175	401913	4783577	118.65	118.65	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	4.86159	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	4.86159	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	3.98466	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.19852	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	4.46852	401900.6	4783893	122.01	122.01	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	36.21063	401892.1	4784104	125.9	125.9	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	35.27129	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	0.90196	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	M_MBBR	1ST	25.4848	401557.8	4783700	113.03	118.14	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.10307	401888.1	4784199	119.96	127.09	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	0.94278	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	0.97804	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	1.04745	401889.1	4784175	123.88	127.07	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	0.90196	401904.7	4783780	121.15	121.15	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	ANNUAL	ALLDCARB	1ST	2.96296	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	89.61297	401890.1	4784151	126.15	127.07	0	22010809	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	126.47669	401900.6	4783893	122.01	122.01	0	22011112	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	123.43453	401892.1	4784104	125.9	125.9	0	22010809	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	896.7734	401892.1	4784104	125.9	125.9	0	22043002	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	898.80534	401899.8	4783916	122.4	122.4	0	22010323	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	21.86621	401912.1	4783600	119.31	119.31	0	22012605	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	M_MBBR	1ST	425.65619	401557.8	4783700	113.03	118.14	0	22031008	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	38.8265	401888.1	4784199	119.96	127.09	0	22090806	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	43.5492	401888.1	4784199	119.96	127.09	0	22090806	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	43.87422	401889.1	4784175	123.88	127.07	0	22090806	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	41.2198	401889.1	4784175	123.88	127.07	0	22090806	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	21.86621	401912.1	4783600	119.31	119.31	0	22012605	SYR2024_2022.SFC
AERMOD 24142	UNIT	1-HR	ALLDCARB	1ST	123.30665	401888.1	4784199	119.96	127.09	0	22090806	SYR2024_2022.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.46946	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.46946	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.1304	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.1304	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	201.40512	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	201.40512	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	184.22333	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	184.22333	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	5.40677	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	5.40677	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	4.55929	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.79959	401899.8	4783939	123.72	124.51	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	5.08044	401900.6	4783893	122.01	122.01	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	45.72349	401892.1	4784104	125.9	125.9	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	44.60614	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	1.00311	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	M_MBBR	1ST	30.03429	401557.8	4783700	113.03	118.14	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.19883	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	1.07264	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	1.11722	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	1.00972	401888.1	4784199	119.96	127.09	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	1.00311	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	ANNUAL	ALLDCARB	1ST	3.29302	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	97.26943	401920	4783920	122.18	123.22	0	23090422	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	142.7306	401920	4783920	122.18	123.22	0	23080503	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	158.11641	401902.3	4783848	120.25	120.25	0	23060122	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	928.99322	401892.1	4784104	125.9	125.9	0	23102520	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	882.85194	401899.8	4783916	122.4	122.4	0	23090305	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	22.05971	401911.1	4783623	119.9	119.9	0	23101320	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	M_MBBR	1ST	404.33257	401557.8	4783677	113.77	118.14	0	23021305	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	95.10228	401888.1	4784199	119.96	127.09	0	23080503	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	104.06325	401888.1	4784199	119.96	127.09	0	23080503	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	103.57043	401888.1	4784199	119.96	127.09	0	23080503	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	93.91314	401888.1	4784199	119.96	127.09	0	23080503	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	22.05971	401911.1	4783623	119.9	119.9	0	23101320	SYR2024_2023.SFC
AERMOD 24142	UNIT	1-HR	ALLDCARB	1ST	302.73596	401888.1	4784199	119.96	127.09	0	23080503	SYR2024_2023.SFC
AERMOD 24142	NO2	ANNUAL	FLREHR	1ST	0.39884	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	NO2	ANNUAL	FLREANN	1ST	0.39884	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	PM	ANNUAL	FLREHR	1ST	0.11079	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	PM	ANNUAL	FLREANN	1ST	0.11079	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	204.70854	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	204.70854	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC

Table B-12 AERMOD Model Output Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)												
Model	Pollutant	Average	Group	Rank	Conc/Dep	East (X)	North (Y)	Elev	Hill	Flag	Time	Met File
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	181.34914	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	181.34914	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	204.70854	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	204.70854	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	181.34914	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	181.34914	401911.1	4783623	119.9	119.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	96.77091	401850	4783080	116.83	116.83	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	96.77091	401850	4783080	116.83	116.83	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	81.26586	402200	4783080	124.12	124.12	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	81.26586	402200	4783080	124.12	124.12	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	180.41471	401920	4783500	118.76	118.76	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	180.41471	401920	4783500	118.76	118.76	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	162.89624	401920	4783500	118.76	118.76	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	162.89624	401920	4783500	118.76	118.76	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	104.31811	401920	4784060	114.38	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	104.31811	401920	4784060	114.38	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	98.88202	401920	4784060	114.38	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	98.88202	401920	4784060	114.38	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	57.51029	401920	4784550	114.32	128.58	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	57.51029	401920	4784550	114.32	128.58	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	49.85434	401990	4784550	118.73	127.93	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	49.85434	401990	4784550	118.73	127.93	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	32.68977	401850	4784970	118.43	125.75	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	1ST-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	32.68977	401850	4784970	118.43	125.75	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREHR	1ST	22.15007	401570	4784970	119.71	119.71	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	4TH-HIGHEST MAX DAILY 1-HR	FLREANN	1ST	22.15007	401570	4784970	119.71	119.71	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	ANNUAL	FLREHR	1ST	4.5935	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	SO2	ANNUAL	FLREANN	1ST	4.5935	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	AERATION	1ST	4.02176	401897.2	4783985	125.04	125.12	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	ANOXIC	1ST	4.14215	401899	4783939	123.72	124.51	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	EQ	1ST	4.36987	401900.6	4783893	122.01	122.01	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	I_MMBRNE	1ST	38.94578	401892.1	4784104	125.9	125.9	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	SCREENS	1ST	38.75652	401899.8	4783916	122.4	122.4	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	FLREHR	1ST	0.85223	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	M_MBBR	1ST	30.60277	401557.8	4783700	113.03	118.14	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB1	1ST	1.04723	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB2	1ST	0.9199	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB3	1ST	0.96588	401886	4784246	116.87	127.07	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	DECARB4	1ST	0.95364	401889.1	4784175	123.88	127.07	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	FLREANN	1ST	0.85223	401903.9	4783803	120.82	120.82	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	ANNUAL	ALLDCARB	1ST	2.86397	401887.1	4784222	117.48	127.09	0	1 YEARS	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	AERATION	1ST	118.51877	401902.3	4783848	120.25	120.25	0	24081304	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	ANOXIC	1ST	133.7398	401899	4783939	123.72	124.51	0	24070406	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	EQ	1ST	152.49743	401897.2	4783985	125.04	125.12	0	24040821	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	I_MMBRNE	1ST	921.40155	401892.1	4784104	125.9	125.9	0	24083124	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	SCREENS	1ST	895.70994	401899.8	4783916	122.4	122.4	0	24020402	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	FLREHR	1ST	22.42153	401911.1	4783623	119.9	119.9	0	24110719	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	M_MBBR	1ST	420.79461	401557.8	4783700	113.03	118.14	0	24022309	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB1	1ST	71.34131	401710	4784340	115.33	117.66	0	24081904	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB2	1ST	71.29004	401888.1	4784199	119.96	127.09	0	24062123	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB3	1ST	72.06983	401888.1	4784199	119.96	127.09	0	24062123	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	DECARB4	1ST	71.37583	401710	4784340	115.33	117.66	0	24081904	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	FLREANN	1ST	22.42153	401911.1	4783623	119.9	119.9	0	24110719	SYR2024_2024.SFC
AERMOD 24142	UNIT	1-HR	ALLDCARB	1ST	207.71526	401888.1	4784199	119.96	127.09	0	24062123	SYR2024_2024.SFC

Table B-13
Modeled Source Parameters
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

VOLUME SOURCE PARAMETERS

The membrane bioreactor and biox are located in the membrane building with no dedicated stack. The screens are located in a building with no dedicated stack. Emissions from these two buildings will predominantly be emitted through open doors and were modeled as volume sources. Initial dispersion parameters were set as follows:

1. Release height is set at one half the building (tier) height.
2. The initial vertical dimension is set at the tier height divided by 2.15 (surface based source).
3. The initial lateral dimension is set at the length of the shorter side of building divided by 4.3 (Single volume source).

VOLUME SOURCE PARAMETERS¹

ITT Membrane Building Height	=	14 ft		Shortest Side	=	100
Release Height	=	14 ft	,	2.00	=	7.00 ft
Initial Vertical Dimension	=	14 ft	,	2.15	=	6.51 ft
Initial Lateral Dimension	=	100 ft	,	4.3	=	23.26 ft
Screen Building Height	=	14 ft		Shortest Side	=	140 ft
Release Height	=	14 ft	,	2.00	=	7.00 ft
Initial Vertical Dimension	=	14 ft	,	2.15	=	6.51 ft
Initial Lateral Dimension	=	140 ft	,	4.3	=	32.56 ft
MTT Membrane Building Height	=	25 ft		Shortest Side	=	158
Release Height	=	25 ft	,	2.00	=	12.25 ft
Initial Vertical Dimension	=	25 ft	,	2.15	=	11.40 ft
Initial Lateral Dimension	=	158 ft	,	4.3	=	36.74 ft

AREA SOURCE PARAMETERS

	Tank Height²	Release Height	Easterly Length³	Northerly Length³
Aeration (Aeration Tanks)	30 ft	30 ft	320 ft	345 ft
Anoxic (Anoxic Tanks)	30 ft	30 ft	320 ft	67 ft
EQ (Equalization Tank)	30 ft	30 ft	78 ft	180 ft

STACK PARAMETERS⁴

Flare:		Decarbonization Unit (1 of 3):	
Flare exit velocity:	14.55 ft/sec	Exit velocity:	325.22 ft/sec
Flare diameter:	3 ft	Assumed diameter:	0.83 ft
Flare effective area:	7.07 ft ²	Area:	0.54 ft ²
Modeled Flow Rate (acfm):	6,172 acfm	Modeled Flow Rate (acfm):	10,560 acfm
Exit Temperature:	1400 F	Assumed temperature:	68 F
Stack Height	40 ft	Assumed height:	30 ft

NOTES:

1. Membrane Building height was obtained from OCDWEP IWWTP WRF Conceptual Design Engineering Report appendix H, dated 6/18/2025
2. Anoxic and equalization tank heights were obtained from OCDWEP IWWTP WRF Conceptual Design Engineering Report appendix H, dated 6/18/2025.
3. Source dimensions were based on the General Arrangement Site Plan (dwg C-1) dated 05/25.
4. Exhaust flowrate from the decarbonization units is based on vendor information from Hunferford & Terry, Inc. (June 23, 2025)
5. The flare is modeled as a point source in BEEST 12.13. The input parameters were estimated based on the expected name plate capacity, typical flare dimensions, and a height that will be calculated by the Flare Tool (SCREEN3 procedure) in BEEST which calculates plume rise for flares based on an effective buoyancy flux parameter. An ambient temperature of 1273K is assumed in this calculation. It is assumed that 55 percent of the total heat is lost due to radiation. Plume rise is calculated from the top of the flame, assuming that the flame is bent 45 degrees from the vertical. The Flare Tool subsequently calculates and prints out the effective release height for the flare.

Table B-14 UNIT IMPACT SUMMARY Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)		
Source	Predicted Unit Impact	
	Hourly ($\mu\text{g}/\text{m}^3$) (lb/hr)	Annual ($\mu\text{g}/\text{m}^3$) (lb/hr)
Area Sources		
AERATION	118.52	4.56
ANOXIC	191.54	4.80
EQUILIZATION	173.77	5.08
Volume Sources		
MEMBRANE	968.08	45.72
SCREENS	929.98	44.61
Point Sources		
FLARE	22.42	1.00
DECARBONIZATION UNIT 1	95.10	1.20
DECARBONIZATION UNIT 2	104.06	1.07
DECARBONIZATION UNIT 3	103.57	1.12
DECARBONIZATION UNIT 4	93.91	1.05
DECARBONIZATION GROUP	302.74	3.29

Notes:

1. Modeled emission rates for the flare criteria pollutants (i.e., maximum 1-hour and annual average) are presented in Table B-5. Toxics were modeled at a unit rate of 1 lb/hr.
2. Each ITT unit process (i.e., Aeration, anoxic, EQ, Membrane, screens) was modeled independently with a unit emission rate of one pound per hour. The predicted impact for each source is calculated by multiplying the unit impact presented above by the hourly emission rate from the source, presented in Table B-10. The facility wide impact is conservatively calculated as the sum of these products.

Table B-15
 Predicted Impacts and Ambient Air Quality Standards ($\mu\text{g}/\text{m}^3$)
 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

	Pollutant	1-Hour	3-Hour	8-Hour	24-Hour	Annual
Flare Impact	CO	0.73		0.33		698.71
Background		1.4		1.1		
Model + Background		2.13		1.43		
NAAQS		40,000		10,000		
Flare Impact	NO ₂	14.37				0.47
Background		30				7.11
Model + Background		44.70				7.58
NAAQS		188				100
Flare Impact	PM				1.48	0.13
Background					22.3	6.2
Model + Background					23.81	6.36
NAAQS (PM _{2.5})					35	9
NAAQS (PM ₁₀)					150	
Part 257					80	
Flare Impact	SO ₂	184.22	125.31		67.81	5.41
Background		1.8			1.0	0.11
Model + Background		186.02			68.81	5.52
NAAQS		196	1,300			
NYAAQS					365	80
Part 257				650	260	78
Flare Impact	H ₂ S	2.18				
NYAAQS/Part 257		14				

- a. Background values are taken from <https://www.epa.gov/outdoor-air-quality-data/monitor-values-report>, excluding exceptional events, from East Syracuse for PM2.5 and from Rochester for the remainder of the pollutants. Per the following:
- a. Background values are taken from <https://www.epa.gov/outdoor-air-quality-data/monitor-values-report>, excluding exceptional events, from East Syracuse for PM2.5 and from Rochester for the remainder of the pollutants. Per the following:
- CO, 1-Hour: 2nd high of 1-hour data, maximum over 2022-2024
 - CO, 8-Hour: 2nd high of 8-hour data, maximum over 2022-2024
 - NO2, 1-Hour: 98th percentile of 1-hour data, averaged over 2022-2024
 - NO2, Annual: maximum of the annual mean from 2022-2024
 - PM2.5, 24-Hour: 98th percentile value, averaged over 2022-2024
 - PM2.5, Annual: weighted annual mean averaged over 2022-2024
 - SO2, 1-Hour: 99th percentile averaged over 2020-2024
 - SO2, 24-Hour: 1st max, maximum over 2020-2024
 - SO2, Annual: annual mean, maximum over 2020-2024
 - CO, 1-Hour: 2nd high of 1-hour data, maximum over 2022-2024
 - CO, 8-Hour: 2nd high of 8-hour data, maximum over 2022-2024
 - NO2, 1-Hour: 98th percentile of 1-hour data, averaged over 2022-2024
 - NO2, Annual: maximum of the annual mean from 2022-2024
 - PM2.5, 24-Hour: 98th percentile value, averaged over 2022-2024
 - PM2.5, Annual: weighted annual mean averaged over 2022-2024
 - SO2, 1-Hour: 99th percentile averaged over 2020-2024
 - SO2, 24-Hour: 1st max, maximum over 2020-2024
 - SO2, Annual: annual mean, maximum over 2020-2024
- b. Per 6 CRR-NY 257-3.3(d), prediction of the conformity with the annual geometric mean standard shall be sufficient to demonstrate predicted conformity with these standards. Therefore, this no separate Part 257 standard for PM emissions listed.
- c. Four general levels of social and economic development and pollution potentials exist in the State under 6 CRR-NY 256.1. The land uses associated with the classification levels assigned to geographical areas of the State are outlined broadly as follows:
- Level I*—predominantly used for timber, agricultural crops, dairy farming, or recreation. Habitation and industry sparse.
 - Level II*—predominantly single and two family residences, small farms, and limited commercial services and industrial development.
 - Level III*—densely populated, primarily commercial office buildings, department stores, and light industries in small and medium metropolitan complexes, or suburban areas of limited commercial and industrial development near large metropolitan complexes.
 - Level IV*—densely populated, primarily commercial office buildings, department stores and industries in large metropolitan complexes, or areas of heavy industry.

Table B-16
 Predicted GHG Emissions from ITT
 Oak Orchard Wastewater Treatment Plant (Industrial Treatment Train)

	ITT Process Steps					
	Train 1 (lb/day)	Train 2 (lb/day)	Total at Startup (lb/day)	Total in 2030 (lb/day)	Startup Total (ton/yr)	2030 Total (ton/yr)
CO ₂ emissions, summer (lb/day)	49,527	49,527	49,527	99,054	9,039	18,077
N ₂ O emissions, summer (lb/day)	107.00	107.00	107	214	20	39.06
CO ₂ emissions, winter (lb/day)	45,752	45,752	45,752	91,504	8,350	16,699
N ₂ O emissions, winter (lb/day)	129.70	129.70	130	259	24	47.34
Total annual CO ₂ emissions					8,694	17,388
Total annual N ₂ O emissions					21.60	43.20
Total GHG emissions (CO ₂ e, ton/yr)					14,396	28,793

NOTES:

1. Activated sludge modeling was used to evaluate the fraction of COD that was converted to biomass and the fraction that was emitted as CO₂ in order to estimate GHG emissions for the proposed ITT.
2. The ITT details, including unit operation characteristics, influent flowrates and loading conditions, and operating conditions were derived from BC's concept design report (BC 2025). The Micron facility's projected compound discharge loads were applied to establish influent compound concentrations.
3. Two separate simulations were evaluated: one assumed a reactor temperature of 21.7°C during winter operation and the other assumed a wastewater temperature of 31.4°C for summer operation. Final values are the average of the summer and winter model runs (assume 6 months of summer conditions and 6 months of winter conditions).
4. An N₂O emission factor of 1.6% (lb N₂O-N/lb TN = EF_{N₂O}) was used in the calculations, which is the emission factor presented in the 2019 Refinement to the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines (IPCC 2019) for centralized aerobic treatment plant.
5. CO₂e values are based on 20-year GWP values.

Table B-17 Predicted GHG Emissions from MTT Oak Orchard Wastewater Treatment Plant (Municipal Treatment Train)					
	MTT Process Steps				
	Anaerobic Digesters (lb/day)	MBR (lb/day)	Total Excluding Digestion (lb/day)	Emissions Including Digestion (ton/yr)	Emissions Excluding Digestion (ton/yr)
CH ₄ emissions (lb/day)	6,700	0	0	1,223	0
N ₂ O emissions (lb/day)	0	60	60	11	11
Total GHG emissions, excludes biogenic CO ₂ (CO ₂ e, ton/yr)				105,602	2,891

NOTES:

1. Results are for average conditions at buildout.
2. CO₂ emissions are considered biogenic and have been excluded.
3. Emissions are based on the 2019 Refinement to the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories. The MTT design details were derived from Carollo's basin of design report (2025).
4. The biogas from the digesters will not be emitted directly but will be combusted for heat/flared. Direct emissions from the boiler/flare are evaluated separately.

Table B-18										
Direct GHG Emissions - Actual Emissions and Potential to Emit										
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)										
Plant		ITT				MTT				
Equipment		Duty Boiler	Duty Boiler	Back up Boiler	HVAC Equipment	Duty Boiler #1		Duty Boiler #2		
Max Heat Input		5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	20.5 MMBtu/hr	5. MMBtu/hr		5. MMBtu/hr		
Fuel		Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	
Potential Emissions (ton/yr)	Direct GHG Emissions	PTE Hours	8,760	8,760	8,760	8,760	8,760		8,760	
		Max Potential Fuel Consumption (MMBtu/yr)	48,180	48,180	48,180	179,580	43,800		43,800	
		CO ₂	2,818	2,818	2,818	10,503	2,562		2,562	
		CH ₄	0.05	0.05	0.05	0.20	0.05	0.15	0.05	0.15
		N ₂ O	0.01	0.01	0.01	0.02	4.83E-03	0.03	0.00	0.03
		CO ₂ e 20-yr GWP	2,824	2,824	2,824	10,525	2,567	21	2,567	21
		Total Direct CO ₂ e 20-yr GWP	18,997							

1. Global Warming Potential 20 (GWP 20) values are found in 6 NYCRR Part 496.5
2. USEPA's "Emission Factors for Greenhouse Gas Inventories," January 15, 2025

20-year Global Warming Potential Values ⁽¹⁾	
CO ₂	1
CH ₄	84
N ₂ O	264

GHG Emission Factors, Stationary Combustion ⁽²⁾			
Pollutant	Units	Digester Gas Combustion	Natural Gas Combustion
CO ₂	kg/mmbtu	52.07	53.06
	kg/scf	0.034106	0.05444
CH ₄	g/mmbtu	3.2	1.0
	g/scf	0.002096	0.00103
N ₂ O	g/mmbtu	0.60	0.10
	g/scf	0.000413	0.00010

Table B-18

Direct GHG Emissions - Actual Emissions and Potential to Emit
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Plant		MTT						Total (Both Plants)	
Equipment		Back up Boiler		Flare		Sludge Dryer			HVAC Equipment
Max Heat Input		5. MMBtu/hr		235 scfm		10. MMBtu/hr			12.28 MMBtu/hr
Fuel		Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas		Natural Gas
Potential Emissions (ton/yr)	Direct GHG Emissions	PTE Hours	8,760		8,760		8,760		8,760
		Max Potential Fuel Consumption (MMBtu/yr)	43,800		625	56,765	87,600		107,590
		CO ₂	2,562		37		5,124		6,293
		CH ₄	0.05	0.15	6.89E-04	2.00E-01	0.10	0.31	0.12
		N ₂ O	0.00	0.03	6.89E-05	3.75E-02	0.01	0.06	0.01
		CO ₂ e 20-yr GWP	2,567	21	37	27	5,134	41	6,306
		Total Direct CO ₂ e 20-yr GWP	19,205						

Appendix C: Toxchem Modeling Report

Section 1: Introduction

Compound fate modeling was conducted using Toxchem Version 4.4.2 (Hydromantis 2021) to estimate air emissions for the new Onondaga County Industrial wastewater treatment plant (IWWTP) in support of project air permitting work. The system details including unit operation characteristics, influent flowrates and loading conditions, and system operating conditions were derived from the Brown & Caldwell (BC) concept design report (Brown and Caldwell 2025). The Micron facilities projected compound discharge loads and design flowrate were applied to establish influent compound concentrations. Compound properties were obtained from the Toxchem compound properties database, U.S. EPA EPI Suite, U.S. EPA WATER9, and online compound databases including the U.S. NIH PubChem and the European Chemical Agency (ECHA) websites. The estimated IWWTP air emissions will be applied in air permitting to evaluate emissions relative to regulatory thresholds and as inputs for air dispersion modeling to establish compound concentrations at site boundaries.

Section 2: Toxchem Model and Inputs

2.1 Influent Compound Loads

Micron Fab1 phase influent compound loads are summarized in Table 2-1. These data include estimates of the Fab1 annual compound discharges with calculation of corresponding daily average loads and influent concentration for the Fab1 design flowrate of 8.25 MGD. The calculated influent concentrations were applied in Toxchem modeling to estimate air emissions from the new IWWTP.

Table 2-1. Micron Fab1 Compound Loading Conditions					
Compound name	CAS No.	Annual influent load (lb/yr)	Daily-avg. influent load (lb/d)	Influent concentration	
				(mg/L)	(ug/L)
Tetramethylammonium hydroxide (TMAH)	75-59-2	467,241	1,280	18.60	18,605
Isopropyl alcohol	67-63-0	155,773	426.8	6.20	6,203
Glycine	56-40-6	59,278	162.4	2.36	2,360
1-Butanol, 3-methoxy-3-methyl	56539-66-3	42,222	115.7	1.68	1,681
Polyethylene glycol	25322-68-3	12,857	35.22	0.512	512
1,2,4-Triazole	288-88-0	8,677	23.77	0.346	346
Ethanolamine	141-43-5	5,937	16.27	0.236	236
2-(2-aminoethoxy)ethanol	929-06-6	5,422	14.86	0.216	216
DL-malic acid	617-48-1	4,524	12.39	0.180	180
Malic acid	6915-15-7	4,524	12.39	0.180	180
Acetic acid	64-19-7	4,194	11.49	0.167	167

Table 2-1. Micron Fab1 Compound Loading Conditions					
Compound name	CAS No.	Annual influent load (lb/yr)	Daily-avg. influent load (lb/d)	Influent concentration	
				(mg/L)	(ug/L)
Maleic acid	110-16-7	4,084	11.19	0.163	163
Diethylene glycol	111-46-6	3,219	8.82	0.128	128
Malonic acid	141-82-2	3,219	8.82	0.128	128
Quaternary ammonium compounds	75-59-68607-29-4	3,219	8.82	0.128	128
N,N,N',N'-tetraethylethylenediamine	150-77-6	2,732	7.48	0.109	109
Ethylene glycol	107-21-1	1,735	4.75	0.0691	69.1
Citric acid	77-92-9	1,665	4.56	0.0663	66.3
1-Hydroxybenzotriazole	2592-95-2	1,508	4.13	0.0600	60.0
Oxirane, methyl-, polymer with oxirane	9003-11-6	1,351	3.70	0.0538	53.8
2-Propenoic, 2-methyl-, polymer with 2-propenoic acid	25751-21-7	1,351	3.70	0.0538	53.8
Triammonium citrate	3458-72-8	1,351	3.70	0.0538	53.8
Polyvinyl alcohol	9002-89-5	1,351	3.70	0.0538	53.8
2-Hydroxy-2-methylpropionic acid	594-61-6	557	1.53	0.0222	22.2
1-Methoxy-2-propanol	107-98-2	335	0.92	0.0134	13.4
Methanol	67-56-1	84	0.23	0.00334	3.3
Cyclopentanone	120-92-3	82	0.22	0.00327	3.3
5-Chloro-2-methyl-4-isothiazolin-3-one	26172-55-4	49.59	0.14	0.00197	1.97
6-Methylbenzotriazole	136-85-6	49.59	0.14	0.00197	1.97
Polyacrylic acid	9003-01-4	49.59	0.14	0.00197	1.97
L-Histidine	71-00-1	49.59	0.14	0.00197	1.97
Disodium 3,3'-dithiobis[propanesulphonate]	27206-35-5	49.59	0.14	0.00197	1.97
2-Pyrrolidinone, 1-ethenyl-, homopolymer	9003-39-8	49.59	0.14	0.00197	1.97
Methoxyirane polymer with oxirane, ether with 2,4,7,9-tetramethyl-5-decyne-4,7-cycl (2:1)	182211-02-5	10,653.36	29.19	0.424	424
Cellulose, 2-hydroxyethyl ether	9004-62-0	2,194.69	6.01	0.0874	87.4

Table 2-1. Micron Fab1 Compound Loading Conditions

Compound name	CAS No.	Annual influent load (lb/yr)	Daily-avg. influent load (lb/d)	Influent concentration	
				(mg/L)	(ug/L)
Benzenesulfonic acid, 4-ethenyl-, sodium salt, homopolymer	25704-18-1	1,665.27	4.56	0.0663	66.3
2-Naphthalenesulfonic acid, polymer with formaldehyde	26353-67-3	1,350.78	3.70	0.0538	53.8
Poly(oxy-1,2-ethanediyl), alpha,-sulfo-omega, -(2-propen-1-yloxy,-ammonium salt (1:1)	55866-85-8	1,350.78	3.70	0.0538	53.8
Polyanionic electrolyte	9003-03-6	1,350.78	3.70	0.0538	53.8
Cellulose, 2-hydroxyethyl ether, reaction products with glyoxal	71888-87-4	1,350.78	3.70	0.0538	53.8
Poly[iminocarbonylimino-1,3-propanediyl(dimethyliminio)(2-hydroxy-1,3-propanediyl)(dimethyliminio)-1,3-propanediyl]	756424-87-0	49.59	0.14	0.00197	1.97
Oxirane, methyl-, polymer with oxirane, ether with (1,2-ethanediyl)dinitrilo)tetrakis[propanol] (4:1)	11111-34-5	49.59	0.14	0.00197	1.97

2.2 Toxchem Model

The Toxchem compound fate model (Hydromantis 2021) consists of unit operations models that can be combined to build a wastewater treatment plant model for compound fate assessments given system characteristics and operating conditions and compound loads. The model predicts the quantities of compound biodegraded, adsorbed to solids, emitted to air, and passing through to the system effluent. A Toxchem model was created based on the Brown and Caldwell (2025) Onondaga concept design report, and the Toxchem model process flow diagram is shown in Figure 2-1. The wastewater treatment system unit dimensions are summarized in Table 2-2, and the general influent conditions and system operating conditions are summarized in Table 2-3.

The design includes influent equalization and diversion tanks, influent screens to protect the Ultrafiltration (UF) Membrane System, two treatment trains in a Modified Ludzack-Ettinger (MLE) activated sludge configuration for organics and nitrogen removal, a UF membrane system to provide solids separation, and a final effluent tank. The two parallel treatment trains each consist of an Anoxic basin followed by an Aerobic basins in parallel. Mixed liquor is recirculated from the end of the aerobic basin back to the head end of the anoxic basin to provide nitrate for denitrification in the anoxic basins. The design Mixed Liquor Recirculation ratio (Q_{mlr}/Q_{infl}) is 5.4. Recycle Activated Sludge (RAS) flow with a RAS ratio (Q_{ras}/Q_{infl}) of 4.0 is routed from the UF Membrane tanks back to the head end of the anoxic basins. In Toxchem, parallel units including the influent screens, the anoxic and aerobic basins, and the UF membrane tanks were combined into one volume to simplify the model.

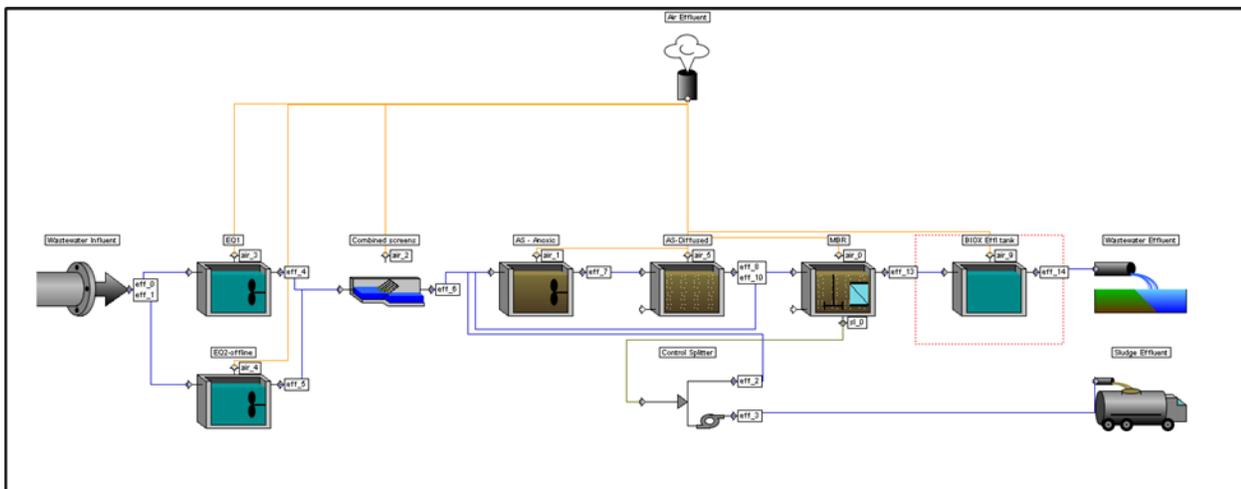


Figure 2-1. Toxchem model process flow diagram for the Onondaga IWWTP concept design

Table 2-2. Onondaga IWWTP Unit Operations Characteristics Applied in Toxchem Model

Unit operation	Number of units	Combined Volume (gal)	Combined Surface Area (ft ²)	Depth (ft)	Detail
Equalization tank	1	3,000,000	13,500	30	Online
Diversion tank	1	3,000,000	13,500	30	Offline - in standby
Influent screens	4	18,671	384	6.5	4 screens combined into single unit
Anoxic tanks	2	2,120,722	9,450	30	2 tanks in parallel combined into single tank
Aerobic tanks	2	11,445,165	51,000	30	2 tanks in parallel combined into single tank
UF membrane tanks	10	439,853	4,200	14	10 tanks in parallel combined into single tank
BIOX effluent tank	1	259,424	1,156	30	Online

Table 2-3. Onondaga IWWTP Influent Characteristics and System Operating Conditions Applied in Toxchem Model

Parameter	Value
Influent characteristics	
Influent flow, MGD	8.25
Suspended Solids, mg/L	125
VSS to SS Ratio	75
Wastewater DOC, mg/L	254
Oil/Grease Conc., mg/L	0

Table 2-3. Onondaga IWWTP Influent Characteristics and System Operating Conditions Applied in Toxchem Model	
Parameter	Value
Temperature, °C	32
System operating conditions	
System pH, s.u.	7.0
Temperature, °C	32
MLSS, mg/L	4,250
VSS/TSS ratio	0.80
Mixed liquor recirc. ratio (Q_{mlr}/Q_{infl})	5.4
Sludge recycle ratio (Q_{ras}/Q_{infl})	4
System SRT, d	25
Waste sludge flow, gal/d	434,108

2.3 Compound Properties and Biodegradation Parameters

Toxchem includes a compound database that contains compound properties required for fate modeling. Additional User database compounds can be added to the model based on compound properties inputs obtained from literature sources containing compound physical properties. Of the 42 compounds in Table 2-1, six compounds were in the Toxchem compound properties database (isopropyl alcohol, ethanolamine, acetic acid, maleic acid, ethylene glycol, and methanol), and these compound properties were applied in the modeling assessment. Of the remaining compounds, twenty-one compounds were added to the Toxchem User compound properties database for modeling using values from U.S. EPA EPI Suite (2016), the U.S. EPA WATER9 (2006) wastewater model database, U.S. National Institute of Health (2025) PubChem, and the European Chemical Agency Chemical Database (2025). The applied compound properties for the modeled compounds are listed in Table A-1 in Attachment A. The final 15 compounds in Table 2-1 (below the bold double line) were not modeled in Toxchem. These compounds are not expected to be emitted because they are either solids, ions, or polymers and therefore not volatile, as discussed in the Minor Facility Registration application for this project.

For the twenty-one modeled compounds not in the Toxchem compound properties database, biodegradation parameters were developed for six compounds using compound properties and biodegradation parameter estimates from EPI Suite and WATER9. These included glycine, 3-methoxy,3-methyl,1-butanol, polyethylene glycol, 1,2,4-triazole, and 2-(2-aminoethoxy)ethanol. Given the high predicted influent load for Tetramethylammonium hydroxide (TMAH) (1,280 lb/d on an annual daily-average basis), a literature review was conducted to obtain compound biodegradation parameters for acclimated biomass conditions as discussed below. For the remaining 14 compounds that were modeled, the biodegradation rate was set to zero although the other compound properties from EPI Suite and WATER9 were applied to estimate emissions.

The literature review for TMAH indicated that this compound is degradable and is also a significant contributor of ammonia nitrogen as a biodegradation product (Wu et al. 2020 and ECHA 2025). Wu et al. (2020) measured biodegradation rates in a lab study using sequencing batch reactors treating

semiconductor wastewater with increasing TMAH feed loads to develop acclimated biodegradation parameters and to demonstrate acclimated removal performance under high TMAH loading conditions. The authors reported measured Monod biodegradation parameters consisting of a maximum specific biodegradation rate of 14.22 mg TMAH/g VSS-hr and a half-saturation coefficient of 1,140 mg TMAH/L. These parameters were adjusted for temperature and applied in the Toxchem modeling.

2.4 Toxchem Model Simulations

Toxchem simulations were conducted for the system configuration shown in Figure 2-1 with application of the concept design flowrate of 8.25 MGD and the maximum daily-average compound concentrations listed in Table 2-1 for 27 compounds. The treatment system unit operations characteristics and system operating conditions shown in Table 2-2 and 2-3 were applied. It was assumed that the diversion tank was off-line and did not contain a stored diverted volume.

Section 3: Toxchem Simulation Results

The Toxchem simulation results are summarized in Table 3-1 where the predicted emissions are listed for the 27 modeled compounds. The predicted total compound emissions for the modeled compounds were 4.355 lb/d corresponding to 0.7948 tons per year. The highest predicted compound air emission was 4.282 lb/d for isopropyl alcohol, equivalent to 98.3 percent of the predicted total emissions. The Toxchem predicted air emissions are summarized by WWTP unit operation in Attachment B, and the Toxchem compound mass balance output tables are listed in Attachment C.

Table 3-1 Toxchem-predicted air emissions and effluent concentrations with uncovered equalization tanks

Compound name	CAS No.	Daily-avg. influent load (lb/d)	Influent conc. (mg/L)	IWWTP effluent conc.		Estimated air emissions			
				(mg/L)	(ug/L)	(lb/d)	(lb/hr)	(lb/yr)	(ton/yr)
Tetramethylammonium hydroxide (TMAH)	75-59-2	1,280.11	18.60	5.643	5,643	1.54E-09	6.43E-11	5.63E-07	2.82E-10
Isopropyl alcohol	67-63-0	426.78	6.20	0.2794	279.4	4.282	0.178	1563.007	0.782
Glycine	56-40-6	162.41	2.36	2.997E-04	0.2997	2.15E-05	8.98E-07	7.86E-03	3.93E-06
1-Butanol, 3-methoxy-3-methyl	56539-66-3	115.68	1.68	2.175E-03	2.17	2.64E-04	1.10E-05	9.65E-02	4.82E-05
Polyethylene glycol	25322-68-3	35.22	0.51	7.24E-05	7.24E-02	1.32E-10	5.48E-12	4.80E-08	2.40E-11
1,2,4-Triazole	288-88-0	23.77	0.35	1.00E-04	1.00E-01	1.36E-05	5.68E-07	4.98E-03	2.49E-06
Ethanolamine	141-43-5	16.27	0.24	0.0120	12.03	1.01E-03	4.20E-05	3.68E-01	1.84E-04
2-(2-aminoethoxy)ethanol	929-06-6	14.86	0.22	0.0368	36.84	1.733E-04	7.22E-06	6.33E-02	3.16E-05
DL-malic acid	617-48-1	12.39	0.18	0.18	180.01	0.00884631	0.000368596	3.22890315	0.001614452
Malic acid	6915-15-7	12.39	0.18	0.18	180.01	1.70049E-10	7.08538E-12	6.20679E-08	3.10339E-11
Acetic acid	64-19-7	11.49	0.17	0.000101	0.101	2.87E-02	1.19E-03	1.05E+01	5.23E-03
Maleic acid	110-16-7	11.19	0.16	0.00569	5.69	1.63E-07	6.78E-09	5.94E-05	2.97E-08
Diethylene glycol	111-46-6	8.82	0.13	0.13	130.0	0.0	0.00E+00	0.00E+00	0.00E+00
Malonic acid	141-82-2	8.82	0.13	0.13	129.9	0.0	0.0	0.0	0.0
Quaternary ammonium compounds,	75-59-68607-29-4	8.82	0.13	0.13	129.6	1.24E-04	5.15E-06	4.51E-02	2.26E-05
N,N,N',N'-tetraethylethylenediamine	150-77-6	7.48	0.11	0.11	105.6	0.0	0.00E+00	0.00E+00	0.00E+00
Ethylene glycol	107-21-1	4.75	0.069	0.00403	4.03	1.99E-09	8.31E-11	7.28E-07	3.64E-10
Citric acid	77-92-9	4.56	0.066	0.066	66.0	5.94031E-05	2.47513E-06	0.021682132	1.08411E-05
1-Hydroxybenzotriazole	2592-95-2	4.13	0.060	0.060	59.8	0.000000	0.00E+00	0.00E+00	0.00E+00

Table 3-1 Toxchem-predicted air emissions and effluent concentrations with uncovered equalization tanks

Compound name	CAS No.	Daily-avg. influent load (lb/d)	Influent conc. (mg/L)	IWWTP effluent conc.		Estimated air emissions			
				(mg/L)	(ug/L)	(lb/d)	(lb/hr)	(lb/yr)	(ton/yr)
Oxirane, methyl-, polymer with oxirane	9003-11-6	3.70	0.054	0.054	54.0	0.000101325	4.22188E-06	0.036983625	1.84918E-05
2-Propenoic, 2-methyl-, polymer with 2-propenoic acid	25751-21-7	3.70	0.054	0.052	51.8	0	0	0	0
Triammonium citrate	3458-72-8	3.70	0.054	0.054	54.0	0	0	0	0
Polyvinyl alcohol	9002-89-5	3.70	0.054	0.054	54.0	0	0	0	0
2-Hydroxy-2-methylpropionic acid	594-61-6	1.53	0.0222	0.0221	22.1	0	0.00E+00	0.00E+00	0.00E+00
1-Methoxy-2-propanol	107-98-2	0.92	0.0134	0.0133	13.3	0.0015869	6.61E-05	5.79E-01	2.90E-04
Methanol	67-56-1	0.23	0.00334	2.36E-08	2.36E-05	5.58E-03	2.33E-04	2.04E+00	1.02E-03
Cyclopentanone	120-92-3	0.22	0.00327	0.00288	2.88	0.026316	0.001097	9.61E+00	4.80E-03

Section 4: References

Brown and Caldwell (2025) *Onondaga County Department of Water Environment Protection Oak Orchard Industrial Wastewater Treatment Plant and Water Reclamation Facility Concept Design Report*. Prepared for OCDWEP SPDES No. Ny0030317, Syracuse NY, August 2025.

European Chemical Agency (2025) ECHA Chemicals Database. European Chemicals Agency, Helsinki, Finland. [ECHA CHEM](#)

Hydromantis Environmental Software Solutions, Inc. (2021) *Toxchem Wastewater Treatment Plant Compound Fate Model*. Hydromantis Environmental Software Solutions, 14 April 2021.

U.S. NIH (2025) *PubChem Open Chemistry Database*. National Library of Medicine, Bethesda, MD. [PubChem](#)

U.S. EPA (2016) Estimation Programs Interface Suite™ for Microsoft® Windows, v 4.11. United States Environmental Protection Agency, Washington, DC, USA.

U.S. EPA (2006) *WATER9 Wastewater Treatment Model, Version 3.0*. United States Environmental Protection Agency, Washington, DC, USA.

Wu, Y-J., Irmayani, L., Setiyawan, A.A., Whang, L-M. (2020) Aerobic degradation of high tetramethylammonium hydroxide (TMAH) and its impacts on nitrification and microbial community. *Chemosphere*. Vol. 258, November 2020, 127146.

Attachment A: Applied Toxchem Compound Property Parameter Values

Table A-1a. Applied Toxchem Compound Properties Parameter Values (Part 1 – Molecular Weight, Density, Henry’s Law, and Kow)

Name	CAS #	Molecular Weight (g/mol)	Density (g/cm3)	Henry's Law Const. @25 C (Lliq/Lgas)	Sorption - Suspended Growth (Kp) (L/g)	Log Octanol/Water Part.(log(Kow)) (log10(LH2O/LOct))
Isopropyl Alcohol	67-63-0	60.1	0.789	0.000614	-	0.05
Ethanolamine(Mono-)	141-43-5	61.09	1.02	1.22618E-05	-	-0.773026
Acetic Acid	64-19-7	60.1	1.05	0.000229	0.011	-0.31
Maleic Acid	110-16-7	116.07	1.59	6.00829E-07	-	-0.445571
Ethylene Glycol	107-21-1	62.1	1.11	7.92E-08	-	-1.36
Methanol	67-56-1	32	0.792	0.000213	0.00494	-0.66
TMAH-micron	75-59-2	91.15	1.016	1.78E-14	-	-2.47
Glycine-micron	56-40-6	75.07	1.1607	4.58E-08	-	-3.21
3-methoxy,3methyl,1-Butanol-micron	56539-66-3	118.18	0.926	0.000004	-	0.18
Polyethylene glycol-micron	25322-68-3	238.28	1.11	3.12E-13	-	-2.3
1,2,4-Triazole-micron	288-88-0	69.07	0.64	0.0000626	-	-0.58
2-(2-Aminoethoxy)ethanol-micron	929-06-6	105.14	1.0572	2.34E-10	-	-1.89
DL-Malic acid-micron	617-48-1	134.09	1.601	3.45E-11	-	-1.27
Malic acid-micron	6915-15-7	134.09	1.601	3.45E-11	-	-1.27
Diethylene glycol - micron	111-46-6	106.12	1.12	0.000000083	-	-1.47
Malonic acid-micron	141-82-2	104.06	1.62	1.66E-10	-	-0.81
Quat ammonium cmpnds - micron	75-59-268607-29-4	467.66	1	1.85E-12	-	0.08
N,N,N,N-Tetraethylethyleneamine-micron	150-77-6	172.32	1	0.00000306	-	1.7
Citric acid - micron	77-92-9	192.13	1.54	3.41E-16	-	-1.64
1-Hydroxybenzotriazole-micron	2592-95-2	135.13	1.438	0.000000151	-	0.146
Oxirane, methyl - micron	9003-11-6	528.69	1.11	1.17E-21	-	-1.58
2-propenoic acid, 2-methyl - micron	25751-21-7	462.45	1.05	8.83E-18	-	1.71
Triammonium citrate - micron	3458-72-8	243.22	1.48	3.78E-29	-	-1.43
Polyvinyl alcohol - micron	9002-89-5	486.61	1.33	1.81E-16	-	-5.3
2-Hydroxy-2-methylpropionic acid - micron	594-61-6	104.11	1.23	0.00000618	-	-0.36

Table A-1a. Applied Toxchem Compound Properties Parameter Values (Part 1 – Molecular Weight, Density, Henry’s Law, and Kow)

Name	CAS #	Molecular Weight (g/mol)	Density (g/cm ³)	Henry's Law Const. @25 C (Lliq/Lgas)	Sorption - Suspended Growth (Kp) (L/g)	Log Octanol/Water Part.(log(Kow)) (log ₁₀ (LH ₂ O/LOct))
1-methoxy-2-propanol - micron	107-98-2	90.12	0.96	0.0000376	-	-0.49
Cyclopentanone - micron	120-92-3	84.12	0.95	0.00157	-	-0.38

Table A-1b. Applied Toxchem Compound Properties Parameter Values (Part 2 – Biodegradation parameters)

Name	CAS #	Aerobic Biodegradation Rate (Kb) @ 20 C (L/(mg.hr))	Aerobic Biodegradation Rate (Kb) @ 20 C (L/(mg.hr))	Half Saturation Constant (Ks) (mg/L)	Anoxic Reduction Factor (fanox)	Anaerobic Reduction Factor (fana)
Isopropyl Alcohol	67-63-0	0.000075	0.000075	200	0.8	0.1
Ethanolamine(Mono-)	141-43-5	0.0000686	0.0000686	141.399	0.8	0.1
Acetic Acid	64-19-7	0.00098	0.00098	14	0.8	0.1
Maleic Acid	110-16-7	0.0000914	0.0000914	192.123	0.8	0.1
Ethylene Glycol	107-21-1	0.00006	0.00006	290	0.8	0.1
Methanol	67-56-1	0.0053	0.0053	90	0.8	0.1
TMAH-micron	75-59-2	1.025e-5	1.025e-5	1140	0.8	0.1
Glycine-micron	56-40-6	0.001808	0.001808	6.95	0.8	0.1
3-methoxy,3methyl,1-Butanol-micron	56539-66-3	0.000699	0.000699	18	0.8	0.1
Polyethylene glycol-micron	25322-68-3	0.00173	0.00173	7.29	0.8	0.1
1,2,4-Triazole-micron	288-88-0	0.00132	0.00132	9.56	0.8	0.1
2-(2-Aminoethoxy)ethanol-micron	929-06-6	0.0000212	0.0000212	593	0.8	0.1
DL-Malic acid-micron	617-48-1	0	0	192.123	0.8	0.1
Malic acid-micron	6915-15-7	0	0	192.123	0.8	0.1
Diethylene glycol - micron	111-46-6	0	0	8.69	0.8	0.1
Malonic acid-micron	141-82-2	0	0	192.123	0.8	0.1
Quat ammonium cmpnds - micron	75-59-268607-29-4	0	0	1140	0.8	0.1
N,N,N,N-Tetraethylethyleneamine-micron	150-77-6	0	0	24.2258	0.8	0.1
Citric acid - micron	77-92-9	0	0	14	0.8	0.1
1-Hydroxybenzotriazole-micron	2592-95-2	0	0	9.56	0.8	0.1
Oxirane, methyl - micron	9003-11-6	0	0	7.29	0.8	0.1
2-propenoic acid, 2-methyl - micron	25751-21-7	0	0	8.69	0.8	0.1
Triammonium citrate - micron	3458-72-8	0	0	24.2258	0.8	0.1
Polyvinyl alcohol - micron	9002-89-5	0	0	57.6	0.8	0.1

Table A-1b. Applied Toxchem Compound Properties Parameter Values (Part 2 – Biodegradation parameters)

Name	CAS #	Aerobic Biodegradation Rate (Kb) @ 20 C (L/(mg.hr))	Aerobic Biodegradation Rate (Kb) @ 20 C (L/(mg.hr))	Half Saturation Constant (Ks) (mg/L)	Anoxic Reduction Factor (fanox)	Anaerobic Reduction Factor (fana)
2-Hydroxy-2-methylpropionic acid - micron	594-61-6	0	0	24.2258	0.8	0.1
1-methoxy-2-propanol - micron	107-98-2	0	0	200	0.8	0.1
Cyclopentanone - micron	120-92-3	0	0	1.63	0.8	0.1

Table A-1c. Applied Toxchem Compound Properties Parameter Values (Part 3 – Dissociation Coefficients, Vapor Pressure, and Boiling Point)

Name	CAS #	Acid/Base	First Acid Dissociation Coefficient (pKa1)	Second Acid Dissociation Coefficient (pKa2)	Vapor Pressure (mm Hg @25C)	Boiling Point (deg C)
Isopropyl Alcohol	67-63-0	Unknown	-	-	33	83
Ethanolamine(Mono-)	141-43-5	Base	9.5	-	0.4	172
Acetic Acid	64-19-7	Acid	4.75	-	11	118.1
Maleic Acid	110-16-7	Acid	1.83	6.07	0.075846	260.001
Ethylene Glycol	107-21-1	Unknown	-	-	0.06	198
Methanol	67-56-1	Unknown	-	-	96	64.7
TMAH-micron	75-59-2	Unknown	-	-	17.5	102
Glycine-micron	56-40-6	Unknown	-	-	8.19E-08	375.7
3-methoxy,3methyl,1-Butanol-micron	56539-66-3	Unknown	-	-	0.938	173
Polyethylene glycol-micron	25322-68-3	Unknown	-	-	0.000000299	353.5
1,2,4-Triazole-micron	288-88-0	Unknown	-	-	0.00181	260
2-(2-Aminoethoxy)ethanol-micron	929-06-6	Unknown	-	-	0.00154	218
DL-Malic acid-micron	617-48-1	Acid	3.3	-	0.00000293	150
Malic acid-micron	6915-15-7	Acid	3.3	-	0.00000293	150
Diethylene glycol - micron	111-46-6	Unknown	-	-	0.0057	245.8
Malonic acid-micron	141-82-2	Acid	2.8	5.7	0.0015	264.1
Quat ammonium cmpnds - micron	75-59-268607-29-4	Unknown	-	-	1.1E-18	761.77
N,N,N,N-Tetraethylethyleneamine-micron	150-77-6	Base	9.55	6.18	0.537	192
Citric acid - micron	77-92-9	Acid	2.79	4.11	1.66E-08	407.16
1-Hydroxybenzotriazole-micron	2592-95-2	Unknown	-	-	0.0000708	300
Oxirane, methyl - micron	9003-11-6	Unknown	-	-	8.89E-15	549.11
2-propenoic acid, 2-methyl - micron	25751-21-7	Unknown	-	-	3.77E-17	715.25
Triammonium citrate - micron	3458-72-8	Base	9.55	6.18	9.27E-22	748.31
Polyvinyl alcohol - micron	9002-89-5	Unknown	-	-	1.57E-22	728.16

Table A-1c. Applied Toxchem Compound Properties Parameter Values (Part 3 – Dissociation Coefficients, Vapor Pressure, and Boiling Point)

Name	CAS #	Acid/Base	First Acid Dissociation Coefficient (pKa1)	Second Acid Dissociation Coefficient (pKa2)	Vapor Pressure (mm Hg @25C)	Boiling Point (deg C)
2-Hydroxy-2-methylpropionic acid - micron	594-61-6	Unknown	-	-	0.00875	212
1-methoxy-2-propanol - micron	107-98-2	Unknown	-	-	12.5	119
Cyclopentanone - micron	120-92-3	Unknown	-	-	11.4	130.6

Attachment B: Toxchem Output – Air Emissions by Unit Operation

Table B-1. Toxchem-Predicted Air Emissions for Each WWTP Unit Operation (lb/d)								
Compound	EQ1	EQ2-offline diversion tank	Combined screens tank	A.S. – Anoxic tanks	AS-Diffused Aeration	UF Membrane tanks	BIOX Effl tank	Combined Total Air Emissions
Isopropyl Alcohol	2.810E+00	0	1.099E-02	2.244E-01	1.142E+00	8.419E-02	1.026E-02	4.282E+00
Ethanolamine(Mono-)	1.503E-05	0	3.462E-08	1.279E-06	4.786E-06	3.547E-07	6.253E-08	2.155E-05
Acetic Acid	2.561E-04	0	7.375E-07	4.877E-06	2.569E-06	8.076E-08	1.247E-08	2.644E-04
Maleic Acid	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.316E-10
Ethylene Glycol	9.170E-06	0	2.054E-08	8.407E-07	3.317E-06	2.489E-07	4.442E-08	1.364E-05
Methanol	1.002E-03	0	2.435E-06	4.580E-06	4.253E-07	3.508E-09	5.846E-10	1.009E-03
TMAH-micron	4.7144E-10	0	0	1.1975E-10	8.6781E-10	0	0	1.543E-09
Glycine-micron	1.703E-04	0	4.056E-07	2.035E-06	5.148E-07	1.028E-08	1.794E-09	1.733E-04
3-methoxy,3methyl,1-Butanol-micron	8.465E-03	0	2.493E-05	2.030E-04	1.468E-04	5.668E-06	9.109E-07	8.846E-03
Polyethylene glycol-micron	1.667E-10	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.700E-10
1,2,4-Triazole-micron	2.798E-02	0	7.917E-05	4.274E-04	1.621E-04	4.128E-06	6.656E-07	2.865E-02
2-(2-Aminoethoxy)ethanol-micron	7.022E-08	0	1.923E-10	1.165E-08	7.389E-08	5.892E-09	9.752E-10	1.628E-07
DL-Malic acid-micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Malic acid-micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Diethylene glycol - micron	1.485E-05	0	4.031E-08	1.038E-05	8.973E-05	7.420E-06	1.232E-06	1.237E-04
Malonic acid-micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Quat ammonium cmpnds - micron	2.011E-10	0	0.000E+00	1.404E-10	1.513E-09	1.223E-10	0.000E+00	1.995E-09
N,N,N,N-Tetraethylethyleneamine-micron	6.773E-06	0	2.222E-08	4.672E-06	4.379E-05	3.591E-06	5.523E-07	5.940E-05
Citric acid - micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1-Hydroxybenzotriazole-micron	1.208E-05	0	3.378E-08	8.430E-06	7.369E-05	6.091E-06	9.988E-07	1.013E-04
Oxirane, methyl - micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2-propenoic acid, 2-methyl - micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Triammonium citrate - micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Polyvinyl alcohol - micron	0.000E+00	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table B-1. Toxchem-Predicted Air Emissions for Each WWTP Unit Operation (lb/d)								
Compound	EQ1	EQ2-offline diversion tank	Combined screens tank	A.S. – Anoxic tanks	AS-Diffused Aeration	UF Membrane tanks	BIOX Effl tank	Combined Total Air Emissions
2-Hydroxy-2-methylpropionic acid - micron	1.919E-04	0	5.111E-07	1.339E-04	1.150E-03	9.509E-05	1.588E-05	1.587E-03
1-methoxy-2-propanol - micron	6.665E-04	0	1.846E-06	4.634E-04	4.062E-03	3.358E-04	5.487E-05	5.584E-03
Cyclopentanone - micron	2.056E-03	0	1.122E-05	1.292E-03	2.108E-02	1.740E-03	1.401E-04	2.632E-02
Total	2.8511	0.0000	0.0111	0.2269	1.1690	0.0864	0.0105	4.3550

Attachment C: Toxchem Output - Compound Mass Balances

Isopropyl Alcohol

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	426.866	100	6.203996803
Total Formed	0	0	
To Air	4.28221	1.00317	
To Wastewater	18.2115	4.26632	0.279383734
To Sludge	1.0863	0.254482	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	403.286	94.476	

Ethanolamine(Mono-)

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	16.5239	100	0.240155512
Total Formed	0	0	
To Air	2.15469E-05	0.000130399	
To Wastewater	0.784012	4.74473	0.012027576
To Sludge	0.044553	0.269628	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	15.6953	94.9855	

Acetic Acid

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	11.7044	100	0.17010973
Total Formed	0	0	
To Air	0.000264381	0.00225881	
To Wastewater	0.00657596	0.0561837	0.000100882
To Sludge	0.000384282	0.00328323	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	11.6972	99.9383	

Maleic Acid

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	11.0159	100	0.16010319
Total Formed	0	0	
To Air	1.31589E-10	1.19454E-09	
To Wastewater	0.370684	3.36499	0.005686686
To Sludge	0.0213404	0.193724	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	10.6239	96.4413	

Ethylene Glycol

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	4.75061	100	0.069044546
Total Formed	0	0	
To Air	1.36408E-05	0.000287138	
To Wastewater	0.262434	5.52421	0.004026016
To Sludge	0.0147259	0.309979	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	4.47344	94.1655	

Methanol

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	0.229957	100	0.003342155
Total Formed	0	0	
To Air	0.00100911	0.438824	
To Wastewater	1.53827E-06	0.000668938	2.35987E-08
To Sludge	8.75028E-08	3.80518E-05	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0.228946	99.5605	

TMAH-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	1280.6	100	18.61201948
Total Formed	0	0	
To Air	1.54264E-09	1.20462E-10	
To Wastewater	367.84	28.7241	5.643055916
To Sludge	20.4766	1.59899	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	892.282	69.677	

Glycine-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	162.485	100	2.361528959
Total Formed	0	0	
To Air	0.000173297	0.000106654	
To Wastewater	0.0195361	0.0120234	0.000299705
To Sludge	0.00108597	0.000668352	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	162.464	99.9872	

3-methoxy,3methyl,1-Butanol-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	115.667	100	1.681084224
Total Formed	0	0	
To Air	0.00884631	0.00764809	
To Wastewater	0.141759	0.122558	0.002174733
To Sludge	0.00856798	0.00740745	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	115.508	99.8624	

Polyethylene glycol-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	35.1132	100	0.510329191
Total Formed	0	0	
To Air	1.70049E-10	4.84287E-10	
To Wastewater	0.0047175	0.0134351	7.23715E-05
To Sludge	0.000262763	0.000748332	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	35.1082	99.9858	

1,2,4-Triazole-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	24.0973	100	0.350226001
Total Formed	0	0	
To Air	0.0286524	0.118903	
To Wastewater	0.00654056	0.0271423	0.000100339
To Sludge	0.000374309	0.00155332	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	24.0617	99.8524	

2-(2-Aminoethoxy)ethanol-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	15.1469	100	0.220142432
Total Formed	0	0	
To Air	1.62828E-07	1.07499E-06	
To Wastewater	2.40119	15.8527	0.036836803
To Sludge	0.134029	0.884865	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	12.6117	83.2624	

DL-Malic acid-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	12.3929	100	0.180116271
Total Formed	0	0	
To Air	0	1.14162E-10	
To Wastewater	11.7336	94.68	0.180005875
To Sludge	0.659289	5.31989	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Malic acid-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	12.3929	100	0.180116271
Total Formed	0	0	
To Air	0	1.14162E-10	
To Wastewater	11.7336	94.68	0.180005875
To Sludge	0.659289	5.31989	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

**Diethylene glycol -
micron**

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	8.95042	100	0.13008386
Total Formed	0	0	
To Air	0.000123654	0.00138154	
To Wastewater	8.4754	94.6927	0.130021629
To Sludge	0.474899	5.30588	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Malonic acid-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	8.95042	100	0.13008386
Total Formed	0	0	
To Air	0	0	
To Wastewater	8.46965	94.6285	0.129933418
To Sludge	0.48076	5.37136	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Quat ammonium cmpnds - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	8.95042	100	0.13008386
Total Formed	0	0	
To Air	1.99475E-09	2.22866E-08	
To Wastewater	8.44537	94.3572	0.129560937
To Sludge	0.504967	5.64182	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

N,N,N,N-Tetraethylethyleneamine-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	7.57344	100	0.11007107
Total Formed	0	0	
To Air	5.94032E-05	0.000784362	
To Wastewater	6.88108	90.8582	0.105563069
To Sludge	0.690835	9.12182	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Citric acid - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	4.54406	100	0.066042584
Total Formed	0	0	
To Air	0	0	
To Wastewater	4.30337	94.7032	0.066018262
To Sludge	0.24069	5.2968	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

1-Hydroxybenzotriazole-micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	4.13096	100	0.06003866
Total Formed	0	0	
To Air	0.000101325	0.00245281	
To Wastewater	3.89623	94.3177	0.059772302
To Sludge	0.234589	5.67879	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Oxirane, methyl - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	3.71787	100	0.054034881
Total Formed	0	0	
To Air	0	0	
To Wastewater	3.52083	94.7002	0.054013268
To Sludge	0.197039	5.29979	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

2-propenoic acid, 2-methyl - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	3.71787	100	0.054034881
Total Formed	0	0	
To Air	0	0	
To Wastewater	3.37592	90.8026	0.051790195
To Sludge	0.341218	9.17778	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Triammonium citrate - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	3.71787	100	0.054034881
Total Formed	0	0	
To Air	0	0	
To Wastewater	3.52051	94.6915	0.054008359
To Sludge	0.197361	5.30844	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Polyvinyl alcohol - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	3.71787	100	0.054034881
Total Formed	0	0	
To Air	0	0	
To Wastewater	3.52223	94.7378	0.054034746
To Sludge	0.19564	5.26216	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

2-Hydroxy-2-methylpropionic acid - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	1.52846	100	0.022214374
Total Formed	0	0	
To Air	0.0015869	0.103824	
To Wastewater	1.44339	94.4347	0.022143134
To Sludge	0.0834702	5.46108	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

1-methoxy-2-propanol - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	0.922582	100	0.013408648
Total Formed	0	0	
To Air	0.00558421	0.605281	
To Wastewater	0.867174	93.9943	0.013303369
To Sludge	0.0498207	5.40014	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Cyclopentanone - micron

Contaminant Load	Stream Mass (lb/d)	Percent of total (%)	Compound conc. (mg/L)
Total Incoming	0.225138	100	0.003272117
Total Formed	0	0	
To Air	0.0263161	11.6889	
To Wastewater	0.187955	83.4847	0.002883429
To Sludge	0.0108654	4.82612	
To Oil	0	0	
Removed/Treated	0	0	
Biodegraded	0	0	

Appendix D: Air Dispersion Modeling Protocol



1527 Cole Blvd. Suite 300
Lakewood, CO 80401

T: 303.239.5400

Technical Memorandum

Prepared for: Onondaga County Department of Water Environment Protection (OCDWEP)

Project Title: Air Dispersion Modeling for Permitting

Project No.: 203555

Technical Memorandum

Subject: OCDWEP Industrial Wastewater Treatment and Water Reclamation Facility Plant (IWWTP-WRF) and Oak Orchard Wastewater Treatment Plant (OOWWTP) – Air Dispersion Modeling Protocol

Date: September 26, 2025, Revised October 10, 2025

To: New York State Department of Environmental Conservation (NYSDEC)

From: Jeremy Pritchett, Brown and Caldwell

Prepared by: Jeremy Pritchett, Senior Associate

Reviewed by: Paul Pepler, Managing Principal

Limitations:

This document was prepared solely for OCDWEP, in accordance with professional standards at the time the services were performed and in accordance with the contract between OCDWEP, Inc. and Brown and Caldwell dated March 21, 2025. This document is governed by the specific scope of work authorized by OCDWEP.; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by OCDWEP, and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Table of Contents

List of Tables.....	1
Acronyms/Abbreviations.....	2
Section 1: Introduction.....	1
Section 2: Model Selection.....	1
Section 3: Modeling Analysis Features.....	1
3.1 Emissions.....	2
3.1.1 National Ambient Air Quality Standards (NAAQS).....	2
3.1.2 Part 212 Air Toxics.....	3
3.2 Building Downwash.....	5
3.3 Flare Stack Height.....	5
3.4 Control Options.....	6
3.4.1 Land Use Classification.....	6
3.4.2 Averaging Periods.....	6
3.5 Receptor and Terrain Data.....	6
3.5.1 Receptor Network.....	6
3.5.2 Terrain Data.....	6
3.6 Meteorological Data.....	7
3.7 Source Types and Parameters.....	7
Section 4: Analysis of Model Results.....	8

List of Tables

Table 1. Emission Sources.....	2
Table 2. Significant Project Thresholds.....	3
Table 3. Equipment Summary Exemption from Part 212.....	4



Acronyms/Abbreviations

AERMOD	AMS/EPA Regulatory Model
AGC	Annual Guideline Concentrations
BC	Brown and Caldwell
DAR	Division of Air Resources
EPA	Environmental Protection Agency
ERP	emission rate potential
GEP	Good Engineering Practice
HTAC	High Toxicity Air Contaminant
ITT	industrial wastewater treatment train
MGD	million gallons per day
MTT	municipal wastewater treatment train
NAAQS	National Ambient Air Quality Standard
NYSDEC	New York State Department of Environmental Conservation
OCDWEP	Onondaga County Department of Water Environment Protection
OOWWTP	Oak Orchard Wastewater Treatment Plant
PB	Persistent and Bioaccumulative
PM-10	particulate matter 10 microns or smaller
SGC	Short-Term Guideline Concentrations
TAC	toxic air contaminant
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter

Section 1: Introduction

Onondaga County (Onondaga) owns and operates the Oak Orchard Wastewater Treatment Plant (OOWWTP) located at 4200 Oak Orchard Road, in Clay New York. The existing OOWWTP was constructed in 1981, has a design flow of 10 million gallons per day (MGD), and provides advanced secondary treatment of wastewater using an activated sludge process. The OOWWTP operates under New York State Department of Environmental Conservation (NYSDEC) Air Facility Certificate ID NO. 7-3124-00018/02000 (OOWWTP Registration) that includes sources of odor and associated controls.

Onondaga, through the Onondaga County Department of Water Environment Protection (OCDWEP) is proposing upgrades to the OOWWTP municipal wastewater treatment train (MTT) and to construct a greenfield Industrial Wastewater Treatment Train (ITT). This modeling protocol has been prepared to support the Minor Facility Registration application which will include an air quality dispersion modeling analysis in accordance with the requirements of 6 NYCRR Part 212.

This technical memorandum presents a proposed air dispersion modeling (Modeling) approach to support the Minor Facility Registration application for the Onondaga Facility. Modeling will be performed in accordance with the *NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis*, Issued 09/01/2020 (DAR-10, Model Guidelines). This protocol describes the proposed methodologies that will be used in the air dispersion modeling analysis to demonstrate compliance with 6 NYCRR 212.

Section 2: Model Selection

The AMS/EPA Regulatory Model (AERMOD) is EPA's preferred and recommended air dispersion model. AERMOD is *"a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain."* AERMOD is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources) and is therefore appropriate for this analysis.

The AERMOD modeling system includes two input data processors that are regulatory components: AERMET, a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP, a terrain data preprocessor that incorporates complex terrain using USGS Digital Elevation Data. A non-regulatory component of the system includes AERSURFACE, a surface characteristics preprocessor.

The following version numbers will be used as incorporated into BEEST user interface, Version 12.13a:

- AERMOD: 24142
- AERMAP: 24142

Meteorological data processed by the NYSDEC Division of Air Resources (DAR) Meteorology group was used in the model, therefore AERMET and AERSURFACE were not utilized to complete the model process.

Section 3: Modeling Analysis Features

A refined modeling analysis will be performed with AERMOD using the regulatory default options. The coordinate system is North American Datum 83 (NAD 83), Universal Transverse Mercator (UTM), Zone 18.



AERMOD requires the following information: meteorological data, terrain data, building geometry, and stack parameters. These input parameters as well as model options selected are described in subsequent sections below.

3.1 Emissions

The facility includes combustion devices, a waste gas burner (i.e., flare), sources of odorous emissions, and sources of toxic air contaminants (TAC). These emission sources are presented below in **Table 1**. A discussion of which sources are included in the model follows.

Table 1 Emissions Sources		
EMISSION UNIT	CAPACITY	POLLUTANTS EMITTED ^A
ITT Duty Boiler #1	5.5 MMBtu/hr	Criteria, Hazardous Air Pollutants
ITT Duty Boiler #2	5.5 MMBtu/hr	Criteria, Hazardous Air Pollutants
ITT Back up Boiler	5.5 MMBtu/hr	Criteria, Hazardous Air Pollutants
MTT Duty Boiler #1	5 MMBtu/hr	Criteria, Hazardous Air Pollutants
MTT Duty Boiler #2	5 MMBtu/hr	Criteria, Hazardous Air Pollutants
MTT Back up Boiler	5 MMBtu/hr	Criteria, Hazardous Air Pollutants
MTT Flare (Waste digester gas burner)	305 scfm	Criteria, Hazardous Air Pollutants, TAC
MTT Sludge Dryer	10 MMBtu/hr	Criteria, Hazardous Air Pollutants
ITT HVAC Equipment	20.5 MMBtu/hr	Criteria, Hazardous Air Pollutants
MTT HVAC Equipment	12.282 MMBtu/hr	Criteria, Hazardous Air Pollutants
Industrial Wastewater Treatment Train	16.5 MGD	Odorous Compounds, VOC, TAC
Municipal Wastewater Treatment Train	31.46 MGD Peak Day (20-year projection)	Odorous Compounds

A: Only sources subject to Part 212 are considered to have TAC emissions.

3.1.1 National Ambient Air Quality Standards (NAAQS)

Proposed new major stationary sources in attainment areas must demonstrate that allowable emission increases from the proposed project will not, at a minimum, cause or contribute to air pollution in violation of the following:

1. Any NAAQS in any air quality control region.
2. Any applicable maximum allowable PSD increment increase over the baseline concentration in any area, as defined in 6 CRR-NY 231-12.2 (c)(3).
3. Quantified air quality related values including visibility for the applicable Federal class I areas.



Under 6 CRR-NY 231-12.3, prior to submitting an application for a PSD permit, the applicant must provide an analysis of air quality monitoring data in the area that the proposed new facility would affect. This analysis is required for each regulated contaminant that the project would have the potential to emit in an amount equal to or greater than the applicable threshold in table 6 of 6 CRR-NY 231-13, reproduced in part in Table 2 below:

Table 2 Significant Project Thresholds		
Contaminant	Facility-Wide Potential to Emit (tons/year)	Significant Project Threshold/ Significant Net Emission Increase Threshold
Carbon monoxide	26.88	100 tpy
Nitrogen oxides	25.26	40 tpy
Sulfur dioxide	23.79	40 tpy
Particulate matter	2.99	25 tpy
Particulate matter: PM-10 emissions	2.99	15 tpy
Particulate matter: PM-2.5 emissions	2.99	10 tpy

As summarized above in Table 2, the facility is a natural minor source of air emissions and the facility-wide Potential to Emit (PTE) for all criteria pollutants are less than the associated Significant Project Thresholds. Since the project PTE does not exceed the Significant Project Thresholds, NAAQS modeling is not required and therefore not included in the Minor Facility Registration application.

3.1.2 Part 212 Air Toxics

The Facility is subject to 6 NYCRR 212 (Part 212) which requires an ambient impact assessment prepared in accordance with DAR-1. Part 212 applies to process emission sources that are not excepted under Section 212-1.4. Sources that will and will not be included in the Part 212 evaluation are discussed further below.

1. Combustion installations will not be included in the model. Under 6 NYCRR 212-1.2(18), a process operation does not include the operation of a combustion installation defined under 6 NYCRR Part 200.1(l) as “an installation, consisting of a single furnace, device, engine or turbine in which fossil fuel, wood, and/or other solid, liquid, or gaseous fuel is burned with air or oxygen and the air contaminant emissions include only those products resulting from:
 - (1) Combustion of the fuel
 - (2) Additives or impurities in the fuel
 - (3) Material introduced for the purpose of altering air contaminant emissions.”

DAR-1 further explains that process emission sources do not include equipment that combust fuel for electricity or space heating for commercial, industrial plants or residential heating. Therefore, boilers and heating and cooling equipment are not required to be included in the Part 212 compliance evaluation and therefore were not included in the model.



2. Flare emissions will be included in the model. The proposed flare associated with the MTT is subject to the control requirements of 6 NYCRR 212-2.3, Table 3 for criteria air pollutants and Table 4 for non-criteria pollutants (i.e., TACs). Based on a worst-case projected hydrogen sulfide concentration in the digester gas (3,000 ppm), complete conversion to SO₂, and the maximum instantaneous digester gas generation rate (305 standard cubic feet per minute), the maximum expected sulfur dioxide emission rate is 9.1 pounds per hour. Maximum emission rates for all other criteria pollutants are less than 10 pounds per hour. The Emission Rate Potential (ERP) for all TACs emitted from the flare is <0.1 lb/hr. Therefore, in accordance with 6 CRR-NY 212-2.3, compliance will be evaluated using dispersion modeling for criteria pollutants and TACs.

3. ITT: TAC emissions from the ITT will be included in the model. TAC emissions from the ITT will be predicted using Toxchem, (Hydromantis 2021), a compound fate model. [Toxchem](#) was specifically included in Appendix C of 40 CFR Part 63 as an accepted alternative to Water 9 for estimation of wastewater treatment emissions. Based on the predicted emission rate potential (ERP) and the applicable environmental rating for each TAC identified in the influent wastewater to the ITT, compliance with ambient air toxics standards will be evaluated with air dispersion modeling (i.e. AERMOD). No High Toxicity Air Contaminants (HTAC) have been identified in the proposed discharge and therefore the Persistent and Bioaccumulative (PB) trigger does not apply. Non-HTAC toxics with an annual loading to the ITT of less than 100 pounds per year will not be included in the evaluation in accordance with DAR-1, Section V. A. 2.

4. Odorous compounds emitted from the ITT and MTT including hydrogen sulfide (medium toxicity) and ammonia (low toxicity) and are subject to the requirements of Part 212. Emissions of odorous compounds will be captured and controlled removing at least 99% from the exhaust stream, which is greater than the most stringent control requirement of 90% provided in Table 4 of 6 CRR-NY 212-2.3(b) for a pollutant with an environmental rating of “B”. Compliance with Part 212 for odorous compounds will be demonstrated using control technology and therefore air dispersion modeling is not required. The exhaust concentrations of H₂S are less than both the American Conference of Governmental Industrial Hygienists recommended threshold limit value of 1 ppm as an 8-hour time weighted average, and the short-term exposure limit of 5 ppm. A summary of odor emissions from MTT is included in Table B-11. As such, the modeling analysis will not include odorous compounds.

Proposed equipment and associated exemption status from Part 212 is included in Table below.

Table 3 Equipment Summary Exemption from Part 212				
Equipment	Heat Input	Fuel	Exemption / Exception	Non-Process Operation
Duty Boiler #1	5.5 MMBtu/hr	Natural Gas	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
Duty Boiler #2	5.5 MMBtu/hr	Natural Gas	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
Back up Boiler	5.5 MMBtu/hr	Natural Gas	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
Duty Boiler #1	5 MMBtu/hr	NG & DG	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
Duty Boiler #2	5 MMBtu/hr	NG & DG	212-1.4(a)	212-1.2(18)



Table 3 Equipment Summary Exemption from Part 212				
Equipment	Heat Input	Fuel	Exemption / Exception	Non-Process Operation
			201-3.2(c)(1)(i)	
Back up Boiler	5 MMBtu/hr	NG & DG	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
Flare	305 scfm	Digester Gas		
Sludge Dryer	10 MMBtu/hr	NG & DG		212-1.2(18)
ITT HVAC Equipment	20.5 MMBtu/hr (total)	Natural Gas	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
MTT HVAC Equipment	12.282 MMBtu/hr (total)	Natural Gas	212-1.4(a) 201-3.2(c)(1)(i)	212-1.2(18)
MTT	31.46 MGD Peak Day (20-year projection)	N/A		
IWWTP	16.5 mgd	N/A		

3.2 Building Downwash

Emissions from stacks below the height to undisturbed flow (H_g) are subject to the influence of aerodynamic downwash due to the presence of nearby buildings (building downwash). AERMOD includes algorithms to evaluate the effects of building downwash on emissions from nearby or adjacent point sources. The Building Profile Input Program BPIP-Prime was used to adjust plume rise based on the impacts from building downwash due to nearby buildings. A building is considered nearby if the distance from the stack to the building is less than 5L (five times the lesser of the building height or crosswind width of the building). All buildings within 5L of the point source were included in the model.

Per Section 2.2 of DAR-10, it is possible for emissions from stack heights that exceed Good Engineering Practice (GEP) computed heights to be impacted by nearby buildings. Therefore, building downwash was evaluated for all nearby buildings regardless of whether stack heights met GEP practice using actual stack heights (listed in Table 4). All buildings associated with the MTT Basis of Design Reports located within the boundary of the Facility were included in the model.

3.3 Flare Stack Height

Computed GEP stack height sets the height of a point source such that the plume is less likely to be impacted by building downwash. Section 2.2 of DAR-10 allows for stacks heights less than the computed GEP height if achieving GEP stack height is not considered feasible.

For the subject facility, the proposed enclosed flare is the only point source. The height of the flare is anticipated to be approximately 40-ft. This is lower than the height of the building which is anticipated to have the greatest impact on plume rise from the flare (the sludge thickening building at a height of 55-ft) and significantly lower than the computed GEP for the flare (137.5-ft).

However, the project is requesting that the proposed flare not be required to meet GEP stack height since doing so is expected to impact the combustion behavior within the flare and could adversely impact the emissions profile.



The flare will be modeled as a point source with stack parameters based on typical flares used for this application and the maximum expected name plate capacity. Source Parameters are presented in the Minor Facility Registration Application Table B-13 in Appendix B.

3.4 Control Options

3.4.1 Land Use Classification

URBAN / RURAL ANALYSIS

Section 2.3 of the Model Guidelines states that methods identified in section 7.2.1.1 of EPA's Modeling Guidelines must be used to determine urban/rural dispersion coefficients within 3 km of the Facility.

Section 7.2.1.1 of EPA's Guidance on Air Quality Models states that if the average population density is greater than 750 people per square kilometer, the urban dispersion coefficients should be used. According to Census Reporter (<https://censusreporter.org/profiles/31000US45060-syracuse-ny-metro-area/>) the population density of metropolitan Syracuse-Auburn, New York is 273.8 per square mile (~105.7 per square kilometer) based on the 2023 United States Census Bureau American Community Survey (ACS). Therefore, rural dispersion coefficients will be used.

3.4.2 Averaging Periods

3.4.2.1 Toxics

The maximum predicted one-hour impact will be compared to the NYSDEC's Short-Term Guideline Concentrations (SGC). The maximum predicted annual impact will be compared to the NYSDEC's Annual Guideline Concentration (AGC).

3.4.2.2 Criteria

Averaging periods used for each criteria pollutant are based on the National Ambient Air Quality Standard for the particular pollutant.

3.4.2.3 Modeling Options

All regulatory default options will be used in the model. Dry and wet deposition will be disabled.

3.5 Receptor and Terrain Data

3.5.1 Receptor Network

A receptor grid will be developed based on Section 2.4 of DAR-10, with a Cartesian receptor grid centered on the Facility. The Facility is currently not fenced; therefore, receptors will be placed at 25m spacing along the property boundary. Receptors were not included inside the property boundary because public access to the facility will be restricted. Receptors will then be placed at:

- 70m spacing from the fence line out to 1km,
- 100m spacing from 1km to 2km,
- 250m spacing from 2km to 5km.

3.5.2 Terrain Data

Topographic elevation data will be obtained from the U.S. Geological Survey's (USGS's) National Elevation Dataset with a 1/3 arc-second resolution. The USGS provides data available for downloaded as 1 x 1 degree tiles for the continental United States.



The following Geo-referenced TIFF tiles will be incorporated into the model:

- N43w076
- N43w077
- N44w076
- N44w077

The terrain pre-processor program, AERMAP, will be used to produce base elevations for each receptor, building, and source and produce a hill height scale value for each receptor. AERMAP outputs elevation data in a format that can be directly inserted into an AERMOD control file (EPA-454/B-18-004 April 2018).

3.6 Meteorological Data

Preprocessed meteorological data was obtained via email from NYSDEC DAR Meteorology:

DAR.Meteorology@dec.ny.gov

Five years of AERMOD-ready meteorological data (2010-2024) for Syracuse Hancock International Airport - KSYR4 [NE of Syracuse, NY (Onondaga County)] is the most representative, available dataset:

- Surface Air Station No. 14771 Syracuse Hancock
- Upper Air Station No. 72528 Buffalo International

3.7 Source Types and Parameters

Emissions will be represented in the model as three area sources, two volume sources, and one point source. The area sources include the aeration tank, anoxic tank, and equalization tank. The two volume sources are the MBR Building (which contain the BIOX Tanks and the Membrane Cassettes) and the Screening Room. The point source is the emergency flare, which will be modeled for criteria air pollutants and toxic emissions.

Toxic emissions from each source will be modeled at a 1 lb/hour rate (0.126 g/s) and resultant ambient concentrations will be adjusted with the generation rate for each individual toxic pollutant. Emissions sources are summarized in Table B-13 in the Minor Facility Registration Application, Appendix B.

3.8 Modeled Emission Rates

Modeled emission rates (max one-hour and annual) for criteria pollutants from the flare are presented in Table B-5 in the Minor Facility Registration Application, Appendix B.

Modeled emission rates for toxic contaminants from the flare and the ITT was based on a unit emission rate of 1 pound per hour from each emission source. The maximum predicted impact from each source was calculated based on the product of the predicted unit impact and the hourly emission rate from that source. The facility-wide impact was calculated by summing the product of predicted unit impacts for each source and the predicted emission rates (via Toxchem) for that source.



Section 4: Analysis of Model Results

Per the Model Guidelines, modeled impacts for each toxic air pollutant will be compared to Short-Term Guideline Concentrations (SGC) and the Annual Guideline Concentrations (AGC) developed by DEC. The acceptable air concentrations, in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), are listed in the 2021 AGC/SGC tables located in Attachment C of NYSDEC DAR-1 (attached). Model impacts of criteria pollutant emissions from the emergency flare will be compared to the respective 1-hour, 3-hour, 24-hour, and/or annual ambient air quality standards established by the EPA and the NYSDEC. Compliance with emission standards for criteria pollutants is evaluated in Table B-15 and compliance with SGC and AGC is evaluated in Table B-8 for the flare and Table B-10 in the Minor Facility Registration Application, Appendix B.

