Sheffield Gardens
SPDES Permit & WWTP
Engineer's Report

NYS Route 17k
Town of Montgomery
Orange County, NY 12549

PREPARED BY
Pitingaro & Doetsch Consulting Engineers, P.C.
15 Industrial Drive, Suite 2
Middletown, NY 10941

P&D #230014
December 2023
Revised March 2024

p+d Pitingaro & Doetsch Consulting Engineers

Table of Contents

1. INTRODUCTION

MILR, LLC has contracted Pitingaro & Doetsch Consulting Engineers, PC (P&D) to prepare an Engineer's Report and the design of a new wastewater treatment plant (WWTP) to serve the Sheffield Gardens project. A location map of the project is in **Appendix A.**

The project is located at NYS Route 17k (SBLs 29-1-5.1, 5.2, 5.3, 5.4 & 5.5) in the Town of Montgomery, Orange County, NY. The total area of the site is 53.08 acres. The site is located in the RA-1, RM-1, and B-2 zoning districts. The site will be used for open space, multi-family dwellings, and the WWTP. The existing uses of the site are vacant and single-family residential. The project proposes a facility that will serve multiple users for a mixed-use development, including 225 two-bedroom apartment units, 36 one-bedroom units and 31,000 sf of potential retail space. The development will comprise a population of approximately 625 people and therefore require wastewater treatment. All proposed facilities are to be serviced by central water and central sewer. There are three (3) existing drilled wells on site.

With this project comes a demand for and use of water. The nearest WWTP is the Village of Montgomery Sewage Treatment Plant about 2 miles to the west of the site. In 2021, the plant treated and discharged a daily average of 254,000 gallons per day (gpd). The existing SPDES permit flow limit for the plant is 0.75 million gallons per day (mgd). The new incoming flow could result in failure or permit limit excursions at the existing plant. It is also undesirable to pump the wastewater 2 miles west to the Village of Montgomery Sewage Treatment Plant; the topography will not support gravity sewers. Furthermore, the Village has rejected outside users. Thus, the only practical option is to design a new WWTP to serve Sheffield Gardens. The site is in the Town of Montgomery Sewer District No. 3.

The total proposed wastewater design flow is calculated to be 56,360 gpd. To treat this incoming flow, the new WWTP will consist of a 6,730-gallon tank for anoxic treatment, four (4) Kubota membrane bioreactor (MBR) units for nutrient removal and a UV disinfection system. To hold the MBR units, there will be two (2) MBR tanks total with a capacity of 8,387 gallons each. There will be a 12,000-gallon septic tank outside of the WWTP building to be buried underground as an equalization tank. The new WWTP will be capable of treating 58,000 gpd of sewage and 98.4 lbs of BOD loading.

The effluent will be discharged in a nearby tributary creek of Wallkill River (Water Index Number: H-139-13-20 thru 53) via a large wetland adjacent to the site that drains to the culvert crossing of NYS Route 17k. **Appendix B** shows the overall plan for the site. A SPDES permit will be needed to discharge into the wetland.

This report is prepared to seek the approval of plans for the facility from the New York State Department of Environmental Protection (NYSDEC).

2. FLOW CALCULATION & WASTEWATER CHARACTERIZATION

Table 1 summarizes the proposed Sheffield Gardens facilities and their design flows. The 2014 New York State Design Standards for Intermediate Sized Wastewater Treatment Systems (2014 Standards) was used as design guidance. The total sewage flow is calculated to be 56,360. Given that there is no significant loss during the treatment process, we are proposing a discharge of 58,000 gpd of treated sanitary sewage for the SPDES permit.

Table 1. Sheffield Gardens Flow Calculation

No.	Facility	gpd
1	225 two-bedroom units	49,500
2	36 one-bedroom units	3,960
3	35-employee, 30,000 sf of potential retail	3,625
4	20% Reduction for Commercial Use water saving fixtures	-725
	Total	**56,360**
	Proposed SPDES	**58,000**

The project will generate approximately 56,360 gpd of wastewater. As demonstrated by the flows in **Table 1**, approximately 95% of the Sheffield Gardens flow will be residential.

According to the 2014 New York State Design Standards for Intermediate Sized Wastewater Treatment Systems, the most important characteristics in the sewage are biological oxygen demand (BOD_5), total suspended solids (TSS), and fats, oils, and grease (FOG). Total phosphorus (TP) and ammonia (NH_4) are only considered in special cases. Nitrogen (N) and phosphorus (P) will be addressed in this case. The typical influent concentrations of these parameters are summarized in **Table 2**.

Table 2. Typical Concentrations (mg/L) of Residential Sewage Characteristics

Parameter	Residential Sewage Range	Residential Sewage Median
BOD_5	155 – 286	220.5
TSS	155 – 330	242.5
TP	6 – 12	9.0
NH_4-N	4 – 13	8.5

Based on the parameters summarized in **Table 2** and influent flow data, the following flow conditions in mgd were used for the preliminary design of the MBR plant. **Table 3** displays the design flow conditions.

Table 3. Design Flow Conditions

Condition	Flow	Unit
Average Daily Flow	0.058	mgd
Max. Monthly Flow	0.058	mgd
Peak Daily Flow (assumed)	0.11	mgd
Peak Hourly Flow (assumed)	157.1	gpm

The assumed peak influent hourly flow of the MBR plant is about 157 gallons per minute (gpm) with a peak daily flow of 0.11 million gallons per day (mgd). According to the 2014 Recommended Standards for Wastewater Facilities, a population of 625 would have a peaking factor of about 3.9. The peaking factor is the ratio of peak hourly flow/design average flow. The equation below was used to estimate the peak hourly flow.

$$Peaking\ Factor = \frac{Peak\ Hourly\ Flow}{Design\ Average\ DailyFlow}$$

$$3.9 = \frac{Peak\ Hourly\ Flow}{0.058\ MGD}$$

$$Peak\ Hourly\ Flow = 0.2262\ MGD$$

$$\frac{0.2262\ MGD}{1440\ minutes} \times 1{,}000{,}000 = 157.1\ gpm$$

After determining the wastewater flow and characteristics, the organic loading and solid loading on the proposed WWTP are computed to be 98.4 lbs BOD_5/day and 108.2 lbs TSS/day. Organic loading and solid loading from the potential retail space is negligible as approximately 95% of the flow is residential. The calculation details are shown in **Table 4**.

Table 4. Sheffield Gardens BOD & TSS Loadings Calculation

No.	Facility	Flow (gpd)	mg BOD_5 /L	lb BOD_5/day	mg TSS/L	lb TSS/day
1	225 two-bedroom units	49,500	220.5	91.1	242.5	100.2
2	36 one-bedroom units	3,960	220.5	7.3	242.5	8.0
Total		-	-	**98.4**	-	**108.2**
Average		-	**220.5**	-	**242.5**	-

3. SPDES PERMIT & PROPOSED TREATMENT PROCESS

The proposed SPDES permit anticipates 58,000 gpd of flow to be discharged into the wetland leading to a tributary creek of Wallkill River, approximately 1,500 feet east of the WWTP. The creek is a Class C waterbody that continues north to meet the Wallkill River. It is not a trout stream. **Appendix C** shows the SPDES permit application for the project. The SPDES permit has information about the flow, water quality, and discharge location.

To manage the anticipated flows, Kubota Membrane USA has prepared a preliminary design based around their SP400 Submerged Membrane Unit (SMU). The SP series was developed to create an SMU that is more energy efficient and faster to assemble on-site than the previous models while still maintaining the reliable and simple operation that is a characteristic of Kubota's MBR systems. The new WWTP will consist of a 6,730-gallon tank for an anoxic treatment, four (4) Kubota membrane bioreactor (MBR) units for nutrient removal and a UV disinfection system. A 12,000-gallon septic tank for primary settling will be outside the building, where wastewater will flow to before being processed in the MBR units. There will be two (2) tanks to hold the four (4) MBR units. **Table 5** describes the MBR system components and specifications.

Table 5. Membrane Equipment Specifications

Component	MBR Specifications
Membrane Model	SP225
Membrane Surface Area per Unit	2,422 ft^2
Design MLSS* at MBR	11,000 mg/L
Number of Membrane Tanks	2 Tanks
Total Number of Submerged Membrane Units	4 units (2 units per tank)
Minimum Wastewater Temperature	10°C

**Mixed liquor suspended solids*

Preliminary tank sizing was performed using Kubota standard design parameters. It was based on the minimum temperature, and the maximum monthly flow and loading. Tank dimensions are included in **Table 6** below.

Table 6. Tank Dimensions and Hydraulic Retention Times

Tank Name	Dimensions (L x W)	SWD	Volume per Tank	Number of Tanks	Total Tank Volume	HRT at MMF*
Anoxic	10' x 20'	6'	6,730 gal	1	6,730 gal	3 hrs
MBR	10' x 10'	10.5'	8,387 gal	2	16,774 gal	7.6 hrs
Total	-	-	-	-	23,500 gal	10.6 hrs

**Hydraulic Retention Time at Maximum Monthly Flow*

4. PROPOSED TREATMENT PROCESS

Kubota is proposing an MLE process flow for the system in order to remove BOD and nitrogen. The MLE process makes use of the carbon found in the influent to treat the sludge, eliminating the need to use other carbon-based chemicals such as methanol or acetate. The proposed MBR system includes a primary settling tank and one process train with an anoxic tank and two MBR tanks operating in parallel. The system shall be capable of treating the daily design wastewater flow to <30 mg/L BOD and <30 mg/L TSS. A feed forward pump will be used to pump flow up to the MBR so that it can return by gravity to the anoxic tank. **Appendix E** displays the flow diagram of the proposed treatment process. The details of the blower, tanks, MBR units, and associated equipment are shown in **Appendix F.**

The dimensions of the WWTP building will be 24' x 38' to accommodate the tanks and equipment. The 12,000-gallon septic tank will be outside the WWTP building. **Appendix D** displays the WWTP layout.

The invert depth at the last sewer stub connecting the facilities into the WWTP is 395.0 ft. The discharge will flow south out of the WWTP building around the DEC wetland boundaries and neighboring property (29-6-1) and then east to discharge into the wetland (Wetland ID WD-29) that is connected to the tributary of Wallkill River.

4.1. Primary Settling Tank

For a proposed SPDES flow of 58,000 gpd, a 12,000-gallon septic tank is recommended before processing in the MBR units. The tank will be outside of the WWTP building and underground. **Table 7** summarizes the specifications of the tank.

Table 7. Primary Settling Tank Specification

Parameter	Value	Unit	Reference
Total Volume	12,000	gallon	Proposed tank capacity
Influent BOD_5 Conc.	220.5	mg/L	Determined in Table 4
Influent TSS Conc.	242.5	mg/L	
Influent P Conc.	10	mg/L	
Estimated Effluent BOD_5 Conc.	154.35	mg/L	30% removal, 2002 EPA OWTS Manual
Estimated Effluent TSS Conc.	169.75	mg/L	30% removal, 2002 EPA OWTS Manual

4.2 Membrane Bioreactor Units

A preliminary design was based around the SP400 Submerged Membrane Unit (SMU). Kubota's SP series of SMUs offer state-of-the-art technology. The SP series was developed in 2011 to create a Submerged Membrane Unit which is more energy efficient and faster to assemble on-site then the preceding RM/RW

series, while still maintaining the reliability and simplistic operation that is characteristic of Kubota's MBR systems. An overview of the structure of the SP series is provided below.

Figure 1. SP Series Unit Structure

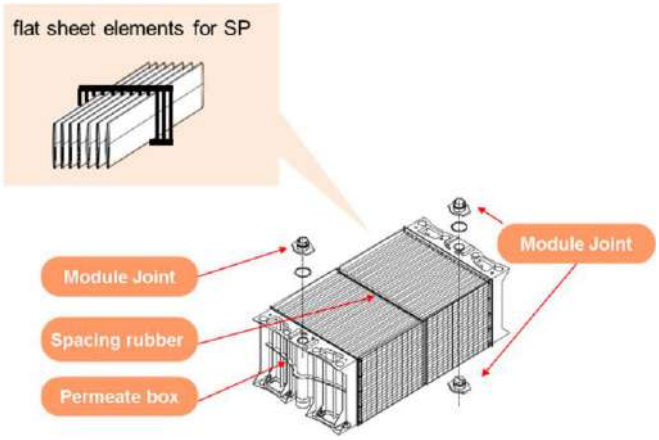


Figure 2. MBR Module

One main takeaway is the cartridge structure of the SP series units, which differs from previous Kubota products. Forty individual membrane sheets are permanently fixed to each membrane module. Each module includes a permeate box and module joint on both ends. These modules are connected in a tubeless configuration by the integrated module joints to form a single cassette. Built-in retainers connect the assembled cassette to a permeate manifold which is connected to the permeate header. The SP series is suited for medium to large installations and offers fast assembly, easy maintenance, and up to 15% lower energy use for air scour in the MBR than other Kubota systems. An overview of the assembly and module connection is displayed below.

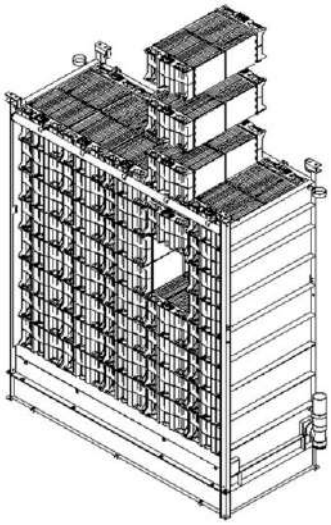


Figure 3. SP Series Module Assembly

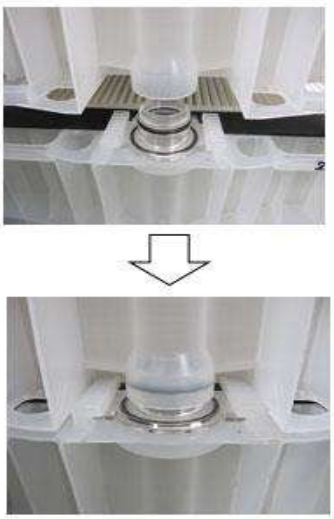


Figure 4. Module Connection Detail

Kubota's membrane sheet is made from chlorinated polyethylene with an average pore size of 0.2 micron (maximum 0.4 micron). This membrane is much thicker than other membranes to provide long-lasting durability and features high porosity to enable high flows. This pore size has been designed as the optimum balance between water quality and quantity and will be a great option for the proposed flow of the new WWTP.

Each MBR uses the process of activated sludge (secondary treatment) and membrane filtration (tertiary treatment). Membrane units are installed in the activated sludge reactor, where sludge and treated water are separated by means of physical filtration. MBRs eliminate the need for gravity sedimentation that are required for conventional activated sludge (CAS), thereby eliminating the need for final clarifiers. **Figure 5** compares the CAS process with the MBR process.

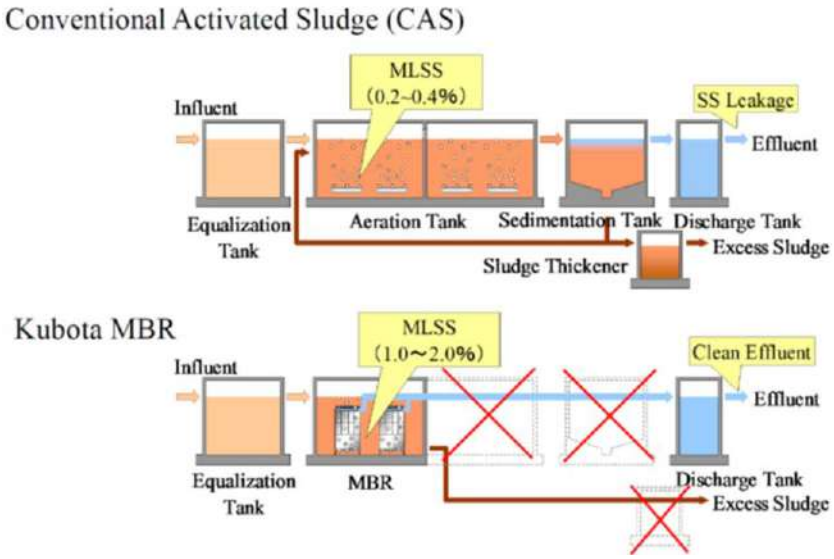


Figure 5. Typical CAS Process (top) vs. Kubota MBR process (bottom)

The Kubota SP series can operate at mixed liquor concentrations ranging from 5,000 mg/L to 13,000 mg/L, which is much higher than that of a conventional activated sludge basin. This allows the system to withstand influent load fluctuations and reduces aeration and waste sludge volume.

The primary method of membrane cleaning for the Kubota MBR system is the air scour provided by the diffusers at the base of the membrane units. The chemical cleaning system eliminates the need for separate tanks or tank linings for immersive cleaning. The system consists of a venturi injector which feeds the cleaning solution through the permeate piping using municipal utility water. The venturi system can be skid-mounted on a wall, as displayed below.

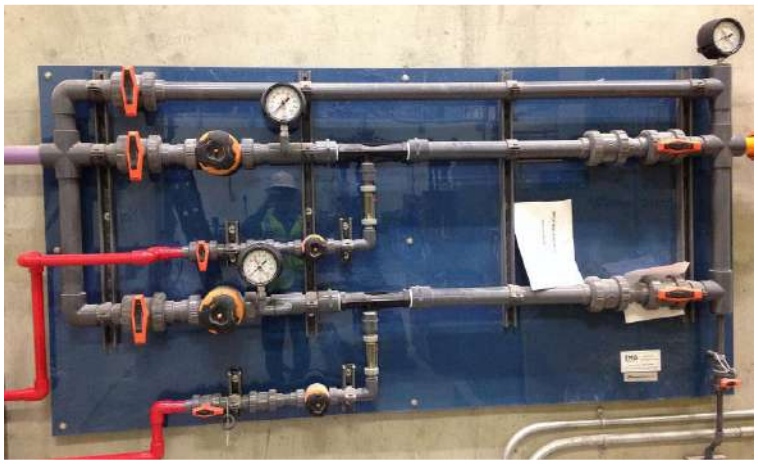


Figure 6. Skid-Mounted Clean-In-Place System

The cleaning process involves stopping the operation, opening a vent, injecting a chemical solution, and allowing that solution to soak in the membrane units for 2 to 4 hours.

Organic fouling can be cleaned with a 0.5% sodium hypochlorite (NaClO) solution two-four times a year. Inorganic fouling such as iron or aluminum can be cleaned by a 1% oxalic or citric acid solution once a year. If the residual chemical cannot be discharged from the system, it can be sent back to the raw water inlet or to the bioreactor to be neutralized. No recovery cleaning is necessary for operation of the Kubota MBR system.

Organic Compounds and Suspended Solids Treatment (BOD and TSS removal)

To meet nutrient level requirements, the influent concentrations were applied to the maximum monthly flow for determination of biological process volumes. **Table 8** below displays the anticipated effluent volumes using the MBR treatment process from the Kubota MBR proposal.

Table 8. Influent and Effluent Volumes

Constituent	Max Month Influent Concentration	Anticipated Effluent Limit
Biological Oxygen Demand (BOD)	154.35 mg/L	<5 mg/L
Total Suspended Solids (TSS)	169.75 mg/L	<10mg/L
TKN*	45 mg/L	-
Total Phosphorus (P)	8 mg/L	<1 mg/L
Total Nitrogen (N)	-	<10 mg/L

According to the Kubota MBR design standards, the MBR system is designed to be capable of treating the maximum monthly flow for up to 3 months, peak daily flow for up to 24 hours, and peak hourly flow for up to 4 hours.

As calculated in **Table 7**, the influent concentrations of BOD and TSS into the MBR system after the septic tank will be 154.35 mg/L and 169.75 mg/L. Assuming each MBR unit treats equal amounts of BOD and TSS simultaneously, **Table 9** breaks down the percent removal rate of a MBR unit.

Table 9. MBR Units Calculation

Constituent	Influent Load (lbs/day) per MBR Unit	Anticipated Effluent Limit (lbs/day) per MBR Unit	Percent Removal per MBR Unit
Biological Oxygen Demand (BOD)	18.68	<0.605	96.8%
Total Suspended Solids (TSS)	20.54	<1.21	94.1%
Total P	1.21	<0.121	90.0%

After the waste has been processed in the septic tank, each MBR unit treats about 18.68 lbs/day of BOD, 20.54 lbs/day of TSS, and 1.21 lbs/day of P. Using the anticipated effluent limit values from **Table 8,** the percent removal of BOD and TSS of each MBR unit were calculated to be approximately 96.8% and 94.1%, respectively. The percent removal of P by each MBR unit is 90.0%. Assuming that there will need to be removal of N and P, the anticipated effluent limits for P and N are predicted to be well below the draft effluent limit (DEL). The efficient removal of nutrients makes the Kubota MBR system a favorable option for the proposed WWTP. The calculations for the percent removal are shown below:

Percent Removal per MBR Unit for BOD:

$$58{,}000\ gallons = 219{,}553.88\ L$$

$$Anticipated\ Effluent\ Limit\ per\ MBR\ Unit = \frac{5\ mg/L}{4} = 1.25\ mg/L$$

$$Influent\ load: 154.35\frac{mg}{L} \times 219{,}533.88L = 33{,}885{,}054.378\ mg = 74.71\ lbs\ BOD$$

$$Influent\ load\ per\ MBR\ unit = \frac{74.71\ lbs\ BOD}{4\ MBR\ units} = 18.68\ lbs\ BOD$$

$$Removal\ per\ MBR\ Unit = \frac{1.25\ \frac{mg}{L} \times 219{,}533.88\ L}{453{,}592\ mg/lb} = 0.605\ \text{lbs/day}$$

$$Percent\ Removal = 1 - (\frac{0.605}{18.68} \times 100) = 96.8\%$$

Percent Removal per MBR Unit for TSS:

$$Anticipated\ Effluent\ Limit\ per\ MBR\ Unit = \frac{10\ mg/L}{4} = 2.5\ mg/L$$

$$Influent\ load: 169.75\frac{mg}{L} \times 219{,}533.88L = 37{,}265{,}876.13\ mg = 82.16\ lbs\ TSS$$

$$Influent\ load\ per\ MBR\ unit = \frac{82.16\ lbs\ BOD}{4\ MBR\ units} = 20.54\ lbs\ TSS$$

$$Removal\ per\ MBR\ Unit = \frac{2.5\ \frac{mg}{L} \times 219{,}533.88\ L}{453{,}592\ mg/lb} = 1.21\ \text{lbs/day}$$

$$Percent\ Removal = 1 - (\frac{1.21}{20.54} \times 100) = 94.1\%$$

Percent Removal per MBR Unit for P:

$$Anticipated\ Effluent\ Limit\ per\ MBR\ Unit = \frac{1\ mg/L}{4} = 0.25\ mg/L$$

$$Influent\ load: 10.0\frac{mg}{L} \times 219{,}533.88L = 2{,}195{,}338.8\ mg = 4.84\ lbs\ P$$

$$Influent\ load\ per\ MBR\ unit = \frac{4.84\ lbs\ BOD}{4\ MBR\ units} = 1.21\ lbs\ P$$

$$Removal\ per\ MBR\ Unit = \frac{0.25\ \frac{mg}{L} \times 219{,}533.88\ L}{453{,}592\ mg/lb} = 0.121\ \text{lbs/day}$$

$$Percent\ Removal = 1 - (\frac{0.121}{1.21} \times 100) = 90.0\%$$

Nitrification

Nitrification will occur combined with the BOD removal in each MBR unit. The effluent limit is anticipated to be <10 mg/L, meaning each MBR unit produces <2.5 mg/L of effluent. The Kubota MBR tank works as both a solid-liquid separation tank and an aeration tank. Kubota's stable air scour and infrequent chemical cleaning allows aeration from the air scour to be used as oxygen supply for biological treatment. This reduces the oxygen requirement in the aeration tank.

4.3. UV Disinfection System & Aeration

Treated effluent will enter a UV disinfection system before discharge into the creek. UV light can eliminate many microorganisms such as bacteria, protozoa, and harmful pathogens that are not eliminated by chlorine.

Re-aeration will be accomplished using MBR blowers with positive displacement at 6.7 psig. The re-aeration system will provide approximately 175 scfm of air to maintain an effluent DO concentration of > 5 mg/L. There will be two (2) MBR blowers on duty and one (1) on standby.

5. CONCLUSION

To provide successful wastewater treatment for the Sheffield Gardens project, a WWTP consisting of a 12,000-gallon septic tank for primary settling, a process train with a 6,730-gallon anoxic tank and two (2) 8,387-gallon MBR tanks operating in parallel for organics and solids removal. The WWTP will be capable of treating 58,000 gpd of wastewater to < 5mg/L of BOD and < 10 mg/L of TSS. Nitrogen and phosphorus levels will be below 10 mg/L and 1 mg/L, respectively. The effluent will then be disinfected though UV disinfection and re-aerated via MBR blowers before discharge into the wetland.

The treated wastewater is proposed to be discharged to the wetland connecting to a tributary creek of Wallkill River, where mitigations will be made to avoid encroaching onto the neighboring property.

Appendix A. Location Map

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

WALDEN QUADRANGLE
NEW YORK
7.5-MINUTE SERIES

SITE LOCATION

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2017 - December 2017
Roads..... U.S. Census Bureau, 2016
Names.....GNIS, 1980 - 2023
Hydrography.....National Hydrography Dataset, 2002 - 2020
Contours.....National Elevation Dataset, 2016
Boundaries.....Multiple sources; see metadata file 2021 - 2022

Wetlands.....FWS National Wetlands Inventory 1984 - 2011

MN 12°42' 226 MILS
GN 0°32' 9 MILS
UTM GRID AND 2023 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
WM
WL
Grid Zone Designation 18T

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1 MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

NEW YORK
QUADRANGLE LOCATION

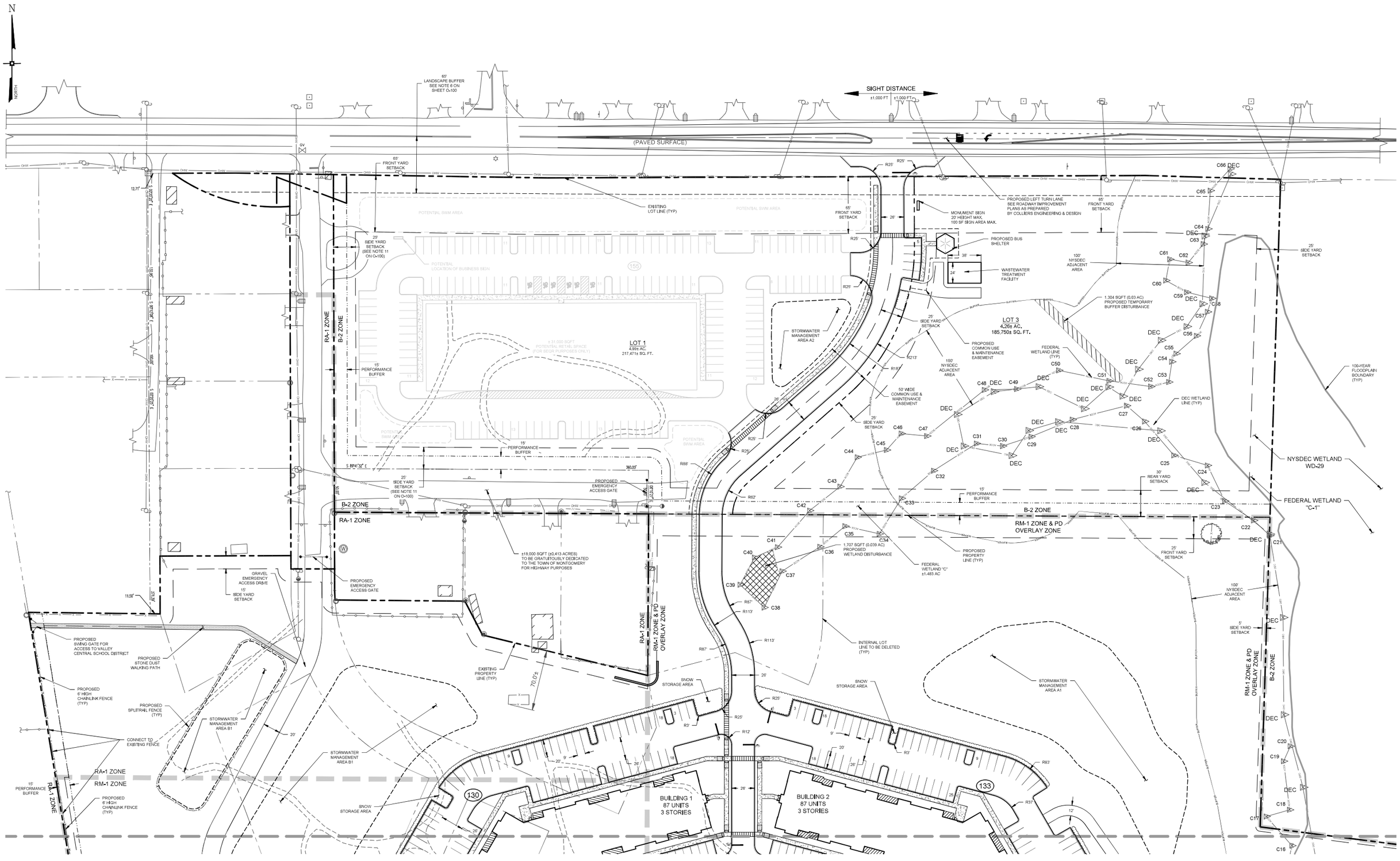
ADJOINING QUADRANGLES
1 Napanoch
2 Gardiner
3 Clintondale
4 Pine Bush
5 Newburgh
6 Goshen
7 Maybrook
8 Cornwall-on-Hudson

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

WALDEN, NY
2023

NSN 7643016387285
NGA REF NO. USGSX24K47223

Appendix B. General Site Plan



No.	DATE	DESCRIPTION
1	01/19/24	REVISED FOR DEIS SUBMISSION

DRAWING STATUS	ISSUE DATE: 01/19/2024		
THIS SHEET IS PART OF THE PLAN SET ISSUED FOR	SHEET NUMBER		
☐ CONCEPT APPROVAL	N/A	OF	N/A
☑ PLANNING BOARD APPROVAL	3	OF	21
☐ OCDOH REALTY SUBDIVISION APPROVAL	N/A	OF	N/A
☐ OCDOH WATERMAIN EXTENSION APPROVAL	N/A	OF	N/A
☐ NYSDEC APPROVAL	N/A	OF	N/A
☐ NYSDOT APPROVAL	N/A	OF	N/A
☐ OTHER: _____	N/A	OF	N/A
☐ FOR BID / ~~CONSTRUCTION~~	N/A	OF	N/A

THIS PLAN AND ALL THE INFORMATION CONTAINED HEREIN IS AUTHORIZED FOR USE BY WHOM THE SERVICES WERE CONTRACTED OR TO WHOM IT IS CERTIFIED. THIS DRAWING MAY NOT BE COPIED, REUSED, DISCLOSED, DISTRIBUTED OR RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF ENGINEERING & SURVEYING PROPERTIES, PC. THIS SHEET SHALL BE CONSIDERED INVALID UNLESS ACCOMPANIED BY ALL SHEETS OF THE DENOTED PLAN SET(S).

COPIES OF THIS DOCUMENT WITHOUT AN ACTUAL OR FACSIMILE OF THE ENGINEER'S SIGNATURE AND AN ORIGINAL STAMP IN RED OR BLUE INK SHALL BE CONSIDERED INVALID.

UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DOCUMENT BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS A VIOLATION OF SECTION 7209 SUBSECTION 2 OF THE NEW YORK STATE EDUCATION LAW.

ROSS WINGLOVITZ, P.E.
NEW YORK LICENSE # 071701

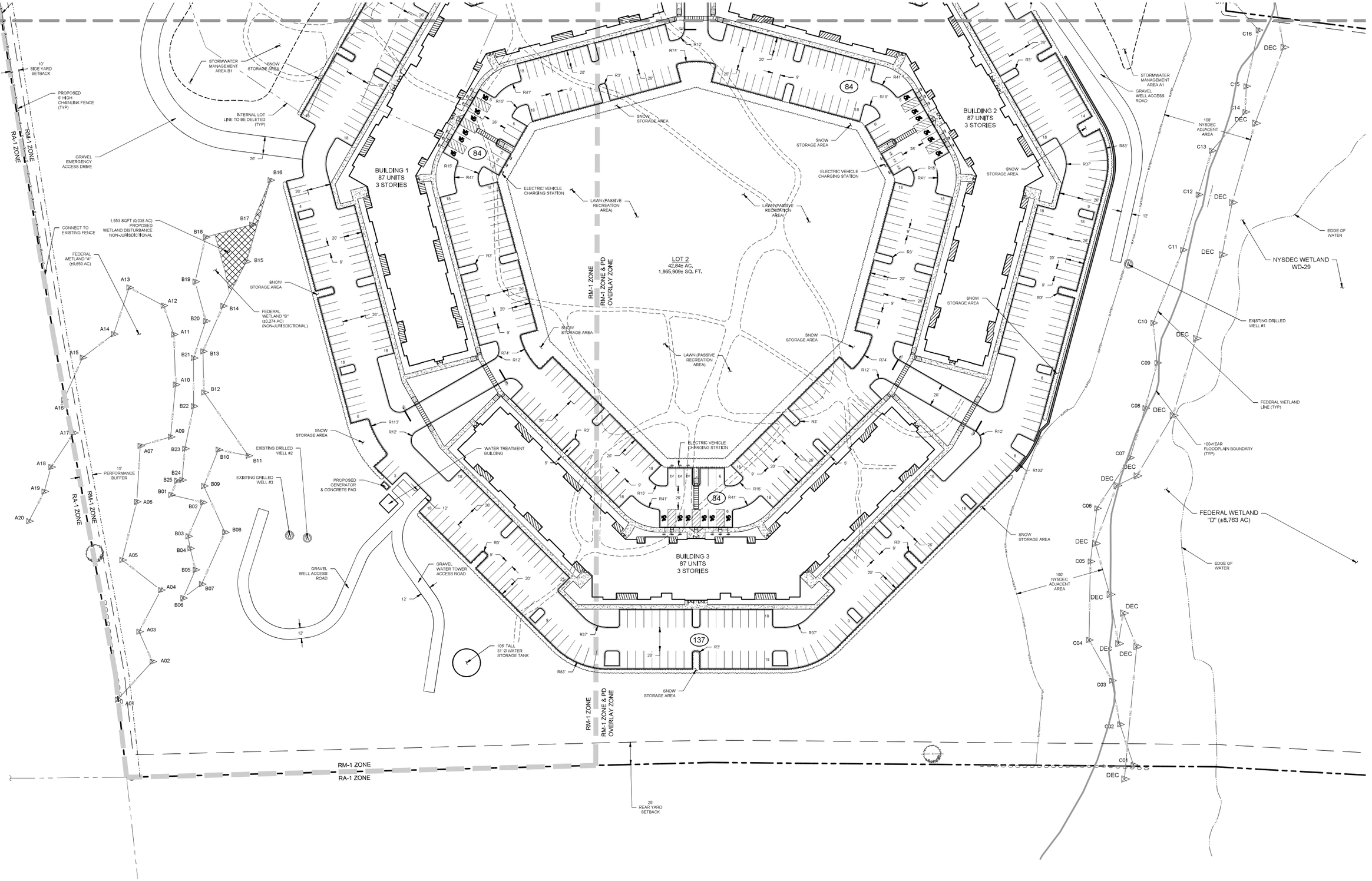
40 0 20 40 80
1 inch = 40 ft.

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs
MONTGOMERY OFFICE
71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-2727
WWW.EP-PC.COM

SITE PLAN

SHEFFIELD GARDENS
NYS ROUTE 17K
TOWN OF MONTGOMERY
ORANGE COUNTY, NEW YORK

JOB #:	DRAWN BY:	
103.0301	ZS	
DATE: 04/17/2023	SCALE: 1" = 40'	C-102
REVISION: 1 - 01/19/2024	TAX LOT: VARIOUS	



No.	DATE	DESCRIPTION
1	01/19/24	REVISED FOR DEIS SUBMISSION

DRAWING STATUS	ISSUE DATE: 01/19/2024		
THIS SHEET IS PART OF THE PLAN SET ISSUED FOR	SHEET NUMBER		
☐ CONCEPT APPROVAL	N/A	OF	N/A
☑ PLANNING BOARD APPROVAL	4	OF	21
☐ OCDOH REALTY SUBDIVISION APPROVAL	N/A	OF	N/A
☐ OCDOH WATERMAIN EXTENSION APPROVAL	N/A	OF	N/A
☐ NYSDEC APPROVAL	N/A	OF	N/A
☐ NYSDOT APPROVAL	N/A	OF	N/A
☐ OTHER: _____	N/A	OF	N/A
☐ FOR BID / ~~CONSTRUCTION~~	N/A	OF	N/A

THIS PLAN AND ALL THE INFORMATION CONTAINED HEREIN IS AUTHORIZED FOR USE BY WHOM THE SERVICES WERE CONTRACTED OR TO WHOM IT IS CERTIFIED, THIS DRAWING MAY NOT BE COPIED, REUSED, DISCLOSED, DISTRIBUTED OR RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF ENGINEERING & SURVEYING PROPERTIES, PC. THIS SHEET SHALL BE CONSIDERED INVALID UNLESS ACCOMPANIED BY ALL SHEETS OF THE DENOTED PLAN SET(S).

COPIES OF THIS DOCUMENT WITHOUT AN ACTUAL OR FACSIMILE OF THE ENGINEER'S SIGNATURE AND AN ORIGINAL STAMP IN RED OR BLUE INK SHALL BE CONSIDERED INVALID.

UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DOCUMENT BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS A VIOLATION OF SECTION 7209 SUBSECTION 2 OF THE NEW YORK STATE EDUCATION LAW.

ROSS WINGLOVITZ, P.E.
NEW YORK LICENSE # 071701

40 0 20 40 80
1 inch = 40 ft.

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs
MONTGOMERY OFFICE
71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
WWW.EP-PC.COM

SITE PLAN

SHEFFIELD GARDENS
NYS ROUTE 17K
TOWN OF MONTGOMERY
ORANGE COUNTY, NEW YORK

JOB #: 103.0301	DRAWN BY: ZS	C-103
DATE: 04/17/2023	SCALE: 1" = 40'	
REVISION: 1 - 01/19/2024	TAX LOT: VARIOUS	

Appendix C. SPDES Permit

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

State Pollutant Discharge Elimination System (SPDES) Application Form: Private, Commercial & Institutional (P/C/I) Discharge of Treated Sanitary Sewage

◉ New Application ○ Renewal Application ○ Modification Application

SPDES Number [ ] NY#######

DEC Authorization [ ] #-####-#####

Applicant/Owner Information

Type of Ownership: ◉ Corporate ○ Individual ○ Partnership ○ Public

Name: MILR, LLC

Taxpayer ID:

Mailing Address: PO Box 366

City: Walden | State: NY | Zip: 12586

Phone: | Email:

Contact/Agent Information

Name: Jason Pitingaro

Title: President

Mailing Address: 20 Industrial Drive

City: Middletown | State: NY | Zip: 10941

Phone: 845-703-8140 | Email: pitingaro@panddengineers.com

Facility Information

Facility Name: Sheffield Gardens

Nature of Business or Facility: Residential, Commercial

Population Served: 625

Street Address: NYS Route 17k

City: Montgomery | State: NY | Zip: 12549

Municipality: ◉ Town ○ Village ○ City

Municipality Name: Town of Montgomery

County: ORANGE

Additional Facility Location Information (if needed)

The facility is located in a combination of five parcels.

Tax Map Information — Section: 29 | Block: 1 | Lot: 5.1- 5.5

Certification: I hereby affirm under penalty of perjury that the information provided on this form and any attached supplemental forms is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to section 210.45 of the Penal Law.

Signature of Applicant/Owner | Printed Name: Gerald N. Jacobowitz | Title: member | Date: 5/7/24

Applicable discharge data on the following pages must be completed. Discharges from this facility are not authorized until this application form is attached to the permit signed and authorized by the New York State Department of Environmental Conservation or its designated agency.

Please Indicate Whether Your Facility 'Discharges To Groundwater', 'Discharges To Surface Water', or both.

☐ Discharges To Groundwater

☒ Discharges To Surface Water

SPDES Application for P/C/I Discharge of Treated Sanitary Sewage

Discharges To Groundwater - 1 of 1

Facility Name Sheffield Gardens

SPDES Number _____ **DEC Authorization** _____

To Add or Remove outfalls, click on the Green + or the Red X respectively. [+] [x]

Complete this page of the application if your facility has any discharges to groundwater. Use additional copies of this page to list additional groundwater outfalls. Sampling information is only required if the disposal system is designed to discharge, or discharges 30,000 GPD or more.

Outfall Information:

Outfall No. _____

Outfall Status ○ Proposed ○ Replacement ○ Existing ○ Expansion

Design Flow _____ Gal/Day

Outfall Location (if subsurface system, indicate center of disposal system area)

Latitude _____ ° _____ ' _____ "

Longitude _____ ° _____ ' _____ "

Treatment:

Standard On Site Treatment: Septic Tanks with:		Alternative On Site Treatment: Septic Tanks with:	
☐ Absorption Trenches	☐ Cut and Fill Systems	☐ Absorption Trenches Using An Alternative Aggregate	☐ Single-Pass Sand Filters & Pressurized Shallow Narrow Drainfields
☐ Shallow Absorption Trenches	☐ Raised Systems	☐ Shallow Absorption Trenches Using An Alternate Aggregate	☐ Mound Systems
☐ Absorption Beds	☐ Seepage Pits	☐ Absorption Beds Using An Alternate Aggregate	☐ Drip Dispersal or Other Low Profile Dispersal System

☐ Other (describe) _____

Frequency of Discharge Months/Year _____ Days/Week _____

Name of Nearest Surface Waters	Distance	Soil Type	Depth To Water Table
_____	_____ Ft.	_____	_____ Ft.

SPDES Application for P/C/I Discharge of Treated Sanitary Sewage

Discharges to Groundwater

Facility Name Sheffield Gardens

SPDES Number _____ **DEC Authorization** _____

Outfall No. _____

Sampling Information

Include the following sampling information if the disposal system is designed to discharge, or discharges, 30,000 GPD or more. Please indicate whether the values listed are from sampling results (include the date), estimated from the treatment system design as installed, or estimated from the proposed treatment system design.

Plant Design Pollutant Information	Influent		Effluent		Number of Samples or Source of Estimate
	mg/l	lbs/day	mg/l	lbs/day	
BOD5					
Percent removal, BOD5					
pH, Range					
Nitrate, as N					
Nitrite, as N					
Ammonia, as N					
Nitrogen, Total, as N					
Phosphorus, Total, as P					
Total Residual Chlorine, if used					
Solids, Total Dissolved (Nassau/Suffolk only)					

SPDES Application for P/C/I Discharge of Treated Sanitary Sewage

Discharges To Surfacewater - 1 of 1

Facility Name Sheffield Gardens

SPDES Number _____ **DEC Authorization** _____

To Add or Remove outfalls, click on the Green + or the Red X respectively. + x

Complete this page of the application if your facility has any discharges to surface water. Complete this form for each surface water outfall.

Discharge Data

Outfall No. 001

Outfall Status (●) Proposed ( ) Replacement ( ) Existing ( ) Expansion

Design Flow 58,000 Gal/Day

Outfall Location (end of pipe or conveyance)

Latitude 41 o 31 ' 29.7 "

Longitude 74 o 12 ' 34.9 "

Type of Treatment

MBR treatment with Nitrogen and Phosphorus removal utilizing an anoxic tank, MBR tanks, UV disinfection, and discharge.

Frequency of Discharge Months/Year 12 Days/Week 7

Name of Receiving Water	Classification	Water Index Number
MINOR TRIBS TO MIDDLE WALLKILL	C	H-139-13-20 thru 53

SPDES Application for P/C/I Discharge of Treated Sanitary Sewage

Discharges to Surface Water

Facility Name Sheffield Gardens

SPDES Number _____ **DEC Authorization** _____

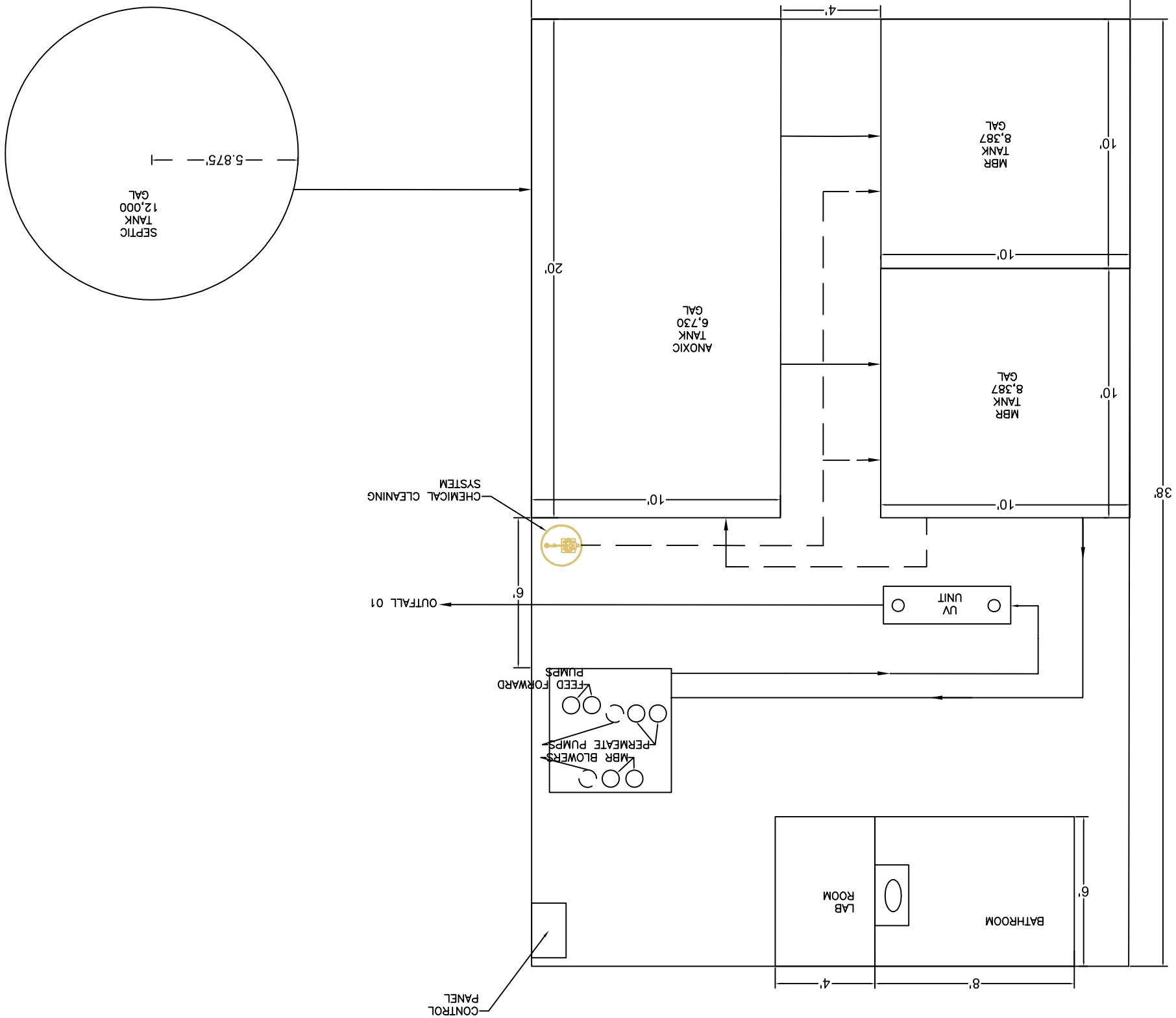
Outfall No. 001

Sampling Information

Include the following sampling information. Please indicate whether the values listed are from sampling results (include the date), estimated from the treatment system design as installed, or estimated from the proposed treatment system design.

Plant Design Pollutant Information	Influent		Effluent		Number of Samples or Source of Estimate
	mg/l	lbs/day	mg/l	lbs/day	
BOD5	250		<5		MBR design estimated
Suspended solids	250		<10		MBR design estimated
Percent removal, BOD/TSS	/		98/96		MBR design estimated
pH, Range	/		/		
Settleable solids, ml/l	/		/		
Solids, total dissolved	/		/		
Dissolved oxygen	/		/		
Ammonia, as N	/		/		
Nitrogen, Total, as N	/		<10		MBR design estimated
Phosphorus, Total, as P	8		<1		MBR design estimated
Fecal Coliform, MPN	/		/		
Total Residual Chlorine (if used)	/		/		
Temperature, Degrees F, Summer	/		/		
Temperature, Degrees F, Winter	/		/		

Appendix D. WWTP Layout



WWTP LAYOUT

EACH SHEET IS INCOMPLETE OR INVALID UNLESS ACCOMPANIED BY ALL THE SHEETS IN THE SET.

IT IS A VIOLATION OF NYS EDUCATION LAW SECTION 7209 FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR, OR ARCHITECT TO ALTER AN ITEM BEARING THE STAMP OR SEAL OF A LICENSED PROFESSIONAL IN ANY WAY. IF AN ITEM IS ALTERED, THE ALTERING ENGINEER, LAND SURVEYOR, OR ARCHITECT SHALL AFFIX TO THE ITEM THEIR STAMP OR SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

WWTP LAYOUT
FOR
SHEFFIELD GARDENS
TOWN OF MONTGOMERY
ORANGE COUNTY, NEW YORK

CONTRACT NO. **230014**

SHEET NO. **1 OF 1**

SHEET NO. 1 OF 1
SCALE: AS SHOWN
DATE: 12/22/2023
JOB NO.: 230014
DRAWN BY: LL
DRAWING NAME: WWTP LAYOUT

FOR BID & CONSTRUCTION
FOR REVIEW & COMMENT
FOR APPROVAL
AS-BUILT

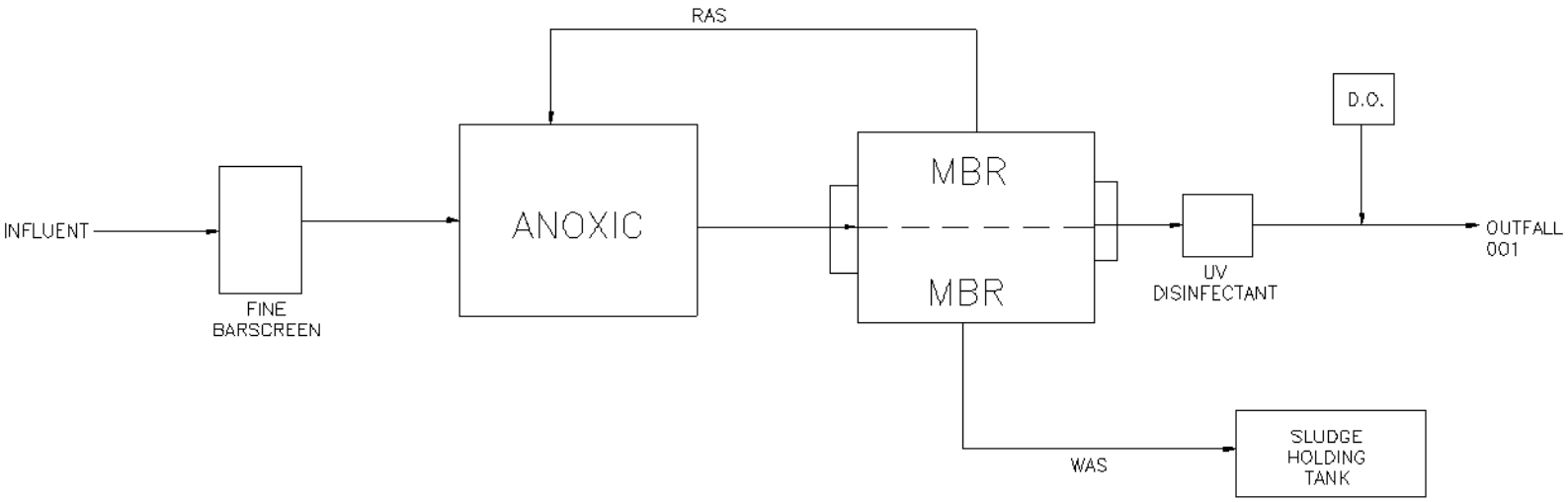
Each sheet is incomplete or invalid unless accompanied by all the sheets in the set.

It is a violation of NYS Education Law Section 7209 for any person, unless they are acting under the direction of a licensed professional engineer, land surveyor, or architect to alter an item bearing the stamp or seal of a licensed professional engineer, land surveyor, or architect. If an item is altered, the altering engineer, land surveyor, or architect shall affix to the item their stamp or seal and the notation "altered by" followed by their signature, the date of such alteration, and a specific description of the alteration.

BY:	REVISION:	DATE:

PITINGARO & DOETSCH
CONSULTING ENGINEERS, P.C.
15 INDUSTRIAL DRIVE
SUITE 2
MIDDLETOWN, NEW YORK 10941
PH: 845 703-8140
FAX: 845 703-8143
INFO@PANDDENGINEERS.COM
WWW.PANDDENGINEERS.COM

Appendix E. Flow Diagram of Treatment Process


RAS
D.O.
INFLUENT
FINE
BARSCREEN
ANOXIC
MBR
MBR
UV
DISINFECTANT
OUTFALL
001
WAS
SLUDGE
HOLDING
TANK

Appendix F. MBR Equipment Information

Name	Type	Anticipated Size	Quantity
Headworks Zone Equipment			
Fine Screen	Internally Fed Drum	100 gpm	1
Anoxic Zone Equipment			
Anoxic Mixer	Submersible	12,000 gal	2
Level Switch	Float	-	2 (1 HL + 1LL)
Level Transmitter	Hydrostatic	-	1
Membrane Equipment			
Submerged Membrane Unit	Flat Plate, 304 stainless steel housing	SP225	4
Guide Set	Kubota	-	4 sets
Level Switch	Float	-	2 LL
MBR Blower	Positive Displacement	175 scfm 6.7 psig	2 duty + 1 common standby
Air Flow Meter	Mass Air Flow, Insertion style	-	2
Permeate Pump	Self-Priming Centrifugal	50 gpm	2 duty + 1 standby
Permeate Flow Meter	Electromagnetic	2-inch	2
Permeate Turbidity Meter	Optical Meter and Transmitter	-	1
Permeate Pressure Transmitter	Diaphragm	-	1
WAS Pump	Self-Priming Centrifugal	20 gpm	1 duty
WAS Pump Flow Meter	Electromagnetic	1-inch	1
Feed Forward Equipment			
FF Pump	Submersible	150 gpm	1 duty + 1 standby
FF Pump Flow Meter	Electromagnetic	3-inch	1
Other Equipment			
Alum Addition System	Dosing Pump, Calibration Column, Injection Quill	-	1 system
CIP System	Chemical Injection System	-	1 system
Control Panel, HMI, SCADA	MBR Control Panel	-	1
Process Tanks	Precast Concrete	10' X 20' X 12'	2

Appendix F. Major Equipment and Instrumentation of MBR Treatment