AUTHORIZATION TO OPERATE AND DISCHARGE UNDER THE LAWS OF THE STATE OF DELAWARE

PERMITTEE: Artesian Wastewater Management, Inc. (AWMI)
664 Churchmans Road
Newark, DE 19702

FACILITY: Sussex Regional Recharge Facility (SRRF) *formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF)*

1. The Delaware Department of Natural Resources and Environmental Control (the Department or DNREC) issues this Operations Permit Amendment (Permit No. 359288-02) to Artesian Wastewater Management, Inc. (the Permittee or AWMI) pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations).

2. The Department's purpose in issuing this Operations Permit Amendment, and in imposing the conditions and requirements specified herein, is to ensure that all systems and discharges at the Sussex Regional Recharge Facility (SRRF) are operated and maintained so as not to create a public health hazard or cause water pollution. It is the responsibility of the Permittee to comply with the terms and conditions of this Permit. Effluent limitations, monitoring requirements, and other conditions are set forth herein.

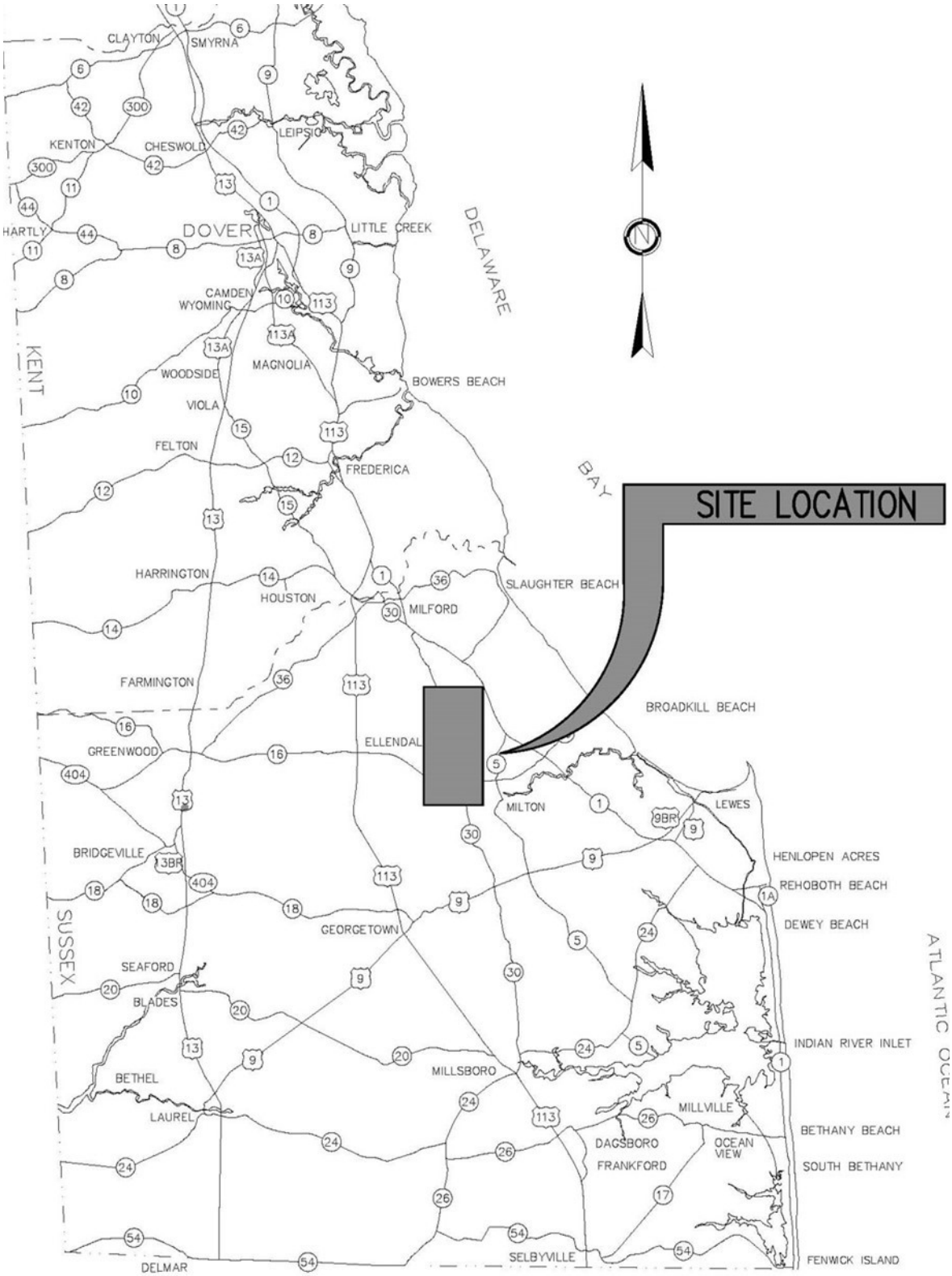
3. The Sussex Regional Recharge Facility is located on Sussex County Tax Map/Parcel Number: 2-35 6.00 28.09 along Route 30 approximately 4,000-ft north of the intersection of Route 16 and Route 30. The Sussex County Tax Map/Parcel Numbers for authorized discharged sites are listed in Part I.A of this Permit.

John Rebar Jr. 04/02/2024

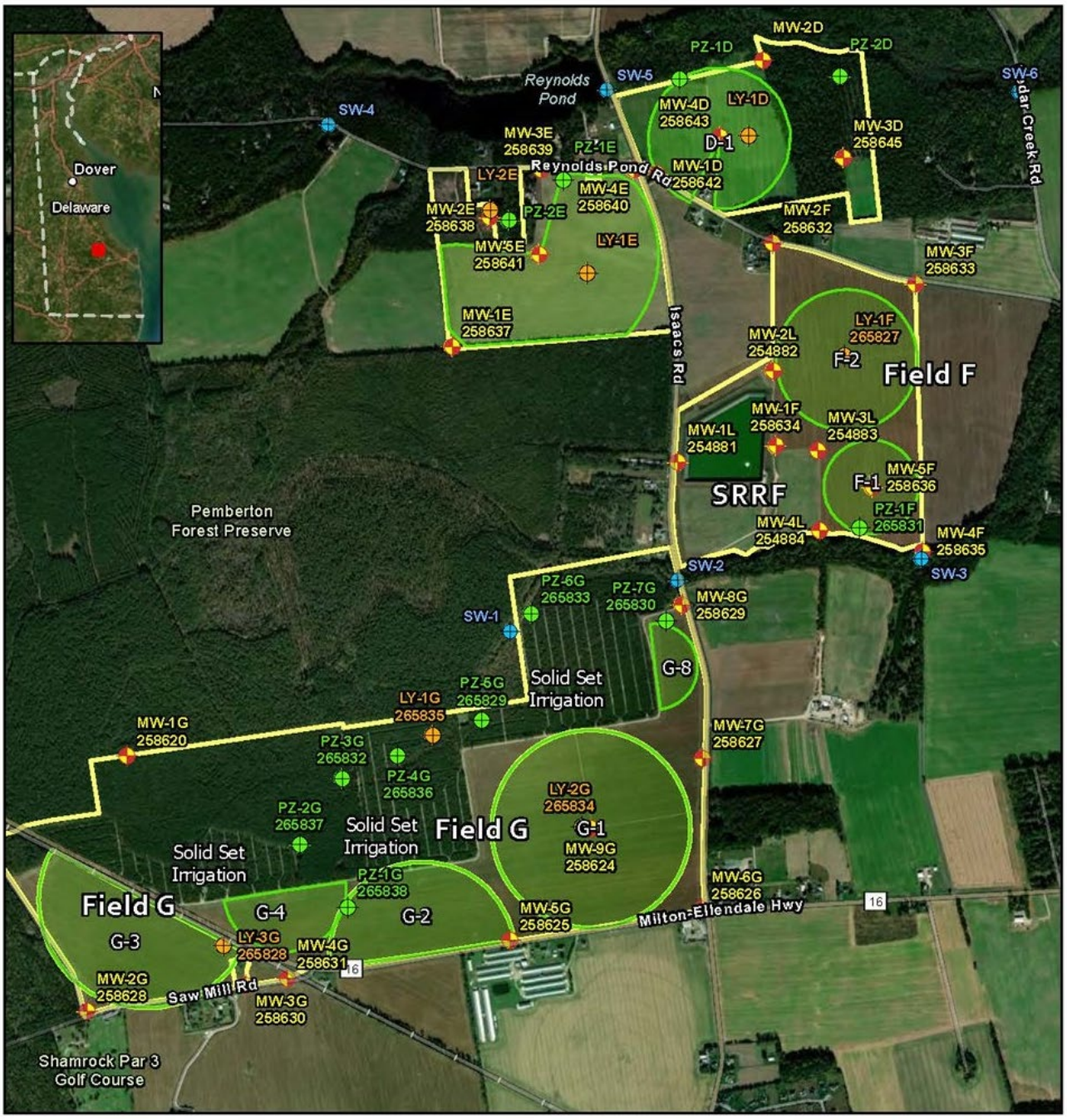
John J. Rebar, Jr.
Environmental Program Manager II
Division of Water
Delaware Department of Natural Resources
and Environmental Control

Date Signed

LOCATION MAP



SITE MAP



Legend

- Groundwater Monitoring Wells
- Lysimeters
- Piezometers
- Surface Water Monitoring
- Irrigation Pivots at SRRF

N
W
E
S

0 500 1,000 2,000 3,000 4,000 Feet

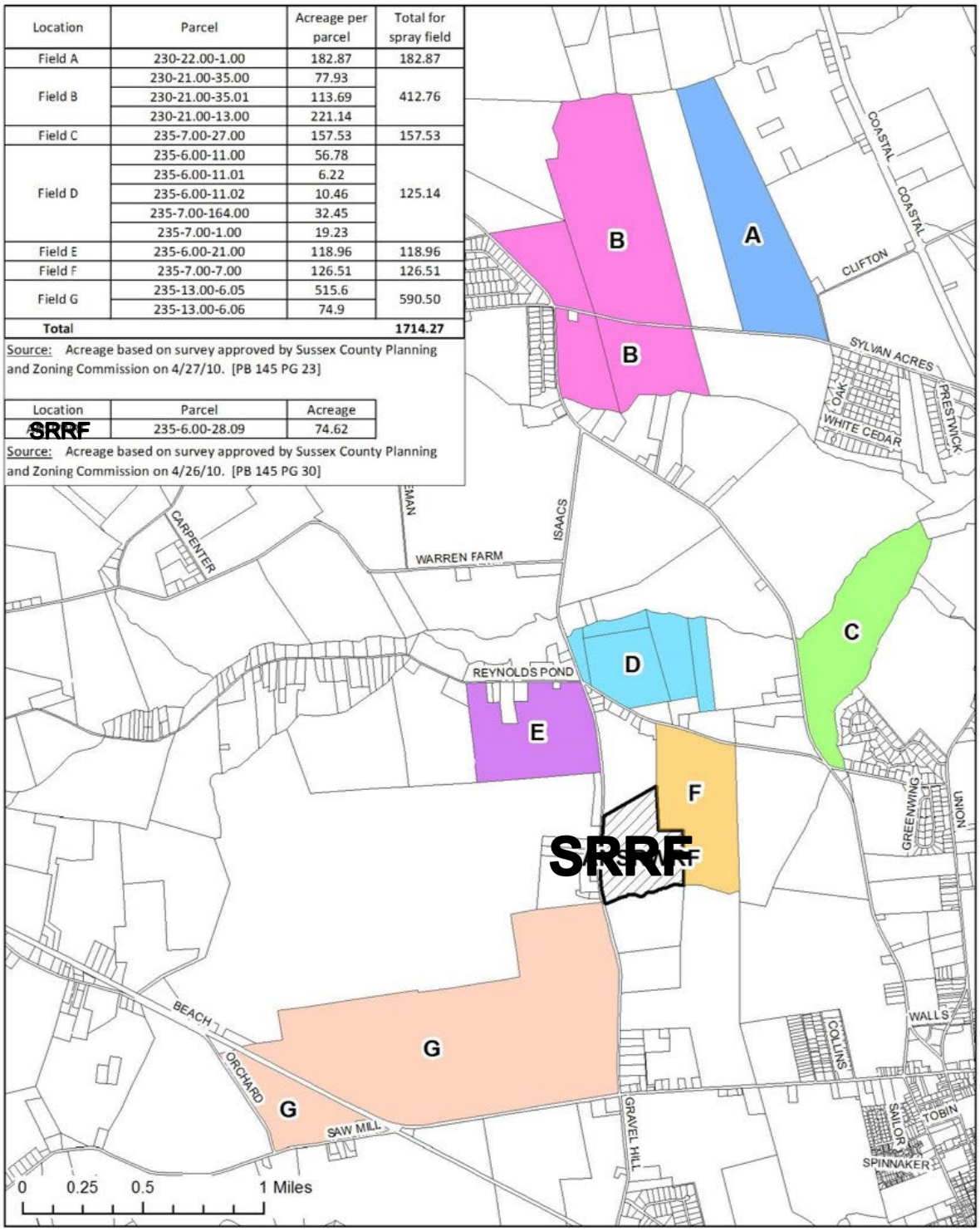
SPRAY FIELDS

Location	Parcel	Acreage per parcel	Total for spray field
Field A	230-22.00-1.00	182.87	182.87
Field B	230-21.00-35.00	77.93	412.76
	230-21.00-35.01	113.69	
	230-21.00-13.00	221.14	
Field C	235-7.00-27.00	157.53	157.53
Field D	235-6.00-11.00	56.78	125.14
	235-6.00-11.01	6.22	
	235-6.00-11.02	10.46	
	235-7.00-164.00	32.45	
	235-7.00-1.00	19.23	
Field E	235-6.00-21.00	118.96	118.96
Field F	235-7.00-7.00	126.51	126.51
Field G	235-13.00-6.05	515.6	590.50
	235-13.00-6.06	74.9	
Total			**1714.27**

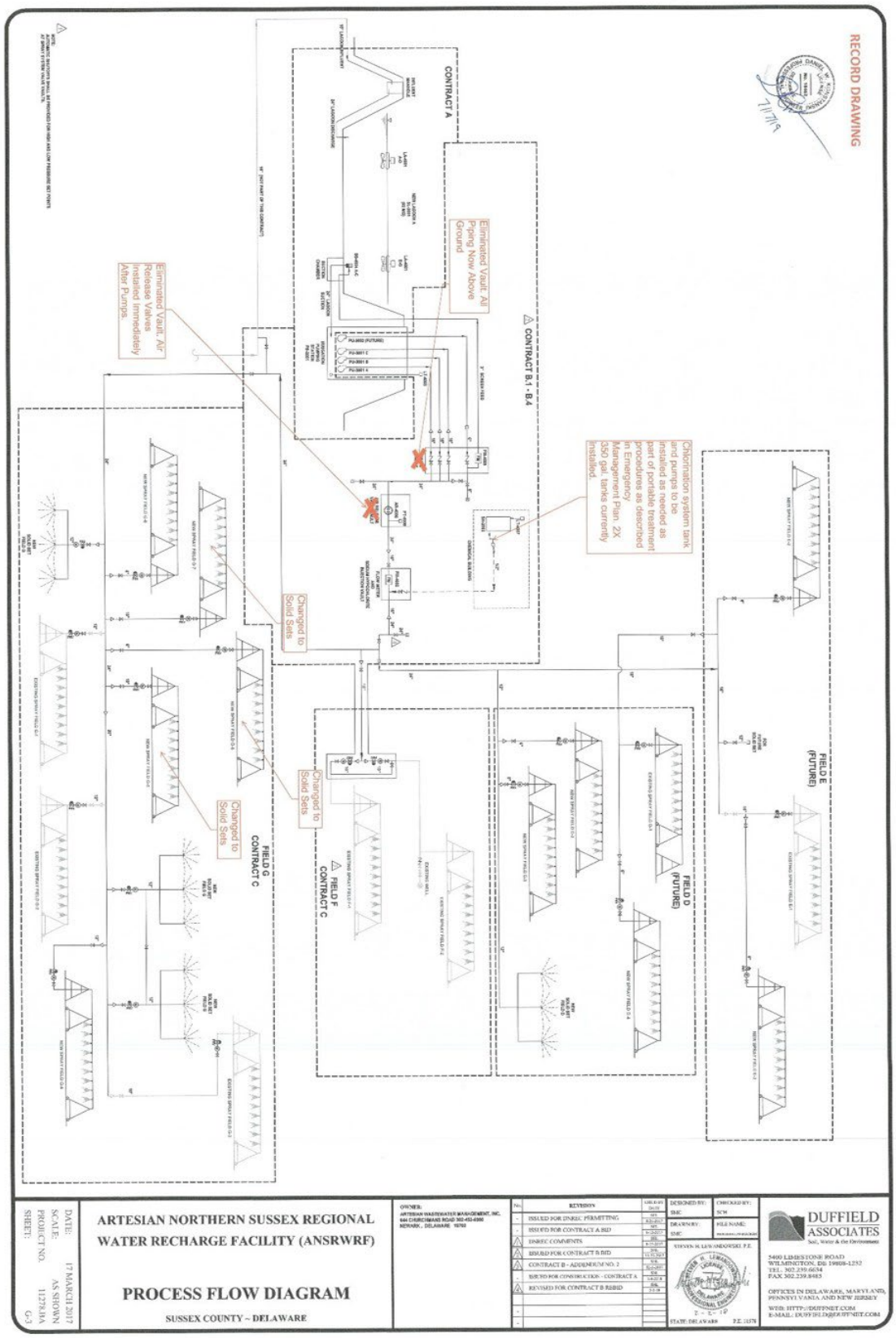
Source: Acreage based on survey approved by Sussex County Planning and Zoning Commission on 4/27/10. [PB 145 PG 23]

Location	Parcel	Acreage
SRRF	235-6.00-28.09	74.62

Source: Acreage based on survey approved by Sussex County Planning and Zoning Commission on 4/26/10. [PB 145 PG 30]



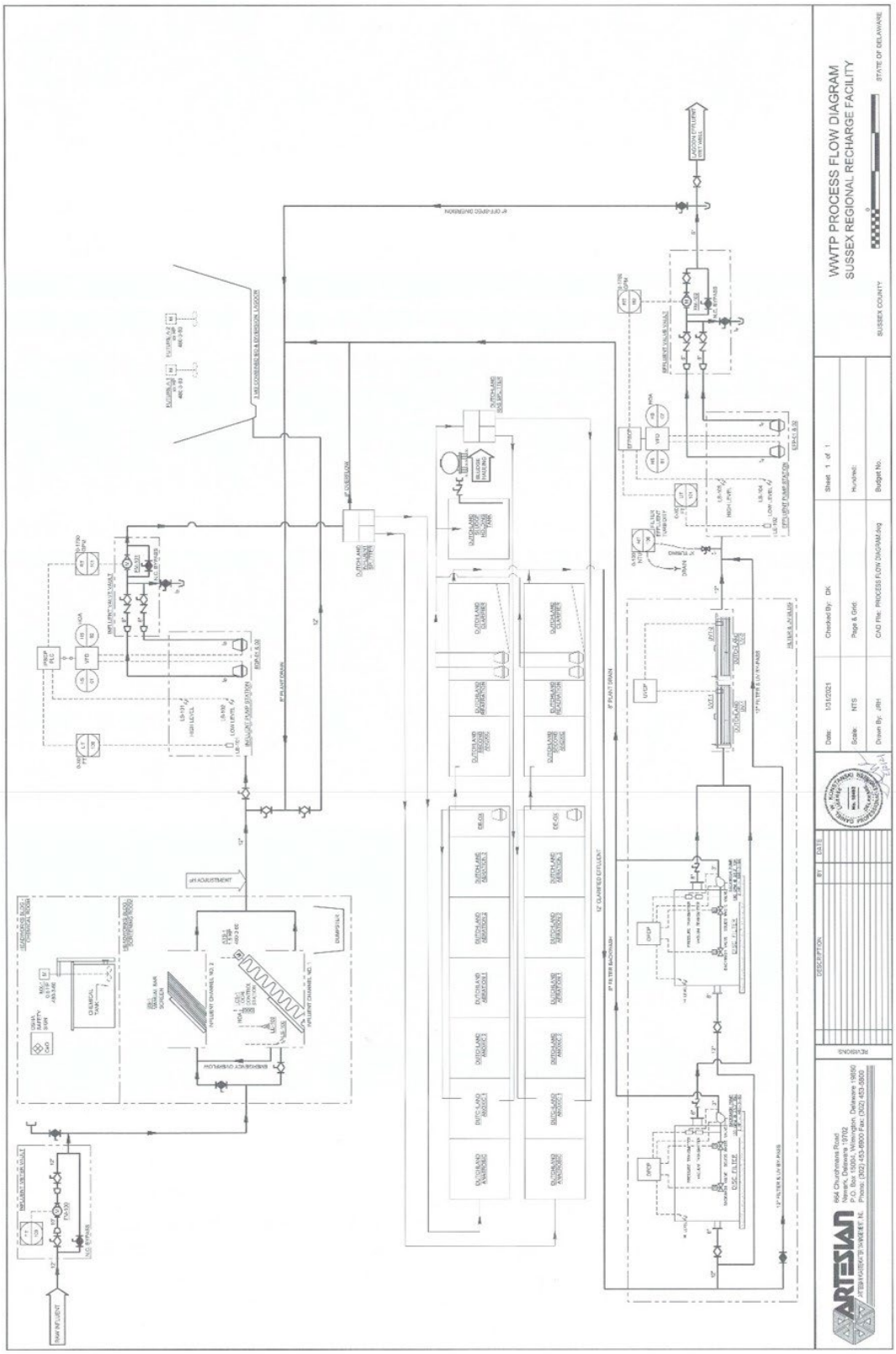
PROCESS FLOW DIAGRAM PHASE 1 [taken from 2019.07.17 Drawings G-3 and G-4]



LAGOON VOLUMES [taken from 2019.07.17 Drawings G-3 and G-4]

Contour Elevation	Contour Area (sq.ft.)	Avg. End Area Cumulative Volume (cu. Ft.)	Gallons (MG)
26	69,330	0	0.0
26.5	474,857	136,047	1.0
27	678,297	424,335	3.2
28	686,689	1,106,829	8.3
29	695,129	1,797,738	13.4
30	703,618	2,497,112	18.7
31	712,155	3,204,998	24.0
32	720,741	3,921,446	29.3
33	729,374	4,646,504	34.8
34	738,057	5,380,219	40.2
35	746,787	6,122,641	45.8
36	755,566	6,873,818	51.4
37	764,386	7,633,793	57.1
38	773,245	8,402,609	62.9
39	782,142	9,180,303	68.7
40	791,078	9,966,913	74.6
41	800,051	10,762,477	80.5
42	809,063	11,567,034	86.5
43	818,115	12,380,623	92.6
44	827,206	13,203,284	98.8
45	836,337	14,035,055	105.0
46	845,508	14,875,978	111.3

PROCESS FLOW DIAGRAM PHASE 2 [SRRF Wastewater Treatment System]



PART I

A. DESCRIPTION OF OPERATIONS AND DISCHARGES

Pursuant to the provisions of 7 Del. C. §6003 and 7 Del. Admin. C. §7101 *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems* (the Regulations), Artesian Wastewater Management, Inc. (the Permittee or AWMI) is authorized to operate and maintain the Sussex Regional Recharge Facility (SRRF), formerly known as the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF), to serve as a regional on-site wastewater treatment and disposal system (OWTDS) meeting the existing and future wastewater treatment and disposal needs of AWMI's service territories in Sussex County, Delaware. Operations are divided into multiple Phases.

Phase 1

SRRF is currently authorized to receive treated poultry processing wastewater (treated effluent) from the Allen Harim Foods Harbeson Processing Facility's wastewater treatment system. The poultry processing facility's wastewater treatment system is owned by Allen Harim Foods, LLC and operated in accordance with State Permit No. 597261-01 (and as amended). The average daily flow of treated effluent received at SRRF is 1.5 million gallons per day (MGD) with a peak flow of 2.0 MGD. Treated effluent is stored (at SRRF) in a synthetically lined lagoon prior to being discharged via spray irrigation to approximately 1,714 acres of agricultural fields located in Sussex County, Delaware (see AWMI's Phase 1 process flow diagram on Page 5).

Treated effluent is authorized to be discharged (via spray irrigation) to Fields D, E, F, and G; however, as of the date of this Permit, only Fields F and G have been constructed and only Fields F and G are permitted for use. Fields D and E will be permitted for use upon completion of the Schedule of Compliance requirements iterated in Part I.F.1 of this Permit and upon written approval from DNREC.

Phase 2

Upon completion of a proposed advanced wastewater treatment system (see AWMI's Phase 2 process flow diagram on Page 7) authorized by Construction Permit No. 359288-03, and upon receiving written approval from the Department, SRRF will be authorized to receive and treat wastewater from within AWMI's service territories in Sussex County, Delaware. The wastewater treatment system will include a 3.0 million gallon (MG) combined equalization and off-spec water diversion lagoon, a headworks system consisting of screening and grit removal, an influent lift station, a Hybrid Bardenpho treatment process, two cloth media filters, a UV system for disinfection, and an effluent lift station to pump treated effluent to the existing 90 MG storage lagoon constructed as part of Phase 1. Treated wastewater from the SRRF treatment system will be mixed with the treated effluent from Allen Harim's treatment system within the existing 90 MG storage lagoon and discharged (via spray irrigation) to the agricultural fields previously permitted under Phase 1 (see Spray Fields on Page 4).

SRRF is located on Sussex County Parcel Number: 2-35 6.00 28.09; on a 75-acre site south of Reynolds Pond Road, east of Route 30, north of Ingram Branch and Route 16, and west of Cedar Creek Road, Sussex County, Delaware.

Treated effluent is discharged via spray irrigation of privately owned agricultural land, under a lease held in perpetuity by AWMI as the wastewater utility provider. The spray fields have been permanently placed in an Agricultural Preservation Easement by the Delaware Agricultural Lands Preservation Foundation. Spray Fields are listed below.

Phase 1 and 2 Spray Fields include Fields F and G [taken from 2019.07.17 Drawing 29]

Field	Tax Map ID	Gross Area (acres)	Crop Spray Area (acres)	Woods Spray Area (acres)	Total Spray Area (acres)
A[1]	230-22.00-1.00	182.9	116.3	34.1	150.4
B[1]	230-21.00-13.00 230-21.00-35.00 230-21.00-35.01	412.8	214.1	86.3	300.4
C[1]	235-7.00-27.00	157.5	37.0	38.2	75.2
D[2,3]	235-6.00-11.00 235-6.00-11.01 235-6.00-11.02 235-7.00-1.00 235-7.00-164.00	125.1	58.0	32.7	90.7
E[2,4]	235-6.00-21.00	119.0	90.5	0	90.5
F	235-7.00-7.00	126.5	110.5	0	110.5
G	235-13.00-6.05 235-13.00-6.06	590.5	276.1	200.5	476.5
Total		1,714.27	902.5	391.8	1294.19

1) Spray areas based on preliminary design for Design Development Report dated June 19, 2009. These will be designed and permitted during a future phase.
2) Fields D and E have not yet been constructed.
3) One parcel from Field D (2-35-6-11.01) is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2017. Spray will not commence on this parcel until it has been added to an approved Conditional Use.
4) There is a wooded region in Field E of approximately 10 acres which is not included in the existing design, but may be utilized in future phases.

B. DOCUMENTATION

The application consists of the materials submitted by the Permittee and materials contained in the administrative record prior to the issuance of this Permit. This includes documents associated with both Phase 1 and Phase 2 construction and operation of SRRF (previously known as ANSRWRF).

Phase 1

1. March 12, 2013, Secretary's Order No. 2012-W-0052
2. May 5, 2017, Application Package for an amended Construction Permit for the Artesian Northern Sussex Regional Water Recharge Facility (ANSRWRF) Phase 1 submitted by AWMI
3. Application Package includes Application Form, Amended Design Development Report (DDR), Drawings and Specifications
4. August 18, 2017, Amended DDR Addendum 1 submitted by AWMI providing requested additional information
5. June 12, 2018, Amended DDR Addendum 2 submitted by AWMI providing a revised drawing of surface water monitoring locations
6. November 2, 2017, Secretary's Order No. 2017-W-0029
7. August 17, 2018, Application for a Construction Permit Extension

8. July 17, 2019, Spray Irrigation Permit Application
9. July 17, 2019, Operation and Maintenance Plan
10. December 9, 2021, AWMI Comment Letter

Phase 2

1. February 8, 2021, Application
2. February 4, 2021, (inadvertently dated 2020) AWMI letter providing resubmittal and addressing comments outlined in DNREC-GWDS's November 30, 2020 letter
3. February 4, 2021, Application Form for an Amended Operations Permit
4. February 3, 2021, Application Form for a Construction Permit
5. February 4, 2021, (inadvertently dated 2020) Artesian letter providing Applications
6. February 2021, Design Engineer Report - Sussex Regional Recharge Facility (SRRF) - Phase 2 prepared by Artesian Resources Corp. for Artesian Wastewater Management, Inc.
7. May 3, 2023, revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2

C. INFLUENT LIMITATIONS

1. Phase 1: The influent received by SRRF from Allen Harim Foods, LLC (Allen Harim) shall not exceed an average daily flow of 1.5 MGD nor a peak daily flow of 2.0 MGD in any calendar month.

   Design Capacity to be received from Allen Harim: 1.5 MGD average daily flow.
   [calculated as Total Monthly Volume divided by number of days in month]

   Peak daily flow from Allen Harim not to exceed: 2.0 MGD.

2. Phase 2: The influent received by SRRF wastewater treatment system shall not exceed an average daily flow of 0.625 MGD nor a peak daily flow of 1.25 MGD in any calendar month.

   Design Treatment Capacity: 0.625 MGD.
   [calculated as Total Monthly Volume divided by number of days in month]

   Peak Daily Treatment Capacity: 1.25 MGD.

3. Combined capacity upon completion of Phase 2: The Phase 2 combined influent received by SRRF shall not exceed an average daily flow of 2.125 MGD nor a peak daily flow of 3.25 MGD in any calendar month.

   Combined Phase 1 and Phase 2 Capacity Average Daily Flow: 2.125 MGD.
   [calculated as Total Monthly Volume divided by number of days in month]

   Combined Phase 1 and Phase 2 Peak Daily Flow: 3.25 MGD.

D. SPRAYED EFFLUENT LIMITATIONS

During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to the spray irrigation Fields F and G as identified on Page 9, in Part I.A, and depicted on Pages 3 and 4 of this Permit in the quantity and quality of treated effluent specified below and in accordance with the design documents listed in Part I.B of this Permit.

1. The monthly quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the monthly, nor the annual, application rates and total volumes calculated by the Permittee to not cause the groundwater to exceed the drinking water standard for Nitrate (as Nitrogen) within the percolate as provided in the revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2 dated May 3, 2023.

Phase 1: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G
Design Disposal Capacity: 2.49 MGD
[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G
Design Disposal Capacity: 3.18 MGD
[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 1														
Crop Rotation (Cover-Corn-Wheat)														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G - Crop	MG/month	16.6	16.1	17.5	14.4	54.8	53.0	54.8	54.8	6.7	11.0	16.8	19.2	335.65
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.21	0.33	0.52	0.58	-
Field F - Crop	MG/month	6.6	6.5	7.0	5.8	21.9	21.2	21.9	21.9	2.6	4.4	6.7	7.7	134.28
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.20	0.33	0.52	0.58	-
Field D - Crop	MG/month	3.2	3.2	3.4	2.8	10.7	10.4	10.7	10.7	1.3	2.1	3.3	3.8	65.66
	in/week	0.50	0.54	0.53	0.45	1.65	1.65	1.65	1.65	0.20	0.33	0.52	0.58	-
Field E -Crop	MG/month	4.8	4.6	5.0	4.1	16.1	17.4	18.0	18.0	1.9	3.2	4.8	5.5	103.28
	in/week	0.44	0.47	0.46	0.39	1.48	1.65	1.65	1.65	0.18	0.29	0.46	0.51	-

Crop Rotation (Wheat-Soybean-Cover)														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G -Crop	MG/month	17.4	20.8	42.7	53.0	54.8	3.9	50.9	54.8	53.0	38.1	11.2	17.6	418.28
	in/week	0.52	0.69	1.29	1.65	1.65	0.12	1.53	1.65	1.65	1.15	0.35	0.53	-
Field F -Crop	MG/month	6.9	8.4	17.1	21.2	21.9	3.6	20.3	21.9	21.2	15.1	4.5	7.0	169.28
	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field D - Crop	MG/month	3.4	4.1	8.4	10.3	10.7	1.8	9.9	10.7	10.4	7.4	2.2	3.4	82.77
	in/week	0.52	0.70	1.29	1.65	1.65	0.28	1.53	1.65	1.65	1.14	0.35	0.53	-
Field E -Crop	MG/month	5.0	6.0	12.3	17.3	15.7	1.2	14.6	18.0	17.4	10.9	3.2	5.1	126.56
	in/week	0.46	0.61	1.13	1.65	1.45	0.11	1.34	1.65	1.65	1.00	0.31	0.46	-
Field G Woods														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G -Woods	MG/month	24.9	18.9	24.0	24.5	26.5	37.8	39.8	39.8	38.5	39.8	33.9	31.3	379.74
	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-
Field D Woods														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field D -Woods	MG/month	4.0	3.1	3.9	4.0	4.3	6.2	6.5	6.5	6.3	6.5	5.5	5.1	61.91
	in/week	1.03	0.87	1.00	1.05	1.10	1.62	1.65	1.65	1.65	1.65	1.45	1.30	-

Phase 2: Effluent Discharge Limitations and Design Disposal Capacity

Fields F and G
Design Disposal Capacity: 2.92 MGD
[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

Fields D, E, F, and G
Design Disposal Capacity: 3.75 MGD
[Calculated as the average of the two annual design disposal capacities for the two-year crop rotation cycle]

The monthly and annual quantity of effluent discharged from SRRF to the spray fields or wooded areas shall not exceed the following application rate limitations (inches/acre-week) on any pivot or zone; and shall not exceed the following application rate limitations (MG/month and MG/year) on the combined pivot/zones within the specified field.

Effluent Volume Limit - Phase 2														
Crop Rotation (Cover-Corn-Wheat)														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G - Crop	MG/month	24.59	23.83	25.93	21.27	54.78	53.01	54.78	54.78	9.86	16.32	24.78	28.43	392.33
	in/week	0.74	0.79	0.78	0.66	1.65	1.65	1.65	1.65	0.31	0.49	0.77	0.86	-
Field F - Crop	MG/month	9.8	9.6	10.4	8.5	21.9	21.2	21.9	21.9	3.9	6.5	9.9	11.3	156.82
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field D - Crop	MG/month	4.8	4.7	5.1	4.1	10.7	10.4	10.7	10.7	1.9	3.2	4.8	5.5	76.68
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-
Field E -Crop	MG/month	8.1	7.9	8.5	6.9	18.0	17.4	18.0	18.0	3.2	5.3	8.1	9.2	128.43
	in/week	0.74	0.80	0.78	0.66	1.65	1.65	1.65	1.65	0.30	0.49	0.77	0.85	-

Crop Rotation (Wheat-Soybean-Cover)														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G -Crop	MG/month	25.8	30.8	54.8	53.0	54.8	4.8	54.8	54.8	53.0	54.8	16.6	26.1	484.01
	in/week	0.78	1.03	1.65	1.65	1.65	0.15	1.65	1.65	1.65	1.65	0.52	0.79	-
Field F -Crop	MG/month	10.4	12.0	21.9	21.2	21.9	3.6	21.9	21.9	21.2	21.9	6.7	10.5	195.12
	in/week	0.78	1.00	1.65	1.65	1.65	0.28	1.65	1.65	1.65	1.65	0.52	0.79	-
Field D - Crop	MG/month	5.1	5.9	10.7	10.3	10.7	1.8	10.7	10.7	10.4	10.7	3.3	5.1	95.34
	in/week	0.78	1.00	1.65	1.65	1.65	0.28	1.65	1.65	1.65	1.65	0.52	0.78	-
Field E -Crop	MG/month	8.4	9.8	18.0	17.3	18.0	2.9	18.0	18.0	17.4	18.0	5.5	8.5	159.58
	in/week	0.77	1.00	1.65	1.65	1.65	0.28	1.65	1.65	1.65	1.65	0.52	0.78	-
Field G Woods														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field G -Woods	MG/month	36.9	27.9	35.6	36.3	39.3	38.5	39.8	39.8	38.5	39.8	38.5	39.8	450.48
	in/week	1.53	1.28	1.47	1.55	1.63	1.65	1.65	1.65	1.65	1.65	1.65	1.65	-
Field D Woods														
Field	**Units**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**SUM**
Field D -Woods	MG/month	6.0	4.6	5.8	5.9	6.4	6.3	6.5	6.5	6.3	6.5	6.3	6.5	73.41
	in/week	1.52	1.29	1.48	1.55	1.62	1.65	1.65	1.65	1.65	1.65	1.65	1.65	-

2. The total amount of Phosphorus that may be applied to the crop areas in Fields D, F, and G shall not exceed crop uptake needs of 31.2 lbs/acre per year. This amount includes supplemental fertilizers (when approved by the Department), the phosphorus supplied from the effluent, and any other source. The wooded areas in Fields D and G, as well as all of Field E, do not have high phosphorus, and are thus exempt from these criteria. [February 2021 SRRF Phase 2 Design Engineer Report, Appendix C.2]

   Adjustments and reductions are not to be factored into the annual reporting of Total Phosphorus Loading for demonstration of compliance with this limitation.

   If any crops are not removed from the spray irrigation fields, then the Total Phosphorus application rate for the field shall be reduced by the amount of phosphorus that would be removed by harvesting the crop.

3. The monthly quantity of effluent discharged may not exceed hydraulic loading assimilative capabilities of the fields.

4. The weekly quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 1.65 inches per acre during any 7-day rolling period.

   If the Permittee wishes to pursue an increase in the application rate, the Permittee shall provide appropriate supporting design analysis in consultation with Department technical staff for consideration and written approval. A request for an increased application rate may require an Application for an Operations Permit Amendment, applicable Department fees and public advertisement.

5. The quantity of effluent discharged to any portion of the spray irrigation field shall not exceed 0.25 inch/acre/hour.

6. There shall be sufficient rest periods between applications to prevent field saturation and runoff from occurring in any part of the field.

7. If the system has a partial circle center pivot, there shall be a minimum one-hour rest period when the center pivot reaches any in-field end stops if the instantaneous application rate exceeds a rate of 0.125 inch/acre in any one hour.

8. The pH of the effluent shall not be less than 5.5 standard units nor greater than 9.0 standard units at any time. The point of compliance shall be in accordance with Part II.A.2 of this Permit.

9. The Total Residual Chlorine (TRC) concentration shall not be less than 1.0 mg/L nor more than 4.0 mg/L at any time. The point of compliance shall be in accordance with Part II.A.2 of this Permit.

10. Design Effluent Nitrogen Concentration

    <u>Allen Harim waste stream</u>
    SRRF is designed to receive an effluent Total Nitrogen concentration of 27.7 mg/L from Allen Harim's wastewater treatment system. [May 5, 2017, Amended Design Development Report ANSRWRF Phase 1].

During Phase 1 operations, if the effluent Total Nitrogen concentration exceeds 34.6 mg/L [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the Department. If the effluent Total Nitrogen concentration exceeds 34.6 mg/L for over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the Department. If the effluent exceeds 41.5 mg/L [Design Value +50%], the Department may invoke the provisions of Part V.A.1 of this Permit. Also reference Part II.B.1.

Phase 2 SRRF wastewater treatment system

Treated effluent discharged from the Phase 2 SRRF wastewater treatment system shall not exceed a daily average Total Nitrogen concentration of 10 mg/L. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by **the number of days during the calendar month when the measurements were made.** [February 2021, Design Engineer Report SRRF Phase 2].

Phase 2 combined blended effluent

The Phase 2 operation is designed to combine and blend the SRRF treated wastewater with the Allen Harim treated wastewater within the storage lagoon. The Phase 2 combined effluent shall not exceed a daily average Total Nitrogen concentration of 22.5 mg/L. The daily average concentration Total Nitrogen shall be determined by the summation of all the measured daily concentrations obtained from composite samples divided by **the number of days during the calendar month when the measurements were made.**

During Phase 2 operations, if the effluent Total Nitrogen concentration from the SRRF treatment system, the Allen Harim waste stream, or the combined blended effluent exceeds 125% of the design value [Design Value + 25%] in any calendar month, the Permittee shall resample the wastewater and submit the additional analyses to the Department. If any of the Total Nitrogen concentrations exceeds 125% of the design value over a three-month period, the Permittee shall have the system evaluated to determine the cause and submit a revised Design Engineer Report to the Department. If the effluent exceeds 150% of the design value [Design Value +50%], the Department may invoke the provisions of Part V.A.1 of this Permit. Also reference Part II.B.1.

11. The total amount of nitrogen that may be applied to each spray field acre shall not exceed the following limitations. This amount includes supplemental fertilizers (when authorized by the Department), the nitrogen supplied from the effluent, and any other source. [Taken from May 3, 2023 revised Nitrogen Balances for Sussex Regional Recharge Facility (SRRF) Phase 1 and Phase 2.] Additional Nitrogen via fertilizer in excess of the below limits may only be applied if approval is received from the Department in accordance with Part I.F.1.a of this Permit.

Phase 1 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	338.9
Wheat-Soybean-Cover	394.6
Woods (Loblolly Pines)	437.9

Phase 2 Nitrogen Loading Limits	
Crop Type	Nitrogen Loading Limit (lbs/acre-year)
Cover-Corn-Wheat	352.5
Wheat-Soybean-Cover	417.7
Woods (Loblolly Pines)	421.9

Adjustments and reductions for denitrification, ammonia volatilization, evapotranspiration, and plant uptake are ***not*** to be factored into the annual reporting of Total Nitrogen Loading for demonstration of compliance with this limitation.

If any crops are not removed from the spray irrigation fields, then the Total Nitrogen application rate for the field shall be reduced by the amount of nitrogen that would be removed by harvesting the crop as detailed in SRRF's Design Engineer Report and/or Design Nitrogen Balance.

12. Application of Fertilizer

    The application of additional fertilizer is only authorized with Department approval upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in Part I.F.1.a through Part I.F.1.c of this Permit. The enhanced monitoring is required prior to application to ensure groundwater protection by providing accurate actual data to determine via field data if potential groundwater impacts occur due to additional nutrient loading.

    Upon installation of the enhanced monitoring well network, and the acquisition of required baseline data; the Permittee is authorized to apply nitrogen commercial fertilizers on the spray irrigation fields in a manner that may exceed the limitations contained in the Permit with Department approval.

    Permittee shall notify the Department within 48 hours of application and submit application data including enhanced monitoring data in the monthly DMR.

    The Department reserves the right to revoke the authorization of additional fertilizer in the event the enhanced monitoring identifies impacts to groundwater, or the Permittee fails to submit complete and accurate monitoring data.

13. The discharge to the spray irrigation fields shall be free from material such as floating solids, sludge deposits, debris, scum, oil, and grease.

14. The facility is designed for Unlimited Public Access criteria.

    Unlimited Public Access

    Treated effluent utilized for unlimited public access sites shall meet the following daily permissible average concentrations. The daily average concentration shall be determined by the summation of all the measured daily concentrations obtained from composite or grab samples divided by the number of days during the calendar month when the measurements were made. The point of compliance shall be at the discharge side of SRRF's irrigation pumps for fecal coliform bacteria and at wastewater treatment

system sampling port located immediately after filtration and disinfection for BOD_5, TSS, and Turbidity.

a. The fecal coliform bacteria concentration of disinfected treated wastewater discharged to the spray fields shall not exceed 20 col/100 mL.
b. The 5-day Biochemical Oxygen Demand (BOD_5) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
c. The Total Suspended Solids (TSS) concentration of treated wastewater discharged to the spray fields shall not exceed 10 mg/L.
d. The turbidity of the treated wastewater shall not exceed 5 NTU.

Parameter	**Daily Permissible Average Concentration**
BOD_5	10.0 mg/L
Fecal Coliform	20 colonies/100 mL
TSS	10.0 mg/L
Turbidity	5 NTU

15. Lysimeter Percolate Limitation

The rolling 12-month average percolate Total Nitrogen concentrations in each lysimeter shall not exceed 10 mg/L. If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, the Permittee shall examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. The Permittee shall report the finding to the Department with any proposed modifications to operational procedures or other corrective actions. The Permittee shall implement proposed actions upon approval by the Department.

Upon the Permittee completing the enhanced, higher resolution monitoring required in the Schedule of Compliance in this Permit, the lysimeter data will be utilized in conjunction with the groundwater monitoring data to determine environmental impact.

E. FACILITY CLASSIFICATION

A classification was performed on SRRF in accordance with the *Regulations Licensing Operators of Wastewater Facilities*. The wastewater treatment system is designated as a Class IV Facility. SRRF shall be under the direction of a Class IV Licensed Operator in Direct Responsible Charge who is available to direct operations. A licensed operator, operating under the direction of the licensed operator in Direct Responsible Charge for the facility, shall be available when the spray irrigation system is in operation.

F. SCHEDULE OF COMPLIANCE

1. The Permittee shall submit the information necessary and/or complete the following requirements.

a. Enhanced Monitoring Plan
   i. Prior to applying nitrogen fertilizers (as discussed in Part.I.D.12), the Permittee shall provide to the Department for review and approval an Enhanced Monitoring Plan for Fields F and G developed by a licensed PG.
   ii. The Enhanced Monitoring Plan shall include, but not be limited to, the following:

1) The installation of additional groundwater monitoring wells at deeper depths both in-field and down-gradient.
2) Additional down-gradient wells to be located in between existing wells.
3) Specific conductivity probes installed in the in-field and down-gradient monitoring wells.
4) May through October increase monitoring frequency to monthly at a minimum.
5) Additional Reporting regarding fertilizer, timing of application, type of application, constituents of fertilizer, etc.
6) Obtain probe baseline data prior to application of additional fertilizer (~6 months of data)

b. Enhanced Monitoring Well Network Requirements
   i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an updated Monitoring Well As-built Drawing for the entire site bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware. The Monitoring Well As-built Drawing shall contain:
      1) Table summary of groundwater monitoring well information.
      2) GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information must be in either Delaware State Plane, North American Datum 1983 meters; or Latitude and Longitude decimal degrees.
      3) TOC elevations survey results, using NAVD88, for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.

c. Enhanced Monitoring Contingency Plan
   i. Within 15 days of installation of the monitoring well network, the Permittee shall provide an Enhanced Monitoring Contingency Plan that shall, at a minimum, address a potential event of elevated Nitrates, or upward trend, being detected in the in-field or downgradient wells. The plan shall include multiple short- and long-term mitigation measures (e.g., field resting, crop rotation, or other source control measures and/or hydrogeologic investigation and corrective actions).

<u>Phase 1</u>

d. Prior to utilizing Fields D and E, the Permittee shall complete the following:
   i. The Permittee shall notify the Department in writing of the intent to initiate construction activities for Fields D and E at least fifteen days prior to the commencement of construction. The written notification shall include a draft construction schedule. The Permittee shall provide updated construction schedules if the schedule changes as construction progresses.
   ii. Complete all construction relative to Fields D and E in accordance with State Permit DEN Number: 359288-01.
   iii. The Permittee shall notify the Department in writing upon completion of construction and request a Construction Completion Inspection to be performed by the Department staff. If an inspection is required, the Design Engineer, Class E.4 system contractor, licensed operator, and the Permittee may be required to be present during the inspection. During the inspection, all mechanical parts are to be tested.

iv. Upon completion of construction, the Permittee shall submit to the Department the following applicable items. The items shall be combined in one package and shall include an electronic copy of all items where possible. Failure to submit all required information constitutes grounds for denial of the authorization to utilize Fields D and E for disposal.
    1) Design Engineer Inspection Report(s) certifying the project has been constructed in accordance with approved plans and specifications.
    2) Copies of any other applicable State/County inspection reports.
    3) Contractor's Certificate of Completion.
    4) A set of "as-built" drawings of the project bearing the seal and signature of a licensed Professional Engineer registered in the State of Delaware.
        a) The "as-built" drawings shall include:
        b) Site map showing the location of all structures, piping and appurtenances, disposal areas and buffers.
        c) A full equipment list and technical specifications for all equipment used, if different than submitted in the permit application.
        d) The new topography elevations of the system.
        e) Monitoring/Observation well elevations at the top of the casing (TOC) and at the ground surface, GPS coordinates (State Plane), and local topography tied to a common benchmark.
        f) The location and screen depth, length of stick up, and well IDs shall be provided for each monitor well.

v. Any necessary updates to the Operation and Maintenance (O&M) Plan in accordance with Section 6.7 of the Regulations.

vi. Spreadsheet summary of groundwater monitoring well, lysimeter, and piezometer information.

vii. GPS information detailing the northings and eastings; the local well ID number; and the DNREC Well ID/Well Permit Number. The GPS information shall be in either Delaware State Plane, North American Datum 1983 meters, or Latitude and Longitude decimal degrees.

viii. TOC elevations survey results for all monitoring wells to be utilized for groundwater monitoring. Provide the length of the well stickup and the well survey information to the closest 0.01 feet. Provide a permanent mark, etch, or fixture to be used to specify the survey point where the TOC elevations were read.

ix. A summary report detailing the analyses of the background groundwater quality sampling program that was conducted consisting of at least three (3) samples one (1) month apart and analyzed within six months prior to the initiation of disposal activities (see Section 6.6.3.16 of the Regulations). Lab data sheets must be provided in addition to an Excel summary worksheet.

x. An approved Conditional Use for Field D parcel (2-35-6-11.01).

xi. A summary report detailing the analyses of background soils sampling that was conducted in accordance with Part II.A.6 "Soil Monitoring Requirements" of this permit and performed within six months prior to the initiation of disposal activities. Lab data sheets must be provided in addition to an Excel summary worksheet.

e. Obtain written approval from the Department authorizing disposal on Fields D and E.

Phase 2

f. Prior to operation of the SRRF wastewater treatment system constructed in accordance with DNREC Construction Permit DEN Number 359288-03, Permittee shall obtain written approval from the Department.

2. The Permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance by specified date. In the event of noncompliance, the notice shall include the cause of noncompliance, any remedial action taken, and the probability of meeting the next scheduled requirement.

G. BUFFER REQUIREMENTS

Buffer zones shall be maintained in accordance with Section 6.3.2.3.10 of the Regulations unless otherwise specified below. Also see buffer requirement set forth in Part I.I.2.c.

1. Buffer zones of at least 150-feet shall be maintained around all public and private domestic wells.

2. A buffer zone of 150-feet shall be maintained from all downgradient domestic wells occurring on parcels 235-14.00-63.00, 235-14.00-66.00, and 235-13.00-6.00 [Per DNREC Hydrogeologic review dated March 25, 2010 and the August 18, 2017 DDR Addendum].

3. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, Permittee shall:
    a. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
        i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.

H. SLUDGE HANDLING REQUIREMENTS

All sludge (biosolids) shall be handled in accordance with standard wastewater practices and shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

Management and disposal of biosolids produced at the SRRF wastewater treatment system shall be handled by pumping and transport to Sussex County's Class A biosolids treatment facility at the Inland Bays Regional Wastewater Treatment Facility. The Permittee owns and operates two (2) 5,000-gallon pumper trucks operating under State of Delaware Non-Hazardous Liquid Waste Transporters Permit (No. DE OH-300). The Permittee shall use these trucks (or other permitted tricks) to transport biosolids. The Permittee shall handle sludge in accordance with the disposal agreement dated September 19, 2019 with Sussex County Council to dispose of up to 100 dry tons of biosolids per year at their IBRWTF biosolids facility. The Permittee shall maintain a current copy of the executed agreement with Sussex County on file with the Department.

I. FACILITY SPECIFIC CONDITIONS

1. The Permittee is authorized to transfer flows to other Permittee-owned and Sussex County-owned wastewater treatment facilities for additional treatment and/or disposal as approved by Department-issued Permits.

2. In accordance with Secretary's Order No. 2012-W-0052 Issued and Effective March 12, 2013, the Permittee shall:
    a. Design the treatment plant to look like an agricultural building and have landscaping to screen it from view from its neighbors.
    b. Ensure that the storage ponds do not become a breeding ground for mosquitos.
    c. Maintain all required buffers for the spray fields as set by both the Department and Sussex County.
        i. Maintain a 100-foot buffer from the wetted field area to the north-west corner of the Sylvan Acres Development.

3. The Permittee shall comply with all applicable Sussex County ordinances and conditional use requirements placed on this facility.

4. The Permittee shall maintain an updated copy of the spray irrigation land area Lease Agreement on file with the Department.

5. Phase 2 is designed to require only 37.2 MG of the storage lagoon's 90 MG capacity. If storage volume exceeds 37.2 MG, the Permittee shall notify the Department in writing. See lagoon volumes table on Page 6 of this Permit.

6. Wastewater spray irrigation will not be permitted on Field D parcel (2-35-6-11.01) until it is added to an approved Conditional Use. Parcel 2-35-6-11.01 is not included in the current Conditional Use Ordinance 1923, adopted July 31, 2007. Once this parcel has been added to an approved Conditional Use, the Permittee shall provide a copy of the approved Conditional Use to the Department for approval.

7. Phase 1 Fecal Coliform Bacteria Contingency Plan

    a. If the analytical results of an effluent sample from discharge side of the SRRF irrigation pumps documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that the maximum limitation for fecal coliform bacteria is continuing to be exceeded, the following corrective actions shall be enacted:
        i. Notify the Department of the non-compliance.
        ii. Immediately cease discharging effluent.
        iii. Submit copies of the recent analytical results documenting the two exceedances to the Department.
        iv. Examine operation and maintenance logs for improper operational procedures.
        v. Conduct a physical inspection of the treatment system, lagoon, and effluent transfer line to detect abnormalities. Any abnormalities discovered shall be corrected.

    b. Within 24 hours of enacting these corrective actions, the Permittee shall collect and analyze a third sample for fecal coliform bacteria from discharge side of the SRRF irrigation pumps. If the analytical results no longer document an exceedance of the maximum limitations for fecal coliform bacteria, the Permittee shall notify the Department and may resume normal operations.

    c. However, if the analytical results of the third sample again documents an exceedance of the maximum limitations for fecal coliform bacteria set by this Permit, the Permittee shall install and operate a temporary disinfection system to further treat the effluent from the lagoon. Disinfection shall continue until fecal coliform bacteria results meet required limits and the Department authorizes the Permittee to cease disinfection.

8. Phase 2 Total Nitrogen Contingency Plan

a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents the exceedance of the 10 mg/L Total Nitrogen concentration, the Permittee shall collect and analyze a second sample within 24 hours of becoming aware of the original exceedance. If the second sample results documents that the 10 mg/L Total Nitrogen concentration continues exceeded the Total Nitrogen limitation, the Permittee shall enact the following contingency plan.
   i. The Permittee shall notify the Department within 24-hours after becoming aware of the second exceedance and submit a copy of the analytical results to the Department.
   ii. If laboratory testing confirms that treated wastewater concentrations exceed 10 mg/L but the exceedance is less than 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall notify the Department to determine if treated wastewater is required to be diverted for retreatment. If required, the treated wastewater shall be immediately diverted for storage and retreatment.
   iii. If laboratory testing confirms that treated wastewater concentrations exceed 20 mg/L for either Nitrate as Nitrogen or Total Nitrogen than the Permittee shall immediately divert the treated wastewater for storage and retreatment.
   iv. The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system to once daily and submit weekly results to the Department.
   v. The Permittee shall examine the operation and maintenance log, required to be maintained by this Permit, for any possible improper operational procedures.
   vi. The Permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to the Department within 30 days of correction.
   vii. When daily analytical results from three consecutive days of wastewater sampling do not exceed the limitation, the Permittee is authorized to discharge to the storage lagoon and return to a bi-weekly monitoring frequency.

b) If the Department approves the continued discharge of treated wastewater in accordance with Part I.I.8a.ii to the storage lagoon, the following additional requirements shall be required.
   i. The Permittee shall increase the frequency of Total Nitrogen effluent sampling at the SRRF wastewater treatment system and at the discharge side of SRRF's irrigation pumps to once daily and submit weekly results to the Department.
   ii. The Permittee shall submit monthly TN balances documenting that the facility can continue spray irrigation at higher concentrations while not exceed 10 mg/L TN (monthly basis) in the percolate.
   iii. When daily analytical results from three consecutive weeks of wastewater sampling do not exceed the limitation, the Permittee is authorized to return to a bi-weekly monitoring frequency.

c) If the facility is required to enact this contingency plan more than three times in a 12-month period, the Permittee shall have the system evaluated to determine the cause of the elevated total nitrogen results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum total nitrogen concentration of 10 mg/L that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the contingency plan being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.

9. Phase 2 Fecal Coliform Bacteria and Turbidity Contingency Plan

a) Upon the operation of the SRRF wastewater treatment system, if the analytical results of a treated wastewater sample collected from the sampling port located immediately after filtration and disinfection documents an exceedance of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the Permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. If the second sample documents that any maximum limitation for fecal coliform bacteria and/or turbidity is continuing to be exceeded, the following corrective actions shall be enacted:
   i. Notify the Department of the non-compliance.
   ii. Submit copies of the recent analytical results documenting the exceedance to the Department.
   iii. Immediately increase filtration through the cloth media filters. This shall be accomplished by either bringing online additional filtration capacity or decreasing the loading per square foot of filter media.
   iv. Examine operation and maintenance logs for improper operational procedures.
   v. Conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected.

b) Within 24 hours of enacting these corrective actions the Permittee shall collect and analyze a third sample for fecal coliform bacteria and/or turbidity from the treatment system discharge. If the analytical results no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and may resume normal operations.

c) However, if the analytical results of the third sample again documents an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity set by this Permit, the following corrective actions shall be enacted:
   i. Notify the Department of the continued non-compliance.
   ii. Submit copies of the recent analytical results documenting an exceedance to the Department.
   iii. Effluent from the treatment system shall be diverted away from the 90-million-gallon storage lagoon back to the influent equalization/diversion lagoon for further treatment.
   iv. When additional analytical results from samples of treated wastewater effluent no longer document an exceedance of any of the maximum limitations for fecal coliform bacteria and/or turbidity, the Permittee shall notify the Department and upon written approval from the Department may resume transferring treated wastewater to the 90-million-gallon storage lagoon and resume normal operations.

d) If the facility is required to divert poorly treated wastewater more than three times in a 12-month period, the Permittee shall have the wastewater treatment system evaluated to determine the cause of the elevated fecal coliform bacteria and/or turbidity results and submit a revised Design Engineer Report with proposed corrective actions to achieve a maximum fecal coliform bacteria count of 20 colonies/100 mL and/or turbidity concentration of 5 NTU that bears the seal and signature of a Class C licensed Delaware Professional Engineer to the Department. The report shall be submitted within one year of the third notification of the diversion of poorly treated wastewater being enacted. The Permittee shall initiate implementation of the plan within 90 days following approval by the Department.

PART II

A. MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through the expiration date of this Permit, the Permittee is authorized to discharge to spray irrigation **Fields F and G** as identified on Page 9, in Part I.A, and depicted on Page 3 and 4 of this Permit. Such discharge shall be monitored by the Permittee as specified herein.

Fields D and E will be authorized for use upon completion of the Schedule of Compliance requirements iterated in Part I.F.1d of this Permit and upon written approval from DNREC.

For samples required to be taken 'monthly' and/or 'twice per month,' the samples for each monitoring location (i.e., influent, effluent, well, lysimeter, etc.) shall be taken a minimum of 14 days apart. Samples required to be taken 'quarterly' shall be taken once every three months and no more than 100 days apart.

Requests for monitoring modifications shall be submitted to the Department in writing. Such requests shall clearly state the reason for and nature of the proposed modification and, where applicable, shall contain supporting scientific information, analysis, and justification. Requests will be addressed by the Department on a case-by-case basis.

The Permittee shall initiate periodic reporting required under Part II.B.2 upon initiation of irrigation activities for all monitoring requirements.

1. INFLUENT MONITORING REQUIREMENTS

a. Phase 1 and Phase 2 Allen Harim treated effluent entering SRRF's storage lagoon

Samples taken in compliance with the sprayed influent monitoring requirements for all parameters specified may either be taken from a sampling port and meter located prior to storage at SRRF or reported as sampled in accordance with Allen Harim LLC's Permit No. 597261-01 at their effluent pump station.

Parameter	Unit of Measurement	Monitoring Frequency	Sample Type
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD_5	mg/L	Monthly	Composite
TSS	mg/L	Monthly	Composite
Total Nitrogen	mg/L	Monthly	Composite
Ammonia Nitrogen	mg/L	Monthly	Composite
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Composite
pH	S.U.	Monthly	Composite
Total Phosphorus	mg/L	Monthly	Composite
Chloride	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual	mg/L	Continuous	Recorded
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite

b. Phase 2 SRRF treatment system influent

Parameter	**Unit of Measurement**	**Monitoring Frequency**	**Sample Type**
Flow - Total Influent Flow for Month to SRRF	Gallons	Continuous	Recorded
Flow - Max Daily Influent Flow to SRRF	Gallons	Continuous	Recorded
Flow - Average Daily Influent Flow to SRRF	Gallons/Day	Continuous	Calculation (Total Influent Flow for Month / Number of Days in Month)
BOD_5	mg/L	Monthly	Grab
TSS	mg/L	Monthly	Grab
Total Nitrogen	mg/L	Monthly	Grab
Ammonia Nitrogen	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
pH	S.U.	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Chloride	mg/L	Quarterly	Grab
Copper	Mg/L	Annually	Grab

2. SPRAYED EFFLUENT MONITORING REQUIREMENTS

a. Requirements for Phase 1 Allen Harim treated effluent discharged from SRRF's storage lagoon

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from the discharge side of the SRRF irrigation pumps.

Parameter	**Unit Measurement**	**Monitoring Frequency**	**Sample Type**
Ammonia Nitrogen	mg/L	Monthly	Composite
Cadmium	mg/L	Annually	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Zone/Pivot[1]	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
Total Residual Chlorine[2]	mg/L	Monthly	Composite
Zinc	mg/L	Annually	Composite

[1] Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.
[2] Total Residual Chlorine shall only be sampled when disinfection is required at SRRF.

Additionally, the Permittee shall provide the following information.

Parameter	**Unit Measurement**	**Monitoring Frequency**	**Sample Type**
Total Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Max Daily Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Average Daily Effluent to all Fields/Zones/Pivots combined	MGD or GPD	Monthly	Calculation (Total Monthly Effluent Flow / Number of Days in Month)
Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined	Days	Monthly	Data
Total Effluent Flow to each Field/Zone/Pivot	Gallons[3]	Monthly	Data
Number of Days Sprayed During the Month to each Field/Zone/Pivots	Gallons[3]	Monthly	Data
Nitrogen Loading Rate to each Zone/Pivot	lbs/acre per Zone/Pivot[3]	Monthly	Calculation
Phosphorus Loading Rate to each Zone/Pivot	lbs/acre per Zone/Pivot[3]	Monthly	Calculation

[3] Data shall be provided for each zone (wooded areas) and each pivot (agricultural fields). Providing only an overall summary for each field will constitute a violation of this Permit.

b. Requirements for Phase 2 effluent (two points of compliance)

Wastewater Treatment System

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located immediately after filtration and disinfection.

Parameter	**Unit Measurement**	**Monitoring Frequency**	**Sample Type**
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD_5	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine[4]	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

[4] Total Residual Chlorine shall only be sampled if disinfection (using Chlorine) is required at SRRF.

Post-Storage Discharge of Blended Treated Effluent

Samples taken in compliance with the sprayed effluent monitoring requirements for all parameters specified shall be taken from a sampling port and meters located at the discharge side of the SRRF irrigation pumps.

Parameter	**Unit Measurement**	**Monitoring Frequency**	**Sample Type**
Ammonia Nitrogen	mg/L	Monthly	Composite
BOD_5	mg/L	Twice per month	Composite
Cadmium	mg/L	Annually	Composite
Chloride	mg/L	Quarterly	Composite
Copper	mg/L	Annually	Composite
Effluent Flow	Gal/day per Field/Zone/Pivot	Continuous	Recorded
Fecal Coliform	Col/100 ml	Twice per month	Grab
Lead	mg/L	Annually	Composite
Nickel	mg/L	Annually	Composite
Nitrate + Nitrite Nitrogen	mg/L	Monthly	Composite
Organic Nitrogen	mg/L	Monthly	Calculation
pH	S.U.	Daily	In-situ
Potassium	mg/L	Quarterly	Composite
Sodium	mg/L	Quarterly	Composite
Total Nitrogen	mg/L	Twice per Month	Composite
Total Phosphorus	mg/L	Monthly	Composite
TSS	mg/L	Twice per month	Composite
TDS	mg/L	Quarterly	Composite
Turbidity	NTU	Continuous	Recorded
Total Residual Chlorine[5]	mg/L	Daily	Composite
Zinc	mg/L	Annually	Composite

[5] Total Residual Chlorine shall only be sampled if disinfection (using Chlorine) is required at SRRF.

Additionally, the Permittee shall provide the following information.

Parameter	**Unit Measurement**	**Monitoring Frequency**	**Sample Type**
Total Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Max Daily Effluent Flow to all Fields/Zones/Pivots combined	Gallons	Monthly	Data
Average Daily Effluent to all Fields/Zones/Pivots combined	MGD or GPD	Monthly	Calculation (Total Monthly Effluent Flow / Number of Days in Month)
Number of Days Sprayed during the Month to all Fields/Zones/Pivots combined	Days	Monthly	Data
Total Effluent Flow to each Field/Zone/Pivot	Gallons[3]	Monthly	Data
Number of Days Sprayed During the Month to each Field/Zone/Pivots	Gallons[3]	Monthly	Data
Nitrogen Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot[3]	Monthly	Calculation
Phosphorus Loading Rate to each Field/Zone/Pivot	lbs/acre per Field/Zone/Pivot[3]	Monthly	Calculation

3. GROUNDWATER MONITORING REQUIREMENTS

Groundwater samples shall be taken from each monitoring well at SRRF. Groundwater monitoring well locations are depicted on the Site Map found on Page 3 of this Permit.

Samples taken in compliance with the monitoring requirements specified shall be taken at each monitoring well in accordance with procedures approved by the Department and listed in the *State of Delaware, Field Manual for Groundwater Sampling* (Custer, 1988) or alternative methodology approved by the Department.

Groundwater monitoring results for each monitoring well shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the *Delaware Regulations Governing the Construction and Use of Wells*, Section 11.1.

All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

Groundwater samples shall be tested from the following wells for the following parameters [well info taken from 2019.07.17 O&M p.32].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)	Casing Depth (ft)
254881	MW- 1L	88993.83	206492.46	34.11	36.67	2.56	20
254882	MW-2L	89332.77	206846.20	33.21	35.67	2.46	20
254883	MW-3L	89038.74	207010.94	28.50	30.69	2.19	20
254884	MW-4L	88740.91	207018.88	34.11	36.67	2.56	20
258634	MW-1F	89056.08	206855.40	31.57	33.98	2.41	20
258632	MW-2F	89805.84	206844.26	31.53	33.93	2.4	20
258620	MW-1G	87908.08	204453.82	39.08	41.88	2.8	20
258628	MW-2G	86961.64	204305.92	42.18	44.70	2.52	20
258630	MW-3G	87059.37	204894.01	38.48	40.82	2.34	20
258631	MW-4G	87083.99	205047.96	39.13	41.72	2.59	20
258625	MW-5G	87224.43	205871.48	35.28	38.11	2.83	20

1) Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
2) Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Depth to Water	hundredths of a foot	Monthly	Field Test
Dissolved Oxygen	mg/L	Quarterly	Field Test
Fecal Coliform	Col/100mL	Quarterly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Quarterly	Grab

pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	□C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab
Arsenic	mg/L	Annually	Grab
Cadmium	mg/L	Annually	Grab
Chromium	mg/L	Annually	Grab
Copper	mg/L	Annually	Grab
Hardness	mg/L	Annually	Grab
Iron	mg/L	Annually	Grab
Lead	mg/L	Annually	Grab
Manganese	mg/L	Annually	Grab
Mercury	mg/L	Annually	Grab
Nickel	mg/L	Annually	Grab
Selenium	mg/L	Annually	Grab
Sulfate	mg/L	Annually	Grab
Zinc	mg/L	Annually	Grab

4. ENHANCED GROUNDWATER MONITORING NETWORK

Groundwater samples from the Enhanced Monitoring Network wells, once installed in accordance with Part I.F.1.a of this Permit; in addition to the following wells, shall be monitored for the following parameters:

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)	Casing Depth (ft)
258633	MW-3F	89653.61	207373.30	23.43	29.03	5.6	20
258635	MW-4F	88664.02	207398.01	18.48	20.98	2.5	20
258636	MW-5F	88901.57	207213.08	27.06	29.55	2.49	20
258626	MW-6G	87338.98	206580.77	32.14	34.70	2.56	20
258627	MW-7G	87898.99	206585.64	33.23	35.64	2.41	20
258629	MW-8G	88466.82	206507.64	28.26	30.94	2.68	20
258624	MW-9G	87639.24	206170.14	33.67	36.15	2.48	20

1) Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.
2) Monitoring Wells have been screened from a depth of 20-ft to 30-ft.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Monthly	Grab
Chloride	mg/L	Monthly	Grab
Depth to Water	hundredths of a foot	Monthly	Field Test
Dissolved Oxygen	mg/L	Monthly	Field Test
Fecal Coliform	Col/100mL	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
pH	S.U.	Monthly	Field Test
Sodium	mg/L	Monthly	Grab
Specific Conductance	µS/cm	Continuously	Field Test
Temperature	°C	Monthly	Field Test
Total Dissolved Solids	mg/L	Monthly	Grab
Total Nitrogen	mg/L	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Arsenic	mg/L	Annually	Grab
Cadmium	mg/L	Annually	Grab
Chromium	mg/L	Annually	Grab
Copper	mg/L	Annually	Grab
Hardness	mg/L	Annually	Grab
Iron	mg/L	Annually	Grab
Lead	mg/L	Annually	Grab

Manganese	mg/L	Annually	Grab
Mercury	mg/L	Annually	Grab
Nickel	mg/L	Annually	Grab
Selenium	mg/L	Annually	Grab
Sulfate	mg/L	Annually	Grab
Zinc	mg/L	Annually	Grab

5. GROUNDWATER TABLE ELEVATION MONITORING REQUIREMENTS

Monthly water level measurements shall be taken at each piezometer and observation well listed below and depicted on Page 3 from December through April [well info taken from 2019.07.17 O&M p.33].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevations (ft)	Top of Outer Casing (ft)	Length of Stick Up (ft)
265831	PZ-1F	88751.53	207166.42	22.53	25.53	25.41
265838	PZ-1G	87347.73	205271.49	35.45	38.86	37.92
265837	PZ-2G	87578.95	205093.80	37.31	41.29	40.00
265832	PZ-3G	87823.90	205250.09	32.78	43.00	41.81
265836	PZ-4G	87908.92	205455.69	32.64	36.24	32.23
265829	PZ-5G	88039.85	205768.25	32.67	35.97	35.23
265833	PZ-6G	88434.07	205949.66	31.58	34.63	33.21
265830	PZ-7G	88408.29	206450.31	25.91	29.58	29.92

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

While performing the monitoring as required by Part II.A.3 and Part II.A.4 of this Permit, if the 'Depth to Water' in any one of the monitoring wells has reached within 3-feet of the ground surface, the Permittee shall be required to collect additional weekly depth to water measurements from the monitoring wells within 3-feet of the ground surface. The additional monitoring is necessary to ensure that spray irrigation ceases on any areas of the spray fields where the groundwater may reach within 2-feet of the ground surface in accordance with Part III.A.6 of this Permit. The Permittee may discontinue the additional weekly sampling for depth to water in a well when the groundwater table elevation readings in the well exceeds a 3-foot separation between groundwater and ground surface. The additional groundwater table elevation measurements must be recorded in the operator's log and reported to the Department in accordance with Part II.B.2 of this Permit.

6. LYSIMETER MONITORING REQUIREMENTS

Samples shall be taken monthly from each lysimeter for SRRF. Lysimeter locations are depicted on the Site Map found on Page 3 of this Permit.

All field sampling logs and laboratory results for samples obtained from a well shall be identified by the DNREC ID affixed to the well.

Samples shall be tested from the following wells for the following parameters. The constituents are listed below in highest priority first. If sufficient sample volume is not be obtained to test for all parameters listed, the sample shall be tested for as many constituents possible in the following parameter order [well info taken from 2019.07.17 O&M p.35].

DNREC Well ID	Local ID	Northings (meters)	Eastings (meters)	Ground Elevation (ft)	Outer Casing (ft)	Inner Casing (ft)
265827	LY-1F	89388.92	207110.93	33.13	35.73	35.23
265835	LY-1G	87984.44	205584.58	34.27	36.22	35.38
265834	LY-2G	87646.77	206139.14	33.80	36.10	35.82
265828	LY-3G	87205.37	204810.20	40.62	43.25	42.82

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Total Nitrogen	mg/L	Monthly	Grab
Total Phosphorus	mg/L	Monthly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Monthly	Grab
Ammonia as Nitrogen	mg/L	Monthly	Grab
Chloride	mg/L	Monthly	Grab
Sodium	mg/L	Monthly	Grab
Total Dissolved Solids	mg/L	Monthly	Grab
pH	S.U.	Monthly	Field Test
Specific Conductance	µS/cm	Monthly	Field Test
Temperature	°C	Monthly	Field Test

Lysimeter Rolling 12-Month Average

The Permittee shall maintain a rolling 12-month average of total nitrogen percolate concentrations in each lysimeter. The rolling 12-month average shall be calculated by adding the current month's total nitrogen concentration to the previous eleven (11) month's total nitrogen concentrations and dividing the sum by the number of samples obtained (i.e., 12 unless sample data was unattainable for any given month). The rolling 12-month average shall be reported to the Department monthly.

7. SOIL MONITORING REQUIREMENTS

The Permittee shall submit a Soil Sampling Plan for Department approval within 120 days from the effective date of this Permit.

Composite soil samples representing each soil series within the wetted spray field shall be taken separately from both soil depths of 0–12 inches and 12–24 inches. A minimum of three composite sample for each mapped soil mapping unit are needed for each depth (0-12 inches and 12-24 inches) in accordance with the Regulations and the GWDS-approved Soil Sampling Plan. The composite soil sampling shall represent the average conditions in the sampled body of material. The discrete samples that are to be composited shall be collected from the same soil horizon and depth interval.

Soil sample locations shall be plotted on a scaled drawing and labeled consistent with the sample nomenclature. Each field shall also be identified so that sample results may be tracked and properly assessed for field life limiting factors.

Soil chemical testing should be in accordance with Methods of Soil Analysis published by the American Society of Agronomy, Madison, Wisconsin.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
pH	S.U.	Annually	Soil Composite
Organic Matter	%	Annually	Soil Composite
Phosphorus (as P_2O_5)	mg/kg	Annually	Soil Composite
Total Nitrogen	Mg/kg	Annually	Soil Composite
Nitrate as Nitrogen	mg/kg	Annually	Soil Composite
Potassium	mg/kg	Annually	Soil Composite
Sodium Adsorption Ratio	meq/100g	Annually	Soil Composite
Cadmium	mg/kg	Annually	Soil Composite
Nickel	mg/kg	Annually	Soil Composite
Lead	mg/kg	Annually	Soil Composite
Zinc	mg/kg	Annually	Soil Composite
Copper	mg/kg	Annually	Soil Composite
Cation Exchange Capacity	meq/100g	*Only if soil pH changes significantly	Soil Composite
Phosphorus Adsorption (Mehlich 3 acceptable)	meq/100g	**Only if soil phosphorus levels become excessive for plant growth	Soil Composite
Percent Base Saturation	%	*Only if soil pH changes significantly	Soil Composite

*A significant change in soil pH is defined as a change of one or more standard units from the original value established in the Design Development Report.

** Excessive levels of soil phosphorus are defined by the Delaware Nutrient Management Commission. Soil phosphorus levels must be tested in accordance with the University of Delaware soil testing methods (Gartley, 2002). If the soil phosphorus levels become excessive, the Permittee shall perform a Phosphorus Site Index (PSI) study. The results shall be submitted to the Department within 30 days of completion. Based on these, the Department may require the Permittee to submit a plan for detailing steps to reduce the phosphorus loading rates at the site.

8. VEGETATION MONITORING

Upon each harvest, a minimum of one composite sample for each pivot is required for each crop type. Results must be utilized for analysis and provided to the Department in the Annual Report in accordance with Part II.B.5.a.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Yield	Bushels/acre and lbs/acre	Per harvest	Vegetation Composite
Nitrogen	% and lbs/acre	Per harvest	Vegetation Composite
Phosphorus	% and lbs/acre	Per harvest	Vegetation Composite
% Moisture	%	Per harvest	Vegetation Composite

9. OPERATIONS MONITORING REQUIREMENTS

a. Spray Field Applications

Parameter	Unit Measurement	Monitoring Frequency	Sample Type
Additional/Supplemental Irrigation Water (i.e., groundwater)	Total Gallons per zone/pivot	Monthly	Recorded/ Calculated
Additional/Supplemental Irrigation Water (i.e., groundwater)	Inches/acre per zone/pivot	Monthly	Recorded/ Calculated
Fertilizer Nitrogen	lbs/acre per zone/pivot	Monthly	Reported
Fertilizer Phosphorus	lbs/acre per zone/pivot	Monthly	Reported

b. Lagoons

Parameter	Sample Location	Unit Measurement	Monitoring Frequency	Sample Type
Lagoon Levels	Lagoons	Feet and Gallons	Weekly	Field Test

10. SURFACE WATER MONITORING REQUIREMENTS

Surface Water samples shall be obtained from the six locations as approximately depicted on the Site Map found on Page 3 of this Permit. The surface water sampling locations include Ingram Branch and Sowbridge Branch (East of Reynolds Pond).

The geographic coordinates of the surface water sampling locations are as follows [location info taken from 2019.07.17 O&M p.34].

Local ID	Northings	Eastings
SW-1	88368.84	205871.47
SW-2	88557.43	206493.46
SW-3	88638.01	207393.63
SW-4	90245.11	205198.77
SW-5	90372.08	206230.09
SW-6	90363.90	207758.40

Coordinates are in NAD 1983 Delaware State Plane 0700 Meters.

Surface Water Monitoring results for each monitoring point shall be reported using the established geographic coordinates.

A downgradient sample for a surface water body should be taken first, immediately followed by the upgradient location for the same surface water body and followed by the downgradient sample for the next surface water body being taken third, immediately followed by sampling of the upgradient location for this same surface water body. All samples shall be taken on the same day.

Surface Water sampling shall not occur within three (3) days of a measurable rainfall event to ensure that the streams have returned to base flow, groundwater dominant, conditions.

Parameter	Unit Measurement	Measurement Frequency	Sample Type
Ammonia as Nitrogen	mg/L	Quarterly	Grab
BOD5	mg/L	Quarterly	Grab
Chloride	mg/L	Quarterly	Grab
Dissolved Oxygen	mg/L	Quarterly	Field Test
Enterococcus	Col/100mL	Quarterly	Grab
Fecal Coliform	Col/100 ml	Quarterly	Grab
Nitrate + Nitrite as Nitrogen	mg/L	Quarterly	Grab
pH	S.U.	Quarterly	Field Test
Sodium	mg/L	Quarterly	Grab
Specific Conductance	µS/cm	Quarterly	Field Test
Temperature	□C	Quarterly	Field Test
Total Dissolved Solids	mg/L	Quarterly	Grab
Total Nitrogen	mg/L	Quarterly	Grab
Total Phosphorus	mg/L	Quarterly	Grab
Total Suspended Solids	mg/L	Quarterly	Grab

B. MONITORING SPECIFICATIONS AND REPORTING REQUIREMENTS

1. Representative Sampling

   Samples and measurements taken as required in the operation permit shall be representative of the volume and nature of the monitored discharge. If there has been significant increase (> 25%) in the characterization of any one parameter of the effluent wastewater as established in the Design Engineer Report, the Permittee shall resample the wastewater and submit the additional analyses to the Department. The Permittee shall re-characterize the wastewater to determine if a change in treatment is required and/or if the land limiting constituent has changed. If a change in treatment is required and/or if the land limiting constituent has changed, a revised Design Engineer Report shall be submitted to the Department. After a review of these results, the Department may invoke the provisions of Part V.A.1 of this Permit.

2. Reporting

   Monitoring results obtained during the previous one month/quarter shall be summarized and reported on an approved monitoring report form(s) postmarked no later than the 28th day of the month following the completed reporting period. Laboratory analytical results and sampling logs shall be submitted with the corresponding month's monitoring report. Signed reports/forms, laboratory analytical results, laboratory sampling logs and field data sheets shall be submitted in one complete package to the Department at the following address:

   Resource Protection Section - Compliance and Enforcement
   Division of Water
   Department of Natural Resources and Environmental Control
   89 Kings Hwy
   Dover, DE 19901
   Office: (302) 739-9945

   The Department may provide written requirements for the Permittee to submit monitoring data electronically. Upon notification from the Department, the Permittee shall transition (as directed) to the Department's electronic database system. The submission may need to be electronically signed.

3. Monitoring results reported as less than the detectible limit shall be reported with the less than symbol ("<") before the detection limit. The full detection limit value shall be utilized in any necessary calculations. The less than symbol shall be carried through the calculation. The resulting value shall include any appropriate less than or greater than symbol resulting from the calculation.

4. Additional Monitoring by Permittee

   If the Permittee monitors any parameter at the location(s) designated herein more frequently than required, using approved analytical methods, the results shall be reported to the Department on an approved monitoring report form. Such increased frequency shall also be indicated.

5. Annual Report

The Permittee shall submit to the Department an Annual Report summarizing the operations, management, administration, and maintenance of the facility for the calendar year. The Annual Report shall be submitted to the Department on or before February 28th of each year. The Annual Report shall include all applicable items found in Section 6.8.2.4.1.3 and Section 6.9 of the Regulations.

Additionally, the Permittee shall report the following:

a. Nutrient Loading, Removal and Analysis:

Permittee shall provide a tabulated summary of the nutrient loading, crop removal and nutrient analysis.

Loading: In accordance with the intent of the reporting requirements of Section 6.9.1.7, 6.9.1.8 & 6.9.14.1 of the Regulations, the permittee shall tabulate Total Nitrogen and Total Phosphorus monthly Average Concentrations, monthly volumes of wastewater irrigated per field/zone/pivot, and monthly mass loadings pounds per acre per field/zone/pivot. Annual volumes and loadings shall be calculated for each field/zone/pivot. If fertilizer was applied, monthly Total Nitrogen and Total Phosphorus loading applications via fertilizer shall also be tabulated and incorporated into the annual totals. If additional/supplemental water (i.e., groundwater) was irrigated, monthly and annual loading applications shall also be tabulated as both 'Total Gallons per field/zone/pivot' and 'Inches/acre per field/zone/pivot.'

Permittee shall tabulate annual loadings per field for Total Nitrogen and Total Phosphorus in comparison to the crop type planted for the year and the permit limit for that specific crop type.

Removal: Utilizing the vegetative monitoring lab data analysis required by Part II.A.8 of the Permit, and in accordance with the intent of the reporting requirements of Section 6.9.14.1 and 6.9.14.5 of the Regulations, the permittee shall calculate and tabulate the Nitrogen and Phosphorus removed by the crops in pounds per acre per field/zone/pivot. The tabulated summary shall note the crop type planted for the pivot, the amount of crop harvested, and the amount of nutrients removed (pounds per acre per pivot). Permittee shall provide a comparison of the lab analyzed crop uptake values with the values utilized in the Nitrogen Balance, Vegetative Management Plan and Phosphorus loading limitation calculation. Permittee shall provide an assessment of Phosphorus utilization relative to the permit limit of 31.2 lbs/acre Total Phosphorus. Permittee shall discuss any discrepancies and proposed operational adjustments. Permittee shall provide the lab data sheets from each crop analysis.

Analysis: When providing the Nitrogen Balance calculations in accordance with Section 6.9.14.2 of the Regulations, the permittee shall provide a Nitrogen Balance worksheet for each Field/Zone/Pivot electronically in Excel spreadsheet format.

b. Soils Monitoring
6.9.14.3 Provide soils data lab sheets.

c. Lysimeter Monitoring - Part II.A.6

Lysimeter Monitoring - Provide Lysimeter 12 month rolling average data for Total Nitrogen.

If the rolling 12-month average exceeds the total nitrogen percolate concentration of 10 mg/L, discuss steps taken to examine the facility's operation and maintenance log for improper operational procedures, conduct a physical inspection of the disposal system to detect abnormalities, and review monitoring data and other records to determine the cause/source of the total nitrogen exceedance. Report all findings along with any proposed modifications to operational procedures or other corrective actions.

d. Operations Monitoring - Part II.A.8

Spray Field Applications - Report a tabulated summary of monthly additional/supplemental:

- Irrigation water in gallons per field/zone/pivot and in inches/acre per field/zone/pivot.
- Fertilizer Nitrogen in lbs/acre per field/zone/pivot
- Fertilizer Phosphorus in lbs/acre per field/zone/pivot

Storage Lagoon Volume - Report a summary of monthly storage lagoon volumes tabulated in comparison to the permitted action level volume. If storage lagoon volumes exceeded the permitted action level volume, discuss steps taken to assess system functionality and any proposed modifications to operational procedures or other corrective actions.

6. Test Procedures

Test procedures for analysis of pollutants shall conform to the applicable test procedures identified in 40 CFR, Part 136 or the most recently adopted copy of Standard Methods unless otherwise specified in this Permit.

7. Recording of Results

For each measurement or sample taken pursuant to the requirements of this Permit, the Permittee shall record the following information:

a. The exact place, date and time of sampling and/or measurement;
b. The person(s) who performed the sampling and/or measurement;
c. The date(s) the analyses were performed and the time the analyses were begun;
d. The person(s) who performed the analyses; and
e. The results of each analysis.

8. Records Retention

All records and information resulting from the monitoring activities required by this Permit or the Regulations including all records of performed analyses, calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation shall be retained for five years. This period of retention shall be extended automatically during any unresolved litigation regarding the regulated activity or regarding control standards applicable to the Permittee or as requested by the Department.

9. Availability of Reports

   All reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. Monitoring data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C., §6013.

10. Operator Log

    An operator log shall always be kept onsite. Each spray system section shall be numbered and referred to by number in the operator log. All records and reports shall also always be kept in a bound logbook onsite and shall be made available upon request for review by the Department. This log shall, at a minimum, include the applicable items listed in Section 6.7.3 of the Regulations.

11. Quality Assurance Practices

    The Permittee is required to show the validity of all monitoring data by requiring its laboratory to adhere to quality assurance practices in accordance with Section 6.8.2.4 of the Regulations.

12. Industrial Users

    Within 30 days of the operation of the Phase 2 wastewater treatment system, the Permittee shall develop and maintain an industrial listing that provides the names and addresses of all current Significant Industrial Users (SIUs) and Non-Significant Categorical Industrial Users (NSCIUs), as defined in 40 CFR 403.3, discharging to the SRRF Phase 2 wastewater treatment system. The list shall be updated annually and submitted in the Annual Report required in Part II.B.5.

PART III

A. OPERATIONAL REQUIREMENTS

1. Duty to Comply

   The Permittee shall comply with all the terms and conditions of this Permit.

   The discharge of any pollutant more frequently than, or at a level in excess of that identified and authorized herein, shall constitute a violation of the terms and conditions of this Permit. The violation of any influent/effluent limitation or of any other condition specified in this Permit is a violation of 7 Del. C. Chapter 60 and is grounds for enforcement as provided in 7 Del. C., Chapter 60 "Enforcement; civil and administrative penalties; and expenses.", "Criminal Penalties." and "Cease and desist order." for Permit termination or loss of authorization to discharge pursuant to this Permit, for Permit revocation and reissuance, or Permit modification, or denial of a Permit renewal application. The Department may seek voluntary compliance by way of warning, notice or other educational means, pursuant to 7 Del. C., Chapter 60 "Voluntary compliance." or any other means authorized by Law. However, the Law does not require that such voluntary means be used before proceeding by way of compulsory enforcement.

2. Groundwater Requirements

   Operation of the wastewater treatment facility and spray irrigation system shall not cause the quality of Delaware's groundwater resources to be in violation of applicable Federal or State Drinking Water Standards. If the Department determines that the discharge is impacting groundwater quality or downgradient receptors, corrective actions will be required.

3. Facilities Operation

   The Permittee shall properly maintain and operate all structures, pipelines, systems, and equipment for collection, treatment control and monitoring which are used by the Permittee to achieve compliance with the terms and conditions of the Permit. Proper operation and maintenance may include but is not limited to, effective performance based on designed facility removals, adequate funding, effective management, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures.

4. The spray irrigation fields shall be managed to assure at a minimum that:

   a. Spray irrigation of wastewater shall only occur on fields being prepared for planting or already planted with a crop and shall not occur on fields with crops not actively growing or on voluntary vegetation.

   b. The spray fields shall be maintained in such a manner as to prevent wastewater pooling and/or discharge of wastewater to any surface waters. Should pooled areas become evident, spraying on those areas shall be prohibited until saturated conditions no longer exist.

   c. Aerosols or nuisance odors shall not extend beyond the boundary of the spray irrigation site when treated wastewater is being applied. If odors are produced and become considered a public nuisance, the Permittee shall take the necessary steps to eliminate such odors. All action taken shall be reported to the Department in accordance with Part IV.A.4 of this Permit.

d. Erosion controls shall be employed to prevent wastewater runoff from the spray irrigation fields. The Permittee shall notify the Department immediately if any wastewater runoff occurs.

e. The spray irrigation field's crops shall be maintained in optimal condition, including any necessary weed management, reseeding, or other vegetative management practices.

f. Effective vegetative management shall be provided such that crops harvested on the spray irrigation sites are removed from the sites.

g. Forage crops shall be harvested and removed from the irrigation field(s) at least twice a year. Crops harvested shall be removed from the irrigation site within six (6) months of harvest.

h. The wastewater shall be applied in a manner such that the application is even and uniform over the irrigation area.

5. Spray irrigation is prohibited when saturated or frozen soil conditions exist.

6. The groundwater mound created by the added infiltration shall at no time reach within two feet of the ground surface in any section of the spray irrigation fields. Should the groundwater mound exceed this limit, the Permittee shall cease all irrigation of wastewater to the affected fields until the groundwater mound recedes to acceptable levels.

7. Connections or additions to the spray irrigation system other than those indicated on the approved plans are prohibited without prior approval from the Department.

8. The Permittee shall take appropriate measures to protect the spray irrigation system from damage due to sub-freezing conditions.

9. Any leaks shall be reported to the Department and repaired immediately.

10. Signs

    Unlimited Public Access: Unlimited public access sites must have advisory signs posted at all entry points that indicate the site is spray irrigated with treated wastewater. Verbiage shall include the following wording: "RECYCLED WASTEWATER – DO NOT DRINK". Alternate verbiage may be used if approved in writing by the Department.

11. Potable, ground, or surface water may be used for distribution system testing and irrigation to establish vegetation when sufficient treated effluent is not available.

12. Phased Systems

    a. Once an Operations Permit is issued and the wastewater flow reaches 80% of the permitted treatment capacity for the constructed phase based on a period of seven (7) consecutive days, the Permittee shall submit written notification to the Department. The written notification shall include a work plan for construction of the next permitted phase. The Permittee shall submit a construction permit application, plans and specifications and Design Engineer Report with applicable fees if the next phase has not yet been permitted or if there are changes to the previously permitted design.

b. Any flow above the permitted flow for a phase shall not be allowed to be discharged to the system until construction is completed on the following phase and an operating permit has been issued or amended by the Department for the next phase.

c. Required documents for connecting subdivisions may be found in Section 6.5.10.3.1 of the Regulations.

13. If the permittee installs new monitoring wells or replaces any existing monitoring wells, the Permittee shall submit to the Department new elevation details relative to the common benchmark previously established. Additionally, the Permittee shall conduct a groundwater quality sampling program prior to initiation of wastewater disposal activities on the area incorporating the well. The sampling program shall be sufficient to establish representative groundwater quality at each well prior to initiation of the wastewater disposal activities. A minimum of three samples shall be collected at least one month apart and analyzed. A summary report detailing all analyses shall be submitted to the Department prior to initiation of wastewater disposal activities. Analyses shall include the parameters iterated in Section 6.8.1 of the Regulations.

14. The Permittee shall calibrate all flow meters in accordance with the Manufacturer's recommendations. Calibration shall include, but not be limited to influent, effluent, continuous online turbidity, and chlorine residual monitors. The calibration documentation shall be submitted with the Annual Report in accordance with Part II.B.5.

15. The Permittee shall operate and maintain SRRF in accordance with the facility's design and the approved Operation and Maintenance Plan (O&M). A copy of the O&M shall always be kept onsite. The Permittee shall maintain the O&M's accuracy and applicability in accordance with both the Permit and the Regulations. In the event of a discrepancy between the O&M and the Permit or Regulations, the requirements of the Permit and the Regulations would govern.

16. At least three feet of freeboard, measured vertically from the lowest point of the berm, is required for all ponds/lagoons. The lowest point of the berm shall be determined and marked.

17. The Permittee shall notify the Department in writing prior to utilizing the freeboard in any lagoon or immediately upon unexpected encroachment into freeboard. In the event of encroachment into freeboard, Permittee shall contact the Department to coordinate relief measures. In the event of an emergency, Permittee may contact the Department at the telephone numbers cited in Part II.B.2 of this Permit; however, written notification shall subsequently be provided within 5 days of encroachment.

18. If the facility does not treat sewage and has a storage tank that requires cleanout, and if the Permittee intends to land apply material collected from the cleanout onto the spray irrigation field, the Permittee shall analyze the material for nutrients and any other applicable parameters of concern as determined by the Department. Prior to tank cleanout being performed. The Permittee shall submit to the Department a report including the results, the frequency and estimated volume of material to be applied, and how and where it will be applied. The report shall include a mathematical analysis determining any nitrogen loading from the tank cleaning combined with nitrogen loading from wastewater application will not exceed the allowable nitrogen load.

19. Fencing is required at treatment facilities, pump stations and storage/treatment ponds. Fencing of spray fields is not required.

20. The collection and channelization of irrigated wastewater for purposes other than retreatment is prohibited.

21. Direct application of treated wastewater to drainage ditches, any water bodies, and wetlands is prohibited.

22. Emergency Repairs

Emergency repairs or the replacement of critical "like kind" components of the wastewater treatment facility necessary for the continued operation of the facility may be performed without first obtaining a construction permit from the Department.

A report shall be submitted to the Department within five (5) days of completion of the emergency repairs. The report shall summarize the nature of the emergency and the repairs performed. All violations shall also be reported in accordance with Section 6.5.9 of the Regulations.

23. Adverse Impact

The Permittee shall take all reasonable steps to eliminate or minimize any adverse impact to waters of the State resulting from this Permit, including such accelerated or additional monitoring as necessary to determine the source, nature, and extent of the impact from a noncomplying discharge. In addition, at the direction of the Department, the Permittee shall submit a corrective action plan which will include a description of the proposed actions to mitigate or eliminate the source of the impact and an associated completion schedule. The plan shall be enacted as approved by the Department.

24. Bypassing

The diversion of flow from any portion of the treatment facility's process flow (including, but not limited to, pretreatment, storage, distribution, and land application) necessary to maintain compliance with the terms and conditions of this Permit is prohibited unless:

a. The bypass is unavoidable to prevent personal injury, loss of life, severe property damage, or materially adversely affect public health and/or the environment; or

b. There are no alternatives readily available.

The Permittee shall orally notify the Department within 24 hours after such bypass; and shall submit a written submission regarding the bypass within five days of the Permittee's becoming aware of the bypass. Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the Department for approval at least ten days prior, or as soon as possible, before the date of bypass.

The treatment facility shall be repaired and restored to the permitted design operations process flow.

25. Removed Substances

Solids, sludges, filter backwash or other pollutants removed in the collection, conveyance, or treatment of wastewater shall be disposed of in a manner such as to prevent any pollutant from entering the surface water or groundwater and to comply with applicable federal or state laws and regulations.

26. Power Failures

An alternative power source, which is sufficient to operate the wastewater treatment and disposal facilities, shall be available. If such alternative power source is not available, the Permittee shall halt, reduce, or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater facilities.

PART IV

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. Operation Permit Re-Issuance

   At least 180 days before the expiration date of this Permit, the Permittee shall submit an application for renewal or notify the Department of the intent to cease discharging by the expiration date. The application package for systems with a design flow ≥ 100,000 GPD, shall include a five (5) year Compliance Monitoring Report (CMR). The CMR shall be prepared in accordance with Section 6.5.4.3 of Regulations. If a timely and complete application has been submitted as determined by the Department, and the Department is unable, through no fault of the Permittee, to issue a new Permit before the expiration date of this Permit, the terms and conditions of this Permit are automatically continued and remain fully effective and enforceable until a decision is made on the new application.

2. Change in Discharge

   All discharges authorized herein shall be consistent with the terms and conditions of this Permit. The discharge of any pollutant identified in this Permit more frequently than or at a level that exceeds that authorized shall constitute a violation of the Permit.

   Any anticipated facility/system expansions, production increases, or process modifications that will result in new, different, or increased discharges of pollutants shall be reported in writing to the Department for approval. A new Permit may be required.

   Any other activity which would constitute cause for modification or revocation and reissuance of this Permit as described in Part V.A.1 of this Permit shall be reported to the Department. Following such notice, the Permit may be modified to specify and limit any pollutants not previously limited.

3. Non-compliance Notification

   The Permittee shall report to the Department orally within 24 hours from the time the Permittee became aware of any noncompliance with this Permit, Regulations, or any other situation that may endanger the public health or the environment by contacting the Department at the telephone numbers cited in Part II.B.2 of this Permit.

   If for any reason the Permittee does not comply with, or will be unable to comply with, any effluent limitations or other conditions specified in this Permit, the Permittee shall provide the Department with the following information in writing within five days of becoming aware of any actual or potential noncompliance:
   a. A description and cause of the non-compliance with any limitation or condition;
   b. The period of non-compliance including exact dates and times; or, if not yet corrected, the anticipated time the non-compliance is expected to continue; and
   c. The steps being taken or planned to reduce, eliminate and/or prevent recurrence of the non-compliant condition.

4. Spill Reporting

In the event of any environmental release of pollutants (i.e., spill), the Permittee shall call the Department's 24-hour Emergency Release Reporting Hotline at (800) 662-8802.

The Permittee shall also notify the Resource Protection Section (RPS) regarding any environmental release of pollutants (i.e., spill) into surface water or groundwater or on land, within 24-hours from the time the Permittee becomes aware of the release and activate their emergency site plan. In addition, the following information shall be reported to the RPS in writing within five days. Permittee shall contact and provide notification via RPS contact information provided in Part II.B.2 of this Permit.

a. The facility name and location of release;
b. The chemical name or identity of any substance involved in the release;
c. An indication of whether the substance is an extremely hazardous substance;
d. An estimate of the quantity of any such substance that was released into the environment;
e. The time and duration of the release;
f. The medium or media into which the release occurred;
g. Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals;
h. Proper precautions to take as a result of the release, including evacuation;
i. The names and telephone number of the person or persons to be contacted for further information; and
j. Such other information as the RPS may require.

5. Facility and Construction Changes

The Permittee shall submit a written report to the Department for review and approval, of any changes to the facility or construction of the system within the following time periods:

a. Thirty days before any planned activity, physical alteration to the permitted facility or addition to the permitted facility if that activity, alteration or addition would result in a change in information that was previously submitted to the Department;

b. Thirty days before any anticipated change which would result in noncompliance with any permit condition or the regulations; or

b. Immediately after the Permittee becomes aware of relevant facts omitted from, or incorrect information submitted in, a permit application or report to the Department.

6. Right of Entry

The Permittee shall allow the Department entry and access, consistent with 7 Del.C. Ch. 60, to:

a. Enter the permitted facility.
b. Inspect any records that must be kept under the conditions of the Permit.
c. Inspect any facility/system, equipment, practice, or operation permitted or required by the Permit.
d. Sample or monitor for the purpose of assessing effluent quality or assuring Permit compliance of any substance or any parameter at the facility.

7. Permit Transferability

The Permit may be transferred to a new owner or operator. The Permittee shall notify the Department by requesting a change of ownership of the Permit before the date of transfer. The transfer shall be consistent with any notarized legal documents and/or CPCN required by the Regulations. The legal documentation shall be provided with the application. The application shall be received by the Department 30 days before the transfer.

a. No person shall transfer a permit from one (1) person to another unless 30 days written notice is given to the Department, indicating the transfer is agreeable to both persons, and approval of such transfer is obtained in writing from the Department, and any conditions of the approval of such transfer is obtained in writing from the Department, and any conditions of the transfer approved by the Department are complied with by the transferor and the transferee.

b. The notice to the Department shall contain a written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of Permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this Permit. The notice shall be signed by both the transferor and the transferee.

PART V

A. PROVISIONS

1. Permit Revocation

   The Department may revoke a Permit if, among other things, the Permittee violates any Permit condition, these regulations, fails to pay applicable Departmental fees, misrepresents facts or data to obtain the Permit, or fails to fully disclose all relevant facts.

   Except in cases of emergency, the Department shall issue a written notice of intent to revoke to the Permittee prior to final revocation. Revocation shall become final within 20 days of receipt of the notice by the Permittee, unless within that time the Permittee requests an administrative hearing in writing.

   The Department shall notify the Permittee in writing of any revocation hearing at least 20 days prior to the date set for such hearing.

   If the Department finds that public health, safety, or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the Permittee. Emergency revocation shall be effective upon receipt by the Permittee. Thereafter, if requested by the Permittee in writing, the Department shall provide the permittee a revocation hearing.

2. Permit Modifications/Amendments

   In consultation with the Permittee, the Department may modify or amend an existing permit provided that the modifications would not result in an increased impact or risk to the environment or to public health.

3. State Laws

   This Permit shall not be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

4. Property Rights

   The issuance of this Permit does not convey any property rights of either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

5. Severability

   The provisions of this Permit are severable. If any provision of this Permit, or the application of any provision of this Permit, to any circumstances is held invalid; the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

6. This Permit does not relieve the Permittee of complying with any applicable federal, state, or local regulations.

7. Additional Information

   The Permittee shall furnish to the Department within a specified period, any information including copies of records, which may be requested by the Department to determine whether cause exists for modifying, revoking, reissuing, or terminating the Permit, or to determine compliance with the Permit and the Regulations.

8. Wastewater Treatment Facility Closure/Abandonment

   If the wastewater treatment facility, or a component of the facility, is proposed to be abandoned, the Permittee shall submit a proposed closure and abandonment work plan with procedures on how the facility will be abandoned for review and approval by the Department. The work plan shall address remediation if monitoring data indicates impacts to the environment. Upon review and approval of the work plan and completion of all closure and abandonment actions the Permittee shall contact the Department for a final inspection of the site.

9. If the *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* or applicable federal regulations are revised, this Permit may be opened and modified accordingly after notice and opportunity for a public hearing.

10. This Permit supersedes all previous spray irrigation operations permits issued to the Permittee for this facility.