APPENDIX G

INSPECTION & COMPLIANCE MONITORING REPORT

NORTH READING PUBLIC SCHOOLS

NORTH READING MIDDLE AND HIGH SCHOOL

WASTEWATER TREATMENT FACILITY

CONTRACT OPERATION AND MAINTENANCE SERVICES

REQUEST FOR PROPOSAL

FEBRUARY 14, 2020

RFP No. 20 - 02

MEA
Civil-Environmental Engineers
& Land Surveyors

MARTINAGE ENGINEERING ASSOCIATES, INC.

131 Main Street, Third Floor
Reading, MA 01867-3966

TEL: 781-944-4808
FAX: 781-944-9676
mea@martinageengineering.com

October 22, 2019

Mr. Jon Bernard
Superintendent
North Reading High School
189 Park St.
North Reading, MA

RE: **Wastewater Treatment Plant**
Groundwater Discharge Permit No. 931-0
North Reading High School
North Reading, MA

Dear Mr. Bernard:

This correspondence is in regard to the operation of the above-referenced wastewater treatment plant.

Enclosed please find the engineering inspection report and the Compliance Discharge Monitoring Reports with the results of the monthly analysis for the Wastewater Treatment Plant conducted for the month of September as required by the Wastewater Treatment Plant Discharge Permit. The copies of the DMR's that were submitted via the internet to DEP are enclosed. Sampling was conducted on September 19-20, 2019. Monthly testing for the Monitoring Wells was conducted on September 5, 2019.

All parameters were met at the time of the inspection with the exception of Effluent Nitrate and Total Nitrogen. See Comment #15.

Should you have any questions, please contact our office.

Very truly yours,

MARTINAGE ENGINEERING ASSOCIATES, INC.

John E. Martinage, E.I.T.
Project Engineer

Reviewed by Donald E. Martinage, P.E.

Enclosures
c. North Reading BOH, via email
Wally Bruce, Weston & Sampson, via email
John Bocchino, Weston & Sampson, via email
Ken Nugent, Weston & Sampson, via email
George Malonson, Weston & Sampson, via email

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Groundwater Discharge Program

Groundwater Permit

DAILY LOG SHEET

931
1. Permit Number

[redacted]
2. Tax identification Number

2019 SEP DAILY
3. Sampling Month & Frequency

C. Daily Readings/Analysis Information

Date	Effluent Flow GPD	Reuse Flow GPD	Irrigation Flow GPD	Turbidity	Influent pH	Effluent pH	Chlorine Residual (mg/l)	UV Intensity (%)
1	1175							
2	1175							
3	2100			0.31	7.44	7.61		ND
4	6200			0.31	7.63	7.20		60
5	2600			0.31	7.93	7.22		ND
6	2168			0.30	7.97	7.24		ND
7	2166							
8	2166							
9	4400			0.38	7.77	7.26		ND
10	4400			0.37	8.03	7.06		63
11	6600			0.39	8.14	7.54		ND
12	4700			0.35	8.05	7.17		63
13	1534			0.35	7.88	7.27		ND
14	1534							
15	1532							
16	4800			0.40	7.87	7.54		ND
17	4400			0.39	7.94	7.19		ND
18	4400			0.39	7.93	7.23		ND
19	2300			0.37	7.94	7.14		ND
20	2334			0.38	7.89	7.29		67
21	2334							
22	2332							
23	6800			0.40	7.68	7.38		62
24	4500			0.40	7.79	7.36		ND
25	ND			0.41	7.93	7.30		ND
26	8900			0.41	7.89	7.26		ND
27	3901			0.39	7.87	7.06		ND
28	3900							
29	3899							
30	4400			0.38	7.46	7.32		ND
31								

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Groundwater Discharge Program

Groundwater Permit

DISCHARGE MONITORING REPORT

931
1. Permit Number

[redacted]
2. Tax identification Number

2019 SEP MONTHLY
3. Sampling Month & Frequency

D. Contaminant Analysis Information

- For "0", below detection limit, less than (<) value, or not detected, enter "ND"
- TNTC = too numerous to count. (Fecal results only)
- NS = Not Sampled

1. Parameter/Contaminant	2. Influent	3. Effluent	4. Effluent Method
Units			Detection limit
BOD MG/L	224	ND	6
TSS MG/L	132	ND	2
TOTAL SOLIDS MG/L	1080	890	50
AMMONIA-N MG/L	174		
NITRATE-N MG/L		17.2	1
TOTAL NITROGEN(NO3+NO2+TKN) MG/L		17.2	0.5
OIL & GREASE MG/L		ND	5
FOAMING AGENTS (MBAS) MG/L		0.102	0.1

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Groundwater Discharge Program

Groundwater Permit

MONITORING WELL DATA REPORT

931
1. Permit Number

[redacted]
2. Tax Identification Number

2019 SEP MONTHLY
3. Sampling Month & Frequency

C. Contaminant Analysis Information

- For "0", below detection limit, less than (<) value, or not detected, enter "ND" <
- TNTC = too numerous to count. (Fecal results only)
- NS = Not Sampled
- DRY = Not enough water in well to sample.

Parameter/Contaminant	Units	MW-1R Well #: 1	MW-4 Well #: 2	MW-5 Well #: 3	MW-6 Well #: 4	Well #: 5	Well #: 6
PH	S.U.	5.86	5.54	5.25	6.00		
STATIC WATER LEVEL	FEET	67.58	63.23	62.50	63.24		
SPECIFIC CONDUCTANCE	UMHOS/C	2640	733	128	710		

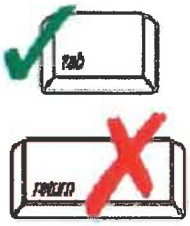
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Groundwater Discharge Program

Groundwater Permit

931
1. Permit Number

[redacted]
2. Tax identification Number

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Any person signing a document under 314 CMR 5.14(1) or (2) shall make the following certification

If you are filing electronic-ally and want to attach additional comments, select the check box.

☐

Facility Information

NORTH READING HIGH/MIDDLE SCHOOL
a. Name

191 PARK STREET
b. Street Address

NORTH READING	MA	01864
c. City	d. State	e. Zip Code

Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that the are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

JULIA MARTINAGE	10/31/2019
a. Signature	b. Date (mm/dd/yyyy)

Reporting Package Comments

PLEASE NOTE: NITRATE-N AND TOTAL NITROGEN EXCEEDED THE PERMIT PARAMETERS ON THE DAY OF THE INSPECTION AT A CONCENTRATION OF 17.2 MG/L. THE EXCEEDANCE MAY BE ATTRIBUTED TO AN INSUFFICIENT CARBON SOURCE, METHANOL, AVAILABLE TO COMPLETE THE DEGREE OF DENITRIFICATION IN THE PROCESS. THE EXCEEDANCE MAY POSSIBLY BE ATTRIBUTED TO A RECENT CHANGE IN THE CARBON SOURCE FROM MICRO-C TO 20% METHANOL IN THE PROCESS THAT HAS YET TO STABILIZE. MEASURES ARE ALWAYS TAKEN BY THE OPERATOR TO ENSURE COMPLIANCE IN THE FINAL EFFLUENT BY MAKING NECESSARY OPERATIONAL ADJUSTMENTS.

WASTEWATER TREATMENT PLANT INSPECTION REPORT
NORTH READING HIGH SCHOOL, NORTH READING, MA

Permit #	931-1	**Lab #**	L2K19-2692	**Month**	September
Date of Inspection	9/19-20/19		11:00AM	**Weather**	clear

Operator Wally Bruce

Tests and Observations Made During Inspection

1. Recorded Wastewater Flow on Day of Inspection			2,334	GPD	
2. Temperature (±)	Influent		19	°C	
	Pre Anoxic Tank		22	°C	
	Aeration Tank		23	°C	
	Post Anoxic Effluent		24	°C	
	Permeate Tank		24	°C	
	Final Effluent		24	°C	
3. Dissolved Oxygen	Pre Anoxic Tank		3.00	mg/l	2.00 hi level
	Aeration Tank		3.30	mg/l	1.5 desired
	Post Anoxic Tank		1.10	mg/l	1.20 low level
4. 30-Min Mallory Settleable Solids in Aeration Tank			990	ml/l	Negligible
5. On Site Operational Testing		Final Effluent	Pre Anoxic	Aeration	Post Anoxic / FET Influent
	pH (s.u.)	7.29	7.42	7.30	7.36 / 7.89
	NO3-N (mg/l)	15.7			
	NO2-N (mg/l)	1.00			
	NH3-N (mg/l)	0.20			
	Alkalinity (mg/l)	180	180	180	180 / 240
	30 Min Mallory (ml/l)			990	
6. FET Flow Rate(+/-)			5.0	varied	flow conditions
7. Chemical Pumps:					
(Carbon) 20% methanol					
	Condition		On line		Flow Conditions
	Inventory		100	GAL. (+/-)	
Citric Acid Pump (CIB)	Pump Rate		varied	GAL/ per use	Flow Conditions
	Condition		On line		
	Inventory		15	GAL. (+/-)	
Sodium Hydroxide (Caustic) Aeration (as needed)	Pump Rate		varied	GAL/ per use	Flow Conditions
	Conditon		on line		
	Inventory		30	GPD (+/-)	

WASTEWATER TREATMENT PLANT INSPECTION REPORT
NORTH READING HIGH SCHOOL, NORTH READING, MA

Permit #	931-1	Lab #	L2K19-2692	Month	September
Date of Inspection	9/19-20/19		11:00AM	Weather	clear

Operator Wally Bruce

Sodium Hydroxide (Caustic) (CIB)	Pump Rate	as needed	GPD	Flow Conditions	
	Condition	on line			
Sodium Hypochlorite (Bleach) (Drain fill)	Pump Rate	0.50	GPD (+/-)	Flow Conditions	
	Condition	auto			
	Inventory	45	GAL (+/-)	Total	
8. Clarity of Final Effluent	clear				
9. Microscopic Examination of Activited Sludge	Predominance of crawling and stalked ciliates.				
10. Primary Settling Tanks	#1 Condition	12/12/12	inches		
	Settled Blanket Depth	24/28/30	inches		
	#2 Condition	off line			
	Settled Blanket Depth	--			
	Sludge Pumping Schedule				
11. Flow Equalization Tank	Condition	Grey in color, light floating mat noted.			
	Flow Rate	5.0	GPM	flow condition	
	Recycle Rate	30	GPM (+/-)		
	Level	28.6	%		
	Settled Blanket Depth	8" light surface			
12. Pre-Anoxic Tank	Condition	Neglidible foam, color medium red brown.			
	Status	On line			
13. Aeration Tank	Air/Process Circulation	Status	On	Operational	
	Condition	Color: Medium red brown. Very light foam.			
14. Blowers	#1	Status	On line	Operational	Yes
	#2	Status	On line	Operational	Yes
15. Mixers	Pre Anoxic #1	Status	On line	Operational	Yes
	Aeration #2	Status	On line	Operational	Yes
	Post Anoxic #3	Status	On line	Operational	Yes

WASTEWATER TREATMENT PLANT INSPECTION REPORT
NORTH READING HIGH SCHOOL, NORTH READING, MA

Permit #	931-1	**Lab #**	L2K19-2692	**Month**	September
Date of Inspection	9/19-20/19		11:00AM	**Weather**	clear

Operator Wally Bruce

16. Post Anoxic	Condition	Color:	Medium red brown; Very light foam.		
	Status	On line			Yes
17. Final Effluent	Dosing Tank	Status	On line	Operational	Yes
	Condition	clear			
18. Effluent Dosing Pump #1 Effluent Dosing Pump #2		Status	On line	Operational	Yes
19. Alarms		Operational	Yes	Auto dialer	
20. Inspection Final Beds	Bed #1 Condition		on line		
	Bed #2 Condition		On line		
21. Flow Meter Reading				Totalizer	Units
	Final Effluent Dosing Pump #1			2.3826	mgd
	Final Effluent Dosing Pump #2			2.3661	mgd
	Skid Feed (Membrane)			438.9880	mgd
	Denite			94.9213	mgd
	CEB Counter			499	reset
	Electric			----	kw
	Generator			--	
	Permeate			8611897	mgd
	FET			5045979	mgd
	Backwash			4.8218	mgd
22. UV Disinfection	Pre Permeate			67%	9904.7
	Post Permeate (recirc)			11	43530.0
23. Turbidity	Permeate			0.38	ntu
24. Pumping Record	Location	Date	Gallons		
	Aeration	5/6/2019	5,000	Maintenace waste	
	Aeration	6/3/2019	3,000	Maintenace waste	
	Aeration	6/13/2019	3,000	Maintenace waste	
	Pre-aeration	7/8/2019	900		
	Post-aeration	7/8/2019	3100		
	Post-aeration	7/12/2019	3,000		
	Equalization	7/16/2019	6,000		
	Post-aeration	7/17/2010	3,000		
	Equalization	7/19/2019	5000		
	Post-aeration	7/19/2019	3000		
	Equalization	7/23/2019	6000		
	Post Aeration	7/23/2019	3000		
	NO PUMPING IN AUGUST				
	NO PUMPING IN SEPTEMBER				

SUMMARY OF LABORATORY ANALYSIS
NORTH READING HIGH SCHOOL, NORTH READING, MA

Permit #	931-1	Lab #	L2K19-2692
Sample Date	9/19-20/19		

COMPLIANCE DATA SUMMARY

Parameter	Units	Raw Influent FET		Final Effluent		% Removed	Meets Permit Levels
Flow	gpd			2,334			
BOD_5	mg/l	224	<	6.0		97.32	meets permit
TSS	mg/l	132	<	2.00		98.5	meets permit
TVS	mg/l						
TS	mg/l	1080		890			
TVSS	mg/l						
% Volatile	ml/l/hr						
SVI							
pH	s.u.	7.89		7.29			
NO_3 as N	mg/l			17.20			exceeds permit
NO_2-N	mg/l		<	0.50			
NH_3 - N	mg/l	174					
Total Nitrogen	mg/l			17.20			
Total Kjeldahl Nitrogen	mg/l			<0.50			
Oil & Grease	mg/l		<	5.00			meets permit
Surfactant	mg/l			0.102			
Total VOC*	µg/l						
Total P**	mg/l						
PO_4 as P**	mg/l						

* = Annual Test G= Grab Sample
**Quarterly ND - NONE DETECTED

MONITORING WELL DATA FOR GROUNDWATER
NORTH READING HIGH SCHOOL, NORTH READING, MA

Permit # 931-1 **Job #** L2K19-1915

Sample Date 9/5/2019

PARAMETER	Units	MW-1R***	MW-4	MW-5	MW-6
pH	s.u.	5.86	5.54	5.25	6.00
Specific Conductivity	umhos/cm^2	2640	733	128	710
Elevation at Top of PVC	ft.	79.88	69.20	68.85	71.52
Water Level	ft.	12.30	5.97	6.35	8.28
Static Water Level	ft.	67.58	63.23	62.50	63.24
Ammonia - Nitrogen	mg/l				
Nitrate - N**	mg/l				
Nitrite - N**	mg/l				
Total Nitrogen (NO_2+NO_3+TKN)**	mg/l				
Total Kjeldahl Nitrogen**	mg/l				
Total Phosphorus as P**	mg/l				
PO4 as P**	mg/l				
Surfactant**	mg/l				
Sulfate	mg/l				
Chloride	mg/l				
Oil and Grease	mg/l				
Iron	mg/l				
Manganese	mg/l				
Silver	mg/l				
Total VOC EPA 624*	ppb				

* Annual Test
**Quarterly Test
*** MW 1R is an upstream well
ND= None Detected
NA = Not Applicable

Wastewater Treatment Plant Permit #931-0
North Reading High School
North Reading, MA

COMMENTS/RECOMMENDATIONS

1. Measures always should be taken by the school department to ensure no recalcitrants such as lab chemicals, paints and floor strippers, waxes, cleaning or sanitized products containing Quaternary Ammonia Compounds (QAC) or Zinc are discharged into the sanitary collection system from the schools. Such compounds may be toxic or inhibitory to the biological treatment system.

2. The FET Pump Stations and Primary Settling Tanks should be regularly checked for any solids blanket in the bottom or floating surface mats and solids should be removed on an as needed basis. Pumping should be noted on the daily log. Measures should be taken by the School Department to ensure no non-biodegradable items (e.g. Wipes, reinforced paper towels, plastic items, etc.) are put into the Sewer Collection System.

3. Proper daily operational testing is an integral part of successfully operating a wastewater treatment facility. The operator is utilizing the lab equipment on a daily basis. The operator was completing necessary calibrations for laboratory testing. Daily calibration logs should continue to be kept up to date.

4. The operator will make notations on the daily operator report of weather conditions and any suspect inflow/infiltration at the facility. Measures should be taken to identify and remediate any contributory factors to the Inflow/infiltration at the site. Remediation maybe such as regrading and installation of infiltration covers in areas subject to flooding during snow melt and rain events.

5. It is required by the Discharge Permit that the operator enter daily flow data, and effluent pH data reading on a daily basis, (Monday thru Friday). The operator log summary will contain all entries as required on a monthly basis. The operator will continue to complete all necessary operational testing and make note of all operational settings to ensure the facility is in compliance with the discharge permit. This data should continue to be included with the monthly operator log for review by the engineer to determine proper plant performance and operations. The operator will continue to note any deficiencies encountered during the month and schedule to make necessary repairs. The operator will continue to keep current records relative to equipment preventive maintenance procedures and schedules. All records pertaining to the facility such as pumping records etc. should be kept on site.

6. The operator should continue to supplement all on site test kits with testing chemicals and necessary reagents on an as needed basis and maintain all test equipment in a calibrated and operational manner. Ph standards should always be fresh, dated and initialed by the operator when opened. First aid kit and eye

wash should always be up to date and safety glasses kept on site.

7. Typically, the operator completes Chemical Enhance Backwash (CEB) weekly. The TMP membrane feed at approximately 6.5 PSI and the Permeate TMP are maintaining at approximately 2.5-3.0 PSI.

8. Containment and segregation of chemical inventory are suggested.

9. Measures should be taken to ensure supervision and maintenance of the Field House pump station.

10. It was noted that the contents of the permeate tank were clear.

11. The operator reports he is conducting mixed liquor (Aeration Tank) TSS samples for solid management in the process as needed.

12. The odor control system was on line.

13. Process flow rates noted at the time of the inspection were as follows:

A)	Denitrification	30.0 GPM
B)	Skid Feed	300 GPM
C)	Permeate	10 GPM

14. Skid feed PH meter is in need of repair/calibration. This task should be completed.

15. All permit parameters were met at the time of the inspection with the exception of Nitrate-N and Total Nitrogen at concentrations of 17.2 mg/l. The exceedance may be attributed to an insufficient carbon source, methanol, available to complete the degree of Denitrification in the process. The exceedance may possibly be attributed to a recent change in the carbon source from Micro-C to 20% methanol in the process that has yet to stabilize. Measures are always taken by the operator to ensure compliance in the Final Effluent by making necessary operational adjustments.

16. On site Monitoring Well laboratory analysis for monitoring pH and Conductivity completed by: Martinage Engineering Associates, Inc., MA Lab Cert. #M-MA 129, 131 Main Street, Reading, MA. Compliance testing completed by Waste Water Environmental Management, Inc., Lab Cert. #077, 270 Littleton Road, Unit 30, Westford, MA 01866.

WASTE WATER ENVIRONMENTAL MANAGEMENT, INC.

Billing
9A Quincy Road
Londonderry, NH 03053
(603) 434-8134

Laboratory
270 Littleton Road, Unit 30
Westford, MA 01886
(978) 692-8010

Test Report

Martinage Engineering Assoc. Inc.
131 Main Street
Reading MA. 01867

Subject: Wastewater Treatment Plant, North Reading High School
North Reading, MA
Sample Date: 9/19-20/19
Date Received: 9/20/19
Report ID: 67489
MEA #: L2K19-2692

Parameter	Units	Raw Composite 67489A	FINAL COMPOSITE 67489B	FINAL GRAB 67489C	Method	Date Completed
BOD	mg/l	224	<6		5210b	9/25/19
!TS	mg/l	1080	890		2540b	9/24/19
TSS	mg/l	132	<2.00		2540d	9/25/19
NH3 as N	mg/l	174			350.1	10/9/19
NO3 as N	mg/l		17.2		4500h	9/27/19
!NO2 as N	mg/l		<0.50		4500b	9/20/19
TKN	mg/l		<0.50		351.2	10/7/19
Oil & Grease	mg/l			<5.00	1664	9/30/19
!MBAS	mg/l			0.102	5540c	9/20/19
TOTAL NITROGEN	mg/l		17.2		N/A	N/A

! Certification Not Provided By State !

10/10/2019 15:01
page 1 of 1

Steven Hansen
Laboratory Director
Massachusetts Certification #M-MA077

MEA Civil-Environmental Engineers & Land Surveyors

MARTINAGE ENGINEERING ASSOCIATES, INC.
131 Main Street
Reading, MA 01867-3966

TEL: 781-944-4808
FAX: 781-944-9676

~~6786~~ 9/20/19 67489 A-C

CHAIN OF CUSTODY

Client Name: NORTH READING HS
Address: 191 PARK STREET
NORTH READING, MASS 01864

Project: M-STP

Sampled By: BFD

LAB NO: L2K19- 2692

MONTHLY WASTEWATER TREATMENT PLANT

	DATE	TIME	STATION LOCATION	SAMPLE TYPE	BOD_5	NO_3-N	NO_2-N	TKN	NH_3-N	TS	TSS	O & G	SURFACTANTS		REMARKS
B	9/19 - 9/20/19	1100	FE	COMP	X	X	X	X		X	X				Preserved 4ºC NOCl2
C	9/20/19	1115	FE	GRAB								X	X		
A	9/19 - 9/20/19	1130	RAW	COMP	X				X	X	X				
			RAW	GRAB											

Relinquished by : [signature]
Date: 9/20/19
Time: 1306

Received By: [signature]
Date: 9-20-19
Time: 1306

Relinquished by :
Date:
Time:

Received By:
Date:
Time:

REVISED 12/19/18