APPENDIX E

NORTH READING HIGH SCHOOL WWTF OPERATION AND MAINTENANCE MANUAL

NORTH READING PUBLIC SCHOOLS

NORTH READING MIDDLE AND HIGH SCHOOL WASTEWATER TREATMENT FACILITY

CONTRACT OPERATION AND MAINTENANCE SERVICES

REQUEST FOR PROPOSAL

March 4, 2015

RFP No. 15 - 01

MEA

Civil-Environmental Engineers
& Land Surveyors

OPERATION AND MAINTENANCE MANUAL

WASTEWATER TREATMENT FACILITY

NORTH READING HIGH SCHOOL AND MIDDLE SCHOOL
NORTH READING, MA

VOLUME 1

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INTRODUCTION

INTRODUCTION

This manual has been prepared in accordance with 314 CMR 12.04 for the operation and maintenance of the Wastewater Treatment Facility serving the North Reading High School located at 191 Park Street, North Reading, MA and Middle School located at 19 Sherman Road, North Reading, MA. In addition, this manual has been prepared per the requirements of Supplemental Conditions Item #2 of the Commonwealth of Massachusetts, Department of Environmental Protection letter dated March 14, 2013 for the submittal of an operation and maintenance manual. The facility is designed to handle an estimated 17,500 gallons per day (gpd) of sewage flow which potentially can be generated at the school. The treatment system is designed for normal domestic sewage flow. Cooling water, industrial wastewater or any other discharge that is not domestic sewage is **prohibited** for discharge to this treatment facility.

The sewage is treated via a BIOPROCESSH_2O Membrane Batch Reactor (MBR) System. This system has been designed to operate at reduced flows as well as at the actual design flow. The system uses Primary, Pre-Anoxic, Aeration Stage, Post Anoxic Stage, and Membrane Stage to meet the groundwater discharge effluent parameters.

The following is a sequential listing of the major components comprising the treatment facility.

a Two (2) 9,000 gallon Trash Traps #1 & #2

b One (1) 19,000 gallon Flow Equalization Tank and Pump Chamber

c One (1) Mechanical Bar Screen

d One (1) 5,000 gallon Pre Anoxic Tank

e One (1) 4,400 gallon Aeration Tank

f One (1) 2,500 gallon Post Anoxic Tank

g One Membrane Stage

h One (1) 2,000 gallon Permeate Tank

i Disinfection two (2) Ultraviolet (UV) units in process (before and after Permeate Tank)

j Final Effluent Dosing Chamber with a 4,375 gallon working volume

k Final Effluent Leaching Area

The remainder of this manual provides information pertaining to the facility including descriptions of the treatment process, sludge handling, sampling, staffing, laboratory testing, record keeping, mechanical maintenance and housekeeping, emergency response, and safety.

It is required that a copy of this manual be kept at the treatment facility for reference, in addition to other pertinent documents and records.

TECHNICAL INFORMATION

SECTION 1

PERMITS

The construction and operation of the wastewater treatment facility serving North Reading High School and Middle School in North Reading, MA is in accordance with 314 CMR Section 12.03 (4) which states **"No person shall construct, install, operate or maintain a waste treatment facility, a sewer system or any extension thereof or connection thereto without the approval of the Division pursuant to applicable provision of 314 CMR 3.00, 5.00, 7.00, 8.00."** The approval of the waste treatment facility was received in a letter of approval from the Commonwealth of Massachusetts, Department of Environmental Protection dated March 14, 2013. Copies of this approval letter can be found in APPENDIX A of this manual.

The operation of this waste treatment facility is strictly controlled by the Commonwealth of Massachusetts, Department of Environmental Protection, Division of Water Pollution Control Transmittal numbers X253180 and Groundwater Discharge Permit 931-0. This permit has been issued to the Town of North Reading Town Administrator. This Discharge Permit is required for discharge from this facility in accordance with 314 CMR 2.00 and 314 CMR 5.00. The effluent limitations of the permit are based upon the level of treatment, and consideration of human health protection criteria for discharges to the Ground Waters of the Commonwealth. A copy of the complete Groundwater Discharge Permit 931-0 can be found in APPENDIX A of this manual.

SECTION 2

SITE AND TREATMENT PROCESS DESCRIPTION

HISTORY

The existing North Reading High School and Middle School (NRMHS) complex wastewater disposal consists of two separate septic disposal systems on approximately a 42.5 acre school site. The Middle School Septic System is approximately 47 years old and the High School System is approximately 56 years old. The Commonwealth of Massachusetts Department of Environmental Protection (DEP) Title V 310 CMR 15.00 requires that for projects generating in excess of 10,000 gallons of sewage flow per day that a Ground Water Discharge Permit (GWDP) be obtained. In order to meet the effluent ground water discharge standards a wastewater treatment facility will be required for this site.

ENGINEERING DATA

Martinage Engineering Associates, Inc. (MEA) working with HML Associates, Hingham, MA, the project hydrogeologic consultant, determined the suitability of the site to receive the project design flow for the new NRMHS. A completed hydrogeologic has previously been submitted to your department under BRP WP 83 (Transmittal # X253180). In summary, suitable soils with excellent percolation rates have been found and official testing witnessed by Mr. Criss Stephens of your department has been completed. The proposed school site is not within a nitrogen sensitive area or classified as within a Zone II Water Supply Protection Zone.

MEA previously submitted engineering data relative to actual water use at the existing NRMH. Copies of this data as well as a copy of an email from your office dated June 20, 2012 are enclosed. The email summarizes DEP's review and concurs with our opinion that based on the information presented by MEA that the use of 10-gallons/person/day as design flow for the proposed NRMH project is appropriate and consistent with current water use records as well as other similar school data presented by MEA. The June 20, 2012 email also concurs that for a design population of 1,750 students and staff that a design flow of 17,500 gpd should be used as the basis of design. This request for variance for school flow is allowed per Title V 310 CMR 15.416.

The proposed wastewater treatment plant will be designed with the following influent and effluent parameters. (Based on similar school effluent studies by our firm).

Influent

Flow 17,500 GPD
BOD_5 450 mg/l
TSS 350 mg/l
TKN 160 mg/l

Effluent

BOD 30 mg/l
TSS 30 mg/l
TN 10 mg/l
Fecal 200 colonies/100*

*MEA respectfully requests that an effluent limit for fecal coliform not be included in the final GWDP, unless DEP review of the downstream environmental receptors or site specific conditions require a permit level for fecal coliform.

PROPOSED LEACH AREA AND PROPOSED 50% RESERVE AREA

The size of the proposed final leaching area is based on the hydrological study prepared by HML with a loading rate of treated effluent at 3 gals/sq.ft./day. The reserve area proposed for the site has been sized for 50% of the proposed design flow. We request that DEP allow the 50% reduction in the reserve area due to site constraints. The permittee is proposing a Membrane Biological Reactor (MBR) treatment system which will achieve high levels of solids removal from the wastewater and provide an extended life to the active final leach area. In addition, the final leach area has been designed as two separate leach areas of 3,000 square feet each independent of each other. The separate distribution network will allow ½ of the total field (3000 sq ft) to be taken off line for repair etc, if necessary, while the other ½ remains on line.

EXISTING INFLUENT DESIGN PARAMETERS

The following designed criterion is based on a previous letter report by our firm as previously noted. Based on the organic analysis of raw waste from five (5) similar High School WWTPs, we determined the following is the realistic expected organic load for the proposed school facility.

BOD_5 = 450 mg/l
TSS = 350 mg/l
TKN = 160 mg/l

The proposed treatment facility final disposal area (SAS) will be located at the site which is outside any designated Zone II Water Supply Protection Zone. The proposed WWTP using MBR Technology will be designed to produce an effluent quality not to exceed the following:

BOD_5	= 30 mg/l
TSS	= 30 mg/l
NITRATE	= 10 mg/l
TOTAL NITROGEN (NO_2 + NO_3 + TKN)	= 10 mg/l
FECAL COLIFORM	= 200 colonies/100 *
OIL & GREASE	= 15 mg/l

*If required by DEP after review of project hydrogeology study

PROPOSED TREATMENT OVERVIEW

Our firm reviewed possible methods of treatment and has elected to use the MBR Process. This process will include Primary Settling, Flow Equalization, Aerobic Stage, Anoxic Stages, Membrane Stage, UV Disinfection, and Dosing Tank to Cultec below grade chambers (or approved equal) and final leach area below grade distribution system.

PROPOSED TREATMENT PROCESS

PRIMARY TREATMENT/ FLOW EQUALIZATION

Wastewater from the new NRMH complex will enter one of two 9,000 gallon trash traps. The trash traps will be precast concrete tanks installed below grade. The purpose of the trash traps is to remove a portion of fats, oil and grease (FOG) and heavy solids prior to the wastewater entering the Flow Equalization Tank (EQ tank). Flow from the trash traps to the EQ tank will be via gravity. A 19,000 gallon precast concrete EQ tank will be installed below grade (9,276 gallon working volume). The EQ tank will be utilized to dampen the flow variations throughout the day in order to feed a relatively constant flow to the treatment process. The trash traps and EQ will have Odor Control to an activated Carbon Motorized Odor Control system. The EQ tank will contain two (one operating/one standby) submersible pumps. The pumps will be controlled by variable speed drives and the flow from the pumps will be monitored by a magnetic flow meter. In this fashion the pump output can be controlled to a specified flow rate regardless of the liquid height in the EQ tank. This flexibility will allow the operator to set the flow into the treatment process for better process control. An ultra-sonic level sensor will be installed in the EQ tank to monitor the liquid level for pump protection and high level alarming. Flow from the EQ pumps will pass through a rotary drum screen. The screening system will remove non-soluble BOD and inorganic solids greater than 2 mm. The

screen system will include conveyor/compactor and automatic bagging system to capture the solids. Screened sewage will then flow to a 5,000 gallon Pre Anoxic Tank. A level sensor will be installed in the Pre Anoxic Tank to control the flow forward from the FET pumps.

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MECHANICAL BAR SCREEN

Wastewater will be pumped at a controlled forward flow rate from the FET through an automated mechanical bar screen assembly prior to flow to the biological treatment reactors. The mechanical bar screen will contain 2 millimeter openings with raking mechanism to remove collected solids to a collection basket.

PRE ANOXIC STAGE

Wastewater will be fed to a 5,000 gallon Pre Anoxic tank from the bar screen. This tank will be a below floor grade precast concrete tank within the building. The anoxic zone is required in order to achieve nitrogen removal. Nitrogen removal is accomplished in the anoxic zone by the conversion of nitrates to nitrogen gas (which purges to atmosphere). Although the anoxic zone is maintained with zero dissolved oxygen it does contain oxygen in the form of nitrates contained in the mixed liquor that is recycled from the membrane skid. The carbon source required for biological Denitrification is provided by the influent wastewater and a supplemental carbon feed system. Oxygen required for the oxidation of BOD by the microorganisms is supplied by the oxygen that is chemically bound to the nitrate ion resulting in the reduction of nitrates to nitrogen gas. The design will utilize the mixing pumps to mix the contents of the anoxic tanks. In order to assure the microorganisms have an adequate food source a supplemental carbon feed system will be installed. An ORP controller will be utilized to monitor the oxidation reduction potential in the anoxic tank which will determine the rate of additional carbon that needs to be fed to the anoxic tank. The supplemental carbon system is fully automatic. A non-hazardous chemical called Micro-C or Sucrose will be utilized as the additional carbon source.

AERATION STAGE

Mixed liquor will flow by gravity from the Pre Anoxic tank to a 4,400 gallon aeration tank. This tank will be a reinforced below grade precast concrete storage tank within the building. The aeration tank is fitted with a fine bubble aeration system in order to provide oxygen to the microorganisms and to provide complete mixing of the aeration tank contents. Both BOD reduction and nitrification occur in the aeration chamber. Air is provided to the aeration chamber by a positive displacement blower that is controlled by a variable speed drive (VFD). A dissolved oxygen (DO) meter will monitor the dissolved oxygen level within the aeration chamber. The DO meter will provide information to the control system to allow for automatic control of the aeration blower. The speed of the blower will be controlled

in order to maintain a set DO level within the chamber. A pH control system will be installed to monitor and control the pH in the aeration tank to optimum levels. Sodium Hydroxide will be utilized to control the pH.

POST TERTIARY ANOXIC REACTOR

A 2,500 gallon precast concrete tank below floor grade similar to the pre anoxic storage described above will provide Denitrification of any remaining Nitrate-N that is contained in the aerobic reactor effluent.

MEMBRANE STAGE

Following biological treatment in the anoxic/aeration tanks, the treated wastewater must be separated from the biomass (activated sludge). This will be achieved by a pressurized cross-flow low energy membrane separation process. The activated sludge in the concentrate stream will be returned to the Aeration Tank.

The proposed Pentair X-Flow Airlift Bio Pulse Membrane will be external tubular membrane system. The Membrane will be configured in the vertical position above the WWTP floor for ease of maintenance. The bank of membranes will be provided with a membrane feed pump to provide the necessary cross-flow velocity through the membrane modules. The feed pumps are 'fed' from below floor grade Post Anoxic tank.

PERMEATE TANK

This tank will be a reinforced above grade HDPE 2,000 gallon storage tank within the building. The purpose of the Permeate Tank is storage of water for backwash of the Membrane with the overflow discharge to the outside below grade Dosing Tank.

TURBIDITY MONITORING

A slip stream from the permeate pump discharge will pass through a turbidity meter prior to the permeate /backwash tank fill connection. The turbidity meter will monitor the clarity of the effluent in order to alert the operator in the unlikely event of a membrane failure. Should the turbidity increase above an acceptable level the system will be faulted and an alarm activated.

UV DISINFECTION

A UV disinfection system will be installed on the discharge of the Membrane Skid Pump. This UV system will be utilized to assure fecal coliform levels meet the permit requirements. A second UV unit with pump will recirculate the stored water in the Permeate Storage Tank to assure that backwash water is disinfected and

free of any growths that could foul the membrane. The discharge to the dosing pumps will include a flow meter and pH monitor.

TREATED EFFLUENT DISPOSAL

Effluent will then be directed to a below grade 4,375 gallon working volume Dosing Tank. The effluent storage tank will be a precast concrete tank installed below grade. The tank will contain two effluent dosing pumps. The dosing pumps will pump effluent to final discharge within the new chambered disposal field. The dosing will consist of dosing to two separate leach areas with separate pump and force main. The dosing pumps will be controlled with VFD's to vary the flow discharge rate for distribution to the final fields. The discharge piping to the SAS will be dual 4" diameter ductile iron pipes. The distribution system within the final leach area will consist of 3" and 4" schedule 80 PVC pipe. 20 distribution nozzles per field are proposed to disburse the treated effluent. Each nozzle is designed to dose at a rate of 10 gpm.

STANDBY EMERGENCY POWER

A standby generator will be installed to provide power in the event the treatment plant loses power. The generator will be designed to automatically start upon a power failure and continue to operate until normal power is restored. The generator will be sized to operate the plant at peak capacity. The generator will be located outside the proposed WWTP building.

SAFETY

The WWTP will be equipped with standard safety features such as first aid kit and fire extinguishers. In addition, eye wash and safety shower within the chemical feed area will be provided. OSHA approved chemical storage containment basins will be provided for all stored chemicals.

The construction of the new WWTP to serve the new NRMH will be a positive long range improvement to sewage disposal at this site.

FUTURE POSSIBLE OTHER SEWER CONNECTIONS

During the WWTP design process, the Town of North Reading discussed the possibility of connecting additional public buildings to the proposed NRMH WWTP at sometime in the future. This was discussed during a meeting with DEP on May 13, 2012. The possible future tie in of North Reading buildings included the Batchelder School, Public Safety, Flint Library, Building on the common, Putnam House, Damon Tavern and Senior Housing adjacent to the school site. DEP stated that these additional flows would be considered after the new NRMH is on line and after consistent actual water use is documented. This evaluation would occur in

2016. It was noted at the meeting that any future connections to the WWTP would be only for public buildings and not private.

OVERALL SITE PLAN

Included with the design package submittal are site drawings showing the proposed sewer collection system for the new NRMH.

Shown on the permit drawings upstream of the WWTP is a sewer stub to allow for the possible future tie in of the North Reading Senior Housing Complex. This possible future tie in would be considered especially feasible to supplement sewage flows to the new High School WWTP during the summer months or periods during the year when school flow is minimal. This tie in would not be made without prior approval by DEP of proposed method of tie in. This proposed tie in would not occur until complete construction of the High School/Middle School as well as a period of recording of actual water from the new school building complex.

SECTION 3

DESCRIPTION OF SLUDGE HANDLING

I GENERAL

The treatment process utilized at the NRHMS treatment facility generates waste solids, as do all biological treatment processes that require handling separate from the wastewater treatment system. Solids generated in the MBR Process will be monitored monthly and will be removed from the modules by a licensed Septage hauler when the contents of the units are at capacity as noted in the BIOPROCESSH_2O operation manual.

Solids generated by the treatment plant are collected and stored in the Trash Traps and Pre-Anoxic and Post Anoxic Tank. Consequently, these tanks should be monitored monthly to check the sludge depth. It is recommended that the sludge be removed by a licensed septage hauler at least once per year. In addition, the scum on the liquid surface of these tanks should be removed, at a minimum, once each year due to its heavy consistency.

II DESIGNATED SLUDGE HAULER

Sludge Hauler:	TELEPHONE NUMBER
Stewart Septic Service, Inc. 58 S. Kimball Street Haverhill, MA 01835	978-688-7560

Disposal Facility:

APPROVED DEP SEPTAGE DUMPING FACILITY
USED BY STEWART SEPTIC SERVICE, INC.

SECTION 4
STAFFING PLAN

A staffing plan is required by 314 CMR 12.04 (3) in order to assure proper operation and maintenance of the waste treatment facility.

The following is the staffing plan provided in accordance with Discharge Permit # 931-0, Transmittal number 253180 in order to meet the requirements of 314 CMR 12.04 (3) as well as to meet Supplemental Condition #9 of the Department of Environmental Protection approval letter dated March 14, 2013.

I. Personnel

Day to Day Staffing

Primary and Secondary operational services will be provided by _____. Weekend and backup staffing will be provided by _____.

Operator	License Grade	License Number

As the treatment facility will be equipped with an alarm system and automatic dialer for all vital systems, it can be operated effectively on a part-time schedule. _____ will provide Primary Operator coverage for up to 2 hours per day, five days per week. The Secondary and Backup Operators will be available when the Primary Operator is unavailable due to illness, vacation, or similar reasons.

Emergency Staffing

Personnel will be available to respond to emergency situations on a twenty-four (24) hour per day, seven (7) day per week basis, including holidays. A certified operator will respond to emergencies within thirty (30) minutes by telephone and one (1) hour onsite, as needed. The facility's automatic dialer system will be programmed, in order, with the cell phone numbers of _____, Primary and Secondary Operator _____, to provide complete, seamless coverage and response to emergency situations and alarm conditions.

Operations

A. Operational Days:
Monday through Friday

B. Operational Hours:

Operator on site average 10 hours per week

C. Shifts Per Day:

1 shift

D. Required personnel per shift

1 operator

E. Saturday, Sunday and Holiday staff coverage only when required by the permittee for special events.

IN ADDITION

On call, can respond within 1 hour of notice. The treatment facility is equipped with automatic alarms and dialers for the following;

1. FET High Water Alarm
2. Process equipment Alarms (See BIOPROCESSH_2O O&M for details)
3. Dosing Pump High Water

These alarms transmit alarm signals to the designated system which is manned 24 hours/day, 7 days/week.

F. Emergency Operating Personnel

1. Chief Operator - 24 hour emergency call.
2. Assistant/Back up Operator - 24 hour emergency call.

Engineer Consultant Services

Martinage Engineering Associates, Inc.
131 Main Street, Third Floor
Reading, MA 01867
781-944-4808

Design Engineer

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Note: The DEP letter of approval dated March 14, 2013 requires a Certified Grade IV (or higher) Wastewater Treatment Plant Operator to be in responsible charge of the plant at all times. Also, a backup operator Grade III (or higher) is required in the event that the primary operator is not available.

314 CMR (3) requires that staffing plan be updated every two years.

III. General Operator Responsibilities

The responsibilities of the operator are to include, but are not necessarily limited to, the following:

1. The operation will include all facets of plant operations necessary to maintain the plant in a proper operating condition.

2. Daily operations (Required by Permit)

ALL REQUIRED COMPLIANCE TESTING LISTED IN THE DISCHARGE PERMIT 931-0 IS THE RESPONSIBILITY OF THE OPERATOR OR COMPLIANCE FIRM.

3. Daily lubrication and routine maintenance of all electrical equipment, mechanical equipment and tankage located at the sewage treatment facility including the final dosing station.

4. Keeping the plant facility clean through a regular maintenance program, i.e. weed control, mechanical screen, scrubbing down areas of sludge build up, etc.

5. Ordering and otherwise procuring required materials for normal plant operation.

6. Being on premises for official inspections as required by the Groundwater Discharge Permit.

7. Providing daily services as well as emergency service whenever necessary.

8. In accordance with 314 CMR 12.04 the operator shall complete the following:

   a. Inspect all pumping stations or lift stations daily and maintain records for submittal to the DEP summarizing all activity. The DEP DMR REPORT is to be sent to the DEP monthly. (310 CMR 12.04-4)
   b. Inspect both the FET Pump Station and Dosing Pump Station. Alarms shall be checked at least twice annually. (314 CMR 12.04-5)
   c. The generator and transfer switch providing emergency power to the Wastewater Treatment Control building as well as the major pumps and equipment at the treatment facility must be tested at least twice annually. This testing may have to be coordinated with the NRHMS Administration. The results of these tests shall be included in the **Wastewater Treatment Plant Operation Report** and attached to and submitted with the DEP DMR report and monthly compliance report. (310 CMR 12.04-6)
   d. **No septage is to enter the wastewater treatment plant. This treatment facility is designed for domestic sewage**

generated from the school facility only (310 CMR 12.04-7).

e. The operator of the treatment works shall maintain the facilities in a manner that will ensure proper operation of the facilities or any part thereof (310 CMR 12.04-8).

f. The operator shall implement a preventative maintenance program to assure efficient operation of all facilities and equipment (310 CMR 12.04-9)

g. The operator of the treatment works shall maintain sufficient and adequate tools, equipment, spare parts and supplies to maintain and operate all appurtenances of the facility on a continuous basis. (310 CMR 12.04-10)

h. A reserve supply of all parts and supplies having a high replacement rate shall be on hand at all times. (310 CMR 12.04-11)

i. All standby and other equipment shall be maintained in an operable condition (310 CMR 12.04-12).

SECTION 5

SAMPLING AND ANALYSIS
COMPLIANCE INSPECTION

I Required Sampling and Analysis by the Operational Firm

Routine analyses of samples taken at selected points of the treatment process are to be made to determine plant performance and compliance with the Discharge Permit. Sampling points to be determined.

The Monitoring and Reporting requirements of Discharge Permit #931-0 and Transmittal number X253180 require the quality and quantity of Influent to the Wastewater Treatment System and Effluent at the Final Effluent Dosing Tank to be measured according to the following schedule and other provisions:

A. INFLUENT

PARAMETER	FREQUENCY	SAMPLE TYPE
FLOW	DAILY	AVERAGE
BOD_5	MONTHLY	24 HR COMPOSITE
TSS	MONTHLY	24 HR COMPOSITE
TOTAL SOLIDS	MONTHLY	24 HR COMPOSITE
AMMONIA NITROGEN	MONTHLY	24 HR COMPOSITE

B. EFFLUENT

PARAMETER	FREQUENCY	SAMPLE TYPE
FLOW	DAILY	READING REPORT MIN-MAX-AVERAGE
pH	DAILY	GRAB
BOD_5	MONTHLY	24 HR COMPOSITE
TSS	MONTHLY	24 HR COMPOSITE
TS	MONTHLY	24 HR COMPOSITE
NITRATE NITROGEN	MONTHLY	24 HR COMPOSITE

PARAMETER	FREQUENCY	SAMPLE TYPE
TOTAL NITROGEN	MONTHLY	24 HR COMPOSITE
OIL & GREASE	MONTHLY	GRAB
SURFACTANTS	MONTHLY	GRAB
TOTAL PHOSPHOROUS	QUARTERLY	GRAB
ORTHO PHOSPHATE	QUARTERLY	GRAB
VOLATILE ORGANIC COMPOUNDS (US EPA METHOD # 624)	ANNUAL	GRAB

More frequent analysis may be required during startup in order to adjust equipment settings.

C. MONITORING WELLS

The monitoring requirements of the Discharge Permit require that monitoring wells MW-1R, MW-4, MW-5 and MW-6, be monitored, recorded, and reported relative to the quality of water in the monitoring wells according to the following schedule and other provisions:

PARAMETER	FREQUENCY
Ph	MONTHLY
STATIC WATER LEVEL	MONTHLY
SPECIFIC CONDUCTANCE	MONTHLY
NITRATE NITROGEN	QUARTERLY
SURFACTANTS	QUARTERLY
TOTAL NITROGEN	QUARTERLY
TOTAL PHOSPHOROUS	QUARTERLY
ORTHO PHOSPHATE	QUARTERLY

PARAMETER	FREQUENCY
VOLATILE ORGANIC COMPOUND (US EPA METHOD # 624)	ANNUALLY

MW-1R is described as the upstream well and MW-4, MW-5 and MW-6 are downstream in the Revised Hydrogeologic Report with a revised date of November 30, 2012.

D. EFFLUENT LIMITS

Town of North Reading High/Middle School is authorized by the DEP to discharge into the ground from the wastewater treatment facilities for which the groundwater permit was issued a treated effluent whose characteristics within one month of startup of the approved wastewater treatment facility and continuing thereafter, shall not exceed the following values:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATION
FLOW	17,500 GPD
BOD, 5 DAY, 20°C	30 MG/L
TOTAL SUSPENDED SOLIDS	30 MG/L
NITRATE NITROGEN	10 MG/L
TOTAL NITROGEN	10 MG/L
OIL & GREASE	15.0 MG/L

E. OBSERVATIONS

1. The pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time.

2. The discharge of the effluent shall not result in any demonstrable adverse effect on the groundwater or violate any water quality standards that have been promulgated.

3. The monthly average concentrations of BOD_5 and Total Suspended

Solids (TSS) in the discharge shall not exceed 15% of the monthly average concentrations of BOD_5 and TSS in the influent into the permittees' wastewater treatment facility.

4. When the average annual flow exceeds 80% of the permitted flow limitations, the permittee shall submit a report to the permitting authorities describing what steps the permittee will take in order to remain in compliance with the permit limitations and conditions, inclusive of the flow limitations established in the permit.

5. The final limits of Discharge Permit # 931-0 are effective one month after completion and startup of the treatment plant.

6. The discharge permit requires EPA Method #624 be used for analysis of samples for Volatile Organic Compounds.

7. Any grab sample or composite sample required to be taken less frequently than daily shall be taken during a period of Monday through Friday inclusive. All composite samples shall be taken over the operating day.

8. The permittee shall submit all monitoring reports on an acceptable form, properly filled out and signed, on the last day of every month, beginning thirty days after the issuance of this permit, to the Deputy Regional Director, Bureau of Resource Protection, Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA 01887, and to the Department of Environmental Protection, Bureau of Resource Protection, Wastewater Management Program, One Winter Street, 5th Floor, Boston, MA 02108 and to the North Reading Board of Health Office, 235 North Street, North Reading, MA 01864.

F. Supplemental Conditions

Please see the Groundwater Discharge Permit in Appendix A for all Supplemental Conditions.

G. Laboratory Procedures

All sampling, sampling preservation and analysis must be performed utilizing procedures approved by the Massachusetts Department of Environmental Protection (DEP). In addition, samples for compliance monitoring MUST be analyzed by a laboratory certified by the Commonwealth of Massachusetts to conduct the required analysis.

The following laboratory procedures will be used to analyze the required sample parameters.

PARAMETER	METHOD
1. Biochemical Oxygen Demand	SM 5210B
2. Total Suspended Solids	SM 2540-D
3, Total Solids	SM 2540-B
4. pH	SM 4500-H-B
5. Nitrate Nitrogen	SM 4500-NO_3-E/300.0
6. Ammonia Nitrogen	SM 4500 NH_3-C
7. Oil and Grease	EPA 1664
8. Specific Conductance	SM 2510-B/120.1
9. Dissolved Oxygen	SM 4500-O-G
10. Nitrite-Nitrogen	SM 4500-NO_2-B/300.0
11. Total Kjeldahl Nitrogen	SM 18-B, E/19, 20-B, C-TTR
12. Total Volatile Organic Compounds	EPA 624

The location of the sampling points to be determined by operator.

SECTION 6

OPERATOR SAMPLING, ANALYSIS & RECORD KEEPING

I. General - Records

A Importance of Records

1. Plant Operation. Review of operating records can be used to evaluate solutions to present (and possible future) problems based upon past experiences.

2. Maintenance. Records are needed to document type and frequency of maintenance performed.

3. Performance records can be used for basis of modifying facility operation and evaluation of design for future expansion or upgrade.

4. Records are required to prepare reports of treatment performance for regulatory agencies.

5. Records provide basis from which personnel, materials and equipment budgets can be made.

B Types of Records

Records can generally be maintained for five categories:

1. Operation and performance (usually required by regulatory agencies).

2. Physical plant and inventory records.

3. Maintenance records.

4. Financial records.

5. Laboratory QA/QC records.

Operation and Performance Records

Originals of all monthly Wastewater Treatment Plant Operations Reports as well as copies of the Operators Daily Log shall be maintained in an organized and neat manner. As noted under Section 4 of this manual a copy of the Wastewater Treatment Plant Operation Report is attached to and submitted with the compliance engineer's monthly compliance report. This data should be readily available to the operator for review and as a reference to the plant operation.

Physical Plant and Inventory Records

Copies of design plans and specifications are important for detailed information regarding piping and wiring of the plant. Copies of plans and operating instructions of plant equipment should be kept at the facility. A complete record of all treatment plant equipment including manufacturers and local service agents should be maintained at the site. Lists of tools, chemicals and lab supplies should be maintained and used for monitoring chemical usage and ordering materials well in advance of needing them.

Maintenance Records

Copies of manufacturers recommended maintenance schedules should be retained and used as a guide in setting up a routine maintenance schedule for the overall treatment facility. This schedule should be used for planning maintenance and for recording maintenance activities as they are performed. These records will provide the operator(s) with information to protect equipment warranties, prepare budgets and conform with regulatory requirements. Performing routine maintenance and recording the activity can go a long way in preventing unnecessary equipment breakdowns.

Financial and Cost Records

Keeping track of purchases and expenses is very important when preparing operating and expense budgets for operation of a wastewater treatment facility. Maintenance of these records provides information necessary for ordering necessary services, supplies and equipment needed to keep the plant operational as well as keeping the names and locations of vendors, from whom these services and materials are ordered, available.

Laboratory QA/QC Records

Proper daily operational testing is an integral part of successfully operating a wastewater treatment facility.

The operator will keep daily calibration logs for the following testing equipment.

a. pH/ISE meter
b. Dissolved Oxygen Meter

II. Visual Inspections

A visual check of the treatment plant should be made daily as well as listening for unusual noises, leaking fluids and smelling for unusual odors to obtain a preliminary, qualitative indication of plant performance.

Upon arrival at the wastewater treatment facility, record the time, temperature, and weather condition at the wastewater treatment plant. Weather conditions are RAIN, SNOW, CLDY = cloudy, CLR = clear.

III. Required Sampling and Analysis by Operator

Routine daily analysis of samples taken from selected points of the treatment process are to be made to determine plant performance and effluent quality as required by the Discharge Permit as well as performance testing by the operator or the compliance engineer. These tasks are outlined in Section 5 of this O&M Manual as well as the Groundwater Discharge Permit #931-0. A copy of the complete discharge permit can be found in Appendix A of this manual.

The location of the sampling points to be determined by the operator.

The operation log book should include:

1. Read both flow recorders to record Effluent flow.

2. Measure the pH of the Aeration Tank and the Final Effluent, and record. Use pH meter for these tests.

3. Measure the temperature of the Aeration Tank, and record.

4. Alkalinity Testing - Performance testing for alkalinity should be performed on a daily basis at the following locations;

   - Influent at FET.
   - Bio-Process unit effluent. (Post Anoxic)
   - Final effluent. (dosing tank)

NOTE: The Bio-Process Technical Staff during the startup phase will determine the desired Alkalinity levels to be maintained and test locations.

5. Measure the Dissolved Oxygen in the Pre-Anoxic Tank and Post Anoxic Tank. Use Dissolved Oxygen (DO) meter for these tests. Be sure DO meter is always charged up and properly calibrated. If there are any questions on the operation of the Dissolved Oxygen meter, the operating manual for the meter should be thoroughly studied. Any specific questions should be directed to the compliance engineer. DO levels in the Aeration Tank under normal operating conditions will probably range from approximately 2.0 mg/l to 5.0 mg/l.

6. Complete any other applicable entries in the Wastewater Treatment Plant Operating Report.

7. At a minimum, the dosing chamber and the final sand beds should be inspected monthly for any solids buildup. (should be no visual buildup.)

8. Forward Flow Rate: Measure the forward flow rate by reading the inflow Flow Meter on discharge from FET.

9. Chemical Addition

   Record the amount of the following chemical additives when used.

   - Sodium Bicarbonate/Sodium Hydrochloride
   - Carbon Source

10. Meter Readings

    Record the following meter readings on a daily basis.

    Flow Meter, Influent and discharge flow meter
    FET pump hour meters
    Dosing hour meters

11. Physical Observations

    The following observations should be made and recorded:

    Physical color/condition of Aeration Tank Mixed Liquor.
    Anoxic condition, floating scum, solids, etc.

IV. PROCESS MONITORING (GENERAL)

The treatment plant equipment is controlled by a master control panel for the major

treatment equipment. Any setting changes contemplated should be discussed by the certified wastewater treatment plant operator with BIOPROCESSH_2O technical staff.

The plant design requires minimal operator attention. Wastewater analysis is necessary to monitor overall plant performance and to identify and correct specific problems should they occur. The laboratory analysis required by the Massachusetts Department of Environmental Protection as outlined in the discharge permit **(a copy which is included in APPENDIX A of this manual)** will provide an important record and chronology of events which will enable the plant operator (over time) to interpret and predict events. This data needs only to be supplemented with accurate and complete records of daily visual observations. Routine daily testing required by the discharge permit of the plant operator is not limited to pH and Flow monitoring. We have outlined in Section 5 additional simple tests which the operator should record in order to have adequate data when needed. Microbiological examination of the media, dissolved oxygen monitoring or other analysis routines will be recommended by BIOPROCESSH_2O technical staff, if necessary, to resolve a particular problem.

The pH of the effluent should be within the range of 6.5 to 8.5 as specified in the discharge permit. A value outside the range for extended periods of time will result in a decrease in plant efficiency. A low pH value is of particular concern, as this will affect the plant's ability to remove nitrogen. The incoming sewage should have sufficient alkalinity present to maintain a pH within the 6.5 to 8.5 range without chemical addition.

A visual inspection should be made of all of the facilities' unit processes each day of operator coverage. Particular attention should be given to the biomass appearance. Reference the BIOPROCESSH_2O O&M manual relative to the operation procedure and trouble shooting.

The detection of abnormal or objectionable odors in the treatment plant can also serve as an early warning of possible operational problems. Many gases are produced during the collection, transportation and storage of wastewater. Fresh domestic sewage has a slight odor usually described as musty, when depleted of Dissolved Oxygen (DO), malodorous compounds such as hydrogen sulfide are given off. The BIOPROCESSH_2O system is designed to maintain a positive DO in the wastewater and therefore, the process system should not be a source of objectionable odors.

SECTION 7

REPORTING

I. GENERAL

It is critical that the required sampling, analysis and reporting are conducted for this facility in accordance with 314 CMR 12.07 as well as the monitoring and reporting requirements detailed in Discharge Permit 931-0. It is imperative that the **operator** maintain records as outlined in Section 6 of this manual. The certified operations firm conducts the weekly, monthly, semi-annual, and annual testing and reporting requirements and prepares and submits the required monthly reports to the Massachusetts Department of Environmental Protection.

II. OPERATOR RECORDS

1. 314 CMR 12.07 (1) requires that the operator maintains a monthly operating record in a format acceptable to the Massachusetts DEP.

2. 314 CMR 12.07 (2) requires that records be submitted on forms approved by the DEP. The Wastewater Treatment Plant Operation Report must be completely filled out and be neat and legible. It is the Operator's RESPONSIBILITY to forward a copy of this report to DEP in a timely manner as required by the Discharge Permit.

3. The Operator should record daily readings and operational analysis results each day on the **OPERATOR DAILY LOG**. In addition, the pertinent data completed by the **WASTEWATER TREATMENT OPERATOR** should also be completed **DAILY** and recorded neatly in a bound notebook (Operator Daily Log Book). The Operator Daily Log remains at the Wastewater Treatment Plant control room in a notebook for review by the DEP or Town of North Reading Board of Health should they conduct an inspection.

4. CMR 12.07 (5) requires that data in the monthly operating records or other such records submitted to the DEP shall be factual and accurate to the best knowledge of the person operating the waste treatment facility.

5. CMR 314CMR 15.07 (3) requires that the operator shall keep records for any pumping or lift station failures which should include:

Reason for Failure.
Length of time out of service.
Total volume overflowed. (If any)

Any resultant overflow or bypass shall be reported to the DEP, Division of Water Pollution Control in accordance with 314 CMR 3.19 (20e) and 5.19 (20e).

6. CMR 12.07 (6) requires the operator to keep all records of all monitoring information including calibration and maintenance records and all original flow meters for continuous monitoring instrumentation, and copies of all reports required by 314 CMR 12.00 for a period of at least three years from the date of the sample, measurement, or report. This period may be extended by the request of the DEP at any time.

   Records of monitoring information shall include:

   - The date, exact place, and time of sampling or measurements;
   - The name of the individual(s) who performed the sampling or measurement;
   - The date(s) analyses were performed;
   - The name of the individual(s) who performed the analysis;
   - The analytical techniques or methods used; and
   - The results of such analysis.

III. COMPLIANCE REPORTING

Compliance reporting is required by the Monitoring and Reporting requirements of Discharge Permit 931-0 to prepare and submit all reports on an acceptable form, properly filled out and signed, on the last day of every month, beginning thirty days after the issuance of the permit, to the following:

Deputy Regional Director Bureau of Resource Protection, Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA 01887;

Department of Environmental Protection, Bureau of Resource Protection, Wastewater Management Program, One Winter Street, 6th Floor, Boston, MA 02108;

North Reading Board of Health, 235 North Street, North Reading, MA 01864;

Copies of the MONTHLY REPORTS for the first year of operations are also to be provided to the following:

Mr. Donald E. Martinage
Martinage Engineering Associates, Inc.
131 Main St., Third Floor
Reading, MA 01867

And to:

Mr. Jeff Marshall
BIOPROCESSH_2O
45 High Point Avenue
Portsmouth Technology Park
Portsmouth, RI, 02871

SECTION 8

MAINTENANCE & HOUSEKEEPING

I. GENERAL

1. The importance of good mechanical maintenance and preventative maintenance at the treatment plant cannot be over-emphasized.

2. Equipment record cards (or equal) should be filled out and maintained on each piece of major equipment. These cards or records should include, at a minimum, item description, model and serial numbers, start-up date, required maintenance interval, maintenance performed, dates, servicing personnel, etc.

3. When equipment record cards (or equal) are completed they should serve as the basis for projecting preventive maintenance for one year.

4. Always be on the alert for abnormal noises or strange behavior of equipment. Get to know the normal equipment sounds. Rotate all duplex equipment on a regular basis to ensure equal wear and tear. This would include the following equipment:

   •Flow Equalization Pumps
   •Final Effluent Dosing Pumps

5. For any maintenance program to work effectively the following must be followed:

   a. Thorough knowledge of equipment including manufacturers suggested procedures for dismantling and re-assembly.
   b. Use of proper tools.
   c. Adequate repair parts.
   d. Planned program for scheduled periodic maintenance.

II. EQUIPMENT O&M MANUALS

1. BIOPROCESSH_2O O&M manuals include a summary of manufacturer information for equipment on site including operating and maintenance procedures. The operator(s) should become thoroughly familiar with the manufacturer's literature and additional information should be obtained whenever questions arise.

III. AERATION SYSTEM MAINTENANCE

1. Preventive Maintenance for Air Blowers: **See BIOPROCESSH_2O O&M for scheduled maintenance.**

    a. Drain and discard old oil.
    b. Replace with SAE Oil. (as recommended by blower Manufacturer.)
    c. Grease motor and blower bearings.
    d. Check condition of "V" belts, record condition in area log book.
    e. Report any malfunctions to maintenance coordinator.

2. Preventive Maintenance for "V" Belt Change on Blowers Frequency: Once per year

    a. Acquire replacement V-belts as required.
    b. Shut down one unit at a time. Inspect Belts. Change if necessary.
    c. Record results on operator log and equipment card (or record).
    d. Report any malfunctions to maintenance coordinator.

IV. GENERAL HOUSEKEEPING

Thorough weekday housekeeping at the wastewater treatment facility is essential. A well kept wastewater treatment plant has a very good psychological impression. A poorly kept plant will have unnecessary odors and operational difficulties.

a. Good housekeeping can and has prevented many accidents.

b. Have a proper place for tools and equipments. When they are not being used, see that they are kept in their proper places.

c. Clean up all spills of oil, grease, chemicals, polymers, wastewater and sludge. Keep walkways and work areas clean.

d. Provide proper containers for wastes, oily rags and papers. Empty these frequently.

e. Remove snow and melt ice with salt in areas where a person may slip and fall.

f. A clean plant will reduce the possibility of physical injuries and infections.

V. DAILY ROUTINE

On a daily basis, at least the following tasks should be performed:

a. Check to make sure that the influent mechanical bar screen is clear, hosing down if necessary. Review any material that may have collected. Maintain solids removal to proper disposal daily.

b. Check all Process Units, unusual noises or visual check.

c. Check all process tankage for any unusual solids accumulation or other build up.

d. Check walls and top angles of Process tank for any water level changes. If "splash-over" seems to routinely occur in certain areas, determine the reason and correct.

e. Clean the UV lamps routinely as necessary.

f. Be constantly on the alert for methods of eliminating housekeeping problem situations. Use common sense.

g. Consult equipment manufacturer's literature for any other suggested housekeeping recommendations. **(SEE BIOPROCESSH_2O O&M MANUAL)**

SECTION 9

EMERGENCY CONDITIONS

I POWER FAILURE

The treatment plant and the lift station are connected to an emergency generator. If there is an electrical power failure the school facility is equipped with an automatic transfer switch to emergency generator power. The school facility manager, and appropriate maintenance personnel should be made aware if the treatment facility is running on standby power. (SEE APPENDIX B FOR EMERGENCY CONTACT INFORMATION.)

II. EQUIPMENT MALFUNCTION AND/OR BREAKDOWN

In the event of an equipment malfunction or breakdown, the WWTP operator should immediately act to correct the problem either by consulting the manufacturer's maintenance section of this manual or by contacting the appropriate service personnel. (SEE APPENDIX B FOR EMERGENCY CONTACT INFORMATION.)

III. HYDRAULIC OVERLOADING

1. Treatment Plant

When wastewater flows to the treatment plant and exceeds the design rate, an immediate investigation of the source should be carried out. It is suggested that any return flows be reduced in order to minimize solids carry-over. It is assumed that this condition would only exist for a very short period under very unusual conditions. (SEE APPENDIX B FOR EMERGENCY CONTACT INFORMATION.)

When excess flows are continuous, the reasons should be investigated and repairs or corrections within the school sewerage collection system should be made immediately.

When treatment facility component(s) are down for long periods of time, provision for septage hauler removal shall be made. Hauling waste off site shall be an option readily available in case of emergency situations as well as for periods when the plant is shut down for lengthy maintenance or anticipated, non urgent repairs. (SEE APPENDIX B FOR EMERGENCY CONTACT INFORMATION.)

2. FET Tank

Abnormal rising water level in the FET is detected and signaled by a light at the Master Control Panel and by Automatic Dialer to the operator and school maintenance. The Waste Treatment personnel shall immediately act to correct any problem and/or make provision for emergency procedures.

3. Dosing Pump Station

Abnormal rising water level in the effluent dosing chamber is detected and signaled by a light located at the Control Panel.

IV FIRE AND MEDICAL EMERGENCIES

All emergencies shall follow the North Reading High/Middle School Emergency Plan. A copy of the plan should be placed in a conspicuous place in the control room of the waste treatment facility by the permittee.

V. SPILL CONTROL AND REPORTING

In the event of an overflow or accidental spillage of untreated wastewater or sludge should occur the following authorities shall be contacted:

Deputy Regional Director, Bureau of Resource Protection, Department of Environmental Protection, 205B Lowell Street, Wilmington, MA 01887;

Department of Environmental Protection, Bureau of Resource Protection, Wastewater Management Program One Winter Street, 6th Floor, Boston, MA 02108;

North Reading Board of Health Office, 235 North Street, North Reading, MA 01864

A written report shall be prepared, and submitted to the above agencies, describing the event, needed remedial actions and the steps to prevent a future occurrence.

SECTION 10

SAFETY

I GENERAL

1. As part of the Waste Treatment Operations, scheduled periodic workplace safety inspections should be performed in accordance with all applicable OSHA standards. A checklist can be used to document these inspections. In addition, monthly documented inspections of the waste treatment plant emergency equipment should be performed (i.e.: fire extinguisher(s), first aid kit, PPE, etc.)

2. 314 CMR 12.05 (9) requires that all wastewater treatment facilities personnel shall have immediate access to an approved first aid kit which shall be provided with adequate supplies at all times. A well-equipped industrial type first aid kit is essential to ensure timely treatment of minor first aid type injuries.

3. A wall-mounted telephone is located in the control room to provide a means of contact during emergencies.

4. 314 CMR 12.05 (5) requires any person operating a sewer system or a waste treatment facility to submit a report to the Director concerning any death or major injuries occurring at said facility. The report shall include as a minimum:

   a. The duties of the individual or individuals involved;
   b. What occurred?
   c. The cause (if known) of the accident;
   d. The extent of injuries; and
   e. The steps taken to minimize and prevent future accidents of the same type.

II. PHYSICAL INJURIES

314 CMR 12.05 (1) requires that all equipment and tools utilized by personnel working at the treatment plant shall be maintained by all persons in a safe and usable condition. The Wastewater Treatment Plant Operator should conduct an assessment study and identify any anticipated physical hazards and comply with OSHA PPE standard 29CFR 1910.132(d) to identify and protect against potential hazards.

III. PERSONAL HYGIENE

1. Personal Hygiene

Considering the type of work involved in operating and maintaining a wastewater treatment facility, it is very important to maintain a strict regimen of personal cleanliness and hygiene. Make it a habit to thoroughly wash your hands before eating and smoking. Avoid hand to mouth contact while at the waste treatment facility If you have cuts or broken skin protect it from contact with wastewater or sludge. Always wear proper protective gloves when in contact with wastewater or sludge. Wear work clothes when performing duties at the treatment plant and do not wear your work clothes anywhere else. Clean your work clothes regularly and launder them separately from your other clothes. Taking these simple steps will reduce the possibility of you or anyone else from becoming ill due to your contact with raw sewage and sludge.

2. Preventive Medicine

314CMR 12.04 (10) requires that any person operating a treatment plant receiving sewage shall provide personnel working at such works, with tetanus toxoid inoculations and with inoculation of typhoid vaccine. Required inoculations shall be kept current according to the most recent Department of Public Health requirements.

IV FIRE HAZARDS

Fires are obvious threats to personal safety as well as to buildings and equipment. The North Reading High/Middle School Fire Prevention Plan will establish procedures and safety policy as it relates to fire prevention at the waste treatment facility. The fire prevention plan will include determining type of extinguishers and best location as well as action plan in case of fire. The basic procedure in case of fire is as follows:

- If there is a fire, pull the alarm;
- If it is a small fire, use a fire extinguisher. A small fire is one that is in the initial or beginning stage and which can be controlled or extinguished by a portable fire extinguisher.

If NOT a small fire, leave the building.

THE WASTE TREATMENT AREA IS A NO SMOKING AREA

V. ELECTRICAL SHOCK

There should be a written Lockout/Tagout program as part of its Safety Program. All treatment operators should be trained on Lockout/Tagout procedures. These procedures should be followed at all times.

VI. NOISE

An assessment of the work area should be made and it should be determined what level of hearing protection (if any) is required at the waste treatment building.

VII. CONFINED SPACE ENTRY

ALL North Reading High/Middle School maintenance personnel, including the Waste Treatment Operators, should be trained on proper **CONFINED SPACE ENTRY**.

VIII. MINIMUM TRAINING

In addition to the treatment plant personnel being certified waste treatment operators, the operators should have completed all OSHA required training for this facility.

SECTION 11

UTILITIES

The following public utilities provide service to the North Reading High/Middle School Wastewater Treatment Facility:

ELECTRICITY

NORTH READING MUNICIPAL LIGHT:	**781-344-1340**

GAS

HESS:	**800-437-7265**
NATIONAL GRID:	**800-548-8000**

PHONE

VERIZON:	**800-903-1526**

CABLE

COMCAST:	**800-391-3000**

WATER

TOWN OF NORTH READING WATER DEPT:	**978-664-6046**

APPENDIX A

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

March 14, 2013

Mr. Greg Balukonis,
Town Administrator
235 North Street
North Reading, MA 01864

RE: Determination of Coverage Under a General Groundwater Discharge Permit
North Reading High School
191 Park Street, North Reading, MA
MassDEP Transmittal No. X253180
Groundwater Discharge Permit No. 931-0

Dear Mr. Balukonis:

The Massachusetts Clean Waters Act (M.G.L. c.21, s.26-53) was amended by Chapter 246 of the Acts of 1973 to authorize the Massachusetts Department of Environmental Protection ("MassDEP") to regulate discharges into all waters of the Commonwealth, including groundwaters. MassDEP regulates discharges through the issuance of discharge permits which impose limitations on the amount of pollutants which may be discharged in effluent, together with monitoring and reporting requirements and other conditions to ensure adequate treatment of all liquid wastes prior to discharge.

In response to your Notice of Intent (the "NOI") application for coverage under the General Permit for a Small Publicly Owned Wastewater Treatment Facility, submitted on December 20, 2012, on behalf of the Town of North Reading in regard to North Reading High School ("No. Reading HS"), located at 191 Park Street, North Reading, Massachusetts to discharge treated sanitary wastewater from a proposed on-site wastewater treatment facility to the ground, MassDEP hereby issues this approval letter. The public notice appeared in the Environmental Monitor on January 23, 2013, in the North Reading Transcript on January 24, 2013, in the and in the Central Register on January 30, 2013.

The facility has been assigned permit number **931-0** and is approved under its hydrogeologic evaluation approval to treat and discharge a maximum of 17,500 gallons per day of sanitary sewage.

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868
MassDEP Website: www.mass.gov/dep

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3. At least ninety (90) days prior to the clear water test, the following documents must be submitted to MassDEP for its written review and approval(s):

   (a) An operation and maintenance manual, prepared in accordance with 310 CMR 12.04(1): Both a hard copy and an electronic copy of the manual, including all third party documentation, shall be submitted to MassDEP. A spare parts inventory shall be included in the operation and maintenance manual.

   (b) If the operation and maintenance of the facility is contracted to a private concern, the permittee shall submit a copy of the contract, consistent with what is required by the approved Operation & Maintenance manual and signed only by the contractor. Along with the contract, a staffing plan and detailed listing of all contract operation obligations of the proposed contractor at other facilities shall also be submitted.

   (c) A copy of the plans and specifications for the wastewater treatment plant shall be submitted for review and approval by MassDEP. The plans and specifications must be stamped and signed by a Massachusetts Registered Professional Engineer.

4. Operation and maintenance for the proposed facility must be in accordance with 314 CMR 12.00: "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges" and 257 CMR 2.00: "Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities".

5. The referenced facility has been rated by this office (in accordance with 257 CMR 2.00) and it has been determined that the proposed wastewater treatment plant is a Grade 4 facility. Therefore, please be advised that as a Grade 4 facility, it is required that the person in responsible charge (Chief Operator) possess a valid Grade 4 Massachusetts Wastewater Treatment Operator's License. A backup operator must also be provided who shall possess at least a valid Grade 3 license.

6. Within sixty (60) days of the effective date of the permit, the services of a Massachusetts Registered Professional Engineer shall be retained under contract for the length of the permit. The engineer shall provide oversight and evaluation of the treatment system including the SAS.

7. If the proposed treatment process is unable to meet the requirements set forth in the Groundwater Discharge Permit for this facility and/or the conditions contained in this approval letter, the treatment process is to be modified, supplemented or replaced, so as to ensure compliance with the permit limitations. Any modification, supplementation or replacement shall require MassDEP approval prior to construction.

MassDEP

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

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Secretary

KENNETH L. KIMMELL
Commissioner

NOTIFICATION OF PERMIT EXTENSION FOR BRP GENERAL PERMITS

In August 2010 Governor Patrick signed Chapter 240 of the Acts of 2010 into law. Section 173 of this Act is known as the Permit Extension Act ("PEA" or "the Act"). In August 2012, Governor Patrick signed Chapter 238 of the Acts of 2012, which included two sections amending the PEA. As amended, the Act automatically extends (with limited exceptions), for four years beyond its otherwise applicable expiration date, any permit or approval for the use or development of property that was "in effect or existence" during the qualifying period beginning on August 15, 2008 and extending through August 15, 2012.

The Permit Extension Act's provisions have extended the term of the Groundwater Discharge Permit Program's General Permits for Car Washes, Small Privately Owned Treatment Facilities and Small Publicly Owned Wastewater Treatment Facilities as each was in effect during the specified time period. These permits will now expire on September 14, 2018.

Persons wishing to continue coverage must either file a Notice of Intent application (BRPWP80 or BRPWP81), requesting coverage under the General Permit OR file an application for an Individual Permit (BRPWP79 or BRPWP85) by March 18, 2018, six months prior to the new expiration date.

David Ferris, Program Director
Wastewater Management Program

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868
MassDEP Website: www.mass.gov/dep

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I. SPECIAL CONDITIONS

A. Effluent Limits

(1) The permittee is authorized to discharge into the ground from the wastewater treatment facilities for which this permit is issued a treated effluent whose characteristics within one month of start-up and continuing thereafter shall not exceed the following values:

Effluent Characteristics	Discharge Limitations
Biochemical Oxygen Demand (BOD5) (5 Day at 20°C)	30 mg/l
Total Suspended Solids (TSS)	30 mg/l
Nitrate Nitrogen	10 mg/l
Total Nitrogen (NO2 + NO3 + TKN)	10 mg/l
Oil & Grease	15 mg/l

(2) Except as otherwise provided herein, the pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time. If under natural conditions, the pH of the receiving ground water is less than 6.5 or greater than 8.5, the pH of the effluent shall not vary from the naturally occurring pH by more than 0.2 units.

(3) The discharge of the effluent shall not interfere with the use of the ground water as an actual or potential source of potable water and the use of surface waters for their existing and designated uses. The discharge of effluent shall not cause or contribute to a violation of the Massachusetts Surface Water Quality Standards, 314 CMR 4.00.

(4) The monthly average concentration of BOD5 and TSS in the discharge shall not exceed 15 percent of the monthly average concentrations of BOD5 and TSS in the influent into the permittee's wastewater treatment facility.

(5) The average daily flow shall not exceed the average daily flow specified in the Notice of Intent requesting coverage under the General Permit. When the average daily flow exceeds 80 percent of the flow specified in the Notice of Intent, the permittee shall submit a report to the Department describing what steps the permittee will take in

Flow	Daily	Reading-report Max-Min-Avg
pH	Daily	Grab
BOD5	Monthly	24 Hr. Composite
TSS	Monthly	24 Hr. Composite
TS	Monthly	24 Hr. Composite
Nitrate Nitrogen	Monthly	24 Hr. Composite
Total Nitrogen (NO2+NO3+TKN)	Monthly	24 Hr. Composite
Oil & Grease	Monthly	Grab
Surfactants	Monthly	Grab
Total Phosphorus	Quarterly	Grab
Orthophosphate	Quarterly	Grab
Volatile Organic Compounds	Annually	Grab US EPA Method 624

(3) If the wastewater is discharged to an open sand bed prior to discharge to the ground water, the permittee shall perform additional monitoring as follows:

(a) The permittee shall take a monthly grab sample of the effluent to monitor the effectiveness of the disinfection and measure the number of colonies of fecal coliform per ml in the effluent and record the results;

(b) If chlorine is used for disinfection, the permittee shall also take a daily grab sample of the effluent to monitor the chlorine residual in the effluent and record the results of this monitoring; and

(c) If UV is used for disinfection, the permittee shall monitor the UV intensity daily and record the results of this monitoring.

For purpose of this requirement, an open sand bed is a disposal system where effluent is spread onto the surface of the disposal area having a sand media so that the effluent may percolate through the sand media and then through the soil and unsaturated zone prior to entering the ground water.

(4) Prior to submission of a Notice of Intent requesting coverage under the General Permit, the permittee obtained

(8) The permittee shall submit all monitoring reports within thirty (30) days of the last day of the reporting month. Reports shall be on an acceptable form, properly filed and signed and shall be sent to the Regional Office that issues permits for discharges located within the municipality where the permittee's discharge occurs and to the Program Director, Wastewater Management Program, Department of Environmental Protection, One Winter Street/5th Floor, Boston, MA 02108.

(9) Submission of monitoring reports in electronic format is available through eDEP and serves as data submission to both the Regional and Boston offices. To register for electronic submission go to:
http://www.mass.gov/dep/service/compliance/edeponlf.htm

C. Supplemental Conditions

(1) The permittee shall notify the Department at least thirty (30) days in advance of a proposed transfer of ownership of the facility for which this permit is written. Said notification shall include a written agreement between the existing and proposed new permittee containing a proposed date for the transfer of the permit and the proposed new permittee's assumption of responsibility for compliance with all the terms and conditions of the permit. The transfer shall be subject to the automatic transfer provisions of 314 CMR 5.12(5). Pursuant to 314 CMR 5.12(5), the transfer shall take effect on the proposed transfer date unless the Department notifies the permittee before that proposed transfer date that it intends to modify or revoke and reissue the permit or that it needs additional information.

(2) An operation and maintenance plan and staffing plan (the "Operations and Maintenance Plan") for the wastewater treatment facility, including without limitation the sewer system, pump stations, and disposal fields, shall be submitted to the Department for its review and approval at least ninety (90) days prior to the operation of the treatment works or forty-five (45) days before the permit takes effect, whichever last occurs.

(3) If the facility is constructed after coverage under the General Permit is granted, an Engineering Report and as-built plans for the wastewater treatment facility shall be submitted to the Department at least ninety (90) days prior to the operation of the facility. These submissions shall

version of *Standard Methods for the Examination of Water and Wastewater*.

(9) The permittee shall notify the Department, in writing, within thirty (30) days of any the following events:

(a) The date the wastewater treatment facility starts operation;

(b) Any interruption of the operation of the wastewater treatment facility other than routine maintenance; and

(c) Final shutdown of the wastewater treatment facility.

(10) The permittee shall contract to have any and all solids and sludges generated by the wastewater treatment facility for which this permit is issued removed off site by a properly licensed waste hauler for disposal at an EPA/MassDEP approved facility. The name and license number of the hauler along with the schedule for the removal shall be reported by the permittee in writing to the Department at least thirty (30) days prior to the start-up of the wastewater treatment facility for new facilities and at least thirty (30) days prior to the start of any new contract for the removal of solids and sludges for existing facilities.

(11) The permittee shall not allow industrial users to discharge wastewater other than sewage to the facility.

(12) The General Permit is in effect for a period of five years from the date of issuance.

(13) The permittee shall file a Notice of Intent requesting continued coverage under the General Permit or shall file an application for an individual permit, at least one hundred eighty (180) days prior to the expiration date of the General Permit, regardless of when coverage was granted.

The General Permit Conditions set forth in 314 CMR 5.16 are hereby incorporated and made part of the General Permit

APPENDIX B

APPENDIX B

EMERGENCY TELEPHONE NUMBERS

AMBULANCE	911
NORTH READING POLICE DEPARTMENT	911
NON EMERGENCY	978-664-3131
NORTH READING FIRE DEPARTMENT	911
NON EMERGENCY	978-664-3112

OPERATIONS

DESIGN ENGINEERS:

MARTINAGE ENGINEERING ASSOCIATES, INC. 781-944-4808
131 Main Street, Third Floor
Reading, MA 01867

TREATMENT PROCESS TECHNICAL STAFF

BIOPROCESSH_2O Technologies 401-683-5400
207 High Point Avenue
Portsmouth Technology Park
Portsmouth, RI 02871

ENGINEER CONSULTANT SERVICES:

MARTINAGE ENGINEERING ASSOCIATES, INC. 781-944-4808
131 Main Street, Third Floor
Reading, MA 01867

EQUIPMENT SUPPLIER:

BIOPROCESSH_2O Technologies 401-683-5400
45 High Point Avenue
Portsmouth Technology Park
Portsmouth, RI 02871

WASTE HAULER:

Stewart Septic Service, Inc. **978-688-7560**
58 S. Kimball Street
Haverhill, MA 01835

OFFICIAL DUMPING STATION:

Approved DEP Septage Dumping Station

APPROVING AUTHORITIES

DEPUTY REGIONAL DIRECTOR **978-694-3200**
BUREAU OF RESOURCE PROTECTION
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B LOWELL STREET
WILMINGTON, MA 01887

NORTH READING BOARD OF HEALTH **978-664-6042**
MR. MARTIN FAIR, HEALTH AGENT