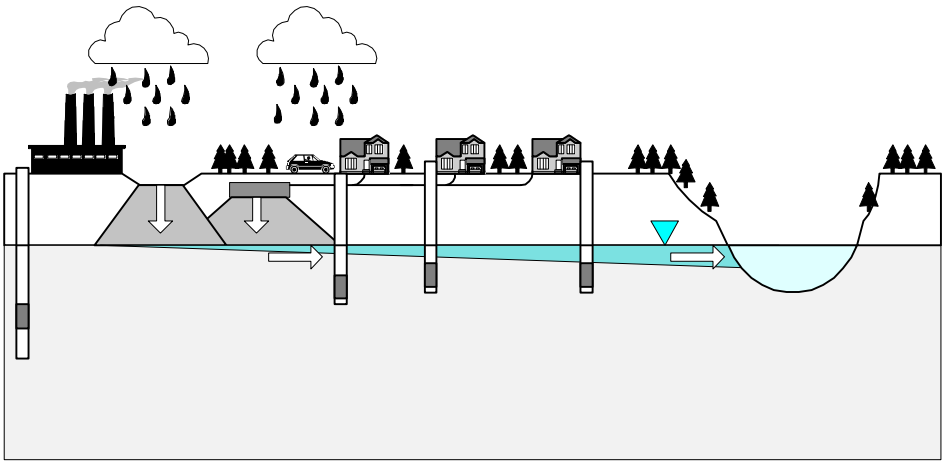
GUIDELINES FOR DEVELOPING GROUND WATER PROTECTION PROGRAM PLANS



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER QUALITY

BUREAU OF NONPOINT POLLUTION CONTROL

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I. INTRODUCTION

A. Purpose of a Ground Water Protection Program (GWPP) Plan

Ground water is a precious natural resource that is critical to both human and animal health. Ground water quality and quantity also plays a key role in our surface water resources by providing recharge to surface water base flows. The New Jersey Water Pollution Control Act provides regulatory authority to protect our ground water resources. Under that Act, the New Jersey Pollutant Discharge Elimination System (NJPDES) Regulations establish the regulatory framework within which the Department regulates the discharge of pollutants to the surface and ground waters of the State.

Every person responsible for a discharge of pollutants to waters of the State is required to obtain a NJPDES Permit. When the discharge impacts ground water, the appropriate permit is a NJPDES Discharge to Ground Water (DGW) permit. Each NJPDES-DGW permit issued by the New Jersey Department of Environmental Protection (NJDEP) is developed to restore, enhance, and maintain the ground water quality of the State, in accordance with the Ground Water Quality Standards (N.J.A.C. 7:9-6, N.J.A.C. 7:14A-8, N.J.A.C. 7:14A-9, or N.J.A.C. 7:14A-10)

In order to demonstrate compliance with the Ground Water Quality Standards (GWQS), each NJPDES-DGW permit includes any or all of the following components: a monitoring well network; ground water monitoring parameters and a sampling/reporting schedule; a discharge/effluent monitoring program and limitations; and/or best management practices and preventative measures. The NJDEP collectively refers to these components as the "Ground Water Protection Program" and, for simplification, we use "GWPP."

The purpose of the GWPP Plan is to present to the NJDEP, and the general public, what the facility does, or will do, to ensure compliance with applicable ground water quality standards. By writing the GWPP Plan, the permittee evaluates the facility's operations, discharges, actual and potential environmental risk and designs a program that makes sense for the facility, while complying with applicable rules and regulations. In the GWPP, the permittee has the opportunity to include preventative measures and practices, such as weekly inspections, that may not traditionally be thought of as a ground water protection measure but which do enhance the overall program.

In the past, the GWPP was developed by the NJDEP and incorporated directly into a NJPDES permit using information supplied by the permittee during the application process. The NJDEP would select all the components needed to comply with the applicable GWQS and draft a permit. Then, the permittee and the public would be given the opportunity to review the draft permit and provide comments. After that point, the permit would be issued in its final form. We now call this approach the NJPDES-DGW Individual (Custom) Permit because it is custom tailored by the NJDEP for the permittee. This approach, while still appropriate in limited cases, is being supplemented by a new process. This process allows permittee's to develop a GWPP on their own, which may better reflect the concerns of the permittee, while still enabling the Department to review the draft document before incorporation into the permit.

Under the new approach, the GWPP Plan will be approved as a separate document that is incorporated by reference into the actual NJPDES permit. Rather than the permittee responding to the NJDEP draft permit, the NJDEP will respond to the permittee's Plan. After the permittee and NJDEP agree to and certify a final plan, the permit and plan are public noticed for comment. This type of permit is called the GWPP Shell Permit, because the permit incorporates the GWPP. We

believe that this new approach will make the permit process both more responsive to the needs of the permittee, and more efficient with regard to the Department's review responsibilities. Please note that the Custom NJPDES Permit is still available when both the permittee and the Department agree that this is the best approach.

This guidance document provides the basic format and components expected to be included in a GWPP Plan. The format and components prescribed in this manual may not be found in each individual GWPP. As each facility is unique, each GWPP Plan will be unique. In many cases, a permit renewed through the GWPP approach may not differ greatly from the existing permit and can simply be a refinement of past permit conditions. On the other hand, the renewed permit can be radically different. For example, monitoring wells can be added or deleted, sampling schedules and parameter lists can be reduced or otherwise modified. The person developing the GWPP Plan, however, must present sound reasoning and data justifying the selected monitoring program.

Through the GWPP Plan, a permittee decides on the components of, and commits to, the monitoring program and best management practices that will be implemented at the facility to demonstrate compliance with GWQS.

B. The GWPP Plan Format

For consistency and ease of review by NJDEP, the organization of the GWPP Plan should be similar to that which is specified in Part II below, but the content will be unique for each facility. As such, each individual GWPP submitted to the Department will be unique. Appendix A contains a sample GWPP Outline and Appendix C provides three sample GWPP Plans for a range of facilities and discharges.

C. Philosophy of the GWPP

When writing your GWPP, keep the following in mind:

> *The GWPP Plan is a document that describes in detail what your facility is going to do in order comply with applicable ground water quality standards. Since it is ultimately approved by NJDEP, it is also a positive statement that you are doing all that is necessary and reasonable to comply with those standards. It should be a document that you can point to with pride and knowledge as a clear demonstration that your facility is a full partner with NJDEP in protection of the environment for all the citizens of the State.*

II. COMPONENTS OF A GROUND WATER PROTECTION PROGRAM (GWPP) PLAN

A. Detailed Site Description

The first step toward development of a GWPP is to thoroughly describe the site, the facility, the operations, the ecological resources that may be impacted, and the physical nature of the site, including geology, hydrology and soils.

1. Facility Description

This section establishes the basis for identifying the residential, institutional, commercial or industrial nature of a site. The facility's Standard Industrial Classification (SIC) code, which is assigned by the New Jersey Department of Labor and, if not known, may be obtained from them, should be included as part of this description. In addition to the narrative description of the site, each GWPP Plan must include a plot plan showing all the relevant features of the site such as buildings, storage areas, property lines, wells, roads, parking lots, and all areas that may create an environmental impact. The actual or anticipated ground water flow direction should also be identified on the plot plan. The purpose of this plot plan is to properly situate the facility and to tentatively identify any impacts that might occur downgradient of the facility as a result of a regulated unit.

2. Nature of Operations

Information relative to both present and past manufacturing processes, materials handling and waste stream flow provides insight into identifying potential pollutant sources or existing ambient conditions. This description should include a discussion of any improvements made, or measures taken, to limit or reduce the potential for pollutants to enter the ground water.

3. Physical Characteristics of the Area

A narrative description and a graphic depiction of the geographic location of the facility helps to identify potential sensitive receptors, adjacent land use trends and limitations, or the general hydrologic setting of the facility site (refer to N.J.A.C. 7:14A-7.9(d) 3 for further details). Each GWPP Plan must include a site location map that identifies the facility location with respect to streams, other water bodies, wetlands, roads, wells and other properties. This map can be produced using a USGS Topographic Quad map as a base.

4. Soils, Geology & Hydrogeology

For an existing facility, geology maps, soils maps and drilling and soil logs should be included whenever they are available. For the construction of a new facility or discharge unit, the following information must be included.

a) GW classification

Classification of the ground water resource establishes an element of the environmental performance standard that must be achieved by the GWPP. Ground water classification can be determined by section 6.5 and Figures 1 through 5 of the GWQS. In the case of III-A and III-B classifications, a more detailed field investigation and justification will be necessary.

b) Description of ground water pollutant migration pathways.

Once a pollutant is discharged into the ground water, the GWPP must be able to predict and track its impact on the environment. To do so, specific characteristics of the aquifer must be known (refer to N.J.A.C. 7:14A-7.9(d) 4 and 5 for further details on the collection of and reporting of this data):

(1) Surface soil conditions

Knowledge of soil or overburden conditions and types provides insight into hydrology of the site and aids in identifying the ground water recharge or infiltration rate and underlying geologic formations. In many circumstances, soil conditions have a significant bearing on the engineering of components designed to intentionally discharge pollutants (e.g. subsurface disposal fields, spray irrigation fields and infiltration/ percolation lagoons). Therefore, an accurate description of soil conditions is required.

(2) Geology

Essential to assessing ground water pollutant migration is knowledge of the physical characteristics of the aquifer. The GWPP Plan must include a full description of the formation and its general composition, its depth and uniformity, the presence of and depth to consolidated strata or formations and the presence of ground water and its associated elevations. When this information is viewed in consideration of structural features, such as orientation and inclination of bedding, foliation trends, faults, jointing and fracture trends in consolidated material, the GWPP writer has preliminary insight into the anticipated ground water pollutant migration pathways along with depths and intervals of concern for ground water monitoring purposes.

(3) Hydrogeology

Knowledge of site hydrogeology, such as direction of ground water flow, hydraulic conductivity, flow velocity and aquifer transmissivity, is essential for the following:

(i) ground water modeling for the purposes of justifying an attenuation monitoring program;

(ii) locating monitoring wells for any ground water monitoring program; and

(iii) gathering the geotechnical field information necessary to design facility components such as disposal fields, I/P lagoons, spray irrigation or any system designed to intentionally discharge pollutants into the ground water.

c) Determination of Background Ground Water Quality

Background or ambient ground water quality must be collected from locations that are (i) within the same hydrologic unit into which pollutants are being discharged and (ii) from an upgradient location. (The location can be onsite, where unaffected, or where least affected by the discharge activity.)

This is the essential element in establishing ground water constituent standards for a subject discharge activity. Additionally, results of the background ground water quality

determination will usually dictate the manner by which compliance with the GWQS is achieved, depending upon the ground water classification (e.g. Class I, II and III).

Background ground water quality must be established through the collection of several sampling events, rather than a single discrete value, to provide for a statistically significant background water quality value. As such, a minimum of 5 independent samples must be collected and analyzed over a time period which is representative of variability in the ground water (i.e., seasonal, spatial, etc.). The parameters to be analyzed must be determined in consideration of the pollutant characterization discussed in section II.D below. Once collected and analyzed the sample data from each independent event is pooled for each parameter and central tendencies that are appropriate to the distribution of the data (e.g. parametric or non-parametric) are then calculated.

d) Presence of Sensitive Receptors

All streams, lakes, ponds, wetlands and potable wells, as well as any other site-specific environmental receptors must be identified in the GWPP Plan.

B. Identification of Pollutant Sources

1. Identification of Regulated Units

Regulated units are referred to in many different ways. The rules at N.J.A.C. 7:14A-7.3(b) provides a list of the most commonly used words to describe units that are regulated by the NJPDES-DGW program. Use of a different name for a unit or source does not exclude one from the need to identify the pollutant source as a regulated unit. A person preparing a GWPP Plan should make an honest assessment of each pollutant source that can possibly contribute to ground water pollution. All pollutant sources must be identified. However, due to the exemptions in N.J.A.C. 7:14A-7.4, not all discharges and pollutant sources are regulated units under the NJPDES-DGW program. Therefore, sources that are not regulated by the GWPP should be identified as either “excluded” or “exempt” from the monitoring under the GWPP Plan. Examples of sources that should be excluded from the GWPP Plan are past discharges such as contaminated soils cleanups, underground storage tank spills and leachate from old landfills that ceased operating prior to 1982.

All pollutant sources and regulated units should be presented in tabular as well as narrative form. Examples of tabular representation of this information can be found in the sample GWPP Plans included in Appendix C. For example, this table can include a summary of the common name of the source, the DEP name for it, and the applicable environmental standards.

2. Engineering and Physical Characteristics of Regulated Units

An assessment of the discharge characteristics of a regulated unit should be stated. To substantiate any claims regarding engineering properties, specification sheets or test results must be included. For example, if a surface impoundment is lined with a high quality liner, the type of liner, its thickness, design specifications, its age and any test results should be provided. If it is partially lined or lined with a material of unknown permeability, such condition must be identified. It should not be assumed to be leak-proof.

C. Determination of Environmental Standards

In order to develop a GWPP Plan, the person developing the GWPP must establish, for each regulated unit or pollution source, the relevant environmental performance standards, or ground water protection standards (GWPS). In order to establish the applicable GWPS, one must determine the facility type, the applicable regulations and requirements set forth by other relevant permits or regulatory documents.

The applicable GWPS depend on the type of regulated unit. When the regulated units are ongoing discharges regulated identified under N.J.A.C. 7:14A-7, the GWQS are applicable. When the regulated unit is a sanitary landfill, the GWQS are specified in N.J.A.C. 7:14A-9. When the regulated unit is a hazardous waste facility as defined by N.J.A.C. 7:26G, the GWQS are specified in N.J.A.C. 7:14A-10. When the unit is an injection well, both N.J.A.C. 7:14A-7 and 8 provide the applicable GWQS.

1. Standards for Ongoing Discharges To Ground Water (DGW)

When the regulated unit has an ongoing discharge, GWQS (N.J.A.C. 7:9-6) are the applicable GWPS and the applicable rules (N.J.A.C. 7:14A-7) outline development of the GWPP Plan. For these DGWs, the primary environmental goal of the monitoring program is to demonstrate compliance with the GWQS at or within the downgradient property boundary of the site. Table 1 provides a depiction of the determination of which environmental performance standards should be applied.

In order to establish the GWPS, one must identify the classification of the ground water into which the discharge(s) will occur. This classification is detailed in N.J.A.C. 7:9-6.5. In summary, the GWQS establish three specific classes of ground water in New Jersey:

Class I: Ground Water of Special Ecological Significance (Trout waters, Pinelands etc.)

Class II: Ground Water for Potable Water Supply (Most of the State)

Class III: Ground Water with Uses Other Than Potable Water Supply (Limited Areas)

Each of these classes has specific criteria and standards that must not be exceeded. The ground water classification of a site will directly affect the elements that are incorporated into each GWPP Plan. The Table below provides a summary of and outlines the relationship between the ground water classification and compliance with the GWQS.

Table 1. Classification of Aquifers

Classification	Constituent Standard	Method of Achieving
I-A	No Degradation	Background = Compliance
I-PL	No Degradation	Background = Compliance
II-A	Antidegradation	GWQS or background (whichever is greater)
III-A	N.J.A.C. 7:9-6.7(e)	Complex (must read GWQS)

The GWPP Plan and its associated permit are designed to be protective of the GWQS within and outside of the domain of the permit. The domain of a DGW permit for an ongoing discharge is

the property boundary of the permitted facility, or a smaller area when necessary to protect the ground water quality, surface water quality or potable water supplies. Contravention of the criteria of N.J.A.C. 7:9-6 within a part of the domain of the DGW permit is often necessary when attenuation of the discharge is relied upon for compliance with the GWQS. This is known as the zone of attenuation or ZOA.

The ZOA is a Classification Exception Area (CEA) as defined in N.J.A.C. 7:9-6.6, and is acceptable. To simplify record keeping, NJDEP typically refers to the entire domain of the permit as the CEA, unless the CEA is relatively small compared to the overall size of the property. In order to minimize the mass of contaminants discharged into the ground water system, the NJDEP requires the GWPP to provide for a ZOA that is as small as possible. For class IIA aquifers, when the ZOA approach is used, the Constituent Standard (CS) is the GWQC.

The monitoring program presented in the GWPP Plan must demonstrate that the Constituent Standard at the property boundary or other established point of compliance, such as a surface water body, potable well, or discharge location can be achieved.

2. Standards for Sanitary Landfills

When the regulated unit is a sanitary landfill, as defined by N.J.A.C. 7:26G, the GWQS is specified in N.J.A.C. 7:14A-9. The domain for a sanitary landfill is 150 meters from the waste area when in the detection monitoring phase, and may extend out to the property boundary when in the assessment or corrective action mode. When the area beyond the domain is known to be contaminated, this GWPP should specify that remediation shall be performed under the direction of the NJDEP's Site Remediation Program. The standard for landfills can be simply stated that the landfill is not authorized to leak or discharge. If it is known to be leaking, a systematic approach must be followed to assess the extent and impact of the leak. Finally, the landfill operator is required to correct the problem so the leak is abated, or its impact is controlled.

3. Standards for Hazardous Waste Facilities

When a hazardous waste facility is included in a GWPP, the GWQS is specified in N.J.A.C. 7:14A-10. GWQS for these facilities is similar to that required for a sanitary landfill, except that the list of analytes is less specific and related to the particular characteristics of the hazardous waste.

D. Detailed Pollutant Characterization

The pollutant characterization is a fundamental element in the development of any GWPP. It is not always easy to determine what is actually the discharge or what exactly is the characteristic of the discharge. However, it is not possible to pursue and develop a GWPP without a clear idea as to these two points.

1. Determining What is the Discharge

Identifying the nature of the facility and the discharge activity will have immediate bearing on the pollutant characterization. For example, sanitary landfills (N.J.A.C. 7:14A-9) and DGWs at hazardous waste facilities (N.J.A.C. 7:14A-10) either do not require pollutant characterization as identified in N.J.A.C. 7:14A-7.9(d)2, or the parameters are controlled through federal regulations adopted by the Department. DGWs from residential or commercial facilities normally would only require analysis of conventional parameters identified in N.J.A.C. 7:14A-7.9(d) 2I(1)(A)-

(O). However, DGWs from industrial or manufacturing sites have a higher probability of containing metals, volatile and semi-volatile organics, pesticides or metal compounds and, as such, the initial pollutant characterization must be more comprehensive as reflected in the requirements of N.J.A.C. 7:14A-7.9(d) 2iii(2).

It should be noted that the parameters identified in N.J.A.C. 7:14A-7.9(d) 2 do not necessarily represent the array of parameters which will be monitored for the active life of the facility's NJPDES-DGW permit. Once the pollutant characterization is completed and the results are assessed, it could be concluded that (i) some parameters or groups of parameters have consistently been detected below the applicable CS and do not need to be analyzed for in the NJPDES permit, or (ii) some parameters or groups of parameters have been detected below the applicable CS but the number of samples are too few to conclusively eliminate the parameter from the permit. (However, the frequency of sampling and analysis in the permit can be reduced.) **NOTE**: the MDL for each analysis must be consistent with the GWQS PQLs or criterion – whichever is higher.

Furthermore, GWPP plans approved for sanitary discharges do not authorize the discharge of non-sanitary pollutants, although sampling for volatile organics is required. This monitoring of non-sanitary pollutants would be conducted to ensure that only sanitary pollutants are discharged to the system. It is possible for these non-sanitary pollutants to enter the system from the use of many domestic, commercial and industrial grade products.

Additionally, upon renewal or modification of a permit, the sampling and analysis of individual parameters can be reduced or eliminated based upon review of the data. Alternatively, if annual group scans identify compounds that are consistently detected above the applicable GWCS, sample and analysis frequency can be appropriately increased.

2. Determining The Discharge Characteristics

The method of determining the discharge characteristics of a facility can involve physical sampling and analysis, estimates based upon published literature, information from similar facilities or some of each of these.

Conventionally, existing facilities would normally be directed to collect and analyze samples from its waste stream for the purposes of pollutant characterization. In the case of an existing facility applying for a permit, collection and analysis of discharge quality would be included as part of the permit application. For existing facilities which are pursuing renewal of a NJPDES-DGW permit and have conducted discharge monitoring in the past, the data may satisfy some or all of the requirements of N.J.A.C. 7:14A-7.9(d)2. These samples would have to be collected from locations that are representative of the discharge quality. It should be noted that in some circumstances, monitoring conducted for the purposes of monitoring a separate regulated discharge activity might be applied to this determination. This data can be used, if the location is representative of the ground water discharge.

Conversely, where a discharge does not exist at the time of the NJPDES-DGW permit application, pollutant characterization for the facility's discharge would have to be based upon estimates from published literature or quality data from similar facilities.

E. Selection of Relevant Monitoring Program

Every discharge or regulated unit has particular characteristics that determine how it should be monitored. Three monitoring programs are suggested here and are incorporated in the rules at N.J.A.C. 7:14A-7.6. The three programs NJDEP has identified are leak detection monitoring, attenuation monitoring, and nonpoint source monitoring. With the GWPP Plan approach, the permittee will decide which approach will be appropriate for each regulated unit. Depending on the site, one approach may be sufficient. If the site/facility is more complex, a combination of approaches may be needed. If none of these styles is appropriate, the GWPP Plan can establish an alternative approach.

1. Evaluating the Characteristics of the Regulated Unit and the Pollutants

a) Physical/Engineering characteristics

For each regulated unit, the GWPP must include a detailed assessment of the physical and engineering design characteristics of the regulated unit. If it is intended to discharge, there should be an assessment of the degree it will do so. If it is not intended to discharge, the engineering design characteristics that prohibit a discharge should be described in detail. For example, the assessment for a surface impoundment could include the type(s) of liner(s) employed, when it was constructed and how often it is inspected or otherwise tested.

b) Pollutant characteristics

During the process of developing a GWPP, environmental risk associated with a discharge must be considered. The following issues should be considered, at a minimum.

(1) Effluent quality

The permit must be tailored with the effluent quality in mind. For example, wastewater from a metal plating company or machine tool company has the potential to present more ecological risk than stormwater from a clay-capped landfill. These factors should be specified, described, evaluated and set into the administrative case record.

(2) Ecological Impact of discharge

The ecological significance of the area where the discharge occurs must be identified. Ecologically sensitive areas include: potable or non-potable aquifer supply area, a well head protection area, the Pinelands, surface water or some other ecologically sensitive area, etc.

(3) Comparison between discharge quality and GWPS

This is one of the fundamental steps in selecting a relevant monitoring style for ongoing discharges (not for municipal solid waste landfills or hazardous waste facilities). When discharge quality exceeds the relevant GWPS, the monitoring style selected must be capable of demonstrating that the discharge will not exceed the GWQS beyond the limits of the domain of the facility. When site dimensions and onsite hydrogeologic conditions are too variable, an attenuation or non-point ground water monitoring style may be suitable. But when site dimensions or onsite hydrogeology do not support attenuation of the discharge, additional engineering controls or wastewater pretreatment may be needed and would prompt a leak detection or alternate approach. A common alternative

approach under these circumstances would involve pretreatment of the discharge to the GWQC confirmed through discharge monitoring with effluent limitations.

2. Selecting A Monitoring Program

Each GWPP must employ a monitoring style. The monitoring style is the approach that will be employed to develop the relevant monitoring program. As we have stated previously, the GWPP uses the scientific method to demonstrate that a discharge does not contravene the applicable GWQS, which is the hypothesis. Following this line of thinking, the monitoring program is like an experiment designed to test the hypothesis. Therefore, one must select the correct monitoring style in order to enable the subsequent demonstration of the hypothesis. Table 2 provides a matrix for selecting the appropriate monitoring style or styles. (Refer to Figure 1)

Table 2. Monitoring styles and applicable regulated units.

Monitoring Style	Assumptions	Demonstration [#]	Applicable Regulated Units
Leak Detection Monitoring	Unit does not discharge	CP ≤ B	Surface impoundment, any lined (<10-7 cm/sec) unit, Operating Landfills, Operating Hazardous waste units
Attenuation Monitoring	Unit does discharge	CP ≤ B or CP ≤ GWQC	Injection wells (septic systems), spray irrigation, dredge spoils disposal, infiltration basins/ lagoons, overland flow systems
Non-point Source Monitoring	Too many units to monitor discharges individually	CP ≤ B or CP ≤ GWQC	Complex industrial sites, non-operating landfills, sites with many units, general stormwater discharges
Alternate Style Developed by Permittee	Specified monitoring styles are not appropriate	CP ≤ B or CP ≤ GWQC	Can apply to all but RCRA Subtitle C and D facilities

c) Leak Detection Monitoring Style

A leak detection monitoring program style will always be employed for sanitary landfills, hazardous waste facilities, when in the detection monitoring mode, and should be employed for DGW when a surface impoundment is the regulated unit. A leak detection-monitoring program should be capable of detecting all discharges from any pollution source not designed to discharge pollutants. A leak detection-monitoring program should be employed when a discharge can occur as a result of a leak or structural failure, but does not occur generally. The leak detection-monitoring program should include a statistical analysis of the monitoring well data to determine whether or not there is statistically significant evidence of a discharge from a pollution source. A leak detection monitoring program consists of any/or all of the following components:

CP means Compliance point. B means background. GWQC means ground water quality criteria.

1. A standard monitoring well system where downgradient wells are located such that they have a high probability of intercepting a plume of contaminants generated from a typically sized leak in the regulated unit.

2. Leak detection devices such as piezometers, alarms, electrical leak detection or leak location systems, or leachate collection systems.

3. An appropriate test method capable of demonstrating there is no leak from the unit. This is typically a statistical test.

4. Effluent monitoring, particularly when pollutant content is low. Proving that the concentration of pollutants is a minimal risk to ground water, coupled with a determination that there is a low probability of a leak, provides a high level of environmental protection without having to include a monitoring well system.

d) Attenuation Monitoring Style

An attenuation monitoring style is appropriate for pollution sources that are known or expected to discharge pollutants. The attenuation monitoring style is also relevant when there is a presumed or verified leak from a regulated unit. This style of monitoring is based on the premise that contaminants will attenuate. This means they will naturally degrade, disperse or be diluted in ground water. Through attenuation, it is possible to comply with GWQS at the property boundary or at another point of compliance in the domain of the permit. The attenuation monitoring style is designed to demonstrate this type of compliance. The attenuation monitoring is also used when a sanitary landfill or hazardous waste facility is in the assessment or corrective monitoring mode. The NJDEP will not approve a GWPP Plan unless it can demonstrate compliance with the GWQS at the domain boundary.

An attenuation-monitoring program typically includes monitoring wells and a discharge/effluent monitoring point. When comparing monitoring wells, the data collected must be subjected to the appropriate statistical analyses as established by the approved GWPP to determine that the discharge does not contravene the constituent standards of N.J.A.C. 7:9-6. The hypothesis to be tested is that the compliance point concentration is less than the GWQC or less than background, or both.

An alternate attenuation-monitoring program that does not require wells may also be possible. Using ground water modeling, past monitoring data or another fact-based method, the permittee may be able to demonstrate that a discharge of a given level of contamination will not contravene Ground Water Quality Standards at the property line. In this case, discharge monitoring or the establishment of effluent limitations at a pipe may be sufficient to demonstrate compliance with the appropriate standards.

e) Nonpoint Source Monitoring Style

There are situations that are not conducive to the “point source” approaches we have discussed above. Some facilities may not be able to resolve the impact of discharges from a number of point sources. Because of their close proximity, it may be impossible or unrealistic to devise a monitoring program that can determine that one or another regulated units is the source. In other cases, the facility may have an

indeterminate number of pollution sources, both point and nonpoint. In addition, a permittee may only have limited ability to control the discharge from sources. Still, in other cases, it may not be possible to utilize a leak detection or attenuation monitoring style.

In these situations, a nonpoint source monitoring program would be appropriate. Similar to an attenuation-monitoring program, the nonpoint source-monitoring program demonstrates compliance with the GWQS at the property boundary or other compliance point. In nonpoint source monitoring, however, the impact of all the sources and regulated units are combined. Rather than measure the impact of each of the sources/regulated units individually, the impact of the entire site is measured. One problem associated with this type of monitoring style is that once a problem has been identified at the site, tracking the exact source of the contamination may be difficult.

A Nonpoint Source Monitoring program will almost always require the use of monitoring wells, perhaps many, because there may be no way to sample effluent. When comparing monitoring wells, the data collected must be subjected to the appropriate statistical analyses as established by the approved GWPP. If analyses indicate that the site is having a negative impact on the ground water quality, the permittee will take all appropriate and reasonable steps to identify and eliminate the sources responsible for the degradation. Pollutant sources that cannot be eliminated should be considered as individual sources subject to attenuation monitoring requirements.

f) Alternative Monitoring Styles

When a permittee determines that the monitoring styles listed in Table 1 do not adequately allow flexibility to demonstrate compliance with the ground water quality standards, an alternate style may be employed. The alternate style can utilize the monitoring components listed below, or can include a different set of tools. The alternate style and tools will simply have to be able to demonstrate that the ground water quality standards are not violated. The most common alternative monitoring approach is discharge monitoring at some point prior to the discharge to ground water. This approach usually associated with a facility that is treating its wastewater to the GWQC and does not rely upon ground water attenuation. Development of an alternative style will need to be adequately justified in the GWPP. It must accomplish the same performance standard to demonstrate the discharge does not contravene the GWQS.

F. Description of the Monitoring Program

The GWPP shall include a detailed description of all devices and tools that will be employed to demonstrate compliance with the GWQS. All components must be included and their purpose described.

1. Monitoring Program Components, Devices and Tools

Unless the NJDEP approves an alternative set of GWPP components, the standard monitoring components are required, consisting of one or more or a combination of the following:

(1) Effluent monitoring

(2) Monitoring wells

(3) Contaminant transport models

(4) Treatment works

(5) Flow limitations

(6) Lysimeters, piezometers

(7) Inspections, structural testing, alarms

(8) Geophysical method of analyses

(9) BMPs, materials management (source control)

Selecting which component(s) and tool(s) to use is a challenge. The final set of components must meet the performance standard that the facility is capable of demonstrating compliance with the applicable GWQS. The GWPP must thoroughly discuss and justify how the components were selected and how they will contribute to the performance standard goal.

2. Sample Locations and Compliance Points

All sample locations or compliance points shall be provided in both tabular and narrative form. The permittee may present the discharge and well monitoring schedules in the GWPP Plan in a tabular format. If the permittee refers to regulated units, wells or data points by different names, those names should also be included in the table. When monitoring wells or discharge points are being added or deleted relative to past permit conditions, a table summarizing these changes should also be included in the GWPP Plan. The idea is to present what will be done at the facility in the most succinct and clear format. All discharge monitoring points are identified by a letter, which indicates the type of unit being monitored, and a two digit number (i.e., 01, 02, 03, etc.) which indicates the individual monitoring point. Below is a table of the Department's standard label for identifying discharge monitoring points:

Label	Type of Unit	Type of Discharge
G	Spray Irrigation	Industrial
H	Overland Flow	Industrial
I	Infiltration/Percolation Lagoon	Industrial
J	Surface Impoundment	Industrial
K	Underground Injection Control	Industrial
P	Spray Irrigation	Sanitary
Q	Overland Flow	Sanitary
R	Infiltration/Percolation Lagoon	Sanitary
S	Surface Impoundment	Sanitary
T	Underground Injection Control	Sanitary

3. Analytes of concern and applicable standards or monitoring limitations

Specify which parameters will be monitored and at which locations.

4. Sample Frequency

Specify the frequency of monitoring the selected parameters. For nonpoint and attenuation monitoring, the Department usually requires quarterly analysis of samples from the monitoring wells. This can be reduced if there is a minimum of 5 years of monitoring data that demonstrates that pollutant parameters are always below the GWQC.

For leak detection monitoring schemes, quarterly monitoring is also the minimum requirement. For RCRA C & D facilities, the frequency is set forth in N.J.A.C. 7:14A-9 and 10, respectively.

Alternate monitoring styles will vary significantly. As a rule, effluent limitations established at discharge monitoring points require monthly monitoring. If there are no effluent limitations, only a report requirement, quarterly monitoring is the minimum sampling frequency. However, for priority pollutant scans (including volatile organic, base neutral, acid extractables, etc.) semiannual or annual scans may be acceptable.

Examples of Tables that describe the monitoring scheme can be found in each of the examples in Appendix C. The use of similar tables in your individual GWPP plan is encouraged.

G. Approaches Employed to Analyze Data

1. Compiling and Managing Data

Provisions should be made to maintain data in a manner that is conducive to its subsequent analysis and reporting. All raw data must be maintained on-site in accordance with NJDEP

permits and policy, so the NJDEP Enforcement and Compliance staff can review it when necessary.

2. Data Assessment and Statistical Analysis

The purpose of this section of the GWPP is to describe the analytical methods or approaches that will be used to draw conclusions from the raw data. It is important that the permittee understand what is provided by the requirements in this section because the analytical findings will be a basis for concluding that the facility is in compliance with the GWQS, or that it is not. The following discussion provides a synopsis of some of the considerations to be kept in mind.

Collection and analysis of raw data is intended to prove various hypotheses based upon which monitoring program was selected and developed. These hypotheses could be "the unit is not leaking", or "the discharge does not exceed the applicable GWPS", or "the discharge attenuates to levels below the GWPS within the domain of the site". The complexity of how the data is analyzed is dependent upon the nature of the regulated unit, the type of monitoring program being employed and the resources and expertise of the permittee.

General guidance for evaluating raw data using statistically valid procedures is identified in N.J.A.C. 7:14A-7.7. These alternatives range from those methods developed for assessing pooled data that is continuous and random (such as the scenario of a leak detection ground water monitoring program, to instantaneous discrete comparison of data such as a discharge monitoring program in which effluent limitations are prescribed. The most common data evaluation scenarios are discussed below. Please keep in mind that alternatives to these methods can be proposed in a GWPP Plan submitted to the Department for approval.

Leak Detection Monitoring

The most common application for leak detection monitoring has been applied to monitoring sanitary landfills and hazardous waste management facilities, which are regulated under N.J.A.C. 7:14A-9 & 10, respectively. Under these circumstances, a series of upgradient and downgradient ground water monitoring wells are compared to each other to determine that the specific regulated unit is not leaking pollutants into the groundwater. In other words, the distribution of data in upgradient wells is not different than the distribution of data in downgradient wells. Consequently, the appropriate method for data evaluation would be those procedures specifically identified in N.J.A.C. 7:14A-7.7 that was developed to assess pooled data that is continuous and random. Similar considerations would apply to data evaluation when a surface impoundment is designed in accordance with N.J.A.C. 7:14A-7.10(b).

Attenuation Monitoring

The data evaluation objectives of an attenuation monitoring program are fundamentally dependent upon the aquifer classification into which the discharge to ground water occurs and its corresponding GWPS.

For DGWs which are subject to Class I classification, the intent of the attenuation monitoring program is to demonstrate that the discharge has attenuated and dispersed within the ground water to a quality which does not exceed background ground water quality. In other words, the distribution of data in upgradient wells is greater than or equal to the levels in the downgradient wells. The statistical premise is the same one used in the leak detection monitoring approach described above and can be addressed in a similar manner.

When the DGW is subject to Class IIA or III classification, then the intent of the attenuation monitoring program is to demonstrate that the discharge has attenuated and dispersed to the applicable GWPS. In many cases, the GWPS is the applicable IIA criteria listed in the GWQS. As such, individual observations in downgradient wells are compared directly to the applicable GWPS. In this sense, the data is discrete (an instantaneous "picture" of conditions) and not pooled, random and continuous as with previous examples discussed above. However, upgradient monitoring wells should still be monitored to establish that background water quality does not exceed the GWPS established for the facility.

Nonpoint Source Monitoring Approach

The discussions above regarding data evaluation for attenuation monitoring programs fundamentally applies to non-point source monitoring programs. The basic difference is that the "facility" in general, and all of its associated regulated discharges to ground water are not exceeding the associated GWPS.

Alternative Monitoring Program

As mentioned previously in this manual, the most common alternative monitoring program involves discharge monitoring at some point prior to the discharge to ground water. Under these circumstances, data evaluations involve comparison of maximum observed values to associated effluent limitations. In this sense, the data is discrete and not pooled, random or continuous.

H. Procedures for Responding to Contravention of Ground Water Quality Standards

1. Objective of Plan

A "*Response to Contravention*" plan needs to clearly identify the measures and contingencies which will be taken by the permittee in the event of any contravention of the ground water quality standards resulting from the regulated discharge activity.

2. Notification Measures

The Department must be provided with formal written notification of the nature and extent of any contravention of the ground water quality standards resulting from the regulated discharge activity, by certified mail and within a time frame established by the NJPDES-DGW permit.

3. Hierarchy of Response Contingencies and Basis for Such

The response(s) to contravention available to a facility is specific to the nature of the discharge activity and the type of monitoring already in place.

Facilities, such as municipal solid waste landfills or discharges to ground water from hazardous waste facilities, are limited to the response provisions identified in N.J.A.C. 7:14A-9 and 10 respectively.

The hierarchy of response contingencies will vary based upon the facility, site conditions and the type of monitoring in place. Nonetheless, there are common elements to all response plans including: (1) determination of extent of ground water contamination; (2) source control and reduction of pollutant concentration; (3) modification or expansion of disposal areas to reduce pollutant loading; and, (4) reduction and/or cessation of the discharge activity.

In some circumstances, offsite contamination may trigger Procedures for Department oversight of the Remediation of Contaminated Sites (N.J.A.C. 7:26C). When the standards of N.J.A.C. 7:9-6 are contravened, at and/or beyond the NJPDES domain boundary, the permittee may request the NJDEP to establish an Alternate Concentration Limit (ACL).

I. Reporting Protocol

Each GWPP shall specify a schedule for reporting raw data and reports based on data analyses. The schedule should never be less frequent than semi-annual unless the NJDEP specifically indicates a different schedule.

1. Inclusions

   a) Narrative summary

      For each sample period, a narrative summary of the findings shall be submitted to the NJDEP. There must be a commitment stated clearly to submit a report that describes the data analysis, evaluation and conclusions.

   b) Manner of raw data submission

      Each GWPP must include provisions to present all raw data to the NJDEP. Data can be submitted electronically, on paper forms or both. In either case, the format must be consistent and standardized. When the data are submitted electronically, the format in Appendix B shall be followed. When the data are submitted on paper forms, the format shall be on TWX or DMR as appropriate.

2. Reporting Schedule

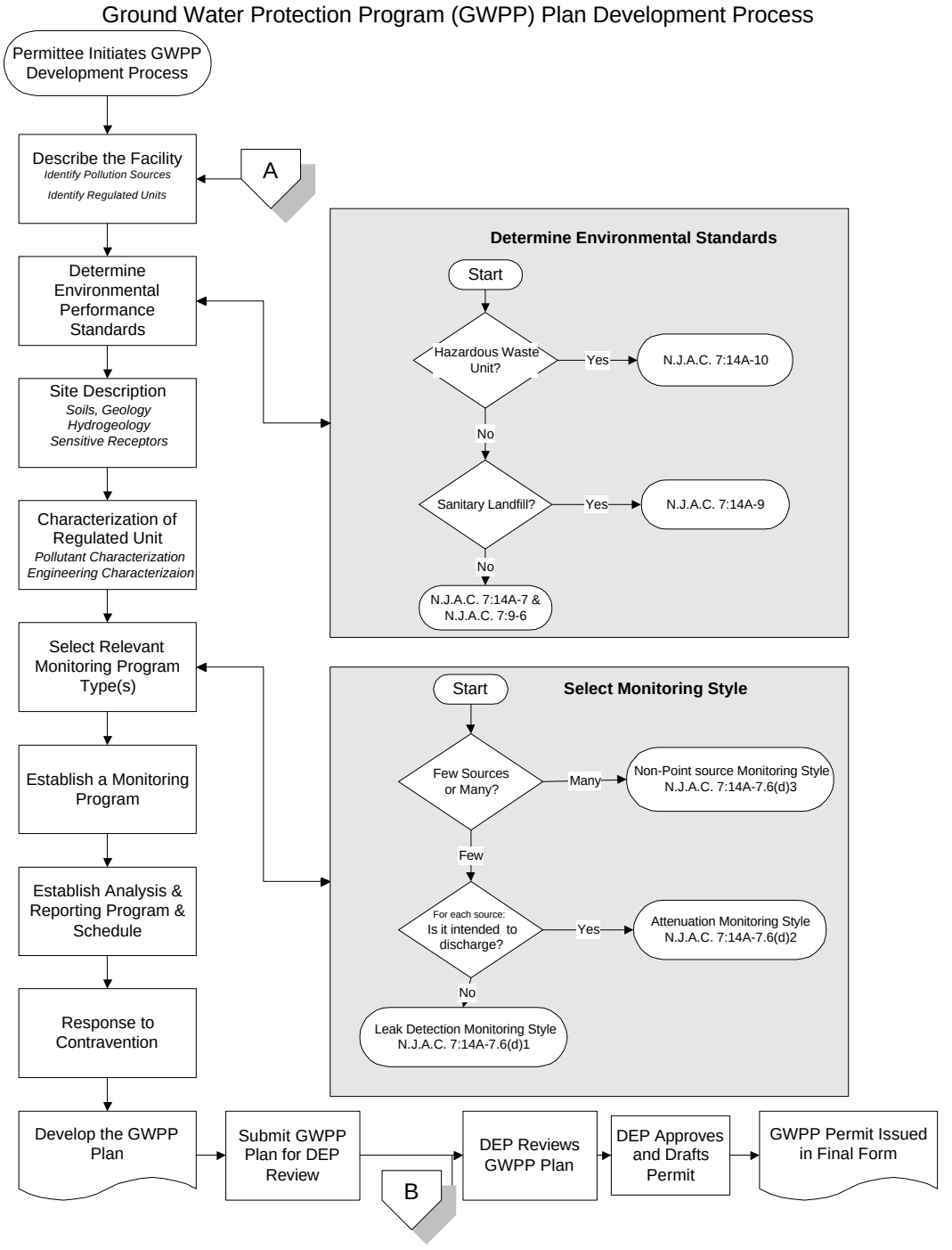
   Data should be submitted on the appropriate forms postmarked no later than the 25th day of the calendar month following the completed reporting period. A copy of the summary data should also be included with the submittal of monitoring data to the NJDEP.

J. Acknowledgment

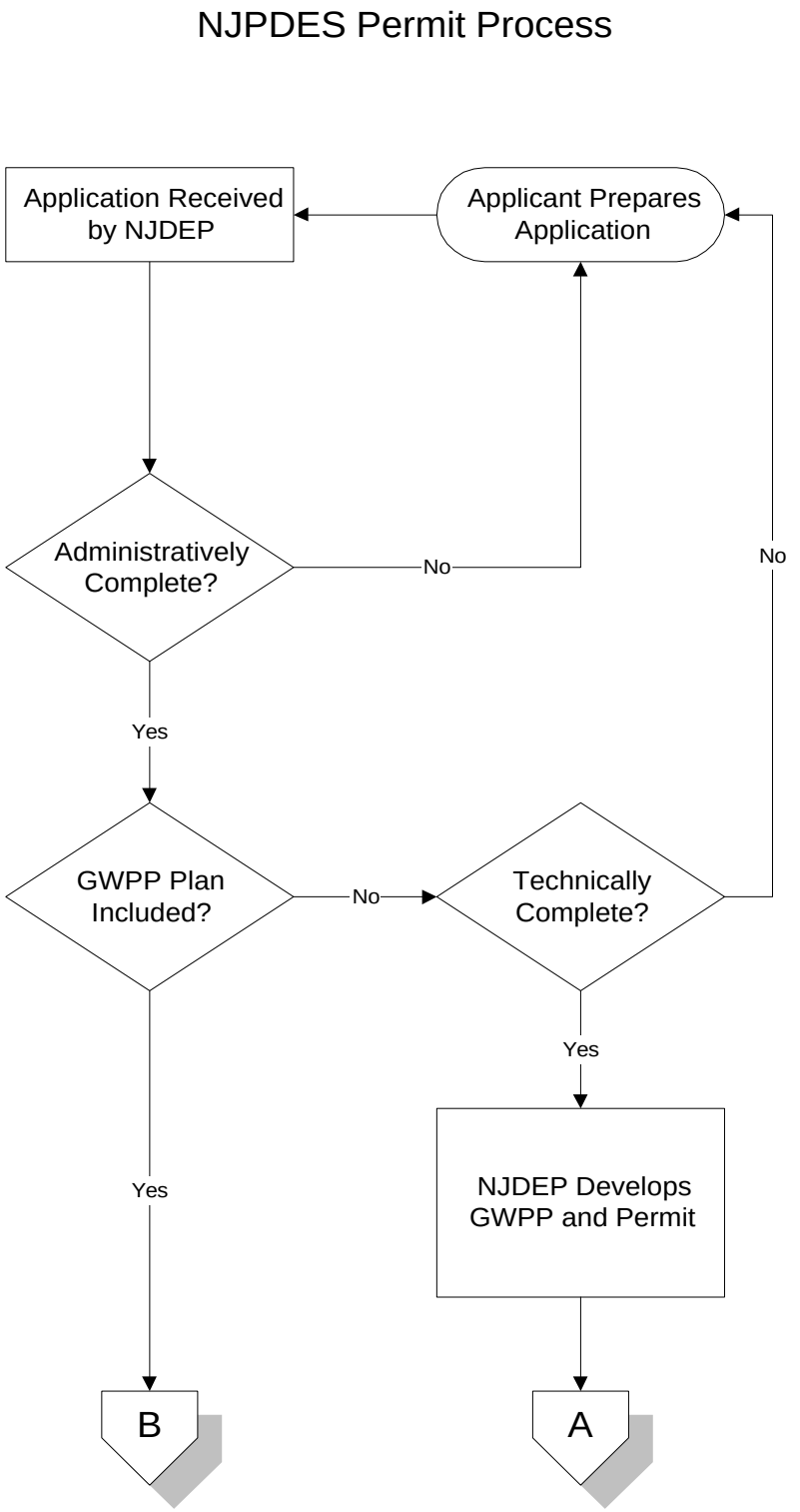
The final page of the GWPP shall include a section that is signed and dated by an appropriate person responsible for the operation of the site. This acknowledgment must state, at a minimum, "This Ground Water Protection Program Plan for the [facility name] fulfills the requirements of the NJPDES regulations and the Ground Water Quality Standards. This plan has been prepared in accordance with the requirements of N.J.A.C. 7:14A and N.J.A.C. 7:9-6." An example of this acknowledgment can be found at the end of Appendices C1, C2 and C3.

III. THE NJPDES DGW PERMIT PROCESS:

A. The GWPP Development Process



B. How a GWPP is Incorporated into a NJPDES Permit



IV. GLOSSARY

A. General Terms

Best management practices: or "BMPs" means:

1. Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State; or

2. Methods, measures, or practices selected by an agency to meet its nonpoint source control needs.

BMPs also include treatment requirements, operating procedures, and techniques to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

CEA: The Classification Exception Area. The same as the ZOA. Also refer to N.J.A.C. 7:9-6.

Discharge: An intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a pollutant into the waters of the State, onto land or into wells from which the pollutant might flow or drain into such waters, or into waters or onto lands outside the jurisdiction of the State which pollutant enters the waters of the State.

Domain: The property boundary of the permitted facility, or a smaller area when necessary to protect the ground water quality, surface water quality or potable water supplies.

GWPP Plan: The document that incorporates the provisions of the GWPP

GWPP: A Ground Water Protection Program. An organized set of actions, procedures and devices for the purpose of demonstrating successful protection of ground water quality from discharges or pollution sources.

GWQC: Ground Water Quality Criteria as specified in N.J.A.C. 7:9-6.

GWQS: The Ground Water Quality Standards" means the New Jersey rules at N.J.A.C. 7:9-6 which set forth a designated use or uses for the ground waters of the State, use classifications, water quality criteria for the State's waters based upon such uses, and the Department's policies concerning these uses, classifications and criteria.

Hazardous Waste Facility: A facility that is defined as such by N.J.A.C. 7:26G-8 through 9.

Infiltration Percolation Lagoon: A natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to transmit pollutants to the subsurface and which is not an injection well.

Injection well: a well, septic system, subsurface disposal bed, cavity, tube, pipe, or any structure used to deliver fluids directly to a point below the ground surface.

New Jersey Pollution Discharge Elimination System Rules: The NJPDES Rules. The particular standards that are applicable to regulated units are dependent on the characteristics of the unit. A sanitary landfill is required to comply with N.J.A.C. 7:14A-9. A hazardous waste unit is required to comply with N.J.A.C. 7:14A-10. All other regulated units are required to comply with N.J.A.C. 7:14A-7 and N.J.A.C. 7:9-6.

NJDEP: The New Jersey Department of Environmental Protection.

Nonpoint Source: Any man-made or man-induced activity, factor, or condition, other than a point source:

1. from which pollutants are or may be discharged;
2. that may temporarily or permanently change any chemical, physical, biological, or radiological characteristic of waters of the State from what was or is the natural, pristine condition of such waters, or that may increase the degree of such change; or,
3. that contributes or may contribute to water pollution.

Overland Flow: The controlled discharge, by spraying or other means, of pollutants onto sloping land with maintained vegetation where a proportion of the wastewater may appear as runoff. Overland flow is also the movement of pollutants across the surface of the land where infiltration may occur.

Point Source: Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

Pollutant: Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et. seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, agricultural, and construction waste or runoff or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a Domestic Treatment Works. "Pollutant" includes both hazardous and non-hazardous pollutants.

RCRA: The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. §§6901 et seq.

Sanitary Landfill. A landfill that operated after January 1, 1982 or as defined by N.J.A.C. 7:26G.

Sanitary Sewage: Any liquid waste containing animal or vegetable matter in suspension or solution, or the water carried wastes resulting from the discharge of water closets, laundry tubs, washing machines, sinks, dishwashers, or any other source of water carried waste of human origin or containing putrescible material. This term specifically excludes industrial, hazardous or toxic wastes and materials.

Spray Irrigation: A system for land application of pollutants, over maintained vegetated ground surfaces using sprinkler heads or nozzles as a method of application.

Surface Impoundment: or "impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may include a liner), which is designed to hold an accumulation of liquid or solid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are lined or unlined holding, storage, settling and aeration pits, ponds, and lagoons.

Waters of the State: The ocean and its estuaries, all springs, streams and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

Well: A bored, drilled or driven shaft, or a dug hole, whose depth is greater than the largest surface dimension.

ZOA: Zone of Attenuation is the area in plan view in which a pollutant from a source is dispersed, adsorbed, converted or otherwise reduced in concentration such that, beyond its outer boundary, the ground water quality complies with the applicable GWQS.

B. Terms Related to Sampling

When developing the sampling scheme for a facility, the following definitions must be used for sampling types and frequencies:

Aliquot: means a sample of specified volume used to make up a total composite sample.

Annually: means monitoring conducted at a minimum of once every twelve calendar months.

Bimonthly: means monitoring conducted at a minimum of once every two calendar months.

Composite: means a combination of individual (or continuously taken) samples (aliquots) collected at periodic intervals over the entire discharge day. The composite should be flow proportional; either the time interval between each aliquot or the volume of each aliquot should be proportional to either the flow at the time of sampling or the total flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

Daily: means monitoring conducted every calendar day, including weekends and holidays.

Grab: means an individual sample collected over a period not exceeding 15 minutes.

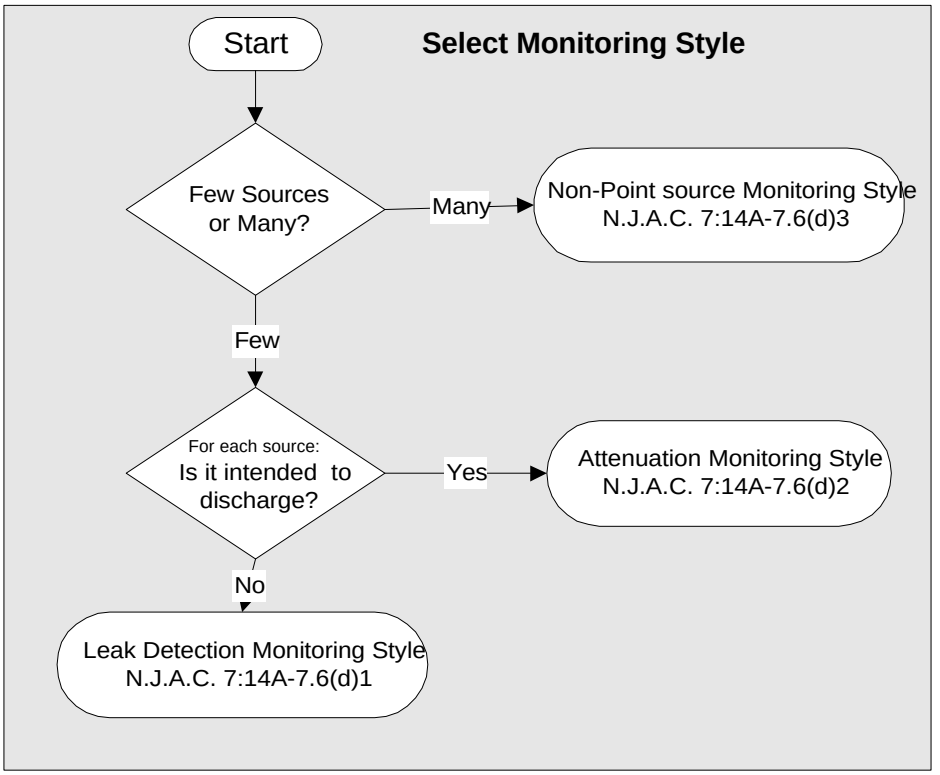
Monthly: means monitoring conducted at a minimum of once every calendar month.

Quarterly: means monitoring conducted at a minimum frequency of once every three calendar months

Semiannually: means monitoring conducted at a minimum frequency of once every six calendar months.

Weekly: means monitoring conducted at a minimum of once every seven calendar day period.

Figure 1


Start
Select Monitoring Style
Few Sources or Many?
Many
Non-Point source Monitoring Style N.J.A.C. 7:14A-7.6(d)3
Few
For each source: Is it intended to discharge?
Yes
Attenuation Monitoring Style N.J.A.C. 7:14A-7.6(d)2
No
Leak Detection Monitoring Style N.J.A.C. 7:14A-7.6(d)1

V. APPENDICES

Appendix A: Sample GWPP Outline

GWPP STRUCTURE OUTLINE

Purpose and Introduction

Description of Facility and Operation
- **Business and general operations**
- **Identification of pollutant sources**
- **Identification of regulated discharges (N.J.A.C. 7:14A 7:14A-7-10)**
- **Other regulated activities**

Description of Site Conditions
- **General setting**
- **Geology**
- **Soils**
- **Hydrogeology**
- **Identification of Sensitive Receptors**

Pollutant Characterization and Associated Monitoring Program
- **Characterization of regulated discharge**
- **Pollutant characterization**
- **Engineering and physical characteristics**
- **Monitoring program type**

Monitoring program for each regulated discharge
- **Monitoring program type**
- **Sample locations**
- **Sample Analytes**
- **Standards and monitoring requirements and/or limitations**
- **Sample type**
- **Sample frequency**
- **Data analysis**

Reporting
- **Raw data submission**
- **Data assessment and statistical analysis**
- **Discussion of results**
- **Assessment of GWPP performance**

Response to Contravention
- **Notification**
- **Confirmatory testing**
- **Identification of source of contravention**
- **Assessment of degree and extent of contravention of GWQS**
- **Response contingencies**

Appendix B: Sample GWPP Plan

Form 1. Fill out this form based on the information provided in the Site Description and Plot Plan.

Regulated Unit ID Number	Common Name	DEP Classification	Environmental Performance Standard	Covered by GWPP
1	North Landfill	Sanitary Landfill	N.J.A.C. 7:14A-9	Y
2	South Basin	IP Lagoon	N.J.A.C. 7:14A-7	Y
3	Pump and treat Cleanup	UIC	N.J.A.C. 7:26	N
4				
5				
6				
7				

Conduct a Pollutant Characterization

Form 2. Pollutant Characterization Report[1]. Complete one for each Regulated Unit Identified in Form 1.

Facility Name: _____

Regulated Unit ID: _____

Parameter Name	Storet Number	CAS#	Concentration Units	Max	Min	Mean	# Samples

[1] Refer to N.J.A.C. 7:14A-7.9 for guidance to select parameters. If MSWLF, ignore this section. For other landfills, add historical data from monitoring well data. For Dredge Spoil disposal, submit results of SBLT or CLT tests,.

Select Relevant Monitoring Styles

Form 3. Monitoring Styles Employed.

ID Number	Regulated Unit	Monitoring Style	Detail #
1	South Basin	Leak Detection	
2	Septic System	Attenuation	
3			
4			
5			
6			
7			

Note: List a monitoring Style for each regulated unit

Monitoring Systems

For each Monitoring Style, a monitoring System must be constructed using the following components, or others as the case may be.

Wells

Effluent Sampling

Piezometers

Typical Regulated Units

(1) Surface impoundments: Basins that are designed to hold, store or convey pollutants without accompanying infiltration into the ground. Liners are employed to accomplish this control.

(2) Spray irrigation: A system where pollutants in solution are sprayed onto the land using overhead irrigation systems. This is typically used to distribute the pollutants over an area to produce vegetation growth, which usually aids in the attenuation of the pollutants.

(3) Overland flow: A discharge of pollutants that flows over the ground, but which can infiltrate but is not usually designed to do so.

(4) Infiltration/percolation lagoons: Basins that are designed to allow infiltration of liquid pollutants into the ground.

(5) Residuals surface impoundments: Basins that are designed to hold residual materials in such a manner to prevent a discharge of pollutants into the ground. Liners are employed to accomplish this control.

(6) Injection well (Underground Injection Control): A well, septic system, subsurface disposal bed, cavity, tube or pipe or any structure used to deliver fluids directly to a point below the ground surface.

(7) Land disposal of dredge spoils: A place where dredge spoils are disposed onto land from which leachate can enter the ground and can contaminate the ground water.

Appendix B: Instructions for Submitting Ground Water Quality Data Electronically

Creating the File

A file can be created using a spreadsheet program (Lotus 123, Excel, Quattro), a database program (Dbase, Paradox, Access), or a word processor. Whichever method is used, be sure to create the table with the characteristics in Table 2.

Table 3 Monitoring Well Data File Definition

Field_Name	Field_Type	Field_Length
NJPDES	Text	7
WELL_ID	Text	7
MON_DATE	Text	6
LAB_NUMB	Text	5
EFF_DATE	Text	4
EXP_DATE	Text	4
OWNER_ID	Text	9
PARAMETER	Text	5
VALUE	Number (Double)	8
REMARK	Text	1

Uploading the File

Files can be submitted to the Department electronically in various ways. Please call the Bureau of Permit Management at (609) 984-4428 for directions. In general, the process is as follows:

1. Using the DEP Bulletin Board System (BBS). Obtain an authorization code form the Sysop. Call the DEP BBS at 609-292-2006 using a modem.

2. To send document file over Internet, the file will need to be converted using UUENCODE, a shareware program available on the BBS.

To send a file using America Online or CompuServe, it must be sent as ASCII, or encoded and sent over the Internet. DEP does not have a direct connection to AOL or CompuServe.

APPENDIX C1: INDUSTRIAL FACILITY WITH NON-CONTACT COOLING WATER, STORMWATER AND VARIOUS WASTEWATER TYPES

Ground Water Protection Program Plan

(Date of Submittal)

For:

John Q. Public, President
New Jersey Industries Company
000 Anywhere Street
Somewhere Township, NJ 00000

Prepared by: (if applicable)

This is only a sample GWPP Plan prepared by the Department to give an example of how to develop the individual GWPP Plan for your facility. Some of the issues may not apply to your facility. All *italicized* items are not included in this sample but are site specific technical items that will be necessary in a final GWPP Plan.

1.0 Introduction

This Ground Water Protection Program (GWPP) Plan has been developed for New Jersey Industries Company (NJIC) in accordance with the NJPDES-DGW Regulations and the Ground Water Quality Standards. The purpose of this plan is to describe the measures employed by the NJIC to protect the ground water quality at the subject facility.

2.0 Description of the Facility and Operation

2.1 Business and General Operations

The NJIC is a chemicals manufacturing company *(include SIC code)* which has been at its present location for five (5) years. 160 people are employed at the facility operating 8 hours, 7 days a week on an 8 hour shift. 15 of these employees work in a separate maintenance facility located on site. The facility uses various types of technology (*specify and describe*) in producing chemicals acceptable to today's engineering standards. The main plant consists of 250 square feet of office space, 1,000 square feet of locker rooms for employees, 25,000 square feet of warehouse storage space, and 35,000 square feet of manufacturing area. *(A plot plan showing the facility's layout must be included as well as a general location map of the area i.e., USGS 7.5 minute quad map with site outlined).*

2.2 Identification of Pollutant Sources

Due to the nature of the operations of the site, NJIC has several areas which may be potential sources of pollution on the site.

2.2.1 Plant Operations and Stored Materials

Raw chemical materials *(identify)* coming into the operation in 55-gallon drums are staged on an open 45'x20' drum storage pad which is bermed with a stormwater release valve. After significant stormwater accumulations this area is observed for free phase product contamination. The release valve is then opened and the discharge is allowed to flow over the parking area and through a culvert, into the facility's clay lined stormwater basin. This stormwater basin also receives flow from the parking lot, rooftop runoff, the truck loading area, and the maintenance area. Raw product is stored on the pad for less than two weeks prior to its use.

All manufacturing is conducted indoors in the main plant. A non contact cooling water (NCCW) operation is used in the manufacturing process. A geosynthetic lined basin with an underdrain is used in the cooling process. No additives (i.e., antifouling or antiscaling agents) are added to the NCCW however, algaecides are used to control algae growth in the cooling system *(include MSDSs)* and a high TDS content is expected.

The main plant is serviced by an on site subsurface sewage disposal system which receives sanitary wastewater from the offices and locker rooms. Waste from the manufacturing operations is taken off-site for solvent recycling, however several floor drains in all areas of the main plant have been dye tested and have been determined to discharge to the septic system.

2.2.2 Maintenance Barn

Several maintenance activities occur on the site which may be sources of contamination in the event of spills or leaks. Oil is stored in 55-gallon drums in a storage area in the maintenance barn. Waste oil is taken from the site by a licensed waste oil contractor *(identify)*. All chemicals used in maintenance activities *(identify)* are stored in a chemical cabinet or vault under permanent cover. However, lawn fertilizer and herbicides *(identify)* are used for the facility grounds and may be a source of stormwater pollution at the facility. Additionally, vehicles that are washed at the facility are washed outside the maintenance barn and discharge to the ground surface.

The maintenance barn is serviced by a small septic system that receives sanitary waste only. There are no floor drains or slop sinks located in this building.

2.2.3 Underground Storage Tanks

Three (3) Underground Storage Tanks (USTs) are located at the northern end of the Main Plant. These tanks are used to supply #2 heating oil to the site (1 - 5,000 gallon tank) and store raw solvents *(identify)* which are used in manufacture (2 - 8,000 gallon tanks). These tanks are checked on a monthly basis as part of inventory control. At that time, an inspection is made to determine if any water is present in the tanks and the tanks are integrity tested every three years. Additionally, there is a 550 gallon #2 heating oil tank used to supply the maintenance barn heating system. This tank is located at the northwestern corner of the maintenance barn. All of the tanks are registered with the NJDEP Bureau of Underground Storage Tanks and meet the current regulatory requirements.

2.3 Identification of Regulated Discharges

Four regulated units have been identified on the site. The septic systems for the facility have an aggregate design flow of over 2,000 gallons per day. The septic system at the main plant receives both sanitary wastewater and floor drain wash water and has an individual design flow of over 2,000 gpd. The individual sanitary septic system at the maintenance barn has a design flow under 2,000 gpd; however, since the design flow of the facility is over 2,000 gpd, this unit is regulated under the NJPDES rules. The geosynthetic lined NCCW basin with an underdrain receives water

from the industrial cooling water operation and the clay lined stormwater basin receives industrial stormwater from the site. These regulated discharges are then classified as:

2.4 Other Regulated Activities

2.4.1 Underground Storage Tanks

All of the USTs identified in section 2.2.3, which includes all USTs on the property, are registered with the NJDEP Bureau of Underground Storage Tanks (BUST) and meet current regulatory requirements.

2.4.2 Water Supply Wells

Three water supply wells exist on the property. Two of the wells, one located near the main plant and one located near the maintenance barn, are used for potable water use. The third well is a community industrial well which has a capacity of pumping greater than 70 gallons per minute. However, actual pumping data shows that no more than 50,000 gpd is drawn from the well. This puts the facility into the NJDEP Water Use Registration Program, under which the facility is currently registered.

2.4.3 Surface Water Discharge

The facility is currently operating under NJPDES-Discharge to Surface Water Permit NJ000000, an individual surface water discharge permit, for its discharge of industrial stormwater to Small Stream. Discharge Point DSN-001 is currently monitored on a quarterly basis for Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), pH, and Streptococcus. Annually, DSN-001 is monitored for Volatile Organic Compounds (VOs).

To date, no parameters have been detected at levels that would exceed the Ground Water Quality Standards (GWQS) but levels of VOs have been detected above the method detection limits (MDLs).

2.4.4 Site Remediation Activity

A memorandum of agreement (MOA) was entered into with the NJDEP to remediate a spill of xylene at the southern end of the main plant. Four monitoring wells were installed and are monitored as part of the MOA. MW-1 is used to monitor background water quality and MW-2, 3 and 4 are used to monitor ground water downgradient of the spill area. *(Results of monitoring and an outline of remedial measures conducted and to be conducted should be outlined)*.

2.4.5 Other Regulated Activities

If there are any other regulated activities, this section would include a list any other permits obtained for the facility. Examples include, but are not limited to, Stormwater to Surface Waters, Solid Waste, Air, Land Use (i.e., Wetlands), etc.

Summary of Discharge Activities

Discharge Activity	Unit Name	Regulatory Oversight
Septic System at main plant that receives mixed waste.	Underground Injection Control (UIC) - Industrial	GWPP
Maintenance Barn Septic System	Underground Injection Control (UIC) - Sanitary	GWPP
Geosynthetic lined basin with underdrain	Surface Impoundment - Industrial	GWPP
Clay lined stormwater detention pond	Surface Impoundment - Industrial	GWPP
Underground Storage Tanks	UST 1-3	BUST Registration #'s
Water Supply Wells	Potable and Industrial Supply Wells	Water Use Registration #'s
Discharge to Small Stream	DSN-001	NJ0000000
Spill Remediation	Memorandum of Agreement	Spill Case #/MOA signed (*date*)
Other	*Other*	*Other*

3.0 Description of Site Conditions

3.1 General Setting

The site is located on the coastal plain of New Jersey in a class IIA aquifer area as specified in N.J.A.C. 7:9-6. The Ground Water Protection Standard (GWPS) is classified as the class IIA criteria. The site is bounded on the North and West by commercial warehouse space. To the south is an eight-lane highway system with access roads. To the east are vacant wetlands. The wetlands consist of an intermittent stream fed by DSN-001 that discharges to Small Stream, approximately one hundred feet away.

3.2 Geology

The site is located in the Bowersville Formation (TbR) located over a major portion of the site and Huberbury (KhB) Formation located along the northeastern corner of the site*(describe the formations and local characteristics)*. The site geology consists primarily of unconsolidated materials which vary from clays to silts to sands, with no trends or dipping bedding.

3.3 Soils

(Describe the site soils formation(s) and local characteristics. A copy of the local soils map from the NRCS and the soil descriptions would be beneficial). The site soils consist of the Millerstown sandy loam with 2-5% slopes (MtA) and with 5-10% slopes (MtB), and Roeville silt loam which are typically found in areas with slope of less than 5% slopes (RvA). Both are moderately drained with a seasonal high water table greater than six feet deep.

3.4 Hydrogeology

The site has an unconfined (phreatic) water table at approximately 14 feet below the ground surface (bgs) and ground water flow is to the east-northeast. During the drilling of the community industrial supply well and the monitoring wells used in the MOA activities, several observations of the subsurface hydrogeologic characteristics were determined *(an appendix with well construction and monitoring data summaries should be attached)*. Transmissivity and permeability data have also been determined *(attach results)*. The surficial aquifer extends to a depth of approximately forty feet bgs. Below the surficial aquifer is a dense clay which is approximately fifty feet thick and precludes any discharge to the water table aquifer from contaminating potable aquifers below the aquitard.

Background water quality has been determined from monitoring well MW-1 under the MOA which was sampled less than 18 months prior to the development of this plan. MW-1 was sampled for VOs, BNs, AEs, PCBs/Pesticides, pH, Total Dissolved Solids (TDS), and Total Petroleum Hydrocarbons (TPH). A result of non detect has been identified for all parameters except for pH which results vary between 5.1 and 6.2, and TDS which varies between 120 parts per million (ppm) and 205 ppm.

3.5 Sensitive Receptors

There are no state or federally protected wildlife or wilderness protection areas within one half mile of the facility. Small Stream is located approximately one hundred feet to the east of the facility. This stream is a tributary of the Large River which is over one-half a mile from the facility to the south. The site is also supplied by two potable wells located near the western property boundary and the maintenance barn. A large community industrial well is also located near the western property boundary. All of these wells were installed to a depth of greater than 250 feet and breach an aquitard that isolates the surficial aquifer from the pumped aquifer.

4.0 Pollutant Characterization and Associated Monitoring Program

4.1 Characterization of Regulated Discharges

4.1.1 Industrial - UIC

The septic system at the main plant has a design flow of greater than 2,000 gpd and receives both sanitary and non-sanitary wastewater. The system consists of two, 2,000 gallon septic tanks in series and a disposal field *(specific design should be provided)* which covers 3,502 square feet.

4.1.2 Maintenance Barn Septic System – Sanitary UIC

The septic system at the maintenance barn has a design flow of less than 2,000 gpd and receives bathroom wastes only. This system was designed and approved by the local health department in 1989 in accordance with the regulations at that time.

4.1.3 NCCW Basin - Industrial Surface Impoundment

The NCCW basin is a geosynthetically lined basin *(include liner specifications)* which has a permeability no more rapid than 10^{-7} cm/s and covers 4,000 square feet and is five (5) feet deep. The liner is chemically compatible with pollutant parameters which have been detected in the basin *(include liner specifications)*. An underdrain is present beneath the basin which collects any water that would leak from a breach in the liner. This underdrain also collects any ground water or stormwater which would come into contact with the liner and drain it away from the system and back into the basin.

4.1.4 Stormwater Detention Pond - Industrial Surface Impoundment

The stormwater detention pond is a clay lined basin, whose engineering characteristics have not been fully delineated or quantified, but the unit is not intended to leak. Stormwater enters the pond through a culvert located at the western end of the pond that receives runoff from the main plant chemical storage areas, chemical loading areas, and roadways. This detention basin then overflows through DSN-001 to Small Stream regulated by NJPDES-DSW Permit NJ00000000 described in Section 2.4.3. *(Depending upon the SIC code for the facility, a discharge of stormwater to surface water permit may also be required.)*

4.2 Pollutant Characterization

Since no data has been previously generated for the discharges from the Industrial UIC and the NCCW basin, NJIC has collected and analyzed, on a monthly basis, five (5) samples from the distribution box of the septic system and the basin in accordance with N.J.A.C. 7:14A-7.9(d)2(1). As expected, levels of nutrient parameters from the sanitary wastewater discharge to the industrial UIC are above the GWQS but are expected to attenuate downgradient of the disposal field. Also, arsenic, sulfate and total dissolved solids were detected in the cooling water basin above the

GWQS. Volatile organic pollutants total xylenes and toluene were detected in the discharge to the UIC and NCCW basin above the MDL. The results for the detected volatile compounds are included in the summary below:

Industrial UIC

Compound	GWQS	January	February	March	April	May
Ammonia	500	100,500	119,300	146,700	152,400	168,500
Fecal Coliform	ND	72	ND	1,100	300	228
Nitrate	10,000	56,700	47,200	80,500	72,500	92,500
Total Xylenes	40	10.1	ND	14.1	22.1	ND
Toluene	1000	ND	32.6	104.0	ND	25.9

NCCW Basin

Compound	GWQS	January	February	March	April	May
Arsenic	8	2.1	ND	3.6	9.2	11.7
Sulfate	250,000	98,000	47,500	149,000	251,000	272,000
TDS	500,000	15,000	27,000	220,000	520,000	519,500
Total Xylenes	40	ND	ND	2.6	11.1	ND
Toluene	1000	1.8	2.5	4.2	ND	5.1

(ND) - Compound Not Detected
All results are reported in parts per billion (ppb).

Physical sampling of stormwater at DSN-001 has been conducted for the past five years. The parameters sampled quarterly (COD, BOD, TSS, pH, Streptococcus) yield limited useful information with regard to the GWQS *(data should be summarized)*. The annual sampling of VOs does help to characterize the stormwater quality. The only compounds which have been detected in DSN-001 are various VO compounds *(data should be summarized)*. None of the results exceed the GWQS but are present above the MDL. Further sampling of the stormwater quality needs to be conducted for BNs, AEs, pesticides and metals as indicated by N.J.A.C. 7:14A-7.9(d)iii(2).

4.3 Monitoring Program Types

Based upon the review of the discharge characteristics, a combination of monitoring styles is necessary to adequately monitor the various discharge units.

4.3.1 Industrial - UIC

The septic system, a unit which is intended to discharge to ground water, at the main plant needs to be monitored for pollutants being discharged through the system and in the ground water downgradient of the system. Since background water quality is below the GWQS and the discharge from the septic exceeds the GWPS, an attenuation monitoring style and alternate monitoring style (discharge monitoring) is necessary to ensure that the discharge is properly attenuating downgradient of the system, but prior to the discharge migrating off-site. Since the nutrient parameters have been detected in the discharge above the GWPS, these parameters will need to be sampled on a quarterly basis, VO compounds will be analyzed annually since they were detected below the GWPS.

4.3.2 Sanitary – UIC

The Sanitary UIC at the maintenance barn was designed and constructed in accordance with the approvals from the local health department. No malfunctions of the system have been reported to date and no alterations of the system are planned. The unit is designed to discharge to ground water; however, based upon the history of this small system, no monitoring of the ground water or effluent is proposed at this time. The system will be managed through Best Management Practices (BMPs) by inspecting the system for signs of malfunction (e.g., ponded effluent, breakout, septic odors, etc.) on a weekly basis and having the septic tank pumped out at a minimum of every three (3) years.

4.3.3 NCCW Basin - Industrial Surface Impoundment

The NCCW basin is relatively impermeable and is not designed to discharge to ground water. In order to demonstrate that this system does not discharge to the subsurface, an alternate monitoring program is established to monitor this system. The underdrain below the liner will be sampled on a quarterly basis for the parameters that have been detected in the cooling water during the pollutant characterization. If any pollutants are detected in this system, it could indicate a breach in the liner that would need to be addressed.

4.3.4 Stormwater Detention Pond - Industrial Surface Impoundment

The stormwater detention pond is a clay lined basin, whose engineering characteristics have not been fully delineated or quantified but is not designed to discharge. In order to determine if there is any impact to the subsurface environment as a result of the discharge of industrial stormwater pond, sampling of the stormwater entering the pond will be conducted at the influent culvert. A sample will be collected quarterly following the first storm event which creates a discharge through the culvert to a pond. If there isn't a storm event large enough to produce a discharge, none will be collected for that quarter and will be reported as such. After five (5) quarters of data have been collected and analyzed, a revised sampling plan may be proposed, reflecting the current pollutant parameters of concern.

5.0 Specific Monitoring Program for Each Regulated Unit

After review of the various discharge units at the facility, three different monitoring approaches are going to be used to monitor the three different discharge units at the facility.

5.1 Industrial - UIC

A combination of attenuation monitoring and alternative monitoring will be used for this regulated unit. A discharge sample will be taken from the second septic tank in series at a point labeled K01 and analyzed for all parameters listed and at the frequencies stipulated in Table IA with a Report limitation. The pollutants selected for quarterly monitoring were those that were detected above the GWPS during the pollutant characterization. The pollutants selected for annual monitoring were those that were detected, but at levels below the GWPS. If pollutants are detected in this discharge above the GWPS, the facility will notify the Department in a summary table in the quarterly report and in accordance with the response to contravention section below.

Limitations for the septic system discharge will be established in monitoring wells MW-5 and MW-6 that are located hydraulically downgradient from the septic system along the northern property boundary. A total of three wells will be used (*include well specifications and screening specifications which ensure that the well is screened **across** the water table, in an appendix to the GWPP Plan*) including MW-1 which will monitor background ground water quality and a 2 inch piezometer well, MW-7 will be installed adjacent to the disposal field to monitor the hydraulic performance of the disposal field (to maintain an appropriate distance between the bottom of the disposal bed and the water table). The parameters to be sampled for, limitations (applied to wells MW-5 and MW-6 only), and frequencies are established in Table III for monitoring wells MW-1, 5 and 6.

All four wells will be monitored according to Table II. All wells will be constructed in accordance with the Department's Field Sampling Procedures Manual within 90 days of the GWPP Plan approval.

5.3 Sanitary – UIC

The monitoring style for the discharge from the maintenance septic system will be an alternate BMP style as identified in section 4.3.2. The system will be managed through Best Management Practices (BMPs) by inspecting the system for signs of malfunction (e.g., ponded effluent, breakout, septic odors, etc.) on a weekly basis and having the septic tank pumped out at a minimum of every three (3) years.

5.3 NCCW Basin (Industrial Surface Impoundment)

The monitoring style for potential discharges to ground water to be used for the basin is an alternate style of monitoring. A sample will be taken from the underdrain at a point labeled J01 and analyzed for all parameters listed and at the frequencies stipulated in Table IB with a Report

limitation. If pollutants are detected in this discharge, the facility will notify the Department in a summary table in the quarterly report and in accordance with the response to contravention section below.

5.4 Stormwater Detention Pond (Industrial Surface Impoundment)

An alternative monitoring style will be used for further characterization of incoming stormwater quality. Samples will be collected at sample discharge locations J01, located at the influent culvert of the stormwater detention pond. Sampling will be conducted in accordance with Table IC. The parameters identified for analyses represent those parameter groups that were deficient from the pollutant characterization. After five (5) rounds of samples have been collected, NJIC will review the data and prepare a modified monitoring program for the stormwater detention basin.

5.4 Sampling Monitoring and Reporting Requirements

5.4.1 Effluent Monitoring Reporting

TABLE IA
Discharge Sample K01

PARAMETER	Discharge Limitations	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Ammonia (N) mg/l	Report	Quarterly	Grab	Quarterly
Fecal Coliform	Report	Quarterly	Grab	Quarterly
Nitrate (N) mg/l	Report	Quarterly	Grab	Quarterly
Volatile Organics, ug/l	Report	Annually	Grab	Annually

TABLE IB
Discharge Sample J01

PARAMETER	DISCHARGE LIMITATIONS	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Arsenic, Total ug/l	Report	Quarterly	Grab	Quarterly
Sulfate mg/l	Report	Quarterly	Grab	Quarterly
Total Dissolved Solids mg/l	Report	Quarterly	Grab	Quarterly
Volatile Organics, ug/l	Report	Annually	Grab	Annually

TABLE IC
Discharge Sample J02

PARAMETER	DISCHARGE LIMITATIONS	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Acid Extractables, ug/l	Report	Quarterly	Grab	Quarterly
Base Neutrals, ug/l	Report	Quarterly	Grab	Quarterly
Total Metals ug/l	Report	Quarterly	Grab	Quarterly
Pesticides, ug/l	Report	Quarterly	Grab	Quarterly
Volatile Organics, ug/l	Report	Annually	Grab	Annually

TABLE II

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Elevation of top of monitor well casing with cap off (to be determined once but reported as indicated)	Quarterly	Quarterly
Depth to water table from top of casing prior to sampling	Quarterly	Quarterly
Depth to water table from original ground level prior to sampling	Quarterly	Quarterly

TABLE III

PARAMETER	Standards	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Ammonia (N) mg/l	0.5	Quarterly	Grab	Quarterly
Fecal Coliform	Not Detected	Quarterly	Grab	Quarterly
Nitrate (N) mg/l	10	Quarterly	Grab	Quarterly
Volatile Organics, ug/l	GWQS	Annually	Grab	Annually

5.4.2 Ground Water Monitoring Reporting

The results will be completed on the forms required on the "Monitoring Report - Transmittal Sheet" (Form T-VWX-014, attached to the GWPP approval) and Discharge Monitoring Reports (DMRs) generated by the Department. All monitoring reports will be sent to:

NJDEP
Division of Water Quality
Bureau of Permit Management
Monitoring Reports Unit
P.O. Box 029
Trenton, New Jersey 08625

NJIC may also elect to submit ground water quality data electronically as outlined by the Guidelines for Developing GWPP Plans.

5.4.3 Data Evaluation

When the analytical results are received from the laboratory, NJIC will evaluate if any of the pollutant parameters exceed the GWPS in the compliance point MW-5 and MW-6. If no pollutant exceeds the GWPS, the facility has maintained compliance under its permit. If an exceedence is detected in MW-5 or MW-6 a discrete comparison of upgradient water quality vs. downgradient water quality will be made. If the upgradient levels are greater than the downgradient results, the facility is in compliance with the GWPS. If the downgradient levels exceed the upgradient levels for the pollutant of concern, a statistical evaluation of the data will be made. *A statistical analysis plan must be presented to the Department outlining how results will be interpreted.*

For the K01 discharge, a control chart using historical data or the collection of enough data at the beginning of the permit authorization will be established. Analysis of future results can be made by determining if there are any significant changes within the discharge for each parameter analyzed.

For the 3 monitoring wells, a discrete comparison of the compliance (downgradient) wells to the background well will be made in addition to comparing the variance of pollutant levels within each wells (ANOVA). Similarly, discharge sample J01 will be discretely compared to the GWQS to determine if there could be any potential impacts to ground water as the result of a leak from this system. Discharge sample J02, however, will be used to determine if there is an exceedence of the GWQS, if the water quality is below the GWQS or if the analysis yields results below the MDL.

Other statistical methodologies more appropriate for your facility may be approved by the Department if one is proposed.

6.0 Response to Contravention

6.1 Notification

The domain of the DGW permit is the property boundary of the facility as established by the municipal tax map *(attach copy)*. If a contravention of the Ground Water Protection Standards occurs at the compliance wells MW-5 and MW-6 the facility will immediately call the Department's Hotline number to notify the Department of the exceedence, will write, by certified mail, BNPC within 7 days of the exceedence (with a copy to the regional Bureau of Water Enforcement and Compliance) describing, in detail, what the cause of the exceedence was and the corrective measure implemented to correct the exceedence. Similarly, if a physical malfunction of any of the regulated units is observed, the Department will be notified and corrective measures will be initiated immediately.

6.2 Confirmatory Testing

If a pollutant is detected above the GWPS and exceeds background water quality at MW-5 or 6, which can not be justified by the parameter's presence in a field or lab blank, NJIC will collect an additional sample to confirm the results within 7 days of receiving the laboratory data. If the results can then be attributed to sampling or laboratory error or other reason, the explanation will be included in the quarterly report to the NJDEP. If a contravention of the GWPS is confirmed, the NJDEP will be notified within 7 days of the confirmation.

6.3 Identification of Source of Contravention and Responses

If a pollutant is confirmed above the GWPS and background water quality at MW-5 or 6, a full investigation will then be conducted in the area to first determine if the contamination is coming from another source other than the basin (i.e., spills, leaking UST, etc.). If the source of contamination cannot be confirmed from another source, the source of the pollution in the wastewater will be removed from the discharge by either eliminating the source of the contamination or pre-treating the wastewater prior to discharge.

Additionally, if a pollutant is detected in the J01 monitoring point, the basin will then be drained, a full inspection of the liner will be conducted, and all leaks will be repaired. If necessary, a mechanical method, to be determined, will be used to identify any breaches in the liner integrity. If, after the proactive measures, exceedences of the GWPS persist, a comparison of the detected parameters to the GWPS will be conducted. If the values exceed the GWPS, a discrete comparison of the values to the background water quality will be made. If the values exceed background water quality, a full investigation will be conducted in the area to first determine if the contamination is coming from another source other than the basin (i.e., spills). If no other source is identified, an investigation to either reduce pollutant loading to the basin or install monitoring wells downgradient of the basin and begin an attenuation monitoring program in the area of the NCCW Basin.

If pollutants are detected in the J02 monitoring point, a comparison of the detected parameters to the GWPS will be conducted. If the values exceed the GWPS, a discrete comparison of the values to the background water quality will be made. If the values exceed background water quality, a full investigation of the area will be conducted to determine if a pollutant source is exposed to stormwater. If a pollutant source is identified, pollutant contact with stormwater will be eliminated by placing the source under permanent cover. If the source of pollution can not be determined NJIC will submit a subsurface evaluation plan to NJDEP to determine if the pollution is migrating to the pond in the subsurface. *(Depending upon the facility's SIC code, issues regarding stormwater permitting may also need to be addressed here.)*

If exceedences occur in the subsequent monitoring period, the facility will submit a revised GWPP Plan to further study and correct the situation. If exceedences continue to occur after eliminating exposure of stormwater with pollutant sources, monitoring wells will be installed downgradient of the stormwater basin, or an investigation will be conducted to determine if contamination is migrating off-site.

7.0 Reporting Protocols

7.1 Report Content

Discharge monitoring data generated from sample locations K01, J01, and J02 will be submitted on pre-printed Discharge Monitoring Report (DMR) forms generated by the NJDEP. Ground water monitoring data generated from monitoring wells MW-1, MW-5, MW-6, and MW-7 will be submitted on copies of Monitoring Well Report Forms (Form T-VWX), with original copies provided by NJDEP with the issuance of the final NJPDES-DGW Permit.

Also included with the monitoring data, NJIC will include a summary of the data for each monitoring period identifying which parameters were detected at each of the monitoring locations, the concentration of the parameters detected at each of those monitoring locations, and an outline of the appropriate response measures taken to ensure compliance with the GWPP Plan.

7.2 Reporting Schedule

NJIC will submit sample data on the appropriate forms postmarked no later than the 25th day of the calendar month following the completed reporting period. A copy of the summary data will also be included with the submittal of monitoring data to the NJDEP.

I hereby acknowledge that this Ground Water Protection Program Plan for the New Jersey Industries Company was prepared in accordance with the requirements of N.J.A.C. 7:14A and N.J.A.C. 7:9-6.

_____ _____

John Q. Public, President Date:
New Jersey Industries Company

APPENDIX C2: PROPOSED SANITARY DISCHARGE TO A CONVENTIONAL SEPTIC SYSTEM

This is only a sample GWPP Plan prepared by the Department to give an example of how to develop the individual GWPP Plan for your facility. Some of the issues may not apply to your facility. All *italicized* items are not included in this sample but are site specific technical items that will be necessary in a final GWPP Plan.

1.0 Introduction

This Ground Water Protection Plan has been submitted in accordance with N.J.A.C. 7:14A and 7:9-6. This plan outlines methods to be implemented to protect the quality of ground water at the proposed North Glenn Shopping Center's sanitary wastewater disposal area.

2.0 Description of the Facility and Operation

Business and general Operations

The North Glenn Shopping Center is a proposed strip of twelve (12) commercial offices and retail shops ranging in size from 1,800 square feet to 8,000 square feet. The total footprint of the facility is 40,000 square feet. Treated wastewater will be discharged to a series of two septic tanks that discharge to a 2,800 square foot disposal field. The facility will be constructed at the proposed site over the next ten to twelve months (see site location map). Due to the variability of tenants that may lease the various tenant spaces, design flow was based upon square footage of the facility. No floor drains will be present at the facility and no individual facility will be allowed to discharge non-sanitary waste to the septic system. A copy of the engineering plans for the design of the facility are included and have been sent to the Department as part of a Treatment Works Approval (TWA) application.

2.2 Identification of Pollutant Sources

Although there is a great potential variability in the types of tenants that will be operating at the facility, the site is being designed to accommodate professional office space and specialty retail shops. Other than domestic cleaning products, no hazardous chemicals should be present at the facility. In order to assure this, each tenant will be required to submit an inventory of chemicals within 30-days of occupying the premises and annually thereafter.

APPENDIX C3: SANITARY WASTEWATER TREATMENT FACILITY WITH SPRAY IRRIGATION AND INFILTRATION LAGOON DISCHARGES.

This is only a sample GWPP Plan prepared by the Department to give an example of how to develop the individual GWPP Plan for your facility. Some of the issues may not apply to your facility. All *italicized* items are not included in this sample but are site specific technical items that will be necessary in a final GWPP Plan.

1.0 Introduction

This Ground Water Protection Plan has been submitted in accordance with the 7:14A and 7:9-6. This plan outlines methods to be implemented to protect the quality of ground water at the Clear River wastewater treatment facility's disposal area.

2.0 Description of the Facility and Operation

2.1 Business and general Operations

The Clear River facility is a wastewater treatment facility which receives and treats approximately 500,000 gallons per day of domestic wastewater from 870 residences. Treated wastewater is discharged to five 43,500 square foot infiltration lagoons and a 50 acre spray irrigation field. The facility has been in operation for 25 years at it's present location (see site location map). Ten employees operate the facility eight hours a day, seven days a week on an eight hour shift. The present wastewater treatment process at the facility consists of communition, screening, flow equalization, extended aeration activated sludge, denitrification, phosphorus removal, ultraviolet disinfection, pH adjustment and final aeration . Treated wastewater is pumped from the aeration/storage basin through a valve chamber which distributes the wastewater to infiltration lagoons or spray irrigation fields for disposal. The majority of the wastewater is diverted to the spray fields (see Figure 1).

2.2 Identification of Pollutant Sources

Plant Operations and Stored Materials

Domestic wastewater is pumped to the treatment plant from 870 residences. The main contaminants in the raw wastewater are pathogens, ammonia, and nitrate.

Methanol, sulfuric acid, phosphoric acid, and calcium hypochlorite are trucked into the plant and transferred to above ground storage tanks *(identify gallonage)* which are on bermed concrete pads with stormwater release valves. Aluminum sulfate is transported into the plant and stored in an underground storage tank (UST). The stormwater

accumulated is visually inspected for contamination, field tested for pH, and then released to a nearby tributary via a pipe. Products are stored on site for approximately one month before use.

All of the wastewater treatment and conveyance systems are constructed of either reinforced concrete or steel.

2.3 Identification of Regulated Discharges

Three regulated units are identified on the site. The post aeration surface impoundment receives and stores wastewater prior to distribution to either the infiltration basins or spray fields. Both the infiltration/percolation lagoons and spray irrigation fields are intended for groundwater recharge of the applied wastewater. These regulated discharges are then classified as:

Discharge Unit	Official Regulated Unit Name
Lined post aeration basin at the treatment plant	Surface Impoundment-Sanitary
Lagoon	Infiltration/percolation lagoon-Sanitary
Spray field	Spray Irrigation-Sanitary

2.4 Other Regulated Activities

Underground Storage tanks

The UST identified in section 2.2.1 is registered with the NJDEP and meets current regulatory requirements.

3.0 Description of Site Conditions

3.1 General Setting

The site is located on the northern coastal plain of New Jersey. The New Jersey Coastal Plain is a seaward-dipping wedge of unconsolidated gravel, sand, silt, and clay sediments that range in age from Cretaceous to Holocene. These sediments generally strike northeast-southwest and dip gently to the southeast 10 to 60 ft/mi. The land use adjacent to the disposal area is pine woodlands on the east, south, and west borders. The northern site boundary is adjacent to wetlands. The nearest residential dwellings are approximately 750 feet from the spray area.

3.2 Geology

The spray field, the infiltration lagoons, and surface impoundment are located on the Cape May Formation. This is a Class II-A aquifer. These formations consist of varying distributions of unconsolidated sand, silt, clay, and gravel.

3.3 Soils

The site is within the Galestown Sand soils (GaA) as mapped in the Burlington County Soil Survey. This soil occurs on 0 to 5 percent slopes and is a dark grayish clear sand to a depth of about 23 inches and the subsoil is a clear loamy sand up to a depth of 60 inches. (*Describe the site soils and local characteristics*).

3.4 Hydrogeology

Ground water flow at the site is to the north with a gradient ranging from 0.01 to 0.02 ft/ft. The groundwater occurs as an unconfined water table with the depth to water ranging from 5 to 20 feet. *Monitor well and soil boring logs are provided in Appendix 1. Results of pump tests and permeability determinations are summarized in Appendix 2.* At the site the Cape May Formation consists of two distinct units. The upper unit is approximately 40 feet thick and consists of gray to orange colored, fine to medium grained, well sorted quartz sand. The basal unit consists of clear to black clayey silt to very fine quartz sand.

Background water quality has been determined by upgradient monitor wells, as per N.J.A.C. 7:14A-7.9(d)5ii, prior to operation of the lagoon and spray field. Five rounds of sampling were conducted on monitor wells 1 and 2 for ammonia nitrogen, nitrate nitrogen, total kjeldahl nitrogen, and biochemical oxygen demand. *Results of these analyses are displayed on Table 1.*

3.5 Sensitive Receptors

The site is located within the Class II-A aquifer. Wetlands border the northern portion of the site. One thousand feet to the northeast of the infiltration lagoons is the Dark Run, which is a tributary to the Wet River. Additionally, there are approximately 20 potable wells within a 0.5 radius of the disposal areas, but all are 100 to 300 feet deep and draw water from the underlying Mount Laurel Formation.

4.0 Pollutant Characterization and Associated Monitoring Program

4.1 Characterization of Regulated Discharges

Several years of effluent sampling data has been established from the effluent point to the post aeration basin for TKN, NH_3-N, NO_3-N, P, Na, BOD, SS, pH, and TDS. *Table 2*

summarizes this data. Data generated from analysis of previous discharges to the post aeration basin, as per N.J.A.C. 7:14A-7.9(d)2(1) indicates consistent exceedences of Ground Water Quality Standards (GWQS) for NH_3-N, NO_3-N, P, Na, and TDS. The remaining parameters on Table II were below the GWQS.

4.2 Engineering and Physical Characteristics

4.2.1 Sanitary – Surface Impoundment

The post aeration basin at the WWTP has a 22.5 million gallon capacity. The basin covers approximately five acres and is 16 feet deep. This allows up to 45 days of storage during times when spray irrigation is not possible because of freezing temperatures, waterlogged ground conditions, and snow cover. The basin is lined with a 30 mil HDPE liner with a permeability no greater than 10^{-7} cm/s. This liner was installed in 1973. No leachate collection system or underdrain exists below the basin. Wastewater from the basin collects in a wet well within the basin where it is pumped to a valve chamber which mechanically directs the wastewater to the IP lagoons and spray fields.

4.2.2 Sanitary - Infiltration / Percolation Lagoon

There are five 43,500 square foot infiltration lagoons which are unlined basins partially excavated below grade with excavated materials built up to form berm walls. Each basin's dimensions are 208 x 208 ’ x 10’ deep. The saturated hydraulic conductivity was determined to be 0.4 inches per hour in the saturated zone beneath the lagoon’s surface using shelby tube testing. *Location of this testing is depicted in Figure 2.* Using a 3 day application and 5 day drying cycle and an application rate of 3.9 inches per day, the five acres of lagoons is a sufficient infiltrative surface area. *Calculations and results of these analyses are attached in Appendix 3.*

4.2.3 Sanitary-Spray Irrigation

The spray area is a 50 acre woodland consisting mainly of needle-leaved evergreens and broad-leaved deciduous trees. The slope of the spray irrigated area does not exceed fifteen percent. A four hundred foot buffer zone is maintained between the perimeter of the spray irrigation area (PSIA) and the nearest residential dwelling. A two hundred foot buffer zone is maintained from the PSIA to the nearest wetland and surface water body. A one hundred foot buffer zone is maintained between the PSIA and the property line. The areal extent of the spray field is depicted in Figure 1. The saturated hydraulic conductivity was determined to be 0.4 inches per hour at the zone of infiltration in the spray irrigation area using tube permeameter testing. A annual hydraulic loading rate based on the infiltrative capacity of the spray area was determined to be 0.4 inch per day. Using this loading rate a minimum spray area of 26 acres was calculated to be required. *Calculations and results of these analyses are attached in Appendix 3.*

4.3 Monitoring Program Types

Based upon results of the discharge analyses the following monitoring programs are to be implemented to ensure that the ground water is protected as per the GWQS (N.J.A.C. 7:9-6).

4.3.1 Sanitary Surface Impoundment

The post aeration basin at the WWTP is a NJPDES regulated unit as per N.J.A.C. 7:14A-7.3(b)1. The basin is not designed to leak, but does not have a leak detection system nor an underdrain. This design does not exclude this unit from ground water monitoring. The treated wastewater exceeded the GWQS for NH_3-N, NO_3-N, P, Na, and TDS. Therefore, leak detection monitoring program will be initiated for this regulated unit.

4.3.2 Sanitary – Infiltration / percolation lagoon

The infiltration lagoon is a basin designed to allow liquid to percolate into the ground. This unit is regulated by the N.J.A.C. 7:14A-7.3(b)1. As this unit is designed to discharge and the wastewater received is likely to exceed GWQS, an attenuation monitoring program is to be instituted.

4.3.3 Spray Field

The spray area is regulated as per N.J.A.C. 7:14A and designed to receive sprayed effluent and dispose of the liquid through evapotranspiration and percolation into the ground. Pollutants in the sprayed wastewater is likely to exceed GWQS, therefore, an attenuation monitoring program will be instituted.

4.3.4 Other

An alternative monitoring program of the WWTP discharge quality and volume will be initiated to assess trends in wastewater quality. The results of the discharge monitoring will provide a source quality control for assessing the attenuation of pollutants prior to reaching the monitor well network.

5.0 Specific Monitoring Program For Each Regulated Unit

A combination of three monitoring program types will be used to demonstrate compliance with the ground water quality standards: (1) an alternative monitoring program consisting of discharge monitoring, (2) a leak detection monitoring program; and, (3) an attenuation monitoring program.

5.1 Alternative Monitoring Program

Discharge monitoring shall occur at the outfall of the existing wastewater treatment plant, prior to the post aeration/storage basin. The monitoring location will be identified as SO1 and sampling and monitoring will be conducted in accordance with Table 3 below:

Table 3

Analyte	Standards	Sample Type	Frequency
Flow gpd	500,000	Continuous	Quarterly
Total Kjeldahl Nitrogen	Report only	grab	Quarterly
Ammonia-Nitrogen	Report only	grab	Quarterly
Nitrate-Nitrogen	Report only	grab	Quarterly
Phosphorus	Report only	grab	Quarterly
pH	Report only	grab	Quarterly
Total Dissolved Solids	Report only	grab	Quarterly
Total Volatile Organics	Report only	grab	Annually

Data analysis will be report only for all parameters with the exception of flow. Flow will be measured with a continuously measuring in-line flow meter. No observed daily value should exceed the limit in Table 3.

5.2 Leak Detection Monitoring Program

Leak detection monitoring shall include four ground water monitoring wells to be installed and shall be identified as MW-1 through MW-4. Monitoring and sampling shall be conducted in accordance with Table 4 below. The parameters listed for analysis in Table 4 were selected because these parameters had the greatest disparity between discharge quality (section 4.1) and background water quality (BGWQ) (section 3.4) and therefore have the highest probability of being distinguished from BGWQ in the event of a discharge.

Table 4

Parameter	Standard	Sample Type	Frequency
Nitrate-Nitrogen	report only	grab	Quarterly
Ammonia-Nitrogen	report only	grab	Quarterly
Phosphorus	report only	grab	Quarterly
Total Dissolved Solids	report only	grab	Quarterly

Downgradient ground water quality observed in monitoring wells MW-2 through MW-4 will be compared to BGWQ in monitor well MW-1 to determine if the post aeration /storage basin is discharging.

5.3 Attenuation Monitoring Program

Attenuation monitoring shall be applied to both the I/P Lagoons and spray field area. The attenuation monitoring program shall include monitor wells MW-5 through MW-9. These wells will be identified as MW-5 through MW-9. Because of each discharge's proximity and the direction of ground water flow, the attenuation monitoring program shall apply to both the I/P lagoons and spray field area. Monitoring and sampling shall be conducted in accordance with Table 5 below.

Table 5

Parameter	Standard	Sample Type	Frequency
Nitrate-Nitrogen	0.5 mg/l	grab	Quarterly
Ammonia-Nitrogen	10 mg/l	grab	Quarterly
Phosphorus	report only	grab	Quarterly
pH	6.5-8.5 S.U.	grab	Quarterly
Total Dissolved Solids	500 mg/l	grab	Quarterly

Downgradient ground water quality observed in monitoring wells MW-5 through MW-9 will be compared directly with the standards identified in Table 5 above.

6.0 Reporting

6.1 Raw Data Submission

Data collected in accordance with Table 3 will be reported and submitted on "Discharge Monitoring Reports" (DMR) to be provided by the NJDEP.

Data collected in accordance with Tables 4 and 5 will be reported and submitted on "Ground Water Monitoring Well Reports" (Form T-VWX). Copies of these forms will be provided by NJDEP with issuance of the final NJPDES permit.

All data will be submitted to the NJDEP no later then the 25th day of the month following the end of the sample period. All data will be submitted to:

NJDEP
Division of Water Quality
Bureau of Permit Management
Monitoring Reports Unit
P.O. Box 029
Trenton, New Jersey 08625

6.2 Data Assessment

6.2.1 Alternate Monitoring Program

All data collected in accordance with Section 5.1 and Table 3 shall be reported and data distribution and trends shall be recorded and maintained onsite. The objective of this data assessment is to monitor long term performance of the wastewater treatment plant.

6.2.2 Leak Detection Monitoring Program

All data collected in accordance with section 5.2 and Table 4 shall be assessed to determine whether a statistically significant increase has occurred ground water quality of each parameter at compliance point monitoring well (MW-5-through MW-9) shall be compared to the background value (MW-1) of that constituent, according to the statistical procedures and performance standards identified in N.J.A.C. 7:14A-7.7.

A report detailing the determination of whether there has been a statistically significant increase over background water quality in each compliance point monitoring well for each specified parameter shall be submitted no later than the 25th day of the month following the last ground water sampling month for a calendar year (for example, if sampling occurs during February, May, August, November, the 25th day of the month following the last sampling month in the calendar year would be December 25th). Each successive report shall incorporate all previous ground water quality data collected from the wells specified in this permit (including background quality data collected during the permit application process). The first report shall not be submitted until a minimum of (four) 4 rounds of sampling have been completed in the compliance point monitoring wells after commencement of discharge. The report:

NJDEP
Division of Water Quality
Bureau of Nonpoint Pollution Control
P.O. Box 029
Trenton, NJ 08625-0029

6.2.3 Attenuation Monitoring Program

All data collected in accordance with Section 5.3 and Table 5 shall be compared directly with monitoring standards identified in Table 5. An assessed value that exceeds the monitoring standards shall be considered a contravention of the attenuation monitoring program.

7.0 Response to Contravention

Notification

In the event of volatile organics being detected at J01 the permittee will provide written notification, by certified mail to the Chief, Bureau of Nonpoint Pollution Control at PO BOX 029, Trenton, New Jersey 08625. Notification will be made within seven (7) days of receiving the analytical results and is in addition to reporting this analytical result on a DMR. After reviewing the analytical results for any priority pollutant required to be monitored, the permittee may increase the monitoring frequency for the substance in question; impose ground water quality monitoring for that substance; locate and remove the source of the substance from the wastestream; and, develop and implement measures to ensure that contamination of the system will not occur.

7.1 Identification of Source Contravention and Response Contingencies

7.2.1 Alternative Monitoring

In the event of volatile organics being detected at S01 the permittee will provide written notification, by certified mail to the Chief, Bureau of Nonpoint Pollution Control at P.O. Box 029, Trenton, New Jersey 08625. Notification will be made within seven (7) days of receiving the analytical results and is in addition to reporting this analytical result on a DMR. After reviewing the analytical results for any priority pollutant required to be monitored, the permittee may increase the monitoring frequency for the substance in question; impose ground water quality monitoring for that substance; locate and remove the source of the substance from the wastestream; develop and implement measures to ensure that contamination of the system will not occur.

7.2.2 Leak Detection Monitoring

If the data assessment conducted in accordance with 6.2.2 indicates that the post aeration/ storage basin is leaking, the facility will immediately assess the integrity of the liner system. Based upon the results of this inspection, the facility will either initiate repairs to the liner or take no remedial measures, but rather petition NJDEP to modify the GWPP in order to implement an attenuation monitoring program for the post/aeration storage basin.

7.2.3 Attenuation Monitoring Program

If the monitoring standards in Section 5.3 Table 5 are exceeded in Wells MW-5 through MW-9, the facility will determine if the contamination is a result of background quality or onsite activities. Additionally, the facility may reduce pollutant loading, increase pretreatment, and/or move the monitor wells.

Certification

This Ground Water Protection Plan for the Clear River wastewater treatment facility fulfills the requirements of the NJPDES regulations, N.J.A.C. 7:14A, and the Ground Water Quality Standards, N.J.A.C. 7:9-6.

_____ _____

Frank T Public, Owner/Operator Date:
Clear River facility

2.3 Identification of Regulated Discharges

One regulated unit is identified on the site. The sanitary septic system with a design flow greater than 2,000 gpd was designed in consideration of N.J.A.C. 7:9A. These regulated discharges are then classified as:

Discharge Unit	Official Regulated Unit Name
Sanitary Septic System	Underground Injection Control –Sanitary

3.0 Description of Site Conditions

General Setting

The site is located on the coastal plain of New Jersey in a class IA aquifer as designated in N.J.A.C. 7:9-6. The Ground Water Protection Standards are the background quality of the groundwater. Residential properties to the east and west border the site. The northern and southern site boundaries are adjacent to similar commercial properties.

3.2 Geology

The disposal area is located over the Cohansey Formation. This formation consists of varying distributions of unconsolidated sand, silt, clay, and gravel (*Describe formations and characteristics. For more specific language, see appendix C1.*)

3.3 Soils

The site is underlain by two soil types as mapped in the Gloucester County Soil Survey. The 2,800 square foot disposal field is located on the Greenwich sand loam (Gv). This soil is fine sand loam to a depth of 2 to 3 feet with poor drainage. It occurs in nearly level areas. (*Describe the site soils and local characteristics. For more specific language, see appendix C1.*).

3.4 Hydrogeology

Ground water flow at the site is to the northwest with a gradient ranging from 0.02 to 0.04. The groundwater occurs as an unconfined water table with depth to water ranging from 5 to 20 feet. Monitor well and soil boring logs are provided in an appendix. Results of pump tests and permeability determinations are summarized in an enclosed table. A mounding analysis and dilution model is included as an appendix. At the site, the Cohansey Formation consists of a basal unit consisting of brown to tan silt to very fine quartz sand. (*A copy of all technical information should be included within the GWPP Plan Appendices or Attachments. For more specific language, see appendix C1.)*

Background water quality has been determined by a monitor well installed in a location that is in the anticipated upgradient direction of the proposed septic system. The monitor well (MW-1) was sampled for VOs, BNs, PCBs, pesticides, pH, TDS, TPH, nitrate, ammonia and fecal coliform. Results of these analyses were non-detect, except for pH that was approximately 5.4, TDS that ranged from 155 ppm to 200 ppm, nitrate that ranged from 3.7 ppm to 6.1 ppm, and ammonia which ranged from 0.2 ppm (the PQL) to 0.36 ppm. VOs, BNs, PCBs, and pesticides were sampled only to ensure that background water quality is not contaminated by an upgradient or off site source. These parameters were not required to be sampled for pursuant to N.J.A.C. 7:14A-7.9(d)2iii(2).

The ground water protection standard (GWPS) for this discharge will be the background ground water quality.

3.5 Sensitive Receptors

The site is located within an area that is developed. There are no streams within one-quarter mile of the site. There are several potable wells in the area, including one that is proposed for the site. The on-site potable well will be located 175 feet from any component of the septic system. The nearest potable well located off-site will be 200 feet from the proposed septic system.

4.0 Pollutant Characterization and Associated Monitoring Program

4.1 Characterization of Sanitary Septic System

Since the regulated unit (septic system) is designed and intended to discharge, and pollutant characterization shows the discharge quality exceeds the GWPS, an attenuation monitoring program is being proposed. The attenuation monitoring program will be comprised of a ground water wells and discharge monitoring.

The sanitary septic system was designed in consideration of N.J.A.C. 7:9A and accordance with N.J.A.C. 7:14A-22. A copy of the design specifications has been submitted as part of a TWA application to the NJDEP and is included as an appendix (*include package*).

4.2 Pollutant Characterization

It has been well documented that sanitary waste is high in nutrient compounds, fecal coliform bacteria and TDS. Beyond the retention of solids within the proposed septic tanks, no pretreatment of the waste water will be provided prior to discharge. Based upon the nature of the facility and its area, 5,000 gpd of sanitary wastewater is expected to be discharged.

4.3 Monitoring Program Type

Since the regulated unit (septic system) is designed to discharge to ground water and the pollutant characterization indicates that the discharge quality will exceed the GWPS, an attenuation monitoring program will be used.

Due to the discharge of sanitary wastewater which contains pollutant levels greater than the GWQS, a monitoring well network consisting of four monitoring wells has been designed for the facility. Based upon the dilution model in an appendix (*include*). One upgradient monitoring well, two downgradient monitoring wells, and a piezometer located in the center of the disposal field will be used to monitor the system's discharge impact and hydraulic performance. Discharge monitoring will be reported to the NJDEP, however, no limitations at the discharge will be applied.

5.0 Monitoring Program For Each Regulated Unit

5.1 Description

5.1.1. Attenuation Monitoring Program

The principal elements of the attenuation monitoring program will be four (4) ground water monitoring wells. Existing MW-1 will be used for upgradient sampling while three additional ground water monitoring wells will be installed in downgradient locations and will be identified as MW-2, MW-3 and MW-4 (*include plot-plan depicting locations*). Locations of the three downgradient wells were in consideration of a ground water contaminant transport model conducted as part of the NJPDES-DGW Permit application. Based upon the results of the modeling, the three downgradient wells were located at points where the discharge plume had dispersed to the GWPS (background ground water quality). Ground water monitoring wells MW-1, MW-2, MW-3 and MW-4 will be sampled in accordance with Tables I and II.

Additionally, a ground water monitoring well will be installed in the approximate center of the proposed disposal field and will be identified as PW-1. This well will be used to monitoring the extent of the ground water recharge mounding beneath the disposal field in order to confirm that unsaturated conditions are maintained to facilitate the microbiological renovation of the applied wastewater. PW-1 will be sampled in accordance with Table I.

Table I

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
Elevation to top of monitor well casing with cap off (to be determined once, but reported as indicated)	Quarterly	Quarterly
Depth to water table from top of casing prior to sampling	Quarterly	Quarterly
Depth to water table from original ground level prior to sampling.	Quarterly	Quarterly
Depth to ground water from bottom of the disposal field. *1	Quarterly	Quarterly

*1 Measurement for the piezometer well only.

Table II

PARAMETER	DISCHARGE LIMITATIONS	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Ammonia (N) mg/l	10	Quarterly	Grab	Quarterly
Fecal Coliform	ND	Quarterly	Grab	Quarterly
Nitrate	0.5	Quarterly	Grab	Quarterly

5.1.2 Alternative Monitoring Program

Discharge quality will be monitored prior to the discharge to ground water to ensure that (1) only sanitary wastewater is being discharged and (2) to confirm data acquired during the pollutant characterization. A discharge sample will be collected from the distribution box of the septic system. This sample location will be identified as T01. Sample location T01 will be sampled in accordance with Table III.

Table III
Discharge Sample T01

PARAMETER	DISCHARGE LIMITATIONS	SAMPLING FREQUENCY	SAMPLE TYPE	REPORTING FREQUENCY
Ammonia (N) mg/l	Report	Quarterly	Grab	Quarterly
Fecal Coliform	Report	Quarterly	Grab	Quarterly
Nitrate	Report	Quarterly	Grab	Quarterly
Volatile Organics, ug/l	Report	Annually	Grab	Annually

5.2 Data Analysis

5.2.1 Attenuation Monitoring Program

Using the methodologies described in N.J.A.C. 7:14A-7.7, ground water quality data acquired from the monitoring wells will be subjected to statistical evaluation for each constituent in Table II. This will be done in order to demonstrate whether a statistically significant difference occurs between upgradient and downgradient ground water quality.

In PW-1, hydrostatic data will be compared to the elevation of the bottom of the disposal field. The distance between the observed ground water elevation and the elevation of the bottom of the disposal field should never be less than four (4) feet.

5.2.2 Alternative Monitoring Program

Discharge samples collected at T01 shall be recorded and used for assessing any trends that may exist in the discharge quality. The data will also be used to ensure that only sanitary wastewater is discharged to ground water through the septic system.

6.0 Reporting

Ground Water Monitoring Reporting

Sampling results will be reported on the appropriate attached forms. Monitoring well results will be submitted on "Monitoring Report – Transmittal Sheet" (Form T-VWX-014). Discharge results will be submitted on Discharge Monitoring Reports (DMRs) generated by the Department. The facility will maintain an adequate supply of the report forms. All monitoring reports will be sent to:

NJDEP
Division of Water Quality
Bureau of Permit Management
Monitoring Reports Unit
P.O. Box 029
Trenton, New Jersey 08625

7.0 Response to Contravention of GWPP Plan

7.1 Raw Data Submission

7.1.1 Notification

If background water quality is exceeded in any downgradient monitoring well, the facility will immediately call the DEP's Hotline number and within 7 days write by certified mail to BNPC, copying enforcement, to report the exceedence. The correspondence will describe in detail the cause of the exceedence and the corrective measure implemented.

7.1.2 Confirmatory Testing

If a pollutant is detected above the GWQS at any downgradient well and cannot be explained by the parameter's presence in the field or lab blank, the facility will collect and analyze a second sample to confirm the results within 7 days of receiving the laboratory data. If the results are attributed to laboratory error or other reason, the explanation will be included in the quarterly report to the NJDEP. If a contravention of the GWQS is confirmed, the NJDEP will be notified within 7 days of the confirmation.

Identification of Source of Contravention and Responses

If a pollutant is confirmed to exceed the GWQS in any downgradient monitoring well, an investigation will be conducted to determine if the contamination is originating at a source other then the facility. If the source of the contamination cannot be confirmed from an offsite source, an evaluation will be made to determine if the facility source of contamination can be eliminated by cessation of the discharge, installing additional downgradient wells or initiating wastewater treatment prior to discharge.

7.1.3 Report Content

Discharge monitoring data from TO1 will be submitted on pre-printed Discharge Monitoring Report (DMR) forms generated by the NJDEP. Ground water monitoring data from all monitor wells will be submitted to the NJDEP on copies of Monitoring Well Report Forms (Forms T-VWX), with original copies provided by NJDEP with issuance of the final NJPDES-DGW Permit.

Included with the monitoring data will be a summary indicating pollutant detections, concentrations of detections, and the response measures enacted to ensure compliance with the GWPP.

7.2 Reporting Schedule

The facility will submit sample results on the appropriate forms postmarked no later than the 25th day of the calendar month following the completed reporting period. A copy of the summary data will also be included with the submittal of monitoring data to the NJDEP.

7.3 Discussion of Results

The facility will submit, no later than the 25th day of the month following the last ground water sampling month for a calendar year (for example, if sampling occurs during February, May, August and November, the 25th day of the month following the last sampling month in the calendar year would be December 25th), a report detailing the determination of whether there has been a statistically significant increase over background water quality in each compliance point monitoring well for each specified parameter. Each successive report will incorporate all previous ground water quality data collected from the wells specified in the GWPP (including background quality data collected during the permit application (process). The first report will not be submitted until a minimum of four (4) rounds of sampling has been completed.

This Ground Water Protection Program Plan for the North Glenn Shopping Center fulfills the requirements of the NJPDES regulations and the Ground Water Quality Standards (N.J.A.C. 7:14A and N.J.A.C. 7:9-6).

Stanley J. Facility, CEO
North Glenn Associates, L.L.C.

Date: