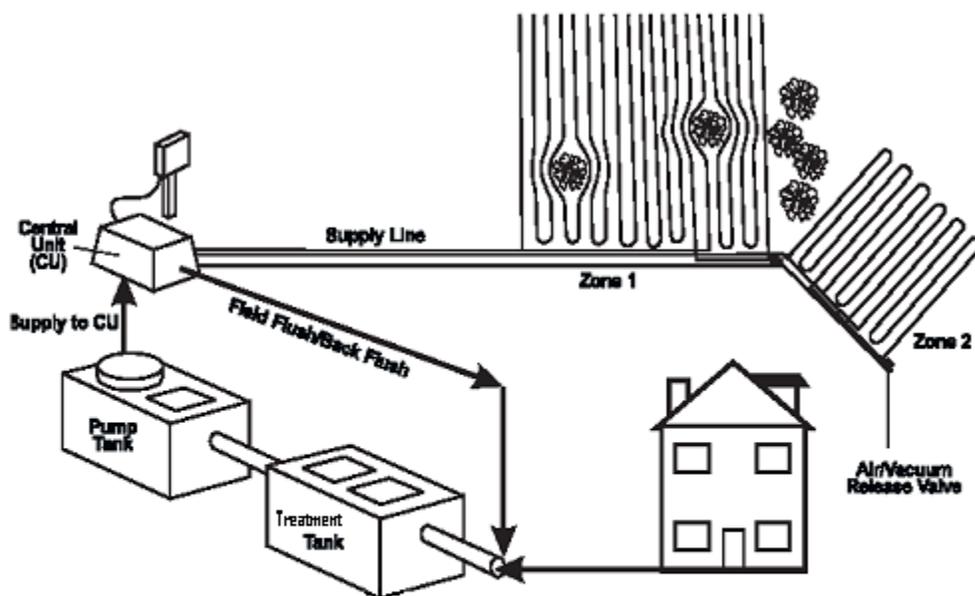


Technical Manual for  
Applications for Treatment Works Approvals Under  
The Standards for Individual Subsurface Sewage  
Disposal Systems (N.J.A.C. 7:9A-3.9)

# VARIANCES



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DIVISION OF WATER QUALITY  
BUREAU OF NONPOINT POLLUTION CONTROL

APRIL 2, 2012

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## Forward

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The health of our State's water resources is essential to our quality of life in New Jersey. Whether swimming in a lake, casting a fishing line into a meandering brook, or drinking a glass of crystal clear water; our environment provides us the basic necessities of life, which can not be taken for granted. To manage our valuable water resources, the Department administers a variety of programs aimed at protecting and restoring water quality, controlling water pollution and ensuring adequate water supplies.

In a densely populated state like ours, with nearly 8.8 million people, and old and new residential, commercial and industrial developments, our ground water resources are always at risk. Septic system design needs to be carefully controlled if we are to maintain high quality ground water for human use and protect it as an ecological resource. New Jersey has a strong record of controlling and eliminating pollution, through implementation of the New Jersey Pollutant Discharge Elimination System (NJPDES). Since the program was implemented in New Jersey in 1981, it has been instrumental in helping to preserve and protect our water resources. Implementation of the "Standards for Individual Subsurface Sewage Disposal Systems" at N.J.A.C. 7:9A (Standards) are just one of the methods used to provide our waters. These Standards provide for advanced water quality controls to smaller treatment systems that help to preserve and protect our ground water resources.

Individual subsurface sewage disposal systems also referred to as septic systems or onsite wastewater treatment systems, are designed to store and treat wastes. When designed and constructed in conformance with the Standards, a system will adequately treat waste and protect human health and the environment.

While many septic system designs are similar, individual site conditions sometimes warrant variations on design. These Standards set forth a process to apply for a "waiver" or "variance" from the Standards through the Treatment Works Approval (TWA) process. The TWA is a State issued approval that allows local authorities, like health departments, to issue construction approvals for systems that can not conform to the Standards. Through this TWA process, the Department examines alternatives proposed by a licensed New Jersey Professional Engineer that are intended to adequately protect human health and the environment.

Amendments to these Standards, adopted in April 2012, identify use of this technical manual to support preparation of administrative and technical submission requirements to obtain a TWA for a variance from the Standards. This manual presents information on how to incorporate current technology as part of an application and provides an explanation of Department policies and procedures. The manual has been produced by the New Jersey Department of Environmental Protection (Department) to make the TWA process more efficient.

The Department welcomes suggestions for improving this manual. Any comments regarding this manual should be directed to:

401-02B  
Bureau of Nonpoint Pollution Control  
Division of Water Quality  
Department of Environmental Protection  
PO Box 420  
Trenton, NJ 08625-0420

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## Introduction

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The Standards set forth at N.J.A.C. 7:9A-3.9 specify that a TWA is required for:

1. Any project which is required to obtain a sewerage facilities certification from the Department, pursuant to N.J.S.A. 58:11-25.1 and these rules at N.J.A.C. 7:9A-3.18;
2. Any design of a new or expanded individual subsurface sewage disposal system which will not conform with one or more requirements of the Standards;
3. Any design that incorporates an experimental system or component pursuant to N.J.A.C. 7:9A-3.11;
4. Any design that incorporates wastewater treatment in order to meet effluent discharge limitations or ground and/or surface water quality standards as prescribed by applicable State or Federal regulations or statutes; or
5. Any design in which sanitary sewage will not flow by gravity from the realty improvement to the septic tank.

This technical manual is focused on items 2, 3 and 5, listed above. All forms and instructions can be downloaded at: [http://www.state.nj.us/dep/dwq/owm\\_permits.htm](http://www.state.nj.us/dep/dwq/owm_permits.htm). Those TWAs in item 1 are addressed by the "50 or More Technical Manual" available at: <http://www.state.nj.us/dep/dwq/pdf/50guide.pdf>. Those TWAs in item 4 are typically addressed after the issuance of a NJPDES permit; more information is available at: <http://www.state.nj.us/dep/dwq/twa.htm>. These item 4 TWAs also include those approvals necessary for the permanent use of a holding tank pursuant to N.J.A.C. 7:9A-3.12.

Applicants for items 2, 3 and 5 must ensure that the system design provides compensation for the required variance to adequately protect human health and the environment. This may include measures such as deed notices or restrictions, to ensure future system owners are provided with the proper notification and levels of safety to protect their interests and proper system functionality.

## **Section 1. What You Need to Know Before You Apply**

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The following is a list of variances that will not be considered under this TWA process:

- Construction of a new or expanded system in areas subject to surface flooding.
- Variances for systems that would violate local ordinance requirements or the requirements of any other applicable regulation.
- Repairs or alterations to correct malfunctioning systems, which are approvable under N.J.A.C. 7:9A-3.3.
- Variances to a system that has already been constructed and received a Certificate of Compliance pursuant to N.J.A.C. 7:9A-3.13.
- Variances to allow for the issuance of a construction approval to allow expansion of an existing structure or improvements that would infringe upon the existing separation distances without improving the existing system.
- Variances that are not endorsed by the local administrative authority pursuant to N.J.A.C. 7:9A-3.9(d).

The following is a list of issues that are addressed by the local administrative authority and do not require a TWA:

- Sewerage ejector pumps that discharge to the septic tank. The Department requires at N.J.A.C. 7:9A-8.2(c) and 10.2 to size the system in accordance with those for garbage grinders.
- Multiple septic systems serving realty improvements on a single property where the aggregate estimated volume of sanitary sewage of all existing and proposed structures on the property does not exceed 2,000 gallons per day. The Department defines "Property" to mean:
  - 1) A single lot as defined by municipal lot and block or right of way (unless item 2, below applies); or
  - 2) The combined area contained within the legal boundaries of two or more contiguous lots where, for any part of each of those lots, there is a shared pecuniary, possessory or other substantial common interest by one or more persons (such as common ownership and/or operation or a common plan of development or sale).
- Set back reductions to potable wells that meet the requirements of N.J.A.C. 7:9A Table 4.3, footnote (4).
- Construction of systems on properties where the slope of the existing ground surface is less than or equal to 25%. In accordance with the Standards, trenches are required on slopes greater than 10% but no more than 25%. However, a variance may be considered for the construction of a disposal bed where the slope of the existing ground surface is greater than 10% but less than 25%.
- Installation of composting or incinerating toilets. Composting or incinerating toilets require approvals from local plumbing subcode officials. However, when proposing to use composting toilets in conjunction with a greywater system, the greywater system must be designed for the appropriate flow and requires approval pursuant to N.J.A.C. 7:9A-7.5.
- Systems located on other properties in conformance with N.J.A.C. 7:9A-1.6(k) provided each system serves a single property.

- Systems that incorporate distribution technologies in lieu of filter material and laterals in conformance with N.J.A.C. 7:9A-9.8.
- Systems that incorporate an advanced wastewater pretreatment device and/or drip dispersal designed and constructed in accordance with N.J.A.C 7:9A-8.3 and/or N.J.A.C 7:9A-10.8, as applicable.

A Frequently Asked Questions (FAQ) document is available online which provides general requirements regarding the Standards and the Onsite Wastewater Management Program. This information may be useful when working with any aspect of onsite wastewater treatment systems in New Jersey. The document may be periodically updated and is available at: <http://www.state.nj.us/dep/dwg/pdf/faq79a.pdf>.

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## **Section 2. How to Apply**

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### **A. PRE-APPLICATION MEETINGS**

In many situations there may be questions regarding the technical details of an application with regard to the type of variance being requested or in cases where multiple variances are requested. These cases would benefit from discussions with Department representatives before formal application. The system designer should contact the Department to discuss the application and determine whether a pre-application meeting is beneficial. Where a pre-application meeting is needed, the following information should be provided to the Department for review prior to the meeting:

1. A complete description of the physical location of the property and the proposed project including any and all phases of any common plan of development or sale of the property;
2. A site location map with the boundaries of the property defined;
3. A site plan (if available). Where a site plans has not yet been developed, a copy of the municipal tax map for the block and lot shall be included.
4. Copies of all technical data collected for the site to date, including soil logs or test data that is on file with the administrative authority.

Pre-application meetings are generally scheduled within two weeks of the request. If there is a preferred time frame, it should be provided in the request. Information may be mailed, faxed or emailed to the Department at the following:

401-02B  
Bureau of Nonpoint Pollution Control  
Division of Water Quality  
Department of Environmental Protection  
PO Box 420  
Trenton, NJ 08625-0420  
Fax: 609-984-2147  
CH199@dep.state.nj.us

## B. APPLICATION FORMS AND ADMINISTRATIVE REQUIREMENTS

The following is a list of Administrative Submission Requirements required for all TWA applications. Incomplete or improperly completed applications may delay the technical review of the application. Copies of all forms and guidance for their completion are available at: [http://www.state.nj.us/dep/dwq/owm\\_permits.htm](http://www.state.nj.us/dep/dwq/owm_permits.htm). All information and forms submitted as part of the application for a TWA must be submitted to the address identified in the application.

1. Treatment Works Approval Permit Application Form (TWA-1) -
2. Engineer's Report Form (Form DWQ-006A) - Section 9 of this form requires the submittal of additional information on the design's ability to adequately treat and dispose of sanitary wastewater. This form also requires endorsement by the local administrative authority.
3. Project Review Fee - Each application must be accompanied by a check made payable to The Treasurer, State of New Jersey, Environmental Services Fund. Fees are established by rule at N.J.A.C.7:14A-22.25. A copy of the current fee schedule is included with the application package. The current, minimum TWA project review fee is \$850.00.
4. Construction Cost Estimate – This estimate must include a breakdown of the estimated cost for all items related to the construction of the proposed treatment works.
5. Copies of Appendix B Forms or local health department equivalent, for the submission of all engineering and soils data. This form must be signed and sealed by a licensed professional engineer.
6. Prior Local Approvals - Copies of signed Domestic Return Receipts of notification to the municipal planning board and municipal environmental commission or county environmental commission. If no municipal or county environmental commission exists, then certification by the design engineer stating such is required.
7. Pinelands Commission Approval - For projects located within the jurisdiction of the Pinelands Commission (as defined in N.J.S.A. 13:18A-1 et seq.), applications must include either a Notice of Filing, a Certificate of Compliance, a Certificate of Filing, a Development Approval or a written statement from the Pinelands Commission that no approval is required.
8. Highlands Regulatory Program – For projects located within the Highlands Preservation Area (as defined in N.J.S.A. 13:20A-1 et seq.) applications must include either a Highlands Preservation Area Approval (HPAA) or a written statement that no approval is required.

## C. MINIMUM TECHNICAL REQUIREMENTS

The following is a list of minimum Technical Submission Requirements required for all TWA applications. Additional technical information will be required to address specific variance(s) from the Standards. Requirements for the most commonly requested variances are outlined in the sections below. If the application is not for a variance described herein, please contact the Department and/or schedule a pre-application meeting, as described in A. above, to discuss the additional technical information that may be required. Technical requirements are as follows:

1. Two sets of signed, sealed and dated Engineering Plans and Specifications for all related appurtenances together with an accompanying technical report that includes:
  - a. Key maps showing the approximate boundaries of the lot(s) on a U.S.G.S. topographic quadrangle and on a U.S.D.A. soil survey map. Care should be taken to ensure that these maps are clear and legible. The requirements for a soil survey map do not apply to projects located in Hudson County, where no modern soil survey is currently available;
  - b. A site plan, prepared in accordance with N.J.A.C. 13:40-7, drawn at a scale adequate to depict clearly the following features within a 150 foot radius around the proposed system:
    - i. Location of all components of the proposed system;
    - ii. Boundaries of lot(s);
    - iii. Locations of existing and proposed buildings, roadways, subsurface drains, wells and disposal areas on same and adjacent lots;
    - iv. Existing and finished grade topography at two (2) foot contour intervals;
    - v. Location of all surface water bodies, natural and artificial, freshwater wetlands and all springs or areas of ground water seepage;
    - vi. Location of all existing and proposed surface water diversions along with any area of stormwater management;
    - vii. Location of all bedrock outcrops;
    - viii. Conformance with setback requirements listed in N.J.A.C. 7:9A-4.3;
    - ix. Location of all soil profile pits, soil borings and permeability tests;
    - x. Location of riparian zones, flood hazard areas and floodways, streams within the near vicinity of the site; and
    - xi. State approved boundaries of any freshwater wetland areas or transition areas within the boundaries of the property or within 150 feet of the proposed system.
2. Soil logs prepared pursuant to N.J.A.C. 7:9A-5.3 for all soil borings or test pits conducted at the property;
3. Soil suitability class(es) determined in accordance with N.J.A.C. 7:9A-5.4;
4. Results, data and calculations for all permeability tests performed;
5. Results and description of any other evaluations of the property for subsurface disposal;
6. Wastewater quantity and characteristics;

7. Description of all proposed treatment processes;
8. Engineering plans and specifications with details for construction of all system components including all design related data and calculations;
9. For an advanced wastewater pretreatment device, products used in lieu of laterals and/or filter material or a drip dispersal system, documentation from the manufacturer or system integrator that the proposed design meets all minimum specifications and recommendations for the proposed system;
10. Copies of the proposed service agreements from an authorized service provider for any advanced wastewater pretreatment and/or drip dispersal technologies incorporated into the proposed design;
11. Manufacturer specified operation and maintenance procedures for any advanced wastewater pretreatment and/or drip dispersal technology incorporated into the proposed design; and
12. A complete description of the proposed development project including all phases of any proposed common plan of development or sale, for the property on which this system will be located.

The excavation of supplemental soil profile pits, soil borings, permeability tests or other evaluations may be necessary to allow for field verification by the Department or provide adequate information for the TWA.

### **Section 3. Common Variance Request Requirements**

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This section describes the technical requirements necessary to complete the application for some of the more common variances requested. Variances for other reasons may require specific technical requirements. Those variances are addressed in Section 4: Individual Variance Requests.

#### **A. DEPTH TO SEASONAL HIGH WATER TABLES LESS THAN TWO (2) FEET**

The following design requirements must be included in applications to construct a system in an area where the depth to the seasonal high water table is less than two (2) feet:

1. A disposal field that meets one of the following:
  - a. A mounded system where the discharge from the system is simulated using a ground water recharge mounding analysis. Appendix A of this document describes requirements for a mounding analysis. The vertical and lateral dimensions of the ground water recharge mound must be represented graphically on a cross section. The graphical representation should be of sufficient detail to show that the ground water recharge mound will not intersect nearby receptors; or
  - b. A drip dispersal system that is mounded to provide at least eighteen inches between the bottom of the dripperline and the seasonal high water table or any other restrictive horizon, and the requirements of N.J.A.C. 7:9A-10.8.
2. The system shall incorporate an advanced wastewater pretreatment device to pretreat the wastewater prior to disposal. This device must be designed and constructed in accordance with N.J.A.C. 7:9A-8.3.
3. If the soil evaluations identify a depth to the seasonal high water table at less than one (1) foot, the system must incorporate a non-chlorine based disinfection of the wastewater prior to disposal.

#### **B. CONSTRUCTION OF DISPOSAL FIELDS IN AREAS WHERE EXISTING GROUND SURFACE EXCEEDS A SLOPE OF 25%**

In reviewing a variance to construct a disposal field in an area where the existing ground surface exceeds a slope of 25%, the Department will consider the slope stability created by regrading, the installation of retaining structures and the hydraulic conditions that are created by the addition of wastewater disposal. In these cases the following requirements must be included:

1. The system shall incorporate drip dispersal, designed and constructed in accordance with N.J.A.C. 7:9A-10.8;
  - a. Prior to the commencement of any construction activities on the site, heavy equipment shall not be permitted in the area proposed for drip dispersal to avoid soil compaction, which can affect the soil structure. Plans must incorporate measures to demarcate the dispersal area during all proposed construction activities (for realty improvements, site improvements and the

- septic system) to prevent vehicles and heavy objects from entering the dispersal area;
- b. The disposal area shall not be regraded;
  - c. Soil profiles must be established to determine the depth of the seasonal high water table and rock substrata across the entire area of disposal. The evaluation must include a sufficient number of profiles upgradient and downgradient across the proposed area of disposal;
  - d. The depth of the bottom of a dripperline shall not be less than 24 inches to a limiting zone; and
  - e. The installation of dripperline shall be hand dug unless the system designer provides for an alternative method of installation that ensures the safety of the installers and maintains the structural stability of the soils for the drip dispersal system functionality.
2. When retaining structures are proposed, they shall not be located within 50 feet of the down gradient edge of the disposal area. Any drain installed in conjunction with a retaining structure that is located at an elevation lower than the uppermost drip dispersal line must be considered a water course.
  3. All stormwater shall be directed away from the drip dispersal area.

**C. CONSTRUCTION OF DISPOSAL BEDS IN AREAS WHERE THE SLOPE OF EXISTING GROUND SURFACE IS GREATER THAN 10% AND LESS THAN 25%**

The following must be included in applications for variances to regrade slopes to allow for the construction of disposal beds where disposal trenches are required:

1. A site plan that identifies that the topography is altered only through the cutting of slopes into the existing gradient. Addition of fill in areas of the disposal bed to raise the existing ground surface is not permitted;
2. A comprehensive hydrogeologic report which documents that, as a result of the regrading of the property; no springs will be created in the cut slope wall(s). Additionally, the report shall include ground water data showing the depth of the ground water below the proposed disposal bed through a full seasonal high ground water period (January through May, inclusive) that is not affected by drought. This monitoring must be conducted with at least two piezometer wells installed within the proposed disposal bed, but no more than ten (10) feet from the edge of the distal ends of the bed (i.e., one at each end or opposite corners of the bed); and
3. In addition to the soil pits required for soil evaluation pursuant to N.J.A.C. 7:9A-5.2, the results of at least two (2) additional soil borings in the area of the disposal bed, within ten (10) feet of each end of the disposal bed, to a depth of at least ten (10) feet below the level of infiltration.

## **D. ALTERNATIVE DEPTH TO SEASONAL HIGH WATER TABLE DETERMINATIONS**

In accordance with the Standards, the depth to the seasonal high water table is determined by physical observation and/or redoxomorphic features observed in the soils (mottling). However, there are some features in soils that can mimic these redoxomorphic features. Where this occurs and an alternative determination of the estimated depth to the seasonal high water table is requested, the following information must be included:

1. The original estimated depth to seasonal high water table being disputed and the alternative elevation of the estimated depth to seasonal high water table;
2. A soil morphological explanation of why the mottling encountered does not represent the estimated depth to seasonal high water table;
3. The actual water level data taken on at least a bi-weekly basis from permitted piezometer wells installed in the area of disposal, to monitor the actual water levels during a wet season (January through May, inclusive), that is not affected by drought conditions;
4. A disposal area sized on the permeability of the most restrictive native soil conditions within the zone of disposal or six (6) inches per hour, whichever is more restrictive. If a soil replacement system is proposed, design permeability shall be based upon the permeability of the most restrictive native soil within the zone of disposal or six (6) inches per hour, whichever is more restrictive.
5. Test pits excavated in the presence of and evaluated by an individual with one of the following qualifications:
  - a. Registered as a Professional Soil Scientist with the American Registry of Certified Professionals in Agronomy, Crops and Soils (ARCPACS);
  - b. A member of the New Jersey Association of Professional Soil Scientists;
  - c. At least four (4) years of professional experience in soil classification, mapping and interpretations and an undergraduate degree from an accredited college or university with 30 semester hours or the equivalent in earth sciences with 15 of such semester hours in soil science; or
  - d. At least two (2) years of professional experience in soil classification, mapping and interpretations with a graduate degree from an accredited college or university with 30 semester hours or the equivalent in earth sciences with 15 of such semester hours in soil science.

## **E. SEPARATION DISTANCE REDUCTIONS**

Where a variance to reduce a minimum required separation distance specified at N.J.A.C. 7:9A-4.3 is necessary, the information below must be submitted. Applications for variances to reduce a minimum required separation distance shall not contravene any other minimum setback distance stipulated in any applicable Federal, State, local or other authorities' law or rule:

Separation distance reduction to another disposal field

1. Certified Mail Return Receipt Cards (signed Green Cards) notifying all affected property owners of the application for a variance to reduce a minimum required separation distance contained in N.J.A.C. 7:9A-4.3. The notification shall include contact information for the Department and for the applicant or their agent that can provide further information regarding the application;
2. Results of a ground water recharge mounding analysis that calculates the vertical and lateral dimensions of the ground water recharge mound beneath the property(ies). Appendix A of this document describes requirements for a mounding analysis. The vertical and lateral dimensions of the ground water recharge mound must be represented graphically on a cross section. The graphical representation should be of sufficient detail to show that the ground water recharge mound will not intersect nearby receptors.

#### Separation distance reduction to a water course

1. A variance will not be granted for an application to reduce the minimum required setback distance to a water course that would violate any separation distance, buffer or transition area requirements established by a local, State or Federal entity having authority for establishing separation distances, including, but not limited to, wetlands protection, stream encroachment and riparian corridor.
2. If the separation distance set forth in N.J.A.C. 7:9A is more restrictive, a variance may be granted, provided the system incorporates an advanced wastewater pretreatment device to pretreat the wastewater prior to disposal. The advanced wastewater pretreatment device must be designed and constructed in accordance with N.J.A.C. 7:9A-8.3.

#### Separation distance reduction to an occupied building

1. A variance will not be granted for an application to reduce the minimum required separation distance to an occupied building that would violate any applicable State construction codes.
2. Documentation that the building is on a slab foundation or for an occupied area suspended above the ground surface where the ground surface is covered by a concrete slab that meets the requirements for a slab foundation;
3. Documentation that all system components are located hydraulically downgradient from all buildings infringed upon;
4. Documentation that the disposal area is not located beneath an occupied building;
5. The results of a ground water recharge mounding analysis that calculates the vertical and lateral dimensions of the ground water recharge mound beneath the property. Appendix A of this document describes requirements for a mounding analysis. The vertical and lateral dimensions of the ground water

recharge mound must be represented graphically on a cross section. The graphical representation should be of sufficient detail to show that the ground water recharge mound will not intersect nearby receptors.

6. Documentation that all system components are located in a manner that they can be readily accessed for maintenance and replacement; and
7. Certification by a structural engineer that the design is sufficient to support the installation and potential replacement of the component without impacting the structural soundness of the structure. Please note that the design engineer will be required to certify the proper installation of the components prior to the administrative authority issuing a final certification of the system.

## **F. ESTIMATIONS OF VOLUMES OF SANITARY SEWAGE**

In accordance with N.J.A.C. 7:9A-7.4(d), the Department requires the use of specific criteria to determine the design volume of sanitary sewage from residential and non-residential sources. The use of other criteria, such as actual flow data, for determining daily design sewage flow is not permitted unless approved through a TWA. Additionally, in accordance with N.J.A.C. 7:9A-7.4(f), the Department requires several types of activities, including commercial food service, to obtain a TWA if the proposed facility believes the appropriate design volume to be less than 2,000 gallons per day.

Types of alternative information that may be acceptable include actual water use data from significantly similar facilities, design flow criteria from alternative regulations, or design flow criteria from other sources with applicable supporting documentation. Daily water use data shall be collected for a minimum of ninety (90) days during the peak operating season for the facility. All alternative data would require the addition of a 50 percent safety factor to the average daily design sewage flow or the use of the single maximum daily flow, whichever is greater. For example, if the facility is located on a major route to a beach location, actual water use data should be gathered during the summer months at a similar facility that is similarly located.

Additionally, a detailed description of the facility(ies) from which the flow data was collected must be included to identify any differences between the facilities in terms of location, size, operations, and other pertinent information that would have an affect on wastewater quantity or quality. If actual water use data can not be obtained, the Department may consider alternative methods that evaluate wastewater quantity and waste strength as compared to typical residential waste strength as part of the analysis. Waste strength analysis must include all parameters listed in N.J.A.C. 7:9A-8.1(i).

Administrative authority endorsement of these applications on the WQM-006a form should be limited to the general agreement by the administrative authority that the proposed project is acceptable at the proposed location and that the proposed design volume is appropriate. Since a proposed system design would not be appropriate until the estimated volume of sanitary sewage is established, there is no endorsement of the system design in the application.

Any application for a commercial food service activity must include an analysis of the waste strength in accordance with N.J.A.C. 7:9A-8.1(i). This analysis is in addition to determining the proposed number of meals served, which must evaluate the availability of indoor seating, outdoor seating, take out service, drive through service and delivery service as applicable.

Where the Department determines that a proposed facility does reasonably fall into one of the activities listed in N.J.A.C. 7:9A-7.4, the Department will estimate the volume of sanitary sewage in accordance with those requirements.

## **G. DISTURBED GROUND/HISTORIC FILL**

The Department will consider those applications where the presence of the disturbed ground can be documented to have existed prior to January 1, 1990. The following must be included in applications for variances to construct a system in disturbed ground/historic fill:

1. An analysis of any historic fill in accordance with the Technical Requirements for Site Remediation (N.J.A.C. 7:26E). The analysis must demonstrate that fill material within twenty-five (25) feet of the proposed disturbance meets any applicable soil cleanup criteria;
2. The disturbed ground material must be fully delineated in terms of extent (horizontal and vertical) and composition. Historic aerial photography is typically used to approximate the age of the historic fill. The disturbed ground must be free of construction materials, concrete, asphalt, debris, trash, solid waste, stumps and other vegetative wastes and any other non-soil related materials;
3. The system shall incorporate an advanced wastewater pretreatment device to pretreat the wastewater prior to disposal. The advanced wastewater pretreatment device must be designed and constructed in accordance with N.J.A.C 7:9A-8.3.
4. Sufficient test pits and soil borings must be conducted to fully delineate the historic fill and various horizons within the historic fill.
5. Permeability of the disturbed ground within fifty (50) feet surrounding the proposed system must be evaluated. Increased setbacks may be required if the permeability exceeds 20 inches/hour. If the disturbed ground is within a required setback, including but not limited to wells or water courses, a ground water recharge mounding analysis may be required. If the disturbed ground is complex in terms of extent or variability, a three-dimensional analysis may be required.
6. On sites with slopes greater than two (2) percent, a mounding analysis may be required.
7. On sites where the depth to the seasonal high water table is within the disturbed ground material or within twelve (12) inches below the interface between the native soil and the disturbed ground material, a ground water recharge mounding analysis may be required.

## H. RESTRICTED ACCESS TO A SYSTEM

The Standards require at N.J.A.C. 7:9A-7.1(d) that all new systems, including expansions to existing systems, are designed in a manner that provides ground access on the property for servicing and maintenance of all system components. Compliance with this requirement at the time of design may be difficult for certain sites, typically those infill lots that were not previously developed. While some access may be available, room to fit typical construction vehicles, such as standard vacuum trucks, backhoes or dump trucks may not be practical. In the event that a variance from this requirement is needed, the Department has determined it necessary to insure that potential future property owners that might be responsible for increased costs associated with specialized equipment to service or replace these systems are aware of these limitations. As such, applicants for this variance are required to submit the following:

1. A signed and notarized letter from the applicant acknowledging the potential increased costs associated with maintaining or repairing the system due to the limited access;
2. An engineering report that identifies the access limitations and the types of equipment that can be used to maintain, repair or replace the system based upon the proposed system components; and
3. A deed notice that acknowledges the site access limitations, the potential for increased costs to service, repair or replace the system and a reference to the engineering report, which will be required to be maintained in the administrative authority's file for the life of the system.

#### **Section 4. Individual Variance Requests**

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While most variance requests fall under one of the categories listed in Section 3, the Department often receives requests for variances that are very site specific and/or contain multiple variances that have complexities beyond the capacity of this document to address fully. Such variance requests have typically included advanced tertiary or quaternary treatment; operation and maintenance requirements, deed notices and restrictions, local management programs, and working with neighboring property owners to resolve the issues.

Where a specific variance is being considered, the design of the system must always consider the safeguards inherent in the Standards that must be compensated for to protect public health and the environment. As previously noted, before committing to a specific design, the Department recommends the applicant discuss options with their local administrative authority to determine the potential acceptability of a design. A pre-application meeting with Department is also recommended to resolve as many issues as possible and ensure appropriate safeguards. This will help ensure that where a design will not adequately protect public health and the environment, the potential for denial of the design is noted as early in the process as possible.

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## **Appendix 1. Ground Water Recharge Mounding Analysis**

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A ground water recharge mounding analysis determines the vertical and lateral dimensions of the ground water recharge mound and demonstrates how the ground water table “mounds up” under the influence of an individual subsurface sewage disposal system.

The ground water recharge mounding analysis must calculate the vertical and lateral dimensions of the ground water recharge mound to a minimum of 150 feet from the center of the proposed disposal field, based upon the maximum daily loading rate for at least one (1) year. The lateral extent of the ground water recharge mounding analysis must be sufficient to demonstrate how the ground water recharge mound will affect any nearby receptors and that there will be no breakout onto the ground surface.

The mounding analysis must also demonstrate that the discharge to groundwater from the proposed individual subsurface sewage disposal system will not encroach on the required four (4) foot unsaturated zone beneath the proposed disposal field, will not intersect building footers and footing drains, and be sufficient to demonstrate how the ground water recharge mound will affect any nearby surface water bodies and/or wetland areas. If a variance to reduce the minimum required separation distance to a neighboring disposal field is requested, the groundwater recharge mounding analysis must demonstrate the cumulative mounding effects of both systems.

The dimensions of the ground water recharge mound must be represented graphically to scale on a cross section of the proposed disposal field depicting the lateral extent of the elevation of the mound.

Many ground water recharge mounding analyses use transmissivity as one of the main factors. Transmissivity is often expressed as  $T = kb$ , where “k” is the hydraulic conductivity and “b” is the saturated thickness of the aquifer. In determining the hydraulic conductivity or “k” value, the permeability of the most restrictive soil horizon must be used. When deriving the aquifer thickness or value for “b”, the depth of the soil borings on the site may be used. However, if another method that will result in a thicker aquifer is used, the Department should be consulted for additional guidance prior to use of the method.

An example of a computer ground water recharge mounding analysis is D. Molden, D.K. Sunada, J. W. Warner, Microcomputer Model of Artificial Recharge Using Glover’s Solution. Ground Water, Volume 22, Issue 1, pp.73-79, January 1984. Another computer program that may be used to provide a ground water recharge mounding analysis is ModFlow®. However, any ground water recharge mounding analysis may be used as long as the input parameters and the method of analysis consider all of the significant hydraulic conditions at the analyzed site. The methodology and supporting documentation for the use of any analysis must be included in the TWA application.