SUBCHAPTER 23. TECHNICAL REQUIREMENTS FOR TREATMENT WORKS APPROVAL APPLICATIONS

7:14A-23.1 Purpose

The purpose of this subchapter is to establish technical requirements for the approval of the design, construction and operation of domestic and industrial treatment works so that wastes are properly collected, conveyed and treated before discharge to the waters of the State.

7:14A-23.2 Scope

(a) These rules apply to individuals, sewerage authorities, municipalities, governmental agencies, private firms and all persons who propose to design, construct and/or operate any treatment works for the collection, conveyance or treatment of domestic or industrial wastes in the State of New Jersey, and for which a treatment works approval from the Department is required pursuant to N.J.A.C. 7:14A-22.

(b) These rules establish specific criteria and standards for the construction and operation of treatment works. In promulgating these requirements, the Department recognizes that, at times, deviations from these requirements may be necessary to address specific circumstances. The Department will consider deviations from these design criteria provided that appropriate documentation addressing the need for deviation and justification for the proposed design is submitted with the treatment works approval applications and includes a signed and sealed statement from the design engineer attesting to the treatment works ability to meet the purposes intended.

(c) These rules do not specify any technical standards explicitly for the construction of industrial treatment works due to the high degree of variability of the wastestreams, and treatment process options available to deal with the various pollutants that may be present at an industrial facility. Because of this variability, it would not be prudent to impose specific technical standards on facilities where such standards may not be appropriate. It is the responsibility of the design engineer to design industrial treatment works to meet all applicable Federal, State or local limitations, conditions, and/or requirements, including, but not limited to, the requirements of a facility's NJPDES or NPDES permit. When appropriate, the general technical standards specified in this subchapter for domestic waste treatment and conveyance systems may be used.

(d) The technical standards for those subsurface disposal systems that require a treatment works approval pursuant to N.J.A.C 7:14A-22.3(a)5 are established in N.J.A.C 7:9A. The Department will consider deviations from the design criteria in N.J.A.C. 7:9A provided that appropriate documentation addressing the need for deviation and justification for the proposed design are submitted with the treatment works approval application and includes a signed and sealed statement from the design engineer attesting to the adequate design of the treatment works to meet the purposes intended.

7:14A-23.3 Projected flow criteria

This is a courtesy copy of this rule. All of the Department's rules are compiled in Title 7 of the New Jersey Administrative Code.

(a) The values specified below are to be used in computing the projected flow to wastewater conveyance and treatment facilities and when making an application for a treatment works approval pursuant to N.J.A.C. 7:14A-22. The specific measurement unit listed for each category shall be used as the basis for the projected flow. No additional provisions for inflow and infiltration are required. For the purposes of design only, other values, proposed by the design engineer, through actual water usage data, may be accepted at the Department's discretion, with an appropriate safety factor. However, all determination concerning whether or not any specific project requires a treatment works approval and/or sewer ban exemption shall be based upon the projected flow criteria established below. These criteria are not mandated to be used by sewerage authorities as a basis for establishing local user fees and/or connection fees.

Type of Establishment	Measurement Unit	Gallons Per Day
Residential Dwellings (single family home, duplex units, townhouses, condominiums, apartments)		
1 bedroom unit	Per Dwelling	150
2 bedroom unit	Per Dwelling	225
3 bedroom unit or larger	Per Dwelling	300
1 bedroom unit (age restricted)	Per Dwelling	110
2 bedroom unit (age restricted)	Per Dwelling	170
3 bedroom unit (age restricted)	Per Dwelling	225
Transit dwelling units		
Hotels	Bedroom	75
Lodging houses and tourist homes	Bedroom	60
Motels and tourist cabins	Bedroom	60
Boarding houses (max. permitted occupancy)	Boarder	50
Camps		

Campground/mobile rec. vehicle/tent	Site	100
Parked mobile trailer site	Site	200
Children's camps	Bed	50
Labor camps	Bed.	40
Day camps--no meals	Person	15
Restaurants (including washrooms and turnover)		
Average restaurant	Seat	35
Bar/cocktail lounges	Seat	20
Fast food restaurant	Seat	15
24 hour service restaurant	Seat	50
Curb service/drive-in restaurant	car space	50
Clubs		
Residential	Member	75
Nonresidential	Member	35
Racquet club	(per court per hour)	80
Bathhouse with shower	Person	25
Bathhouse without shower	Person	10
Institutions (includes staff)		
Hospitals	Bed	175
Assisted living facility	Bed	100
Skilled nursing facility	Bed	75
Other institutions	Bed	125
Schools (includes staff)		

No shower or cafeteria	Student	10
With cafeteria	Student	15
With cafeteria and showers	Student	20
With cafeteria, showers and laboratories	Student	25
Boarding	Student	75
Automobile service stations		
	per filling position	125
Service bays	per bay	50
Mini-market	Sq. Ft.	0.100
Miscellaneous		
Office buildings (gross area)	Sq. Ft.	0.100
Stores and shopping centers (gross area)	Sq. Ft.	0.100
Factories/warehouses (add process wastewater)	Employee	25
with showers, (add process wastewater)	Employee	40
Laundromats	Per machine	580
Bowling alleys	Alley	200
Picnic Parks (restrooms only)	Person	10
Picnic Parks with showers	Person	15
Fairgrounds (based upon average attendance)	Person	5
Assembly halls	Seat	3
Airports (based on passenger use)	Passenger	3

Churches (worship area only)	Seat	3
Theater (indoor)	Seat	3
Dinner theater	Seat	20
Catering/Banquet Hall	Person	20
Sports stadium	Seat	3
Visitor Center	Visitor	5
Multi-member swimming pool	Person	15

(b) Flow for facilities that have combined uses shall be determined by the summation of all appropriate projected flow values for each use.

(c) The Department recognizes that the table in (a) above may not cover all establishments and facilities, and in particular facilities that require an industrial treatment works approval. In the event that a facility is not covered, the applicant shall propose the projected flow based upon operation of similar facilities or best professional judgment. The Department reserves the right to accept, modify or deny the proposed flow values.

7:14A-23.4 Plans and specifications submitted to the department with treatment works approval applications

(a) Maps, drawings, plans and profiles submitted as part of a treatment works approval application shall conform to the following:

1. Plans shall be drawn to standard scale and show the entire area of the project, including a general site plan;
2. The name of the New Jersey licensed professional engineer responsible for the design and his or her signature and embossed seal shall appear in the title block of each sheet of the submitted plans;
3. In the event that there is more than one sheet of plans, all shall be bound together and an index provided;
4. Plans shall not exceed 30 inches by 42 inches in size;
5. Streams and wetland areas, if present, shall be clearly indicated;
6. Plans shall show municipal boundaries, property lines, easements and all existing and proposed streets, including the existing and proposed surface elevations at all street intersections where sewer lines are proposed; and
7. All existing and proposed structures, sanitary sewers and combined sewers, both above and below ground, shall be shown and clearly labeled.

(b) Symbols used on submitted drawings shall conform to the following:

1. Existing and future sewers shall be shown by standard conventions;
2. All topographical symbols and conventions used shall conform to those of the United States Geological Survey; and
3. Elevations shown shall meet the following requirements:
   i. Elevations of the surfaces of streets shall be placed outside the street lines, opposite their respective locations;
   ii. Elevations of sewer inverts shall be shown at intersections, ends of lines, and wherever a change in sewer grade occurs;
   iii. The elevation of sewers shall be written close to the point to which they refer, parallel with the sewer lines and between the street lines;
   iv. The elevations of surfaces shall be drawn to the nearest 0.1 foot and those of the sewer inverts to the nearest 0.01 foot; and
   v. All elevations shall be referenced to the North American Vertical Datum of 1988.

(c) The horizontal distances and stationing between manholes, grades in percent and sewer sizes and materials shall be shown for all proposed sewer lines.

(d) All sewer appurtenances, such as manholes, siphons and pumping stations shall be designated on the plans by appropriate symbols and referenced by a legend.

(e) Plans labeled preliminary are not acceptable for review unless a note is added to each sheet submitted stating that the plans are final with respect to sanitary sewer design.

(f) Plans submitted for treatment works that are already constructed shall show the "as-built" conditions (as determined through field investigation) and the title block of each sheet shall include the term "as-built."

(g) Profiles and construction details shall meet the following requirements:

1. Profiles shall indicate all manholes, pumping stations, sanitary, combined or industrial sewer lines, concrete encasements, sleeves, and any significant crossings such as storm sewers, potable water lines or utility lines.
2. In the case of stream crossings, elevations of stream beds, normal flow lines and the type of sewer pipe with the length of concrete encasement, as required by N.J.A.C. 7:14A-23.6(b), shall be indicated.
3. The size and gradients of sewers, surface elevations and sewer inverts shall be shown at or between each manhole.
4. Profiles of gravity and forced sewer lines shall be drawn to standard scale with all symbols indicated in the legend.
5. Detail drawings of all sewer appurtenances, such as manholes, drop manholes, inspection chambers, siphons, pumping stations, force main connections into manholes and other related items shall accompany the general sewer system plans.

6. For sewage treatment plants, in addition to all other requirements, the plans shall contain the following:
   i. A general plan showing site boundaries including areas reserved for future expansions;
   ii. All buildings or building lots within 500 feet of the plant property;
   iii. A detail plan of the various units and structures which comprise the plant; and
   iv. Detail plans showing a flow diagram, and longitudinal and transverse sections sufficient to explain the construction of each unit including hydraulic gradient.

(h) Specifications for the construction of treatment works shall be directly applicable to the engineering (including hydraulic) features of the proposed project and shall meet the following minimum requirements:

1. Detailed information shall be included on the construction methods and materials proposed for use so as to provide the construction contractor with the specific details necessary to satisfy the project design; and

2. Specifications shall address the following:
   i. The quality of materials and workmanship;
   ii. The operating characteristics and equipment rating;
   iii. Allowable infiltration/exfiltration and the testing procedures to be followed;
   iv. Requirements for all mechanical and electrical equipment necessary for the treatment works; and
   v. A program for maintaining the operation of existing sewerage systems during construction.

7:14A-23.5 Engineering design reports to be submitted to the Department **with treatment works approval applications**

(a) Engineering reports required to be submitted pursuant to N.J.A.C. 7:14A-22.8 for domestic treatment systems shall, at a minimum, include:

1. A complete description of the selected waste treatment system;

2. For the modification of an existing system which has not previously been granted a treatment works approval, the capacities of the existing units and a brief description of the operation of each, and a statement concerning which units are existing and which are proposed at the time of the application. If there exists a previously issued treatment works approval for the subject facility, the date of issuance and the TWA number shall be provided;

3. The basis and computations for the projected wastewater flow;

4. Hydraulic profiles of the flow of wastewater through the system;

5. A unit by unit mass balance for all discharge parameters;

6. The ultimate disposal location of all effluent;

7. The basis and computations for average and peak flow requirements;

8. The expected composition of the influent and effluent from the treatment system including the average, maximum and minimum values of the pollutant parameters specified in the facility's NJPDES permit;
9. An evaluation of the quantity and quality of any and all residuals generated and projected to be generated, including a hydraulic profile and unit by unit mass balance for the flow of residuals through the system;
10. Documentation of adequate storage and handling facilities for residuals;
11. Provisions for the ultimate management of residuals pursuant to the State Solid Waste Management Plan and/or the Statewide Sludge Management Plan, as applicable. For proposed upgrading or expansion of domestic treatment works, sludge management planning forms may be submitted pursuant to the Statewide Sludge Management Plan, Appendix K, to satisfy this requirement;
12. Details of flow monitoring and control, alarm systems, auxiliary power, storage facilities for treatment chemicals and wastes, and a plan for bypassing units during construction or maintenance; and
13. A signed and sealed statement from the New Jersey licensed professional engineer who designed the treatment works attesting to the proposed treatment works' ability, as designed, to meet the requirements of this subchapter and to attain all applicable discharge limits.

(b) For treatment works applications involving the temporary or permanent use of holding tanks, the engineering reports required to be submitted by N.J.A.C. 7:14A-22.13 and 22.8 shall include:

1. A description of the high water alarm to be provided to alert the responsible persons that the holding tank has reached 75 percent of its capacity and which will allow sufficient time to take appropriate measures to prevent overflows;
2. A description of provisions for aeration at a rate of two cubic feet per minute per 1,000 gallons to prevent septic conditions and solids settling;
3. Identification of a source of washdown water for routine maintenance and emergency situations, adequately protected by a backflow prevention device;
4. A description of the holding tank area, including adequate measures to protect it from vandalism and safeguards for public health and safety;
5. Engineering drawings containing construction details for all system components;
6. Specifications including construction practices and operation and maintenance procedures; and
7. Sizing of holding tanks which, at a minimum, provides two days of waste storage, as determined in accordance with the projected flow requirements in N.J.A.C. 7:14A-23.3.

(c) Engineering reports required to be submitted for projects involving the use of equalization tanks within a collection system, pursuant to N.J.A.C. 7:14A-22.15, shall include the following:

1. A description of the method for placing the tank into operation and the timing and procedure for releasing the effluent back into the collection system, including quantity of flow and duration held;
2. Average and peak flow requirements;
3. A description of the high water alarm to be provided to alert the responsible persons that the equalization tank has reached 75 percent of its capacity and which allows sufficient time to take appropriate measures to prevent overflows;
4. A description of the equalization tank area, including adequate measures to protect it from vandalism and safeguards for public health and safety such as covers, overflow protection, fencing, etc.;
5. The engineering drawings containing construction details for all system components; and
6. The specifications including construction practices and operation and maintenance procedures.

(d) Engineering reports required to be submitted pursuant to N.J.A.C. 7:14A-22.14 and 22.8, for flow diversion, shall include, but are not limited to, the following:

1. The existing and anticipated average and peak flow events within the collection system;
2. The ultimate disposal location of all effluent; and
3. A report outlining the procedures to be used in the hauling/diversion operation, including, but not limited to, the location at which the wastewater will be withdrawn, the frequency and time of withdrawal, and the effect that the procedure may have upon the treatment capabilities of both treatment facilities.

(e) Engineering reports required to be submitted pursuant to N.J.A.C. 7:14A-22.8, for industrial treatment works approval applications shall include, but are not limited to:

1. A complete description of waste treatment system;
2. A mass balance and, if temperature change across any unit will exceed 10 degrees Celsius, a heat balance;
3. The ultimate destination of all wastewater, sludge and residuals;
4. Average and peak flow requirements and rationale for design;
5. A listing of all pollutants, including regular and intermittent flows, and expected composition that may enter the system;
6. The composition and quality of all sludge generated, name and registration number of the sludge hauler, frequency and parameters for periodic analysis;
7. Documentation of adequate storage and handling facilities for residuals;
8. Provisions for the ultimate management of residuals pursuant to the State Solid Waste Management Plan and/or the Statewide Sludge Management Plan, as applicable;

9. The expected composition of effluent from the treatment system;
10. A listing of any standards, ordinances, permits, court orders, contracts, etc. which regulate the discharge;
11. An evaluation of the capability of the system to meet the most stringent applicable effluent limitation for each pollutant parameter from the NJPDES permit or other authorizations such as an administrative or judicial consent order;
12. Potential spills from within the industrial facility which may enter the treatment system and provisions for treatment and containment;
13. Provisions for metering and monitoring of the effluent;
14. A discussion of: instrumentation, reliability of system components, storage and handling facilities, provisions for treatment during construction, safety features, laboratory facilities and analytical capabilities; and
15. A plan for bypassing units during maintenance or down time.

7:14A-23.6 Sanitary sewer design

(a) Proposed sewerage systems shall connect into downstream sewer lines and pump stations that have adequate conveyance capacity.

(b) Gravity sanitary sewers, including outfalls, shall be designed to carry at least twice the estimated average projected flow when flowing half full. In the case of large interceptor sewer systems, consideration may be given to modified designs. In addition, sanitary sewer conveyance systems shall meet the following requirements:

1. Materials used in sewer construction shall be acceptable to the Department for the purposes and conditions they are intended to serve;
2. Sewers shall be designed with the following minimum hydraulic slopes (grades producing velocities of greater than 10 feet per second are not recommended unless supported by adequate justification acceptable to the Department):

PVC Pipe (Polyvinylchloride)	Fall in feet per 100 feet of sewer
Pipe diameter (based on Kutter's or Manning's formula with n=0.01)	
8 inches	0.30
10 inches	0.20
12 inches	0.15
14 inches	0.12
15 inches	0.10
16 inches	0.09
18 inches	0.075
20 inches	0.065
21 inches	0.06
24 inches	0.05
27 inches	0.042
30 inches	0.035

36 inches	0.028

All Other Pipe Material (based on Kutter's or Manning's formula with n=0.013)

Pipe diameter	Fall in feet per 100 feet of sewer
8 inches	0.40
10 inches	0.29
12 inches	0.22
14 inches	0.17
15 inches	0.16
16 inches	0.14
18 inches	0.12
20 inches	0.10
21 inches	0.095
24 inches	0.080
27 inches	0.067
30 inches	0.058
36 inches	0.046

i. When grades or sizes less than those specified in this paragraph are proposed, justification for the use of such grades shall be provided with the treatment works approval application.

ii. The minimum diameter of sewer extensions shall be eight inches, however, consideration will be given to the use of smaller diameter sewers for lateral connections;

3. Sewers crossing streams and/or located within 10 feet of the stream embankment, or where site conditions so indicate, shall be constructed of steel, reinforced concrete, ductile iron or other suitable material;

4. Sewers conveying sanitary flow, combined sanitary and stormwater flow, or industrial flow shall be separated from water mains by a distance of at least 10 feet horizontally. If such lateral separation is not possible, the pipes shall be in separate trenches with the sewer at least 18 inches below the bottom of the water main, or such other separation as approved by the Department;

   i. Where appropriate separation from a water main is not possible, the sewer shall be encased in concrete, or constructed of ductile iron pipe using mechanical or slip-on joints for a distance of at least 10 feet on either side of the crossing. In addition, one full length of sewer pipe should be located so both joints will be as far from the water line as possible. Where a water main crosses under a sewer, adequate structural support for the sewer shall be provided. The Department may also require additional structural support for storm sewers crossing over sewer lines;

5. Any sewer within 100 feet of a water supply well or a below-grade reservoir shall be constructed of steel, reinforced concrete, ductile iron or other suitable material, shall be completely watertight and shall be tested for watertightness after installation;

6. The construction of sewer lines through storm sewer pipes or manholes will not be approved;

7. Sewer lines, including force mains and laterals, shall be constructed at least three feet below the proposed grade (as measured from the top of the pipe to the grade elevation);

8. Sewer pipes, including force mains and laterals, shall be sized to adequately convey the projected contributory flow in accordance with this subchapter. In general, sewer lines that are larger than hydraulically necessary to carry the projected flow and for which the larger size is proposed only for the purpose of achieving the minimum slope requirements specified in this section are not permitted;

9. Sewer lines shall not be approved for the use of storage or detention of sewage unless they are designed as an integral part of an existing combined sewerage system (sanitary/storm) where in-line storage is being proposed as a corrective measure to prevent the discharge of untreated wastewater from the treatment works;

10. New sewerage systems or extensions shall be designed as separate systems, in which all water from roofs, cellars, streets and other areas is excluded; except that separate connections to an existing combined system may be approved when it is demonstrated to the satisfaction of the Department that no other alternative is feasible. In addition, the Department may permit, on a case-by-case basis, the introduction of contaminated stormwater from containment areas into sanitary sewers;

11. To minimize the development of septic conditions, the Department may require special operational and/or maintenance procedures for treatment works if the initial contributory flows to the treatment works will be substantially below the design capacity; and

12. When a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently, or the smaller pipe raised sufficiently, to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation.

(c) For sewers other than circular in cross section, the submitted data shall include the geometrical shape, dimensions and hydraulic characteristics of the proposed sewer.

(d) Approval for curved sewers will be considered by the Department only under the following circumstances:

1. Areas where curved streets comprise the general layout, or the use of curved sewers would permit substantial savings in cost to avoid deep cuts due to rocks or obstructions;

2. The minimum diameter of the sewer is eight inches and the minimum radius of curvature is 100 feet; and

3. Manhole spacing does not exceed 300 feet.

(e) All sanitary sewers, manholes, and cleanouts shall be tested by an infiltration, exfiltration or pressure test after being flushed and before being placed into use. The maximum rate of infiltration/exfiltration shall not exceed 100 gallons per inch diameter per mile per day.

7:14A-23.7 Inverted siphons

(a) Inverted siphons shall be constructed of ductile iron or other approved material and shall not have less than two barrels.

(b) Provisions shall be made for rodding and flushing.

(c) A velocity of 3.0 feet per second shall be maintained and flow control gates in chambers shall be provided.

7:14A-23.8 MANHOLES

(a) Manholes shall be provided at the ends of each sewer line and at intersections and at all changes in grade, size or alignment.

(b) Distances between manholes shall not exceed 400 feet for sewers 18 inches or less in diameter and 500 feet for sewers greater than 18 inches in diameter.

(c) A drop pipe shall be provided for sewers entering manholes above the manhole invert whenever the difference in elevation is two feet or more.

(d) No manholes or connections to a sanitary sewer system are permitted within 100 feet of a public water supply well or a below-grade reservoir.

(e) Adequate provisions shall be made for ventilation.

(f) Watertight manhole covers are required for all street elevations less than 10 feet above the North American Vertical Datum of 1988 and/or wherever the top of a manhole may be flooded by street runoff or high water. These manholes shall be properly protected, of watertight construction, and shall be inspected for adequacy after installation.

(g) The minimum diameter of manholes is 48 inches; larger diameters are preferable for large diameter sewers. A minimum access diameter of 22 inches shall be provided.

7:14A-23.9 Outfalls

(a) Ocean outfalls from municipal wastewater treatment works shall extend at least 1,000 feet in length beyond the mean low water mark. Manholes are required on the shore end of all gravity outfalls.

(b) Outfalls, other than those to the ocean, shall be submerged and so located as to accomplish effective dispersion of flow.

7:14A-23.10 Wastewater pumping stations

(a) Raw sewage pumping stations shall conform to the following requirements:

1. Sewage shall be screened before pumping. Comminutors may be approved in lieu of screens, however, the requirement for screening raw sewage may be waived, at the Department's discretion, for individual, privately owned pumping stations;
2. Pumping stations shall provide for stage pumping, preferably by the use of variable speed pumps, so as to eliminate, as far as practical, surges of flow to or through the treatment plants;
3. Pump stations shall be provided with two power sources, one as a back-up;
4. Automatic sound alarms, operating independently of the main power system, shall be installed to give warning of high water, power failure, or breakdown. Such alarm systems shall be telemetered to a police station or other staffed location so that competent emergency assistance can be obtained on a 24 hour basis;
5. Pumping stations shall be protected against flooding and adequate provision shall be made for access to the stations during storm events;
6. Adequate light and ventilation shall be provided at all pumping stations;
   i. Where operational or maintenance duties are required in enclosed areas or pits, forced ventilation by appropriate means shall be provided with sufficient capacity to induce at least 12 air changes per hour;
   ii. Appropriate equipment to guard against explosion shall be utilized; and
7. Adequate fresh-water facilities shall be provided to permit routine washdown and cleaning operations at all pumping stations;
   i. Where a domestic water service connection is provided to a pumping station, the water supply shall be adequately protected by a backflow prevention device;
   ii. Connections between potable water lines and wastewater pumps or sewers is not permitted.

(b) At least two pumps, each designed to handle peak flows equivalent to 2.5 times the average daily flow (using the Department's projected flow criteria specified in N.J.A.C. 7:14A-23.3) shall be provided. If more than two pumps are provided their capacities shall be such that, upon failure of the largest pump, the remaining pumps can handle peak flows.

(c) When ejectors are provided as the method of raising sewage, at least two compressor units (one as a standby) are required and shall be so interconnected that the standby unit will commence operation in the event of failure of the one in use.

(d) Pumps installed in dry wells shall operate under a positive suction head unless specifically designed and manufactured with appropriate features to allow for proper operation otherwise.

(e) A means of flow measurement shall be provided in municipally owned, regional pumping stations.

(f) Shut-off valves shall be provided on suction and discharge piping, which shall be flanged or otherwise removable, and check valves shall be provided on all discharge lines. Shut-off valves shall be accessible during all operating conditions.

(g) Force main velocities of less than two feet/second at normal pumping rates will not be approved. Properly designed air release valves shall be provided on the high points of the force main and cleanouts are recommended on low points of the force main in cases where necessary for operational and maintenance reasons.

(h) The use of low pressure force mains is permitted in only those circumstances when all other means of sewage conveyance have been explored and it has been demonstrated to the satisfaction of the Department that the use of low pressure force mains is the most prudent alternative available.

7:14A-23.11 Submersible wastewater pumps

(a) In addition to the requirements specified at N.J.A.C. 7:14A-23.10, submersible wastewater pumps shall meet the following additional requirements:

1. Submersible pumps and motors shall be designed specifically for raw sewage use, including total submersion during a portion of each pumping cycle;

2. Submersible pumps shall be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well;

3. The motor control center shall be located outside the wet well and be protected by a conduit seal or other appropriate measures meeting the requirements of the National Electrical Code, to prevent the atmosphere of the wet well from gaining access to the control center. The seal shall be so located that the motor may be removed and electrically disconnected without disturbing the seal; and

4. Winch and guide rails shall be provided to facilitate pump removal.

(b) An effective method to detect shaft seal failure or potential seal failure shall be provided, and the motor shall be of squirrel-cage type design without brushes or other arc-producing mechanisms.

7:14A-23.12 Dry wells and wet wells

(a) The construction of dry wells and wet wells for sewage pumping stations shall meet the following requirements:

1. Dry and wet wells shall be completely separated and have adequate ventilation and drainage;

2. Dry wells and wet wells shall have a means of entrance and exit, preferably by a stairway;

3. Dry wells shall have sufficient accessible space for the repair and removal of pumps;

4. The detention time of a wet well shall not exceed ten minutes when the flow is at the average dry weather rate. The detention time is calculated by dividing the volume of the wet well (volume between the pump on and the pump off switch levels) by the projected flow for the pumping station;
   i. Wet well detention times greater than 10 minutes may be approved by the Department for small pump stations that cannot meet this requirement due to

the minimum available size of the wet well and an estimated low volume daily wastewater flow. If longer detention times are proposed, additional measures necessary to prevent the development of septic conditions may be required;

ii. To minimize the development of septic conditions during the early phases of pump station operation, the Department may require special operational and/or maintenance procedures particularly when the initial contributory flows will be substantially below the approved design flow;

5. The base of pump station wet wells shall slope at least 45 degrees toward the pump suctions to prevent solids accumulation; and

6. A sump pump or other effective method to drain accumulated water from the dry well to the wet well and to prevent sewage from entering the valve pit during surcharged wet weather conditions shall be provided.

7:14A-23.13 Wastewater treatment plants

(a) Adequate treatment shall be provided for all wastewater before discharge into the waters of the State.

1. The minimum level of sewage treatment shall be as specified by the Department in the applicable NJPDES permit.

2. The design of the proposed treatment system shall be adequate to meet all NPDES or NJPDES permit requirements, and shall take into consideration the topography of the plant site, receiving waters, operating costs and effects of any industrial waste component.

(b) Treatment plants shall be designed to produce an effluent which will consistently meet the limitations specified in the applicable NPDES or NJPDES permit and be conducive to the attainment and maintenance of such water quality criteria for the various classifications of surface and ground waters of the State.

(c) Siting requirements for wastewater treatment plants are as follows:

1. Treatment plants shall be located as far from existing or future residential structures as practical;

2. To the extent possible, the treatment plant units shall not be situated within 500 feet of the plant property lines. If this is not possible the Department may impose additional requirements concerning plant design, location, landscaping and operation;

3. Treatment plants shall be raised above the flood elevation level, or adequately flood proofed. For the purposes of this requirement, the flood elevation level is considered to be one foot above the 100 year flood elevation for non-delineated waterways and up to the Flood Hazard Design Flood Elevation for delineated waterways (see N.J.A.C. 7:13); and

4. The plant layout shall be designed for ease of operation, safety and accessibility.

(d) A suitable operating building shall be provided meeting the following requirements:

1. The building shall be heated, ventilated and lighted and contain an office, workshop, laboratory, storage space, drinking water, toilet, lavatory, and shower facilities;
2. An adequate supply of water under pressure shall be installed. Any domestic service connection shall be protected by an approved backflow prevention device acceptable to the Department; and
3. Taps supplying non-potable water shall be clearly labeled "Unfit for Drinking."

(e) Treatment plant sites shall be appropriately landscaped and graded.

(f) Drains shall be installed and soil stabilized to prevent washing into tanks, basins or filters and to prevent erosion.

(g) The following safety features shall be incorporated into the treatment plant design:

1. At a minimum, railings, guards, and handrails shall be provided;
2. Flame traps at all gas outlets, a blower and hose, and adequate ventilation of enclosures shall be provided;
3. Non-slip treads on stairs shall be provided;
4. Warning signs shall be posted in hazardous locations;
5. A readily accessible first aid kit shall be provided; and
6. The plant site shall be secure and enclosed by a fence with lockable gates.

(h) Treatment plants shall be provided with an adequate auxiliary source of power that is capable of maintaining the necessary plant functions to assure compliance with the facility's NJPDES permit.

1. When a plant is not staffed on a 24-hour basis, the auxiliary source of power shall have the ability to be automatically activated.
2. Emergency generators shall be tested regularly and maintained in proper working order at all times.

(i) An alarm system operating on an independent source of power shall be provided for all treatment plants when 24-hour supervision is not provided.

1. The alarm system shall extend to a police station or other location where competent 24-hour assistance can be obtained in an emergency.

(j) All electrical equipment work shall comply with the Fire Underwriters' regulations and with the National Electrical Code.

(k) Adequate means shall be provided for dewatering all treatment units for inspection and maintenance while still maintaining NJPDES permit compliance.

(l) Piping located under plant units shall be encased in concrete.

(m) Plant designs which propose the use of bypass lines that would circumvent treatment units and allow untreated or partially treated wastewater to be discharged will not be

approved by the Department. The need for such bypassing is to be eliminated by providing adequate auxiliary treatment facilities.

(n) Treatment units should be designed for the population and wastewater flow that is anticipated 10 years or more after the completion of construction.

(o) Unless accurate data justifying a lesser design are submitted and approved by the Department, the hydraulic design of piping, channels, flumes and pumps shall be based on not less than 250 percent of projected flow, and treatment units shall be designed so as to provide adequate treatment to meet all NJPDES permit effluent conditions.

1. Where recirculation is employed, the resulting additional flow from this source shall be considered in the design.

2. Organic loading shall be based upon a minimum five-day B.O.D. content of 250 mg/l for domestic sewage, to which B.O.D. values for industrial wastes shall be added. For existing sewer systems, higher B.O.D. values may be used if an analyses based on composite samplings indicate a higher actual B.O.D.

3. For systems designed to treat wastewater from proposed or recently constructed buildings which have been equipped with water conservation devices or designed to be served by wastewater treatment and recycling systems, appropriate adjustments for higher B.O.D. values and reduced volume of wastewater should be considered in the treatment unit design.

(p) Flow equalization at the treatment facility is suggested in cases where the ratio of peak (maximum instantaneous) to average daily flow exceeds 2.5.

7:14A-23.14 Measuring, recording, and sampling requirements at treatment plants

(a) At treatment plants, a means for continuous measuring, indicating and recording of the sewage flows shall be installed.

(b) Meters shall be installed in such a manner and location so as to provide a true indication of actual flow.

(c) All wastewater treatment plant designs shall include provisions in terms of number and location for sampling and monitoring as required by its NJPDES permits, Sludge Quality Assurance Reports, Bioassay, and Local Pretreatment Discharge Limits.

1. At a minimum, all wastewater treatment facilities shall be designed and constructed to provide for the collection of representative samples as follows:
   i. Influent quality before introduction of recycled waste which may be incorporated within the wastewater facility's processes (for example, wastewater quality prior to introduction of supernatant from sludge thickening or digestion and prior to the introduction of scrubber water from sludge incineration etc.);
   ii. Effluent quality after the last treatment plant unit at the point of discharge;
   iii. Sludge at a location meeting the requirements established under the Sludge Quality Assurance Regulations, N.J.A.C. 7:14C. In addition, the provisions for sludge sampling shall meet the following minimum requirements:

(1) Sludge sampling points shall be established at a location which assures homogeneity and best represents the physical and chemical quality of all sludge which is removed from the treatment works for ultimate management;
(2) Sludge sampling points shall provide for sample collection at the frequency required under the Sludge Quality Assurance Regulations; and
(3) Sampling equipment shall be constructed of materials which will not contaminate or react with the sludge (for example, galvanized or zinc coated items may not be used); and

iv. Wastewater quality after every treatment unit.

2. In specific cases, the Department may require the installation of additional sampling points and equipment to assure adequate collection of technical data relevant to protection of the environment or public health.

(d) Monitoring chambers shall meet the following minimum requirements:

1. The monitoring chamber shall be constructed of a permanent and durable material with an opening large enough for access by both sampling personnel and equipment.
   i. The sampling chamber shall have a minimum seven foot ceiling clearance;
   ii. Electrical outlets shall be provided so that 24 hour sampling equipment can be accommodated; and
   iii. The access door or manhole shall have a minimum opening of 24 inches and shall be lockable;
2. An accurate flow measuring device with a totalizer and recording equipment with a documented regular calibration program shall be provided;
3. High water alarms shall be included in all sumps;
4. Pickup probes for all monitoring and sample collection devices shall be provided;
5. All influent streams into the public sewer which are required to be monitored by the applicable permit shall be free of external sources of water (for example, supernatant return, stormwater runoff, unless such runoff is being monitored, tidal water, etc.);
6. A back flow prevention device shall be installed if pumping or flowing to a force main;
7. If the sampling chamber is not in a secured area, it shall be surrounded by a chain link fence;
8. The sampling chamber shall be accessible by motor vehicle; and
9. Adequate lighting and ventilation shall be provided and the area shall be free of any safety hazard.

7:14A-23.15 Screening and comminution

(a) All sewage treatment plants shall be provided with a means for screening or comminuting coarse material in the sewage. Except in small plants with a design

capacity of less than 150,000 gallons per day, screening equipment shall be of the mechanical type.

(b) Operation of mechanically cleaned devices shall be continuous or automatically controlled.

(c) Bar screens shall conform to the following:

1. Bars of nonmechanical screens preceding treatment plants shall be spaced so that the maximum clearance between bars is not greater than 1½ inches and not less than one inch;
2. Clear openings for mechanically cleaned screens shall not be less than 5/8 inch;
3. Bar clearance for coarse racks or screens preceding mechanically cleaned screens or comminutors shall not exceed 1 3/4 inches;
4. At sewage pumping stations, openings in bar screens shall be at least one inch smaller than the solid size which can be handled by the pump;
5. Motors shall be of the type suitable for operation in a damp atmosphere if placed below ground;
6. The screen chamber shall be designed to provide a velocity through the screen of not less than one foot per second at average flow and not more than three feet per second, based on the screen openings projected vertically between the invert and the crown;
7. Hand-cleaned screens shall be inclined from 30 degrees to 45 degrees from horizontal; and
8. Where only one mechanical screen is provided, auxiliary hand-cleaned screens shall be provided for use in case of failure of the mechanically cleaned screens.

(d) Disposal of screenings shall be in conformance with the following:

1. Adequate facilities shall be provided for prompt removal, handling and sanitary disposal of screenings;
   i. A platform shall be provided at the top of hand-raked screens; and
   ii. Appropriate containers shall be provided for removal of screenings;
2. An appropriate method shall be provided for drainage of screenings, both on the platform and in containers, such that water content is not a limitation to ultimate disposal. The disposal and treatment method for the drainage from the screenings shall be indicated;
3. Where screen chambers are located substantially below grade, a suitable hoist shall be provided. Such chambers shall have a stairway and adequate lighting; and
4. Screen chambers shall be adequately ventilated. Where required, forced draft fans with explosion-proof motors shall be installed.

(e) Comminutors shall be in conformance with the following:

1. Comminuting devices shall have slots not less than 1/4 inch wide and be designed to cut or shred material below the surface of the sewage. Comminuting capacity shall be adequate to handle peak flows when the largest unit is out of operation;
2. A bypass screen shall be provided except where there are multiple units; and
3. Gates shall be provided to isolate each channel, and provisions shall be made for the removal of mechanisms for repair and maintenance.

7:14A-23.16 Grit removal equipment

(a) Except in small sewage treatment plants with a design flow of less than 150,000 gallons per day, mechanical grit removal devices shall be provided.

(b) Grit chamber channels and flumes shall be designed to produce velocities of not less than 0.5 foot per second and not greater than one foot per second. Detention shall be adequate to deposit grit coarser than 0.20 millimeters.

(c) All grit chambers shall be provided with a means for washing the grit and return of washwater to wastewater flow.

(d) Grit removal facilities shall include adequate means for the collection and temporary storage of grit material prior to sanitary disposal.

1. A stairway or ladder shall be provided for entrance if the unit is four feet or more below ground level.
2. Adequate lighting and ventilation shall be provided.
3. Provisions for dewatering shall be made such that water content is not a limitation to ultimate disposal.
4. Provisions for the treatment and disposal method for drainage of the grit shall be provided.

7:14A-23.17 Settling tanks

(a) Multiple units or independent compartments shall be provided except in small installations of less than 150,000 gpd design flows.

(b) Channels shall be designed to maintain a velocity of one foot per second at 50 percent of design flow.

(c) Baffling shall be provided to dissipate inlet velocity and diffuse flow equally across the cross section of the tank. Baffles shall also be provided to retain scum in primary tanks. Scum collectors shall be provided.

(d) Weirs shall be adjustable.

(e) The minimum slope of the side walls of sludge hoppers shall be 1.7 vertical to 1.0 horizontal.

(f) The use of upward flow settling tanks may be considered when accompanied by supporting data on their hydraulic characteristics and results of operation in actual plants.

(g) Walls of settling tanks shall extend at least 18 inches above the surrounding ground surface.

(h) Mechanical means shall be provided for the collection and removal of sludge from settling tanks, and shall meet the following design requirements:

1. Primary tanks, except those preceding the activated sludge process, shall have a surface settling rate that does not exceed 600 gallons per square foot per day of design flow, and a minimum water depth of six feet;

2. Inlets shall be designed to dissipate inlet velocity promptly so as to diffuse the flow and to prevent short-circuiting; and

3. Adjustable outlet weirs shall be provided.

(i) Final settling tanks shall be designed according to the following:

Type of Treatment	Side Water Depth	Maximum Surface Settling Rate gals./sq. ft.day (At Design Flow)
Standard Rate Trickling Filter	6 feet minimum	1,000
High Rate Trickling Filter	8 feet minimum	800
Activated Sludge (2.0 m.g.d. and less design flow)	8 feet minimum	800
Activated Sludge (Over 2.0 m.g.d. design flow)	10 feet minimum	1,000

7:14A-23.18 Chemical coagulation

(a) This method of sewage treatment is considered to be a degree of treatment intermediate between sedimentation, and sedimentation plus oxidation. Chemical coagulation will not be considered as a substitute for oxidation.

(b) Coagulants shall be applied to the sewage in a suitable and approved form proportional to the sewage flow.

(c) A chamber or tank for the rapid and thorough mixing of the sewage and coagulants shall be provided with a detention period of not less than one minute based on design flow.

(d) Two or more flocculation tanks, with individual controls, shall provide a combined detention period of between 20 and 30 minutes. Diffused air or paddles with a slow rotary motion shall be provided for continuous agitation of the full content of the flocculation tanks.

(e) The automatic control of apparatus for feeding chemicals shall include equipment to provide variation in chemical dosage with variation in sewage flow.

7:14A-23.19 Trickling filters

(a) Trickling filters of the "standard rate" or "high rate" type may be used for the treatment of sewage amenable to treatment by a biological process.

(b) Filters shall be preceded by effective preliminary treatment and shall be followed by individually controlled and mechanically cleaned settling tanks.

(c) When the average five-day B.O.D. of the raw sewage exceeds 325 parts per million, two stages of trickling filter treatment are required, with or without intermediate sedimentation. Consideration may be given to designs providing supplementary preliminary treatment in the case of strong sewages or industrial wastes.

(d) The sewage shall be distributed uniformly over the filter so that at least 95 percent of the surface area receives sewage directly.

1. Distribution devices may be actuated by twin siphons, pumps or gravity discharge from preceding treatment plant units.

(e) The filter media may be crushed rock, manufactured material, or other approved material. Manufactured media shall be resistant to ultraviolet degradation, disintegration, erosion, aging, all common acids and alkalies, organic compounds, and fungus and biological attack. In addition, manufactured media shall be structurally capable of supporting a person's weight or a suitable walkway shall be provided to allow for distributor maintenance.

1. Where applicable, the upper 18 inches of the filter bed shall have a loss, measured by the 20-cycle sodium sulfate test, of less than ten percent and the balance shall pass the 15-cycle test.

2. Wear shall not exceed 20 percent after 500 revolutions of Los Angeles Rattler Test as determined by the current ASTM Standard, Designation No. C-131.

3. Rock media shall be approximately cubical in shape, free from dust, clay, sand or fine material and of a size that passes a four-inch screen and is retained on a 2 1/2 inch screen.

4. Material shall be screened or forked, and washed to remove fine grains and shall be so placed as to avoid breaking the underdrains.

(f) The underdrainage system shall be resistant to the action of sewage wastes and shall cover the entire floor. Inlet openings into the underdrains shall have an unsubmerged gross combined area equal to at least 15 percent of the surface area of the filter. Use of half-tile for underdrains will not be approved.

1. Lateral underdrains shall have a minimum slope of one percent.

2. Main underdrain and effluent channels shall be designed to provide a velocity of not less than two feet per second.

3. The entire underdrainage system shall be designed to permit free passage of air, and be of such size that not more than 50 percent of the cross sectional area of the flow channels in the underdrains will be submerged during operation of the filter at the maximum design rate. Provisions shall be made for flushing lateral underdrains from the main drain or head channel.

(g) Standard rate trickling filters shall be designed as follows:

1. The volume of sewage to be treated by standard rate filters shall not exceed 14,400 gallons per day per 1,000 cubic feet of filtering media and the average rate of organic loading shall not exceed 15 pounds of five-day B.O.D. per thousand cubic feet per day.
2. The average rate of application during dosing periods shall not exceed 22 gallons per thousand cubic feet of media per minute. The time intervals between dosing cycles to the filter shall not exceed five minutes at design flow.
3. The minimum depth of filtering media at any point in the filter, measured from the top of the underdrains to the surface of the media, shall not be less than five feet, and the maximum depth shall not exceed eight feet.
4. Means for Psychoda fly control, such as provisions for backflooding and filter flushing, shall be provided. The application of chemicals is discouraged unless other forms of control have been ineffective and the use of chemicals shall be in conformance with all other applicable laws, ordinances and regulations.
5. Means shall be provided for recirculating a portion of the effluent from intermediate or final settling tanks during periods of low flow.
6. The Department will consider other suggested loading rates to address manufactured media if supported by appropriate engineering documentation.

(h) High rate trickling filters shall be designed as follows:

1. Organic loading to high rate filters shall not exceed 67 pounds of five-day B.O.D. per thousand cubic feet of filter media per day, based on the total volume of the filters.
2. The depth of filtering media at any point in the filter, measured from the top of the underdrain block to the surface of the media, shall not be less than five feet nor more than eight feet. The distributor shall clear the media by not less than eight to nine inches; and the filter retaining walls shall not be less than three inches higher than the media.
3. High rate trickling filters shall be equipped with rotary distributors and flushing devices shall be provided at the outer end of each distributor arm.
4. Provisions shall be made for controlled recirculation to maintain a continuous application rate of not less than 230,000 gallons per 1,000 square feet per day. Devices to measure flows to the filter and the recirculated effluent shall be provided.
5. The number and capacities of the recirculation pumps shall be such that the conditions of (h)4 above can be met if the largest pump for each point of return is out of service unless other provisions are made which will achieve adequate and effective degree of treatment if power or pump failure occurs.
6. The Department will consider other suggested loading rates to address manufactured media if supported by appropriate engineering documentation.

(i) Under conditions where treatment of unusually strong sewage is necessary and two-stage filtration is adopted, intermediate settling tanks may be required, with suitable sludge and scum removal devices to provide a detention period of one hour based upon projected flow.

7:14A-23.20 Rotating biological contactors

(a) Rotating biological contactors (RBC) process may be used when wastewater is amenable to biological treatment.

(b) RBCs shall be preceded by properly designed settling facilities. Efficient grease and scum removal devices shall be provided.

(c) At least four stages shall be provided for secondary treatment applications. Additional stages may be necessary for nitrification and additional BOD removal.

(d) Permanent buildings or covers shall be used to protect the RBC units from sunlight and winter weather. Provisions shall be made for access to the RBC units for observation and repairs. Buildings shall have adequate ventilation, heating, and humidity control, and an internal hoisting device for the removal of the shaft/media assembly. Covers shall be made in removable sections, or have some other means of allowing removal and replacement of the shaft/media assembly.

(e) Drive systems shall be variable speed and may be mechanical or air driven. Air driven systems shall have positive air flow metering and control to each RBC unit.

1. Bearing units shall be self-aligning and shall be located outside of media covers to allow easy access for lubrication and maintenance.

2. A provision for auxiliary power during power outages is required.

(f) Operation and maintenance requirements, including biofilm control, drive train and radial support arm maintenance and repair, and media/shaft repair and replacement, shall be considered in the design and layout of RBC treatment systems. Provisions shall be made for positive flow control to each stage, allowing flexibility in feeding and discharge. Tank depth and configuration shall be such that solids are not deposited in the tank; also, provisions shall be made for draining the tank.

(g) To avoid system failure, flexibility shall be considered in RBC designs. Flexibility can be achieved by having variable rotational speed, the ability to periodically reverse rotational direction, supplemental aeration, or the potential for chemical addition (for example, hydrogen peroxide or chlorine).

(h) Final settling shall provide a detention time of not less than 90 minutes, with a maximum surface settling rate of 600 gpd/sq. ft. and a weir overflow rate not greater than 5,000 gallons per day per linear foot. Higher surface settling and weir overflow rates may be used if the contactor is to be followed by tertiary treatment.

7:14A-23.21 Activated sludge

(a) The activated sludge process may be used when wastewater is amenable to biological treatment.

(b) The design data outlined in this section are presumed to achieve a removal of 90 percent or more of the B.O.D. and suspended solids susceptible to treatment from sewage of normal characteristics and may not be appropriate where only partial removals are intended.

(c) Provisions for pre-chlorination of the raw sewage shall be made depending on the condition of the influent.

(d) The design of plants which may receive abnormally strong concentrations of wastewater, or require an unusual aeration period or special equipment, may be considered for approval as an activated sludge process upon presentation of appropriate supporting data obtained from existing installations that demonstrate the efficiency of the process.

(e) Settling tanks for the activated sludge process shall be designed in conformance with the following:

1. A skimming tank, or equivalent, shall be provided for wastewater which contains greater than 100 milligrams per liter (mg/l) of oil or grease;
2. Except in small sewage treatment plants with a design capacity of less than 150,000 gallons per day, a minimum of two preliminary settling tanks shall be provided with a total capacity that provides a detention period of 90 to 150 minutes and a maximum surface settling rate of 1,000 gallons/square foot/day based upon design flow;
3. For plants having a design capacity of 2.0 M.G.D. or less, final settling tanks shall have a minimum eight foot side water depth and a maximum surface settling rate of 800 gallons per square foot per day. For plants with a design capacity of more than 2.0 M.G.D. final settling tanks shall have a minimum 10 foot side water depth and a maximum surface settling rate of 1,000 gallons per square foot per day;
4. Final settling tanks shall be provided in multiple units except in small installations;
5. Mechanical means shall be provided for the collection and removal of sludge from all settling tanks; and
6. The use of upward flow settling tanks may be considered when accompanied by supporting data on their hydraulic characteristics and results of operations in actual plants.

(f) If the incoming wastewater to an activated sludge system contains less than 2.0 parts per million dissolved oxygen, pre-aeration of the pre-settled wastewater is required before the admixture of returned sludge.

(g) Aeration tanks for the activated sludge process shall be designed in conformance with the following:

1. Multiple units, capable of independent operation, shall be provided for all installations;

2. Total required detention period of aeration tanks, based upon 125 percent of design flow, shall not be less than six hours. If provisions are made for the re-aeration of the returned sludge before admixture with the pre-settled sewage, a lesser detention period in the aeration tanks can be considered (the greater the return sludge aeration period, the less the required mixed liquor detention period);

3. Applied loading shall not exceed 38 pounds of B.O.D., exclusive of return sludge, per 1,000 cubic feet of tank volume;

4. Liquid depths of not less than 10 feet, nor more than 15 feet, shall be provided; and

5. Means to minimize foaming in aeration tanks shall be provided.

(h) All inlets and outlets shall be equipped with suitable devices for controlling the flow to each tank unit and to withdraw any unit from service. Velocity between bays or around baffles shall not exceed 0.5 feet per second.

1. Channels and pipes shall be designed to provide self-cleaning velocities, or shall be equipped with mechanical devices for maintaining solids in continuous suspension.

(i) Devices shall be provided for indicating rates of flow of presettled effluent, return sludge, air to each tank unit, and total volume of wasted sludge. These devices shall also totalize and record as well as indicate flows.

(j) Requirements for air supply are as follows:

1. Air requirements at all times shall be sufficient to:
   i. Maintain at least two parts per million of dissolved oxygen in all parts of the aeration tank;
   ii. Maintain sufficient turbulence to maintain intimate contact of sludge particles with sewage; and
   iii. Prevent deposition of solids in any part of aeration unit.

2. Aeration capacity at standard temperature and pressure shall be at least 1.5 cubic feet per gallon of incoming raw sewage plus the capacity required for reaeration of returned sludge.

3. Blowers shall be in multiple units and of such capacity that full operation requirements can be met with the largest unit out of service.

4. Blower capacity required to deliver air to channels, sludge pumps, foam-control pumps, or similar demands shall be in addition to that required for tank aeration as specified in 1 above.

5. The air diffuser system shall be capable of delivering 150 percent of normal requirements. Normal requirements are considered to be 1,000 cubic feet per pound of B.O.D. to be removed from the sewage entering aeration tanks.

6. Air filters shall be capable of supplying a continuous air supply having a dust content of not more than 0.5 milligrams per 1,000 cubic feet.

7. Each blower shall be equipped with a silencer.

8. Aeration plates, tubes or jets shall be designed to permit removal for inspection or cleaning, and for maintaining an even distribution of air throughout the aeration tanks.

9. Individual assembly units of diffusers shall have a substantially uniform pressure loss and shall be equipped with control valves with indicator markings.

(k) Return activated sludge pumps or air lifts shall have variable combined capacity, capable of pumping at least 25 percent of the projected flow with the largest single unit out of service. Normal return sludge capacity shall be at least 50 percent of the average dry-weather sewage flow.

1. In addition to capacity required for return sludge pumping, waste sludge pumping facilities shall be provided with a minimum capacity not less than 0.5 percent of design flow, or 10 gallons per minute, whichever is larger.

2. The means for the further treatment and management of waste activated sludge shall be specified.

(l) Extended aeration systems shall be designed in accordance with the following:

1. Screening equipment consisting of a comminuting device with a bar screen in parallel is required.

2. Aeration tanks shall provide a detention period of at least 24 hours based upon design flow without recirculation. At least two tanks shall be provided in plants with design capacities of 100,000 gallons per day or more.

3. Air blower equipment shall be at least in duplicate and shall have capacity with the largest unit out of service to provide either at least three cubic feet per minute per foot length of aeration tank or at least 2,100 cubic feet of air per pound B.O.D. of raw sewage, whichever is greater. Equipment shall provide for variation in the volume of air to be delivered in at least three steps. Additional air capacity shall be provided if required for air lifts or other needs.

4. Provisions shall be made for the future installation of froth-breaking spray equipment, if necessary.

5. Final settling tanks shall provide at least a 3.5 hour detention period based upon design flow without recirculation.
   i. Two or more tanks shall be provided on installations having capacities of 100,000 gallons per day or more.
   ii. For tanks with hopper bottoms, the upper third of depth of hopper may be considered as effective settling capacity.

6. Return sludge capacity of at least 100 percent of design sewage flow shall be provided.

7. Appropriate means, such as a V-notch weir, shall be provided for measurement of sewage flow. For installations having capacities of 100,000 gallons per day or more, indicating-recording-totalizing equipment is required.

8. Waste sludge holding tanks with a capacity of at least one cubic foot per capita shall be provided.

(m) Contact stabilization systems shall be designed in accordance with the following:

1. Screening equipment consisting of a comminuting device with a bar screen in parallel is required.

2. Combined volumes of the contact aeration and sludge reaeration tanks shall provide a detention period of at least nine hours based on design flow without recirculation.
   i. Aerobic digester tanks shall provide a capacity of at least three cubic feet per capita.
   ii. At a minimum, duplicate tanks shall be provided in sewage treatment plants with design capacities of 100,000 gallons per day or more.
   iii. When anaerobic digestion is employed, the design of the drying beds must be in conformance with N.J.A.C. 7:14A-23.28.

3. Air blower equipment shall be at least in duplicate, and shall have capacity with the largest unit out of service to provide at least 1,600 cubic feet of air per pound B.O.D. of raw sewage for contact aeration sludge reaeration and aerobic digester requirements.
   i. The proposed equipment shall provide for variation in the volume of air to be delivered in at least three steps.
   ii. Additional air capacity shall be provided if required for air lifts or other needs. The air supply requirements stated in (j)1 through 9 above also apply to contact stabilization.

7:14A-23.22 Intermittent sand filters

(a) For intermittent sand filters, at least two filter units shall be provided.

(b) Sod and similar coverings over intermittent sand filters are prohibited.

(c) Loading requirements for intermittent sand filters are as follows:

1. Organic loading of five-day B.O.D. shall not exceed 3.8 pounds per 1,000 square feet per day;

2. With acceptable primary treatment of normal sewage, volumetric loading shall not exceed 2,875 gallons per 1,000 square feet per day. For stronger sewage the rate of filtration shall be proportionately lower.

3. For chemical coagulation and sedimentation the volumetric loading shall not exceed 5,750 gallons per 1,000 square feet per day.

4. For standard or high rate trickling filters or activated sludge followed by secondary settling tanks, the volumetric loading shall not exceed 9,200 gallons per 1,000 square feet per day.

5. For schools, camps, and institutions, not having a full-time treatment plant operating staff, volumetric loading should not exceed 1,150 gallons per 1,000 square feet per day for primary tank effluent.

(d) Intermittent sand filter media shall be in conformance with the following:

1. Clean graded gravel shall be placed in at least three layers over the entire floor of the bed and around the underdrains and to a depth of at least six inches. Grading for the three layers shall be 1 1/2 inches to 3/4 inch, 3/4 inch to 1/4 inch and 1/4 inch to 1/8 inch.
2. Underdrains shall have maximum spacing not exceeding six feet and shall be at least four inches in diameter, or of equivalent area.
3. Pipes shall be laid on a firm base with open joints with a space of approximately 1/4 inch between ends.
   i. A single layer of muslin, cheese cloth, burlap or other suitable material shall be wrapped around each joint of open joint underdrains.
   ii. Tar paper or other waterproof material may not be used.
   iii. Perforated clay or other approved perforated pipe may be used for underdrains.
4. Sand with an effective size of 0.3 to 0.6 millimeters and a uniformity coefficient of not more than 3.5 shall be provided to a depth of at least 30 inches. The sand shall be free from clay, loam or silt.

(e) Intermittent sand filter dosing shall be in conformance with the following:

1. A dosing tank or its equivalent with a capacity to dose each filter at least twice a day shall be provided. Where practical, a dosing tank or equivalent shall have a maximum detention time of two hours based upon the design flow.
2. The dosing tank volume shall be such that each filter bed will be covered to a depth not less than two nor more than four inches with each dose.
3. Siphons shall have a discharge capacity, at minimum head, of at least 100 percent in excess of the maximum rate of inflow to the dosing tank, and at average head, at least one cubic foot per second per 5,000 square feet of each filter bed.

(f) Intermittent sand filter distribution shall be in conformance with the following:

1. A rotary distributor may be used if nozzles are adjusted so flow will not erode the sand bed.
2. Troughs or piping used for distribution of the settled sewage over the filter surface shall be so located that the maximum lateral travel distance is not more than ten feet. Provision shall be made at each discharge port for adjustment of the flow.
3. Splash slabs shall be provided at each point of discharge.
4. A drain opening from troughs or discharge piping shall be provided.

(g) The base of the filter shall be either enclosed with concrete or lined with a material that has a permeability no faster than 10^{-7} cm/sec.

(h) Rapid sand filter design shall be in conformance with the following:

1. The use of rapid sand filters may be considered where treatment beyond secondary treatment is required and where skilled operational personnel will be present.
2. In general, rates shall not exceed three gallons per square foot per minute; backwash facilities shall be provided; the sand bed should not be less than 20 inches in depth; and suitable underdrainage of graded gravel shall be provided.
3. Operating head on the filter shall not exceed eight feet.

(i) The use of micro-strainers is acceptable when additional treatment such as reduction in B.O.D. and suspended solids is required after secondary treatment and final settling, and will be considered when accompanied by an engineer's report that contains complete data on the installation and accompanied by suitable plans.

7:14A-23.23 Chlorination

(a) Chlorination devices shall be of the solution feed type, installed in duplicate or with duplicate essential parts. Chlorinators shall be of an automatic feed type for sewage treatment plants with a design capacity of greater than 150,000 gallons per day.

(b) Chlorinating devices shall be designed in accordance with the following:

1. The devices shall be placed in separate rooms with an outside entrance only and shall be provided with adequate ventilation.
2. Rooms containing chlorinating devices shall have doors that open outward.
3. Provisions for heating during the winter season are required.
4. Suitable gas masks shall be provided and maintained in good operating condition, and shall be stored in an accessible location outside the chlorine room.
5. An automatic alarm and observation window to permit visual inspection without opening the door, should be provided.

(c) For reduction in fecal coliform, a chlorine contact period of at least 30 minutes, based upon design flow, shall be provided in a separate baffled tank, and a contact period of not less than 20 minutes shall be provided during peak hourly flow. For reduction of enterococci or other pathogenic indicators increased contact periods and/or application rates may be required.

(d) Provisions shall be made for the thorough mixing of the disinfectant and the sewage before discharge to the chlorine contact tank.

(e) Scales shall be provided for determining chlorine consumed, and a suitable means for measuring residual shall also be provided.

(f) If hypochlorite feeders are provided, duplicate solution tanks each having at least 36 hours storage capacity are recommended.

(g) Automatic chlorinators with residual recorders and alarm systems to indicate chlorinator failures are required.

(h) Capacity of chlorinators shall be in conformance with the following:

1. For disinfection, the capacity of chlorinators shall be adequate to produce a concentration of residual chlorine in the effluent so as to dependably and consistently reduce the fecal coliform concentration to that specified in the applicable discharge permit. For normal domestic sewage the following minimum dosing capacities are required:

Type of Treatment	Dosage (Based on Average Design Flow)
Raw Sewage	30 ppm
Primary Sedimentation Effluent	20 ppm
Trickling Filter Plant Effluent	15 ppm
Activated Sludge Plant Effluent	10 ppm
Sand Filter Effluent	10 ppm

2. For reduction of enterococci or other pathogenic indicators increased contact periods and/or application rates may be required.

7:14A-23.24 Dechlorination

(a) Dechlorination chemicals shall be applied in an area where the flow is turbulent and short circuiting is minimal, immediately preceding discharge of the effluent. A contact period of one to five minutes is recommended.

(b) If sulfur dioxide is utilized for dechlorination, safety precautions similar to those for chlorination systems are required, including the provision of self-contained breathing apparatus. Steps shall be taken to prevent the accidental interconnection of chlorine and sulfur dioxide lines to avoid an explosion hazard.

7:14A-23.25 Ultraviolet disinfection

(a) The following provisions apply to the design of ultraviolet disinfection (UV) systems:

1. The turbidity and color of the wastewater shall be addressed in the design. Treatment of the influent wastewater prior to the UV units by intermittent sand filtration, or other filtration, as approved by the Department, is recommended. Removable screens, located upstream of the UV unit, are recommended to prevent debris from entering the system.

2. Wastewater shall pass over the UV source in a thin film, so that the maximum depth of penetration is no greater than two inches. The UV contact time shall be dictated by water absorbance and film thickness.

3. A UV intensity sensor shall be installed at the maximum depth from the source with an alarm to alert operators when the UV level falls below acceptable levels. The UV intensity reading shall be displayed by a meter on the control panel. UV sensors shall be properly maintained to insure reliable, accurate readings.

4. The UV unit shall be protected from dust, excessive heat, and freezing temperatures. Adequate ventilation of heat-generating electrical components shall be provided.
   i. An alarm system shall be provided to alert the operator of excessive temperatures in the ballast power panel.
5. When utilizing a closed channel UV system two separate units, or one UV unit and another approved form of disinfection, each capable of treating peak flow, shall be provided.
6. Open channel UV systems shall be equipped with a sufficient number of bulbs such that a safety factor of at least 125 percent will be provided. Separate electrical racks shall also be provided to permit maintenance of the system without removing the entire unit from service.
7. Electrical wiring shall be properly sized and the wire covering shall be resistant to UV radiation effects.

(b) UV lamps/sleeves shall be chemically cleaned semi-annually if automatic wipers are present, or three to four times per year if automatic wipers are not present. A clean water supply equipped with a back flow prevention device shall be available at all times.

(c) UV bulbs shall be replaced when dead life occurs (60 percent of initial emission).

7:14A-23.26 Anaerobic sludge digestion and management

(a) The Department does not examine plans covering fire and explosive hazards, heat controlling equipment or safety devices and such safeguards are the responsibility of the design engineer.

(b) Supernatant liquor from sludge digestion tanks shall be returned downstream of the influent monitoring points to the raw sewage except that at activated sludge plants, or other plants utilizing air as a method of biological treatment, provisions may be made for disposal in aeration or reaeration tanks. The wastewater treatment facility shall be designed to treat the increased pollutant concentration and hydraulic loading of the supernatant or means shall be provided for separate treatment.

(c) The minimum diameter of all sludge pipes shall be eight inches for gravity flow and six inches for sludge pumping.

(d) A fresh-water hydrant near the sludge digestion tanks is recommended, and, if present, shall be provided with a suitable backflow-prevention device.

(e) Provisions shall be made for the introduction of chemicals into all sludge storage or digestion tanks.

(f) Digesters which are proposed to be utilized to satisfy stabilization requirements shall be designed to meet the requirements for pathogen reduction and vector attraction reduction in accordance with N.J.A.C. 7:14A-20.

(g) Sludge digestion tanks shall be in conformance with the following:

1. Two or more separate units shall be provided, a single digestion tank may be approved if the plan and report show all emergency provisions and the proposed use is for small installations (design capacity of less than 150,000 gpd) where alternate sludge storage is available for emergency use without creating a local nuisance, and where pumps and piping are available for such emergency.
2. Suitable equipment to insure mixing or circulation of the tank contents shall be provided for primary digesters.
3. The proportion of tank depth to area shall be such as to permit the formation of a reasonable depth of supernatant liquor.
4. Tank bottoms shall slope toward the withdrawal pipe not less than three inches per foot. Flat bottom tanks will not be approved.
5. At least two access manholes of adequate size shall be provided in the top of the digester in addition to the gas dome. An access manhole in the side wall of the tank is recommended.
6. In the case of multiple tanks, a provision shall be made to direct the raw sludge to any tank. In circular tanks the raw sludge inlet shall be at a point that is removed from the overflow or supernatant draw-offs by a distance at least equal to the radius of the tank. In rectangular tanks the raw sludge inlet shall be at the opposite end from the overflow and digested sludge draw-off lines.
7. An emergency overflow shall be provided. Provisions shall be made for sampling and removal of supernatant from several levels.
8. Means shall be provided for sampling of digested sludge in accordance with N.J.A.C. 7:14A-23.14. Digested sludge withdrawal piping shall extend from the center and bottom of circular tanks. Means shall be provided for backflushing digested sludge withdrawal piping. Adequate transfer piping shall be provided.
9. Unheated primary anaerobic digestion tanks will not be approved.
10. The mixing of the contents of anaerobic digesters by air is prohibited.

(h) Separate sludge digestion capacity shall be in conformance with the following:

1. Separate sludge digestion capacity shall be as follows, unless acceptable justification is submitted for an alternate design:

Type of Plant	Minimum Cubic Feet per Capita
Primary	2 to 3
Primary plus standard filter	2.5 to 3
Primary plus high rate filter	3 to 4
Chemical coagulation	4 to 6
Activated sludge	4 to 6

2. Larger volumes of sludge digestion capacity shall be provided for smaller plants.

3. The sludge digestion capacity shall be increased when industrial wastes and/or garbage solids are present, and may be reduced if the sludge is thickened. Volumes shall be computed on the basis of the bottom sloping up 30 degrees from the horizontal unless mechanical sludge collection is employed.

(i) Anaerobic digestor gas collection shall meet the following general requirements:

1. Waste gas burners shall be provided for excess gas.
   i. Burners shall be placed at least 25 feet away from structures if placed at ground level, or may be located on roofs of buildings provided they are remote from digestion tanks.
   ii. Burners shall be equipped with pilot lights and means for igniting manually, and shall be equipped with flame traps.
2. All enclosures containing gas piping or apparatus shall be equipped with forced draft ventilation either of the wind-driven or motor-operated type. If of the motor type, the design shall be such that the motor does not come in contact with gases; or spark-proof motors shall be used.
3. A gas meter shall be provided and a bypass installed.
4. Boilers utilizing gas shall be located in a separate enclosure having adequate means of ventilation and preferably located at ground level.
5. All gas lines shall have suitable flame traps and other safety equipment.

(j) Anaerobic digestor heating shall meet the following general requirements:

1. Preference shall be given to means of external heating by means of a heat exchanger. Heating capacity shall be adequate to maintain sludge at 85 to 95 degrees Fahrenheit at all times. Suitable controls shall be provided for automatic operation.
2. Thermometers shall be provided to show temperatures of sludge in the digester, and the sludge going to and from the heat exchanger. Thermometers shall also be provided to show the temperature of the water going to and from the heating coils or heat exchanger.
3. An auxiliary fuel shall be provided, such as oil or commercial gas.

7:14A-23.27 Sludge pumps

(a) Duplicate sludge pumps shall be provided and shall be so arranged with appropriate valves such that either may be used, in emergencies, for handling either raw or digested sludge.

(b) The capacity of each pump for handling raw sludge shall be such as to remove sludge from hoppers of settling or concentration tanks in not less than one hour nor more than two hours. Pump capacity shall be adjustable.

(c) A minimum positive head of 24 inches shall be provided at the suction side of centrifugal pumps and is desirable for all types of pumps. Maximum dynamic suction lift of plunger pumps shall be 10 feet.

(d) Sludge sampling facilities shall be provided in accordance with N.J.A.C. 7:14A-23.14. The size of valve and piping shall be at least 1 1/2 inches.

(e) Pressure gauges shall be provided on the discharge line of sludge pumps to denote pumping and to indicate unusual discharge heads due to clogging.

7:14A-23.28 Drying beds for residuals

(a) The following table of requisite areas applies to domestic sewage, the sludge of which is digested by an anaerobic method. Based upon the physical and chemical characteristics of the residual (for example, domestic/industrial, solids concentration, and/or method of prior stabilization) appropriate adjustments can be made to the following table. Written justification for any adjustments or alternative designs shall be provided in the engineer's report. However, under most circumstances drying beds will not be approved for dewatering unstabilized sewage sludge unless appropriate provisions to control odors have been included.

Area in sq. ft./capita

Type of Treatment	Open Beds	Glass Covered Beds
Primary	1.50	60 percent
Standard Rate Filter	1.75	of the area
High Rate Filter	1.75	of open
Activated Sludge	2.00	beds
Chemical Precipitation	2.25	

(b) The following are minimum requirements governing the design of drying beds and phragmites reed beds:

1. Not less than two beds or compartments shall be provided;
2. For conventional sand drying beds:
   i. Gravel shall be at least 12 inches deep with the top at least six inches above underdrains. Gravel shall be graded from 1/8 to one inch in effective diameter; and
   ii. Depth of sand shall be at least six inches and shall consist of clean coarse sand.
3. All drying beds shall be provided with underdrains of bell and spigot vitrified clay tile pipe, porous tile, perforated pipe, or other suitable material or drainage. Lateral drains shall be at least four inches in diameter laid with open joints. An acceptable engineering fabric shall be provided around joints. Drains shall be spaced not more than eight feet apart on center and have a minimum slope of one percent.
4. The permeability of the bottom and side walls shall not be greater than 1 x 10-7 cm/sec and shall extend 15 to 18 inches above the sand surface. Walls shall be at least six inches above the surrounding ground elevation to prevent soil from washing on beds;
5. Means shall be provided to facilitate the removal of dried sludge from drying beds;

6. Influent piping shall provide for uniform distribution of residuals across the entire drying bed area. Splash slabs shall be provided.

7. Residual bed effluent shall be treated and suitable means shall be provided for the satisfactory management of the residual cake.

8. The capacity of the beds shall be sufficient to process the residuals generated to prevent any day to day accumulations.

9. Drying beds proposed to be utilized to satisfy stabilization requirements shall be designed to meet the requirements for pathogen reduction and vector attraction reduction in accordance with N.J.A.C. 7:14A-20. For Phragmites reed beds, a minimum capacity to allow three weeks between loadings to the same bed at the projected sludge production shall be provided. Additional capacity to allow for bed evacuation is recommended.

7:14A-23.29 Residual dewatering lagoons

(a) The use of lagoons for the drying or residuals is permissible provided that:

1. The lagoons shall be sufficiently isolated from existing and possible future residences as to afford such residences reasonable protection from odors or other nuisances which may arise from the operation of such lagoons;

2. The permeability of the bottom and sides of the lagoon shall not exceed 1 x 10-7 cm/sec, for solid waste classes I.D. 12, 73, and 74 as defined by N.J.A.C. 7:26-2.13(g). For other solid waste I.D. classes of residuals, the bottom and side permeability shall be approved by the Department, on a case-by-case basis, after evaluating the specific chemical characteristics of the residuals to be dewatered;

3. The area provided shall be at least double that specified for open drying beds, and a sufficient number of lagoon units shall be available to permit withdrawals from service and cleaning at necessary intervals. The means provided for residual removal, ultimate management and resting intervals shall be indicated;

4. Shallow residual dewatering lagoons shall meet the requirements of N.J.A.C. 7:14A-23.32(d);

5. Residuals shall be properly stabilized for pathogen reduction and vector attraction reduction in accordance with N.J.A.C. 7:14A-20 prior to discharge to the lagoon; and

6. Means shall be provided for obtaining representative samples of the residual prior to discharge to the residual lagoon pursuant to the measuring, recording, and sampling requirements in N.J.A.C. 7:14A-23.14.

7:14A-23.30 Mechanical dewatering of residuals

(a) For installations where residuals are mechanically dewatered, mechanical dewatering equipment shall be provided in duplicate unless nuisance-free storage of residuals is provided in a manner approved by the Department.

1. Duplicate installation shall include duplicate conditioning equipment, conveyors, feeders and other appurtenances.
2. Capacity shall be sufficient to process the residuals generated to prevent any day-to-day accumulation.
3. The engineer's report shall include complete data on capacity, residual volume to be handled, conditioning methods, and equipment, chemical storage and satisfactory management of residual cake.
4. The plans shall show provisions for housing the dewatering equipment, for ventilation and odor control, for handling and/or loading the residual cake and the area and method proposed for ultimate management.
5. Filtrate collection and treatment shall be provided and indicated.

7:14A-23.31 Stabilization residuals

(a) All residuals stabilization equipment shall be designed to meet the requirements for pathogen reduction and vector attraction reduction in accordance with N.J.A.C. 7:14A-20.

(b) New residual stabilization operations, or expansions shall be designed in accordance with the following requirements:

1. Residual stabilization and curing operations shall be enclosed and vented and shall be in compliance with the Department's air pollution control rules at N.J.A.C. 7:27. For residual stabilization operations which process less than one dry ton per day, the Department shall waive the requirement for enclosure of the residual stabilization operation, in full or in part, where the control of the effects of odor or climatic conditions are otherwise satisfactorily addressed as part of the permit application consistent with N.J.A.C. 7:14A-20.6.
2. All transfer conveyors and associated equipment shall be constructed of fire resistant materials.
3. Composting systems shall be designed to produce a sludge derived product that has a final solids content between 50 and 60 percent.
4. The aeration system shall be designed to distribute air evenly throughout the composting mass, to maintain aerobic conditions, and to control temperatures within acceptable ranges in active composting pursuant to (a) above.
5. The process monitoring system shall be designed to monitor all process criteria (such as temperature, pH, or percent solids) as required pursuant to (a) above.
6. Leachate collection and treatment shall be provided.
7. Equipment capable of adequately mixing bulking agent and dewatered sludge to the desired porosity, structure, and moisture content prior to composting shall be provided.

8. Storage capacity for a minimum of 30 days production of stabilized residuals shall be provided, unless suitable alternative contingency arrangements, as acceptable to the Department, are demonstrated.
9. The minimum time for compost curing shall be 30 days. Compost curing capacity shall be developed independent of finished compost storage capacity.
10. For active composting, the maximum height of a static pile shall not exceed seven feet.
11. Process and curing pads shall provide for drainage away from piles and shall have a minimum slope of two percent.
12. Compost curing pile designs shall provide aeration either through the installation of aeration equipment, or through mechanical turning at least two times per week. For compost curing on pads, the maximum height of the curing piles shall not exceed 10 feet.

7:14A-23.32 Storage of residuals or septage; and septage handling

(a) All new, upgraded, or expanded domestic treatment works shall be designed to provide adequate residuals storage capacity based on anticipated downtimes (that is weather, maintenance closures, etc.) of the ultimate residual management alternative. This design shall insure the continual, uninterrupted operation of all residual production/processing activities when the ultimate residual management alternative cannot be utilized.

(b) The design of sludge or septage storage facilities shall:

1. Prevent overtopping from normal or abnormal operations, overfilling, wind and wave action, precipitation, run-on and run-off, malfunctions of equipment, and human error;
2. Specify materials that have the appropriate physical and chemical properties, wall thickness, and structural integrity to prevent massive failure due to climatic conditions, pressure gradients, and daily operational stresses;
3. Provide for the periodic removal of stored residuals, cleaning, and inspection;
4. Prevent the migration of residuals to ground water and/or surface waters;
5. Provide for adequate collection and treatment of supernatant or leachates where applicable;
6. Permit residuals sampling and collection pursuant to N.J.A.C. 7:14A-23.14; and
7. Include overflow prevention devices and/or high level alarms and automatic shut off valves on influent lines.

(c) Slurry tanks shall be designed to provide for mechanical mixing equipment capable of homogenizing stored residuals for removal and sampling.

(d) Surface impoundments shall be designed in accordance with the following conditions:

1. A depth indicator (gauge) which indicates residuals quantities in storage shall be provided.
2. A fence shall be provided around the surface impoundment to prevent unauthorized access or entry.
3. Surface impoundment liners shall conform to the following design requirements:
   i. The permeability of the liner materials shall be no greater than 1×10^{-7} cm/sec for the material being contained. Permeability shall be determined by utilizing the liquid portion of the intended contents to be stored.
   ii. The liner shall be adequately supported by a foundation or base so as to resist any pressure gradients that may cause settlement, compression, or uplift.
   iii. Liners shall be of materials that are capable of resisting failures caused by: pressure gradients, including static head and hydrogeologic forces, physical contact with the contents, climatic conditions, and stresses associated with installation and daily operations.
4. The design shall provide for a minimum freeboard level of two feet.
5. Mechanical mixing equipment capable of homogenizing stored residuals for removal and sampling shall be provided.
6. When flow is to, from, or between impoundments, all interconnections shall be piped or lined with an impervious material and other appropriate safeguards to prevent both the degradation/erosion of impoundment banks or dikes, and discharges to groundwater.
7. Surface impoundments shall be utilized to store only stabilized residuals that have met the stabilization requirements for pathogen reduction and vector attraction reduction specified in N.J.A.C. 7:14A-20.
8. Surface impoundments require an application be submitted for a NJPDES permit for potential groundwater discharges pursuant to N.J.A.C. 7:14A-10.7.

(e) Bunker silos, pads, and storage sheds shall be in conformance with the following:

1. The storage surfaces of bunker silos, pads, and storage sheds shall be designed with a minimum slope of two percent to permit the drainage of leachate away from storage piles for collection and treatment.
2. The management and treatment method for the drainage from bunker silos, pads or storage sheds shall be indicated.
3. Storage surfaces shall be constructed of reinforced concrete, asphalt, or other suitable material capable of preventing discharges to groundwater.

(f) Septage handling/receiving facilities shall be designed to provide the following:

1. An unloading ramp for the haul trucks with a hard surface sloped to a drain to facilitate the cleaning of any spillage and washing the haul truck, connector hoses, and fittings. The ramp drainage shall be a tributary to treatment facilities and shall exclude excessive stormwater;

2. A flexible hose fitted with an easy connect coupling to provide a direct connection from the haul truck to the receiving facility;
3. Washdown water with adequate pressure, a hose, and a spray nozzle for cleaning the receiving station and the haul trucks. If a potable water source is utilized, it shall be protected with a suitable backflow prevention device;
4. An adequate off-line septage receiving tank which allows for the collection of representative samples from any truckload of waste accepted for discharge at the wastewater treatment plant. The receiving tank shall be designed to provide complete draining and cleaning by means of a sloped bottom equipped with a drain sump. The design shall also provide for adequate mixing, testing, uniform septage strength, and chemical addition for treatment or odor control purposes;
5. Screening, grit, and grease removal as appropriate to protect downstream treatment units;
6. Valving and piping designed with sufficient operational flexibility so as to control the flow rate and point of discharge of septage to the wastewater treatment plant;
7. Laboratory facilities for determining septage strength and/or toxicity to the wastewater treatment processes; and
8. Any pumps provided for the handling of septage shall be of the non-clogging design and shall be capable of passing three inch diameter solids.

7:14A-23.33 New treatment methods and technologies

(a) Designs for new treatment methods or for methods not included in these rules shall be accompanied by detailed supporting data from full scale tests performed under competent supervision. In evaluating the acceptability of applications for new treatment methods, or for technologies not included in these rules, the Department shall utilize the best available information including, but not limited to, texts, reports and U.S. Environmental Protection Agency publications that contain research, test, and design information relevant to the applicant's proposal.

(b) The Department may disapprove new treatment methods if in its opinion such disapproval is in the interest of environmental protection.

7:14A-23.34 Closure requirements for wastewater treatment units

(a) This section applies to any and all wastewater and sludge facilities and equipment permanently removed from use or operation at NJPDES permitted facilities or at facilities for which a NJPDES permit has been revoked or an application for renewal denied, unless a judicial or administrative stay is in effect. The intent of this section is to protect public safety and health and to assure that no contamination of ground or surface water will occur as a result of removing such facilities and equipment from service either through the act of closure or through continuing the discharge of pollutants into or through equipment; or through leaking, leaching, or discharge of pollutants from wastewater or residuals remaining in facilities or equipment which has been removed from use but remains on site.

(b) The closure of a wastewater treatment facility or equipment means either the termination of the source of wastewater or sludge, or the permitted conveyance of wastewater or sludge to an alternate location (such as a regional facility) in such a manner that no further treatment storage or conveyance of wastewater or sludge is performed by the facility.

(c) Wastewater treatment works closures shall conform with the following procedures:

1. On or before 60 calendar days prior to taking the facility or certain operating equipment out of service a permittee shall:
   i. Submit to the Division of Water Quality's Watershed Permitting Element the following information concerning closure activities:
      (1) The date the facility will cease operation or the date that discharge to specific operating equipment will cease;
      (2) The date the influent and effluent pipes will be sealed;
      (3) Plans (signed and sealed by a New Jersey licensed professional engineer) for final disposition of the physical facilities, including all treatment units, outfall line, and all mechanical and electrical equipment and piping;
      (4) Plans (signed and sealed by a New Jersey licensed professional engineer) for elimination of all equipment and/or conditions that could possibly pose a safety hazard, either during or after shut-down of operations;
      (5) Verification that there are no lines in the collection system which are cross connected (receiving both sanitary and stormwater) or which do not contain adequate conveyance capacity as defined in N.J.A.C. 7:14A-1.9;
      (6) The name of the licensed individual responsible for the maintenance and operation of the wastewater pumping station and/or wastewater collection or treatment systems that are still to be maintained; and
      (7) Proof of a request to the Water Compliance and Enforcement Element for a site inspection to verify cessation of the discharge. The Water Compliance and Enforcement Element may be contacted by writing to:
         Administrator
         Water Compliance and Enforcement Element
         PO Box 422
         Trenton, New Jersey 08625-0422; and
   ii. Notify the Division of Water Quality's Watershed Permitting Element, in writing, concerning any deactivated lagoons or other actual or potential discharges to ground water which may exist at the site. TheWatershed Permitting Element may be contacted by writing to:
      Assistant Director
      Watershed Permitting Element
      PO Box 029
      Trenton, New Jersey 08625-0029

2. Proper management and/or removal of all residual materials (collected grit and screenings, scums, sand bed material, and dried or liquid sludges), as well as filter

media, and all other solids from the treatment process that may remain in the abandoned treatment works is required.

i. The permittee shall submit to Watershed Permitting Element proof of ownership of or contractual arrangement with an operation or operations permitted to manage all such waste materials. A contract with a hauler will only be accepted as proof of proper waste management if documentation of management at an approved site or sites is included. In addition, all necessary State or Federal permits/approvals must accompany the submission.

ii. Sludge quality assurance reports which are representative of the sludge removed following closure shall be submitted. Where quality information is not available, new samples shall be obtained and analyzed upon closure. All sludge samples and analyses shall be prepared in accordance with the Sludge Quality Assurance Regulations, N.J.A.C. 7:14C.

iii. All residual material shall be removed within 180 calendar days after the facility is taken out of service. Proof of proper residuals management shall be submitted to the Watershed Permitting Element within 30 calendar days after their removal. The dates of removal and quantities removed shall be specified.

3. Upon completion of closure activities, a permittee must complete a "Certification of Closure" form (form can be obtained by contacting the Water Compliance and Enforcement Element) which will provide certification that all waste materials have been properly managed, and that the remaining components of the facility have been properly secured regarding public health and safety. This form shall be completed after closure activities cease, signed in the presence of a Notary Public, and submitted to the Watershed Permitting Element. Incomplete Certifications of Closure are unacceptable and will be returned to the permittee.

(d) Upon satisfaction of closure requirements specified in (c) above, the Water Compliance and Enforcement Element shall be contacted, in writing, to schedule a final site inspection of any treatment works which had a NJPDES discharge permit to verify that influent and effluent pipes have been sealed and that all solid and residual materials related to the treatment process have been removed.

(e) Upon satisfactory completion of the items specified in (c) and (d) above, an "Application for Termination" (application may be obtained from the Division of Water Quality or the Water Compliance and Enforcement Element) from the New Jersey Pollutant Discharge Elimination System shall be completed and submitted to the Division of Water Quality, Bureau of Permit Management with a copy to the appropriate permitting bureau. The application form includes information concerning the facility, its NJPDES permit number, the nature of the discharge, and a certification to the effect that the closure has been performed in accordance with all submissions made to the Department. Applications received before completion of items (c)1 through 3 above, shall not be processed and shall be returned for resubmission upon satisfactory completion of all closure requirements by the permittee.