Navajo Nation
Domestic Wastewater Regulations

Navajo Nation Environmental Protection Agency
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NAVAJO NATION
DOMESTIC WASTEWATER REGULATIONS

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DOMESTIC WASTEWATER REGULATIONS

PART I
GENERAL PROVISIONS

§ 101. Title

These regulations may be cited as the Navajo Nation Domestic Wastewater Regulations ("NNDWWR").

§ 102. Authority

These regulations are adopted pursuant to the Watershed Protection Program established in Subchapter 8 of the Navajo Nation Clean Water Act ("NNCWA"). This statute authorizes the Navajo Nation Environmental Protection Agency ("NNEPA") to "develop a program to protect surface and ground water from pollution on a watershed basis, taking into account impacts on water quality from a variety of sources and considering cumulative impacts as well as discrete instances of contamination." 4 N.N.C. § 1371 (NNWCA § 801).

§ 103. Effective Date

These regulations shall be effective upon formal approval by the Navajo Nation Resources Committee.

§ 104. Purpose

These regulations seek to promote the health and welfare of the Navajo people and to protect the environment by establishing a design review and permitting program for the construction, installation, alteration, repair, extension, operation, and maintenance of domestic wastewater treatment systems.

§ 105. Applicability

These regulations shall apply to all domestic wastewater treatment systems serving homes, communities, businesses, institutions and other establishments that are served by public water systems within the jurisdiction of NNEPA. In addition, these regulations shall apply to on-site wastewater treatment systems that are not served by a public water system, but are instead located within a delineated wellhead protection area pursuant to the Navajo Nation Primary Drinking Water Regulations, Part XVII, Wellhead Protection Regulations.

§ 106. Definitions

A. For purposes of these regulations:

1. “Administrator” means the Administrator of the U.S. Environmental Protection Agency.

2. “Absorption area” means the area in square feet of infiltrative surface in an absorption system.

3. “Absorption bed” means an absorption system consisting of a covered, gravel-filled bed into which septic tank effluent is discharged through specially-designed distribution pipes for seepage into the soil.

4. “Absorption system” means a device constructed to receive and to distribute effluent such that the effluent is effectively filtered and retained below ground surface.

5. “Absorption trench” means standard trenches, shallow trenches with capping fill, and chambered trenches, all constructed to receive and to distribute effluent such that the effluent is effectively filtered and retained below ground surface.

6. “Aggregate” means a clean graded hard rock, volcanic rock, or gravel of uniform size, between ¾ inch and 2½ inches in diameter, offering thirty percent (30%) or more void space, washed or prepared to be free of fine materials that would impair absorption surface performance, and having a hardness value of three or greater on the Mohs scale of mineral hardness (can scratch a copper penny).

7. “ASTM” means ASTM International, originally known as the American Society for Testing and Materials), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken PA, 19428-2959.

8. “Bedrock” means the more or less solid, undisturbed rock in place either at the ground surface or beneath surficial deposits of gravel, sand or soil; or a consolidated rock formation of impervious material that may exhibit jointed, fractured, or deteriorated characteristics; or the R horizon of a soil profile as defined in U.S. Department of Agriculture soil survey manuals.

9. “Bedroom” means any portion of a dwelling which is so designed as to furnish the minimum isolation necessary for use as a sleeping area. It may include, but is not limited to, a den, study, sewing room, sleeping loft, or enclosed porch. Unfinished basements shall be counted as a minimum of one additional bedroom.

10. “BOD_5,” or the “5-day biochemical oxygen demand,” means the amount of oxygen required to stabilize biodegradable organic matter under aerobic conditions within a 5-day period in accordance with the Standard Methods for the Examination of Water and Wastewater. “Total 5-day biochemical oxygen demand” (“$TBOD_5$”) is equivalent to BOD_5 and is sometimes used in order to differentiate carbonaceous plus nitrogenous oxygen demand from strictly carbonaceous oxygen demand, or $CBOD_5$.

11. “Building sewer” means the pipe that carries wastewater from the building drain to a

public sewer, an on-site wastewater system, or other point of disposal. It is synonymous with "house sewer."

12. "$CBOD_5$," or the "carbonaceous 5-day biochemical oxygen demand" means BOD_5 less the nitrogenous oxygen demand of the wastewater.

13. "Cesspool" means a drywell with an open bottom and/or perforated sides that receive untreated wastewater.

14. "Chapter," when used with reference to a governmental unit, means those community organizations duly certified and recognized as such by the Navajo Nation Council Resolution in CAP-34-98, which enacted the Navajo Nation Local Governance Act.

15. "Clean Water Act" ("CWA") means the Federal Water Pollution Control Act of 1972, as amended, 33 U.S.C. § 1251 *et seq*.

16. "Condominium" means the ownership of a single unit in a multi-unit residential development, together with a common interest (along with the development's other owners) in the common areas and facilities of the development.

17. "Conventional system" means an onsite wastewater system consisting of a building sewer, a septic tank, and an absorption system.

18. "Design flow" means the daily flow rate a wastewater system or its components are designed to accommodate on a sustained basis while satisfying all applicable requirements. Design flow either incorporates or is used together with appropriate peaking and safety factors to ensure sustained and reliable operations.

19. "Director" means the Executive Director of NNEPA or his/her designee or authorized representative.

20. "Disinfection" means the process of destroying pathogenic and other microorganisms in wastewater, typically through application of chlorine compounds, ultraviolet light, iodine, ozone, and the like.

21. "Disposal Area" means the entire area used for the subsurface treatment and dispersion of septic tank effluent by an absorption system.

22. "Distribution box" means a watertight structure that receives septic tank effluent and distributes it concurrently, in essentially equal portions, into two or more distribution pipes leading to an absorption system.

23. "Distribution pipe" means an approved perforated pipe used to disperse septic tank effluent into an absorption system.

24. "Domestic septage" means the semi-liquid material which is pumped from septic

tanks receiving domestic wastewater. It consists of the sludge, the liquid, and the scum layer of the septic tank.

25. "Domestic wastewater" means a combination of water-carried wastes from residences, commercial buildings, institutions, and other establishments with installed plumbing, which has originated from activities such as restroom usage, washing, bathing, food preparation, and laundry. Domestic wastewater is synonymous with the term "sewage." For the purpose of these regulations, "wastewater" shall mean domestic wastewater unless specified otherwise.

26. "Drainage system" means all the piping within public or private premises that conveys domestic wastewater to a legal point of treatment and disposal.

27. "Drop box" means a watertight structure that receives septic tank effluent and distributes it into one or more distribution pipes, or into an overflow leading to another drop box and absorption system located at a lower elevation.

28. "Drywell" means a well, other than an improved sinkhole or subsurface fluid distribution system, that is completed above the water table so that its bottom and sides are typically dry except when receiving fluids.

29. "Dwelling" means any structure, building, or any portion thereof that is used, intended, or designed to be occupied for human living purposes, including, but not limited to, houses, mobile homes, hotels, motels, apartments, businesses, and industrial establishments.

30. "Earth fill" means excavated or otherwise disturbed soil, suitable for embankment construction, that is imported and placed over the native soil. It is characterized by its lack of distinct horizons or color patterns, as found in naturally developed undisturbed soils.

31. "Effluent lift pump" means a pump used to elevate septic tank effluent to a disposal area at a higher elevation than the septic tank itself.

32. "Ejector pump" means a device to elevate or pump untreated sewage to a septic tank, public sewer, or other means of disposal.

33. "Existing domestic wastewater system" means a domestic wastewater disposal system in operation on the effective date of these regulations or, for purposes of compliance with a revised NNDWWR, on the effective date of the revision.

34. "Freeboard" means the vertical distance from the highest water level in a sewage lagoon to the top of the lagoon's side berm or dike.

35. "Groundwater" means subsurface water in the zone of soil saturation.

36. “Groundwater table” means the surface of a body of unconfined groundwater in which the pressure is equal to that of the atmosphere.

37. “Groundwater table, perched” means unconfined groundwater separated from an underlying body of groundwater by an unsaturated zone (perching bed), which constitutes a restrictive strata or impervious layer. Perched groundwater may either be permanent, where recharge is frequent enough to maintain a saturated zone above the perching bed, or temporary, where intermittent recharge is not great or frequent enough to prevent the perched water from disappearing from time to time as a result of drainage over the edge of (or through) the perching bed.

38. “Holding tank” means a non-discharging watertight tank designed to receive and retain wastewater for periodic pumping and disposal off-site.

39. “Household hazardous waste” means a wide range of household products having the characteristics of hazardous waste when discarded and the potential to disrupt wastewater treatment systems, including but not limited to pesticides and herbicides; oil-based paints and stains; automobile fluids (antifreeze, motor oil, and gasoline, and transmission, steering, and brake fluids); and pool, hobby, and darkroom chemicals.

40. “Impervious strata” means a layer of earth that prevents or slows water or root penetration and has a percolation rate greater than sixty (60) minutes per inch.

41. “Invert” means the lowest portion of the internal cross-section of a pipe or fitting.

42. “Lateral” means a secondary pipeline branching directly from a main pipeline.

43. “Leachate” means water that collects contaminants as it trickles through wastes.

44. “Liner” means a manufactured or naturally-occurring substance that restricts seepage to fewer than 550 gallons per acre per day.

45. “Liquid capacity” means the volume of liquid that a septic tank or treatment unit can hold as measured from the invert of the outlet. This volume is calculated by multiplying the tank’s inside length by its inside width by its depth (as measured from the invert of the outlet to the floor of the tank) and converting the resulting product to gallons.

46. “Load” or “loading” means:

    a. in the context of a biological or chemical load, the amount of material applied to a treatment unit per unit area or unit volume; or
    b. in the context of a structural load, the force applied to a treatment unit per unit of surface area.

47. “Lot” means a portion of a subdivision, or any other parcel of land, including a home

site lease or business site lease, intended as a unit for transfer of ownership or for development, or both, and excluding any part of the right-of-way of a street or road.

48. "Malfunctioning system" or "failing system" means a domestic wastewater system that is not functioning in compliance with these regulations and includes, but is not limited to:

    a. absorption systems that seep or flow to the surface of the ground or into waters of the Navajo Nation;

    b. systems that are overflowing from any of their components;

    c. systems that, due to failure to operate in accordance with their designed operations, cause backflow into any portion of a building's plumbing;

    d. systems discharging effluent that does not comply with applicable effluent discharge standards; and

    e. leaking septic tanks.

49. "Maximum groundwater table" means the highest elevation that the top of the "groundwater table" or "groundwater table, perched" is expected to reach, for any reason, over the full operating life of the on-site wastewater system at that site.

50. "Municipal wastewater treatment facility" means a publicly-owned treatment works ("POTW") that treats domestic wastewater, as defined below.

51. "National Pollutant Discharge Elimination System" ("NPDES") means the regulatory program operated under CWA §§ 307, 318, 402, and 405 (including pretreatment and sludge management) and under Subchapters 3, 4, and 5 of the NNCWA.

52. "Navajo Nation" or "Nation" means:

    a. when referring to the body politic, except as the context may otherwise require, the same meaning as set forth in 1 N.N.C. § 501; or

    b. when referring to territorial jurisdiction, all lands and waters within the territorial boundaries of the Navajo Nation, including:

        i. all lands and waters within the exterior boundaries of the Navajo Indian Reservation or of the Eastern Navajo Agency or within the boundaries of Navajo dependent Indian communities, including all lands within the boundaries of Navajo chapter governments, all without regard to the nature of title thereto;

        ii. all lands and waters held in trust by the United States, or restricted by the

United States, or otherwise set apart under the superintendence of the United States, for the use of the Navajo Nation, the Navajo Tribe, any Band of Navajo Indians, or any individual Navajo Indians as such; and

iii. all other lands and waters over which the Navajo Nation may exercise governmental jurisdiction in accordance with federal or international law.

53. "Navajo Nation Clean Water Act" ("NNCWA"), 4 N.N.C. § 1301 *et seq.*, means the statute enacted by the Navajo Nation Council to prevent, reduce, and eliminate pollution of the waters of the Navajo Nation.

54. "Navajo Nation Environmental Protection Agency" ("NNEPA") means the environmental regulatory agency of the Navajo Nation government, established by the Navajo Nation Council and charged with protecting human health, welfare, and the environment of the Navajo Nation.

55. "Navajo Nation Primary Drinking Water Regulations" ("NNPDWR") means those regulations adopted pursuant to the Navajo Nation Safe Drinking Water Act for the purpose of establishing appropriate water quality standards to ensure that Navajo drinking water is safe for human consumption.

56. "Navajo Nation Safe Drinking Water Act" ("NNSDWA"), 22 N.N.C. § 2501 *et seq.*, means the statute enacted by the Navajo Nation Council to ensure that drinking water is safe for human consumption and to protect underground sources of drinking water from potential contamination by underground injection activities.

57. "Non-domestic wastewater" means process wastewater originating from the manufacture of specific products. Because contaminants in such wastewater are usually more concentrated and more variable in content and rate than contaminants in domestic wastewater, non-domestic wastewater requires more extensive or different treatment than domestic wastewater.

58. "Non-public water source" means a culinary water source that is not defined as a public water source.

59. "On-site wastewater treatment system" means a conventional septic tank system or alternative system installed at a site to treat and dispose of domestic wastewater and which is not designed to serve multiple dwelling units owned by separate individuals (except condominiums). An on-site wastewater treatment system usually consists of a building sewer, a septic tank, and an absorption system.

60. "Percolation rate" means the time expressed in minutes per inch required for water to seep into saturated soil at a constant rate during a percolation test.

61. "Percolation test" means the method used to measure the percolation rate of water into soil as described in these rules.

62. “Permeability” means the rate at which a soil, when saturated, transmits water.

63. “Permit” means written approval from NNEPA to construct, install, modify, or operate a wastewater treatment system.

64. “Permittee” means any owner or operator of a permitted wastewater treatment system.

65. “Person” means the Navajo Nation or any agency, entity or institution thereof, any chapter, township, political subdivision, public or private corporation, individual, partnership, association, federal agency, state, Indian Tribe, any interstate or intertribal body, municipality, commission or political subdivision of a state, or other entity, and includes any officer or governing or managing body of any chapter, township, political subdivision, or public or private corporation.

66. “Pollution” means any manmade or man-induced alteration of the chemical, physical, biological, or radiological integrity of any waters of the Navajo Nation, unless the alteration is necessary for public health and safety.

67. “Pollutant” means “waste,” as defined below.

68. “Pretreatment” means reduction of the amount of pollutants, elimination of pollutants, or alteration of pollutant properties in wastewater before or instead of discharging or otherwise introducing pollutants into a publicly-owned treatment works.

69. “Pretreatment program” means the program operated by NNEPA or any POTW, whose program has been approved either by the Director or the Administrator, to implement national pretreatment standards to control pollutants which pass through or interfere with treatment processes in a POTW or which may contaminate sewage sludge.

70. “Primary treatment” means the first stage of wastewater treatment, which removes settleable or floating solids. The primary treatment units may include screens, a grit chamber, and/or a sedimentation tank.

71. “Public health hazard” means a condition characterized by the presence of sufficient types and amounts of biological, chemical, or physical agents relating to water or sewage to be likely to cause human illness, disorders, or disability. Such agents include, but are not limited to, pathogenic viruses and bacteria, parasites, toxic chemicals, and radioactive isotopes. A malfunctioning on-site wastewater system constitutes a public health hazard.

72. “Publicly owned treatment works” (“POTW”) means any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature that is owned by the Navajo Nation, its political subdivisions

or entities, or a state, municipality, or other tribe. The term does not include any POTW owned or operated by the United States.

73. "Public water source" means a water source connected to a public water system.

74. "Public water system" means a "public water system" as defined in NNPDWR § 104.

75. "Public Water Systems Supervision Program" ("PWSSP") means the NNEPA program that is responsible under the NNSDWA for regulating public water systems within the Navajo Nation.

76. "Replacement area" means sufficient land with suitable soil, excluding streets, roads, and permanent structures, that complies with the setback requirements of these regulations and is intended for the complete replacement of an absorption system.

77. "Restrictive layer" means a soil layer that because of its structure or low permeability does not allow water entering from above to pass through the soil layer as rapidly as it accumulates. During some part of every year, a restrictive layer is likely to have a perched groundwater table temporarily accumulated above it.

78. "Schedule of compliance" or "compliance schedule" means a schedule of remedial measures, including an enforceable sequence of actions or operations leading to compliance with these regulations.

79. "Scum" means a mass of sewage solids floating on the surface of wastewater in a septic tank, which is buoyed by entrained gas, grease, or other substances.

80. "Seasonal high groundwater table" means the free surface representing the highest point of groundwater rise within an aquifer due to seasonal changes in the water table over a year.

81. "Secondary treatment" means the second stage of wastewater treatment, following the primary treatment, which converts dissolved and suspended pollutants into a form more readily separated from water and thereby produces a highly treated effluent meeting the requirements of these regulations. Secondary treatments may utilize biological treatment processes such as activated sludge or trickling filter.

82. "Seepage pit" means an absorption system consisting of a covered pit into which septic tank effluent is discharged.

83. "Septic tank" means a watertight receptacle which receives the discharge of a sewer system or a part thereof, designed and constructed so as to retain solids, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside the tank through an absorption system meeting the requirements of these regulations.

84. “Septic tank effluent” means partially treated sewage which is discharged from a septic tank.

85. “Setback” means the minimum horizontal distance to be maintained between a feature of a domestic wastewater system and a potential point of impact.

86. “Sewage” means domestic wastewater, as defined above.

87. “Sewage holding tank” means a watertight receptacle which receives water-carried wastes from the discharge of a sewage system and retains such wastes until their removal and subsequent disposal at an approved site or wastewater treatment system.

88. “Sewage sludge” means solid, semi-solid, or liquid residues generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solid removed in primary, secondary, or tertiary wastewater treatment processes; and material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator, or grit and screenings generated during the preliminary treatment of domestic sewage in a treatment works.

89. “Sewer system” means the same as “wastewater collection and conveyance system,” as defined below.

90. “Shall” means required.

91. “Should” means recommended or preferred.

92. “Single-family dwelling” means a building, together with accessory buildings, that is designed to be used as a home by the owner or lessee of such building and that is located on a lot that contains no other dwellings.

93. “Sludge” means accumulated solids which have settled in a septic tank, a sewage holding tank, a wastewater lagoon, or a treatment unit.

94. “Soil exploration pit” means an open pit dug to permit examination of the soil to evaluate its suitability for an absorption system.

95. “Standard trench” means an absorption system consisting of a series of covered, gravel-filled trenches into which septic tank effluent is discharged, through specially designed distribution pipes, for seepage into the soil.

96. “Storm water” means storm water runoff, snowmelt runoff, and surface runoff and drainage.

97. “Substantial modification” means a modification to a wastewater treatment system

that changes its capacity or hydraulic condition, the operation of treatment units, the wastewater treatment process, or the quality of the treated wastewater (effluent).

98. "Tertiary treatment" means advanced treatment beyond secondary treatment, including but not limited to filtration; removal of nutrients (nitrogen and phosphorus), toxic chemicals or metals; the addition of chlorine; and oxygenation.

99. "Total suspended solids" ("TSS") means the measurable component of solid matter suspended in water or wastewater.

100. "Treatment unit" means a component or unit of a wastewater treatment system that represents a distinct process(es) of treatment. Examples of treatment units include but are not limited to sedimentation, aeration, trickling filters, chlorination, wastewater lagoons, absorption systems, and septic tanks.

101. "Treatment works" means a plant, device, unit process, or other works, regardless of ownership, used for treating, stabilizing, or holding domestic wastewater in a wastewater treatment facility or on-site wastewater treatment system.

102. "Uniform Rules" means the NNEPA Uniform Regulations for Permit Review, Administrative Enforcement Orders, Hearings, and Rulemaking under Navajo Nation Environmental Acts.

103. "Waste" or "pollutant" means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

104. "Wastewater" means "domestic wastewater."

105. "Wastewater collection and conveyance system" means a system of pipelines, conduits, manholes, pumping stations, force mains, and all other structures, devices, and appurtenances that collect, contain, and convey domestic wastewater from its sources to the entry of a wastewater treatment facility or an on-site wastewater treatment system.

106. "Wastewater lagoon" means a surface impoundment made by excavation or earth fill for biological treatment of wastewater.

107. "Wastewater lagoon system" means a wastewater treatment facility consisting of a number of wastewater lagoons (normally three or more) connected in series.

108. "Wastewater treatment facility" means a plant or system for domestic wastewater treatment and disposal that consists of treatment works, disposal works and appurtenant pipelines, conduits, pumping stations, and related subsystems and

devices. A wastewater treatment facility includes a municipal wastewater treatment facility and a wastewater lagoon system, but does not include any on-site wastewater treatment system or any components of a wastewater collection and conveyance system.

109. "Wastewater treatment system" means a wastewater treatment facility, a wastewater collection and conveyance system, and/or an on-site wastewater treatment system.

110. "Waters of the Navajo Nation" means all surface waters, including but not limited to portions of rivers, streams (including perennial, intermittent, and ephemeral streams and their tributaries), lakes, ponds, dry washes, marshes, waterways, wetlands, mudflats, sandflats, sloughs, prairie potholes, wet meadows, playa lakes, impoundments, riparian areas, springs, and all other bodies or accumulations of water, surface, natural or artificial, public or private, including those dry during part of the year, that are within or border the Navajo Nation. Consistent with federal requirements, the Director may exclude from waters of the Navajo Nation certain waste treatment systems.

111. "Wetlands" means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

§ 107. Siting Requirements; Responsible Agency

A. Before a person may enter into a financial commitment for or initiate construction of a new wastewater treatment system, or undertake a substantial modification to an existing wastewater treatment system, s/he shall notify the Director, comply with these regulations, and to the extent practicable avoid locating part or all of the new or modified system at a site that is:

1. Subject to a significant risk from earthquakes, floods, fires, or other disasters which could cause a breakdown of the domestic wastewater disposal system or any portion thereof; or

2. Within the hundred-year floodplain.

B. Permits to construct and/or operate a domestic wastewater treatment system may be obtained from the Domestic Wastewater Program of the NNEPA Surface and Ground Water Protection Department.

§ 108. Variances and Exemptions

(Reserved.)

§ 109. Confidentiality of Business Information

(Reserved.)

§ 110. Enforcement; Administrative Procedures

Enforcement of these regulations shall be governed by the provisions of Subchapter 9 of the NNCWA. Permit procedures, hearings, administrative orders, and other administrative procedures shall be governed by the Uniform Rules.

§ 111. Judicial Review

Issuance of a construction permit pursuant to Section 201 and an operating permit pursuant to Section 301 are final agency actions for purposes of 4 N.N.C. § 1392 (NNCWA § 1002) and §§ 212(b) and 214 of the Uniform Rules.

§ 112. Severability

If any provision of these regulations or the application thereof to any person or circumstance is held invalid, the remainder of these regulations, and the application of such provision to other persons or circumstances, shall remain unaffected, and to this end the provisions of these regulations are declared to be severable.

§ 113. No Waiver of Sovereign Immunity

These regulations shall not constitute a waiver of sovereign immunity. NNEPA assumes no liability for domestic wastewater disposal system malfunction or underperformance. NNEPA only prescribes minimum design requirements, which shall not diminish the duty of owners and operators to comply with applicable statutes, regulations and industry standards, and to provide adequate system design, construction, operation, maintenance, and performance.

PART II
CONSTRUCTION PERMIT PROVISIONS

§ 201. General Requirements

A. Prior to the construction or installation of a new wastewater treatment system, or a substantial modification to an existing wastewater treatment system, an application for a construction permit shall be made to, and a construction permit obtained from, the Director. The Director shall review the application, taking into consideration the Minimum Design Requirements of Part IV of these regulations, and issue a permit according to the procedures outlined in Subpart 2 of the Uniform Rules. Failure to obtain a construction permit is a violation of the NNCWA and is subject to an enforcement action by the Director pursuant to Subchapter 9 of the NNCWA and Subpart 3 of the Uniform Rules.

B. Every sewer system shall be connected to a public sewer except when such sewer is not available or practical for use, in which case an on-site wastewater treatment system may be considered.

C. No surface runoff shall be discharged into any portion of a wastewater treatment system. Non-domestic wastes such as chemicals or paints and other substances, including household hazardous wastes, that are detrimental to the proper functioning of a wastewater treatment system, shall not be disposed of therein.

D. Effluent from any on-site wastewater system shall not be discharged to surface waters or upon the surface of the ground. Sewage shall not be discharged into any abandoned or unused well, or into any crevice, sinkhole, or similar opening, either natural or artificial.

E. When a wastewater treatment system is found by the Director to create or contribute to a public health hazard, to violate any provision of the NNCWA, or to deviate significantly from the construction plans or construction and material specifications approved by the Director, the Director may order the owner or operator to take the action necessary to correct or eliminate the hazardous condition or to otherwise bring the wastewater treatment system into compliance with the NNCWA and these regulations. The necessary action may include physical upgrades to meet the Minimum Design Requirements of Part IV of these regulations, as provided in Section 401(A).

F. Upon closing an on-site wastewater treatment system, the owner must provide written notification to the Director within thirty (30) days of closure, per Section 407(G). When a wastewater treatment facility is closed, a closure plan must be submitted to the Director, and his or her approval obtained, before any work begins in the field. Closure of a wastewater lagoon system must meet the requirements of Section 406(K).

§ 202. Construction Permit Requirements

A. An application for a construction permit for a proposed wastewater treatment system or proposed substantial modification to a wastewater treatment system shall include, but is not limited to, the materials listed immediately below. Documents prepared with the aid of a computer shall be submitted in both printed form and electronic form such as portable document format (PDF) or other format acceptable to the Director. Any application not containing the requisite materials will be rejected. The requisite materials are:

1. an application form, to be obtained from the Director and completed;

2. the appropriate fee, as determined by the Director, and submitted by certified or cashier's check or money order;

3. two (2) sets of construction plans, as required in Section 204;

4. two (2) sets of material and construction specifications, as required in Section 205;

5. two (2) copies of engineering reports, as required in Section 206;

6. a copy of any recordation of a right-of-way or easement;

7. a copy of the operation and maintenance manual, as required in Section 303(A); and

8. a copy of any operation and maintenance agreement between the applicant and the customer for an on-site wastewater treatment system, if the ownership and maintenance responsibility for the system will be transferred to the customer after construction.

B. The Director shall review the application package for the adequacy of the proposed design and construction of the system and shall, if necessary, mandate such changes as are required by these regulations. When the Director is satisfied that the plans and specifications are adequate for the conditions under which the proposed wastewater treatment system is to be installed and operated, a construction permit shall be issued to the owner. Construction shall not commence until the construction permit is issued by the Director.

C. Any deviation from the plans and specifications approved by the Director that could change the hydraulic conditions and operation of the wastewater treatment system must be approved by the Director prior to making such deviation in the field. Noncompliance with this requirement is grounds for permit revocation pursuant to Uniform Rules § 204.

D. Before a construction permit may be issued for a new wastewater treatment system, the applicant shall demonstrate to the satisfaction of the Director that it has the financial, managerial and technical capacity to comply with the NNCWA and all applicable NNEPA regulations. Moreover, the applicant must have an agreement in place with the

customer for maintenance of an on-site wastewater treatment system, per an approved operation and maintenance manual, if the ownership and maintenance responsibility of the on-site wastewater treatment system will be transferred to the customer following construction.

E. If the wastewater treatment system discharges into the waters of the Navajo Nation, a NPDES permit must be obtained. If it involves land application, a No Discharge permit must be obtained before a construction permit may be issued. If a wastewater treatment system involves septage transport, it must meet the requirements for the use and disposal of sewage sludge developed pursuant to Subchapter 4 of the NNCWA and any regulations promulgated thereunder.

F. A construction permit shall be valid for three (3) years from the date of issuance, unless an extension is obtained through permit modification pursuant to Uniform Rules § 204.

G. An application for an extension of time to complete construction must be submitted at least thirty (30) days prior to expiration of the construction permit. The responsible engineer must apply for the permit extension. If a permit extension is not obtained from the Director within thirty (30) days after the date of submittal of the application for the extension, all construction must terminate at the end of the permit term until further notice from the Director.

§ 203. Exemptions from the Requirement to Obtain a Construction Permit

A construction permit shall not be required for the following activities:

1. Installation of a service connection, if:

   a. the connection is dedicated for a single customer;

   b. the customer consists of a single-family dwelling or a single building, which may contain multiple-family dwellings, but is not a shopping mall or a multiple-building complex; and,

   c. the sewer line serving the customer does not pass by a potential customer located between the connection and the customer to be served.

2. Operation and maintenance activities, including:

   a. repair of a sewer line leak;

   b. replacement of existing deteriorated pipeline with new pipeline of the same size;

   c. routine cleaning and maintenance of a sewer system; and

   d. replacement of equipment with equipment of the same type, size, and rated

capacity.

§ 204. Construction Plans

A professional engineer licensed in Arizona, New Mexico, or Utah, and qualified in civil engineering design and construction, shall prepare construction plans as described below. Illegible, mutilated, or poorly prepared plans are not acceptable and will not be reviewed. Documents prepared with the aid of computer shall be submitted in both printed form and electronic form, such as portable document format (PDF) or other format acceptable to the Director. All construction plans shall comply with the requirements set forth in subsections (A)-(D) of this section.

A. Quality: Construction drawings and maps shall be made from actual field or photogrammetric surveys and shall be drawn on sheets no larger than thirty (30) inches by forty-two (42) inches. The scale(s) used on the drawings may vary according to the space available to show clearly all the necessary data, but shall be such that the drawings are legible when photocopied onto sheets eleven (11) inches by seventeen (17) inches. The plan sheets shall be numbered sequentially with the first sheet being sheet number one and the last sheet number equal to the total number of sheets. Each sheet shall have the responsible engineer's seal and signature. The cardinal direction of north shall be shown where appropriate.

B. Title Sheet: The first sheet of a set of construction plans is the title sheet. The title sheet shall contain the following information, as appropriate:

1. name of the project;

2. name of the utility or owner, and complete contact information;

3. a vicinity map of sufficient size and scale to locate the project within its immediate area;

4. a summary of the scope of the project;

5. the name of the responsible engineer, and complete contact information; and

6. the signed certification of the responsible engineer that the plans were prepared by him or her, or under his or her direct supervision.

C. Site Topography: A detailed topographical map of the project site shall be provided, showing the arrangement of the present or planned wastewater treatment system and both the original and final grades for the site, with a contour interval not greater than two (2) feet. Elevations shall be based on North American Vertical Datum 1988 or a more recent adjustment.

D. Design Details: Detailed information for the various construction features of the

wastewater treatment system shall be provided, including a plan view, elevations, cross-sections, and profiles. The construction plans shall include the following items as appropriate:

1. plans and profiles for all sewer lines, manholes, force mains, and lift stations in a horizontal scale of not more than one hundred (100) feet to the inch and a vertical scale of not more than ten (10) feet to the inch, with both scales clearly indicated;

2. plans and cross-sections showing construction details and elevations of key components of the wastewater collection and conveyance system;

3. elevation drawings of structures showing the hundred-year flood plain or the highest flood elevation if the hundred-year flood plain has not been defined;

4. location and dimensions of the various components of the wastewater treatment system, including setback distances;

5. location of soil exploration pit(s), boreholes, and percolation test holes;

6. location of building sewer and water service lines;

7. location and size of existing sewer mains;

8. location of streams, ditches, watercourses, ponds, subsurface drains, etc. in the vicinity of the wastewater treatment system; and

9. location of easement and/or right-of-way and identification of any physical or political boundaries within the area to be served.

E. For an on-site wastewater treatment system, the construction plans shall include the following additional information, as appropriate:

1. lot size and dimensions;

2. location and dimensions of driveways, roadways, parking, and other paved areas;

3. type of dwelling, number of bedrooms, and estimated number of occupants;

4. location, dimensions, and capacities of the essential components of the system;

5. location, type, and depth of all existing and proposed nonpublic water supply sources within two hundred (200) feet of the proposed on-site wastewater treatment system, and of all existing or proposed public water supply sources within one thousand (1000) feet of the proposed system; and

6. distance to the nearest public sewer, the size of that sewer, and whether it is

accessible by gravity.

F. For an absorption system, the construction plans shall include the following additional information, as appropriate:

1. plans and cross-sections showing the details and elevations of key components of the absorption system;

2. details of the distribution pipe, including its size, length, slope, spacing, and constituent material;

3. details of drop boxes or distribution boxes;

4. type and dimensions (including thickness) of filter materials, and their arrangements;

5. type and dimensions (including thickness) of the barrier separating the filter material from the backfill; and

6. location and dimensions of the replacement area.

§ 205. Construction and Material Specifications

A. Specifications shall be prepared for each proposed wastewater treatment system or proposed substantial modification to an existing system, which—in describing the anticipated methods of construction and the materials to be used—will supplement the construction drawings. Specifications must be clear and concise and include a detailed description of the methods of construction, quality and sizing of materials, and unit quantities, along with a detailed description of testing methods and quality control, construction supervision, and inspection procedures. A professional engineer licensed in Arizona, New Mexico, or Utah, and qualified in civil engineering shall prepare the specifications, as described below.

1. The title page of the specifications shall show the name of the project, the Navajo Nation Chapter and the county in which the project is located, and the responsible engineer's seal and signature.

2. Construction specifications shall include, but are not limited to, the following information:

a. a detailed plan for maintaining the normal operations of any existing facilities during construction, with minimal interruption of service;

b. laying methods and conditions, including depth of cover, type of bedding, reaction blocking for sewer mains, and structural considerations and construction details for manholes;

c. pressure and leakage test procedures for new sewer mains, including the applicant's proposed method of determining maximum allowable leakage;

d. construction methods and procedures for specific treatment units, such as septic tanks, drain fields, and wastewater lagoons; and

e. construction methods and procedures for chemical feeding, pump, flow measurement and other devices, if applicable.

3. Material specifications shall include, but are not limited to, the following information:

a. material specifications for all wastewater treatment equipment;

b. schedule and class of sewer main and all appurtenances, including approval status by testing and certification organizations;

c. make, model, horsepower, and performance curve of all pumping equipment;

d. liner material for lined wastewater lagoons;

e. material specifications for septic tank, appurtenances, and absorption system materials; and

f. chemicals to be used for wastewater treatment together with usage information.

B. If a wastewater treatment system or professional engineering firm utilizes a set of standard construction and/or material specifications, such specifications may be submitted to the Director for approval. Following this approval, no construction or material specifications will be required for any future construction permit application for the same wastewater treatment system or for applications submitted by the same professional engineering firm, provided no changes are made to the standard specifications. If there are any additions, deletions, or revisions to the approved standard specifications for a particular application, the responsible engineer shall submit an addendum with the construction permit application covering only the changes, but if the changes are made to the standard specifications themselves, a complete revised copy of the standard specifications must be submitted for the Director's review and approval. Any responsible engineer who is using a set of standard construction and/or material specifications must place his or her seal and signature on the cover page for these specifications, pursuant to subsection (A)(1) of this section.

§ 206. Engineering Report

A. An engineering report containing all the information required to evaluate the safety and performance of the proposed design and construction of a new wastewater treatment system or substantial modification to an existing system shall be submitted with each application. It shall carry the seal and signature of a professional engineer licensed in

Arizona, New Mexico, or Utah and qualified in civil engineering design and construction. The engineering report shall have a title sheet comparable to that of the construction plans and construction and material specifications outlined in Sections 204(B) and 205(A)(1). The report shall include, but is not limited to, the following information which, when necessary to avoid duplication, may be provided by reference to documents already being submitted with the application, pursuant to Sections 202, 204, and 205:

1. General Information:

    a. name of the project owner and/or the utility responsible for the operation and maintenance of the wastewater treatment system, and complete contact information;

    b. name of the responsible professional engineer, and complete contact information;

    c. description of the project area and its surroundings (for example, location, terrain, zoning and current use, future development potential); and

    d. approval of proposed land use and development by the appropriate authority having jurisdiction, if required.

2. General Design Data:

    a. description of the project;

    b. number and type(s) of existing and proposed service connections;

    c. details (estimated and justified as necessary) of average daily and peak flows;

    d. physical, chemical, and biological characteristics of the wastewater;

    e. assumptions underlying design parameters and analyses, and their justification;

    f. detailed hydraulic analyses and the sizing of sewer pipes and appurtenances;

    g. minimum and maximum flow velocities; and

    h. pump design details.

3. Information Specific to Septic Tanks and Absorption Systems:

    a. septic tank capacity, material, dimensions, and other features, and the name and address of the manufacturer if the tank is to be commercially manufactured;

    b. design details of service connections, sewage pumps (if any), and discharge lines, including schedule, grade, type, pipe slope, and discharge capacity;

c. soil condition from soil exploration pits and boreholes, including soil logs prepared in accordance with the U.S. Department of Agriculture soil classification system;

d. present and highest anticipated groundwater table;

e. flooding potential for the area in which an on-site wastewater treatment system is located;

f. results of percolation tests, estimation of soil absorption rate, and calculation of absorption area; and

g. design details of the absorption system.

4. Information Specific to Wastewater Lagoon Systems:

a. results of geotechnical investigations, including but not limited to borehole logs, soil classification, groundwater level, permeability, percolation tests, compaction tests, and strength parameters;

b. estimated soil absorption rate, seepage rate, and evaporation rate, and the proposed size and arrangement of the wastewater lagoons, with explanation;

c. design of hydraulic and organic loading, and the operation and maintenance procedures to be followed when loading;

d. anticipated treatment efficiency, effect of effluent seepage into groundwater, and the physical, chemical and biological characteristics of that effluent;

e. embankment or dike design.

f. freeboard to be provided, with justification; and

g. liner properties and design details.

5. Information Specific to Wastewater Treatment Facilities:

a. projected maximum volume of wastewater to be treated and, for existing facilities, present operating capacity;

b. year when plant is expected to operate at its maximum capacity;

c. land available for the future expansion of the facility;

d. proposed or present treatment scheme shown in block diagram;

e. proposed or present design criteria (retention times, velocities, discharge rate, etc.);

f. quality of treated wastewater discharge;

g. for substantial modifications to an existing treatment facility, a detailed description of the effect of the proposed modification, including retention times and velocities; and

h. detailed description of any pilot testing to be performed.

§ 207. Notification of Commencement of Construction, and Inspections

The Director shall be notified at least seven (7) days before the beginning of construction on the site in order to timely schedule an inspection or inspections. The Director may inspect a construction site at any time to evaluate compliance with the approved construction plans and construction and material specifications pursuant to 4 N.N.C. § 1381 (NNCWA § 901(b)), and shall be given access to the site for that purpose.

§ 208. Approval of Construction

A. New wastewater treatment systems and substantial modifications to existing wastewater treatment systems shall not be placed into operation until the Director issues written approval of construction.

B. Upon completion of the permitted construction, the responsible engineer shall make arrangements with the Director for a final inspection. Prior to this inspection, the responsible engineer shall submit to the Director a letter certifying that the construction is complete in accordance with the approved plans and specifications. The letter must specifically identify the project by permit number. The following information, where applicable, shall be submitted as part of the responsible engineer's letter of certification:

1. as-built construction drawings;

2. results of lamp tests, pressure/leakage tests, and air tests conducted on sewer lines, manholes, lift stations, and septic tanks, and the results of pressure/leakage tests conducted on force mains;

3. results of field compaction tests conducted on earthwork;

4. results of liner tests;

5. a letter of acceptance from the relevant entity to be responsible for the operation and maintenance of the wastewater treatment facility; and

6. any information specified on the construction permit, or other pertinent information for the project.

C. If the project was not completed in accordance with the approved plans and specifications, the responsible engineer shall so state in the certification letter, shall describe any deviations from the project as permitted, and shall provide an explanation for all such deviations.

D. Issuance of a written approval of construction shall not be subject to separate permit issuance procedures under Subpart 2 of the Uniform Rules unless the Director finds in his or her sole discretion that a deviation from the project as permitted is significant enough to warrant public notice and comment.

E. Failure to obtain written approval of construction from the Director prior to placing into operation any new wastewater treatment system or a substantial modification to a wastewater treatment system is a violation of these regulations and is subject to an enforcement action by the Director pursuant to Subchapter 9 of the NNCWA and Subpart 3 of the Uniform Rules. A public water system may not serve a customer or customers of the new or substantially modified wastewater treatment system until the Director has issued his or her written approval of construction.

PART III
OPERATING PERMIT PROVISIONS

§ 301. General Requirements

A. Any new or substantially modified wastewater treatment system shall not be placed into operation until the Director issues an operating permit, which permit shall not be issued until written approval of construction has been secured by the permittee. A public water system may not serve the customer or customers of any new or substantially modified wastewater treatment system until the Director has issued an operating permit for the system.

B. Any existing wastewater treatment system shall apply for an operating permit from the Director within six (6) months of the effective date of these regulations. If an existing system has submitted a timely and complete application for an operating permit but the Director has not taken final action on the application, operation of the system without an operating permit shall not be considered a violation of these regulations. The system may be operated consistent with the information provided in the operating permit application. Existing systems shall not operate, however:

1. in violation of any provision of the NNCWA or implementing regulations; or

2. in such a manner as to contribute to or constitute a public health hazard.

In addition, no substantial modification to an existing system may be constructed or operated without the required permits, as provided in Section 201 and subsection (A) of this section.

C. Application for an operating permit is made by filing the appropriate application form, together with the appropriate fee in the form of a certified or cashier's check or money order, with the Domestic Wastewater Program of the NNEPA Surface and Ground Water Protection Department. The application form and fee schedule may be obtained from the Domestic Wastewater Program. Applications for operating permits must include the following:

1. a completed application form, together with the appropriate fee;
2. a business plan for the system, if available or as required under subsection (H) of this section;
3. a statement as to whether and how many certified operators will be at the system, and their grade levels;
4. an operation and maintenance manual for the system (for existing systems that do not have such manuals, a manual shall be developed and submitted within the time specified in the operating permit); and
5. a certification by the owner or operator that the system will be operated in compliance

with all applicable requirements.

D. Operating permits shall be issued pursuant to Subpart 2 of the Uniform Rules, and shall be good for three (3) years from the date of issuance. Public comment on a proposed operating permit shall be limited to addressing the operating requirements in the permit and shall not address whether the system should be allowed to operate at all; that issue may be addressed only when the construction permit is proposed, for new systems or substantial modifications to existing systems. An application for renewal must be submitted at least thirty (30) days before expiration of the permit, together with the appropriate fee in the form of a certified or cashier's check or money order, with the Domestic Wastewater Program. If a wastewater treatment system has submitted a timely and complete renewal application under these regulations, but the Director has not taken final action on it, the current operating permit shall remain in effect until the renewal application has been finally determined by the Director.

E. The Director may specify conditions of operation based on minimum design requirements, as specifically provided in Part IV of these regulations.

F. The Director may revoke an operating permit, pursuant to Uniform Rules § 204, for any domestic wastewater treatment system that is unable to demonstrate its continuing ability to remain in compliance with these regulations.

G. The Director may modify an operating permit at any time, pursuant to Uniform Rules § 204, to reflect any approved or permitted modifications to the system or to modify a compliance schedule. The permittee also may request modification of an operating permit, at any time, with adequate justification. The permittee shall submit the request to the Director, together with a detailed justification for the modification(s) requested. Permit modifications will be issued by the Director on a case-by-case basis, pursuant to Uniform Rules § 204.

H. Operating permits are non-transferable, except with the Director's prior approval. The permittee shall submit written notification to the Director at least thirty (30) days prior to the proposed transfer. This notification shall include an operating permit application form completed by the proposed new owner of the wastewater treatment system. The Director may request on a case-by-case basis that the proposed new owner submit a business plan, demonstrating management of the system to ensure its long-term viability. Upon the Director's approval of the transfer, an operating permit shall be issued to the new owner of the wastewater treatment system.

I. Possession of an operating permit does not convey a property right of any sort nor any exclusive privilege.

J. The permittee shall report any noncompliance with the terms and conditions for operating the wastewater treatment system as established in the operating permit. An oral report, by telephone or in person, must be provided to the Domestic Wastewater Program within twenty-four (24) hours of the time the permittee becomes aware of the noncompliance. A

written report shall follow, by email, express mail, or hand-delivery to the Domestic Wastewater Program, within five (5) working days of the time the permittee becomes aware of the noncompliance. The written report shall include a description of the noncompliance and its cause(s); the period of noncompliance, with exact dates and times; and, if the noncompliance has not yet been corrected, the length of time it is expected to continue, with what degree of severity, and the steps already taken or planned to reduce or eliminate the noncompliance and to prevent its reoccurrence.

§ 302. Certified Operators

A. A new wastewater treatment system shall employ certified operators of the appropriate grade level and number, as determined by the Director, before the operating permit may be issued. Operators may be certified in Arizona, New Mexico, or Utah.

B. An existing wastewater treatment system with operators who are not certified at the appropriate level or levels shall ensure that they obtain certification within the time specified as part of the terms and conditions of the operating permit. The permittee shall be given an opportunity to negotiate with the Director the timeframe within which the operators are to obtain certification.

§ 303. Operation and Maintenance

A. Each new and existing wastewater treatment system shall develop an Operation and Maintenance Manual ("O&M Manual"). The O&M Manual shall be reviewed and approved by the Director as part of each system's operating permit application, except as provided in Section 301(C)(4), and except that the O&M Manual for a new or substantially modified system must first be submitted with the application package for the construction permit, pursuant to Section 202(A). A copy of the document shall be on site and readily accessible to inspectors from NNEPA, upon their request. The O&M Manual shall contain, but is not limited to, the following information, and should be updated as necessary:

1. schematics of the wastewater treatment system showing treatment processes, sewer mains, service lines, pumps, valves, and control systems;

2. standard operating procedures and staffing for the day-to-day routines of the system;

3. details about any manual, automatic, and semi-automatic controls for the system, and the procedures for troubleshooting pumps, valves, and treatment units;

3. safety procedures for handling of chemicals used at the system;

4. sampling requirements and schedules; and

6. an emergency action plan.

§ 304. Entry and Inspections

A. Pursuant to 4 N.N.C. § 1381(B) (NNCWA § 901(b)), the permittee shall allow the Director or his or her authorized representative (including an authorized contractor acting as a representative of the Director), upon presentation of his or her credentials, to:

1. enter upon the permittee's premises, where a regulated system, facility, or activity is located or conducted, or where records are kept;

2. access, review, and copy any records that must be kept under the terms and conditions of an operating permit;

3. inspect at reasonable times any system, facility, equipment, practice, or operation regulated or required under the terms and conditions of an operating permit; and

4. sample, analyze, or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the NNCWA, any substance or parameter at any location.

§ 305. Responding to the Inspection Report

(Reserved.)

§ 306. Inventory

(Reserved.)

PART IV
MINIMUM DESIGN REQUIREMENTS

§ 401. General Provisions

A. These regulations shall apply to all new wastewater treatment systems and to all substantial modifications to existing wastewater treatment systems. Pursuant to Section 201(A), the Director shall take the Minimum Design Requirements into account when reviewing construction permit applications. Additionally, and pursuant to Section 201(E), the Director may require an existing wastewater treatment system to physically upgrade, and thereby meet the Minimum Design Requirements, when the system is found to create or contribute to a public health hazard or to violate a provision of the NNCWA, and the Director determines that the upgrade is necessary to correct or eliminate the hazardous condition or to otherwise bring the wastewater treatment system into compliance with the NNCWA and these regulations.

B. Location and Installation:

1. A wastewater treatment system shall be so located that, with regular maintenance, it will function in a safe and sanitary manner and will not create a nuisance or a public health hazard, nor compromise the waters of the Navajo Nation. An on-site wastewater treatment system shall be located on the same lot as the building it serves unless the system is sited on a perpetual utility easement and right-of-way located on an adjacent or nearby lot. Any such easement and right-of-way shall be recorded in the form of a deed which:

    a. conveys the easement and right-of-way from the record owners of the burdened parcel to the owners of the parcel to be developed;

    b. includes a full legal description of the easement area prepared by a licensed land surveyor licensed in Arizona, New Mexico, or Utah, or by a professional engineer licensed in Arizona, New Mexico, or Utah and qualified in surveying;

    c. conveys all appurtenant easements for access, construction, operation and maintenance, repair, collection and drainage, etc.;

    d. includes setbacks as required in Section 407(E); and

    e. records conditions, covenants, and restrictions as follows:

        i. that the easement shall bind and inure to the benefit of the respective heirs, personal representatives, successors, and assigns of the grantor and grantee, and that all specifications of the easement shall pertain to and run with the land.

ii. that the use of the area of the absorption bed by the grantor shall be restricted from uses which are incompatible with its proper operation, such as structures, vehicular parking, roadways, drainage courses, and wells; and

iii. that the grantee shall maintain the right to do all things reasonably necessary to install, maintain, inspect, repair, and/or replace the septic tank or absorption bed within the boundaries of the easement.

2. To determine a suitable location for a wastewater treatment system, due consideration shall be given to such factors as the size and shape of the lot, the slope of its natural and finished grade, the location of existing or future water supplies, the depth to groundwater and bedrock, soil characteristics and depth, potential flooding or storm catchment issues, any anticipated expansion of the system, and its connection in the future to a public sewer system.

3. A wastewater treatment system located within a delineated wellhead protection area shall meet the requirements of Part XVII of the NNPDWR (Wellhead Protection Regulations).

§ 402. Wastewater Quantity

A wastewater collection and conveyance system shall be designed for a peak sewage flow that is at least eighty percent (80%) of the peak water usage. Methods of calculating peak sewage flow for residential and non-residential establishments are found below. The Director may also accept other estimates of wastewater quantity, and the calculation of peak flows based upon them, when they are accompanied by adequate justification. In no event shall the wastewater treatment system be designed such that the anticipated peak daily sewage flow exceeds the capacity for which the system is designed.

A. Residential establishments: Estimates of peak sewage flow shall be based on the water usage of the users of the wastewater treatment system, as multiplied by an appropriate peaking factor. The responsible engineer shall designate and justify the peaking factor in his or her engineering report, pursuant to Section 206(A)(2)(c).

In the absence of water usage data, the peak sewage flow may be calculated as follows, where H is the number of single-family dwellings and Q is gallons per minute:

1. for one hundred (100) or fewer single-family dwellings, using the equation $Q = 8*H^{0.6336}$;
2. for more than one hundred (100) single-family dwellings, using the equation $Q = 0.8[185+1.21(H-100)]$.

B. Multiple-family dwellings and non-residential establishments: The peak sewage flow may be calculated by multiplying the average daily usage for a given establishment, calculated according to Table 1, by an appropriate peaking factor. The responsible engineer shall designate and justify the peaking factor in his or her engineering report,

pursuant to Section 206(A)(2)(c).

TABLE 1
AVERAGE QUANTITY OF DOMESTIC WASTEWATER

Type of Establishment	**Gallons per Day**
Airports	4 per passenger 10 per employee
Beauty & Barber Shop	75 per service chair
Bowling Alleys a. with snack bar* b. no snack bar	 100 per alley 85 per alley
Campgrounds a. day, no cooking facilities b. overnight, with flush toilets c. overnight, with flush toilets and showers d. luxury resort e. seasonal, with flush toilets and showers	 30 per camping unit 75 per camping unit 150 per camping unit 125 per person 50 per person
Churches a. sanctuaries b. with kitchen waste	2 per seat 7 per seat
Apartments or Multiple Family Dwellings	75 per person
Country Clubs	100 per resident member 10 per nonresident member
Dentists' Offices	200 per chair 35 per employee
Doctors' Offices	250 per doctor
Fairgrounds	1 per person (max. attendance)
Fire Stations (24-hour staffing)	45 per employee
Gyms	25 per member
Hospitals*	250 per bed
Hotels, Motels, and Resorts (exclusive of laundries, lounges, and restaurants)	75 per room

Industrial Buildings (exclusive of industrial waste) a. with showers b. no showers	 35 per employee 25 per employee
Laundromats (if no manufacturer's recommendation)	400 per commercial washer
Mobile Home/Trailer Parks	250 per space
Nursing Homes*	200 per bed
Office Buildings and Business Establishments (sanitary wastes only, per 8-hour shift)	 15 per employee
Parks (temporary use) a. picnic, with flush toilets only b. RV, with water and sewer hook-ups c. RV, no water and sewer hook-ups	 20 per parking space 100 per space 50 per space
Restaurants* a. not 24-hour service b. with 24-hour service	 35 per seat 50 per seat
Schools* a. boarding b. day, no cafeteria, gyms, or showers c. day, with cafeteria, no gyms, no showers d. day, with cafeteria, gyms, and showers	 75 per student 15 per student 20 per student 25 per student
Service Stations and Convenience Stores with uni-sex restrooms	400 per toilet 800 per toilet
Shopping Center (no food or laundry)	0.1 per square foot of retail space
Stores	20 per employee
Swimming Pools (public)	10 per person
Theaters, Auditoriums	5 per seat
Veterinary Clinic	250 per practitioner 15 per employee 20 per kennel, stall, or stage
Visitor Centers	5 per visitor

* No commercial food waste disposal unit shall be connected to an on-site wastewater treatment system unless first approved by the Director.

§ 403. Wastewater Quality

A. Wastewater treatment shall be designed for at least 0.17 pounds of BOD_5 per capita per

day, and 0.20 pounds of TSS per capita per day, unless alternate designs are justified.

B. Domestic septage and leachate, if discharged to a wastewater treatment system, may contribute significant organic load and other waste materials, which can in turn cause operational problems and non-compliance with NPDES permit limitations. If septage or leachate is to be so discharged, compliance with septage disposal regulations promulgated under the NNCWA is required, and all design data and their underlying assumptions must be provided for the Director's review.

C. Data from existing wastewater treatment systems with characteristics similar to those of a new wastewater treatment system may be utilized for the new system if a thorough analysis of the data is conducted, adequately documented, and provided for the Director's review.

§ 404. Wastewater Collection and Conveyance Systems

A. General Requirements: A wastewater collection and conveyance system shall be designed, constructed, and operated so as to:

1. provide adequate wastewater flow capacity for the planned service area;

2. minimize sedimentation, blockage, and erosion through maintenance of proper flow velocities throughout the system;

3. prevent releases of sewage to the soil surface through appropriate sizing, capacities, and inflow and infiltration prevention measures throughout the system;

4. protect water quality through minimization of exfiltration losses from the system;

5. provide for adequate inspection, maintenance, testing, and accessibility;

6. maintain structural integrity throughout the system; and

7. minimize, throughout the system, the occurrence of a septic condition.

B. A wastewater collection and conveyance system shall be designed for peak sewage flow, as calculated per Section 402. For a lift station serving fewer than six hundred (600) single-family dwellings, pumps may be sized for peak dry weather flow, $Q_p = 17(H)^{0.42}$ or $11.2(\text{population})^{0.42}$, where H is the number of single-family dwellings and Q is gallons per minute. Allowances shall be provided for infiltration and wet weather flow.

C. Pipe Size and Slope: The minimum size of a sewer main shall be eight (8) inches in diameter. Six-inch (6-inch) diameter sewer mains may be used on dead-end lines, such as those for cul-de-sacs, that have no potential for extension and that do not exceed four hundred (400) feet in length. A sewer main shall be designed so as to operate at no more than seventy-five percent (75%) of capacity in peak dry weather flow conditions.

Further, a sewer main shall be designed and constructed with such a slope as to ensure a mean velocity, when flowing at capacity, of not less than two (2) feet per second, utilizing Manning's formula and a roughness coefficient of 0.013. The minimum slope for a sewer main shall not be less than 0.4% for an eight-inch main and one percent (1%) for a six-inch main. Steep slopes leading to a flow velocity greater than ten (10) feet per second shall be avoided. If steep slopes are unavoidable, a sewer main shall be designed so as to resist damage from high velocity flows.

Service lines shall have a minimum slope of two percent (2%). Cleanouts shall be placed at the house, at hundred-foot intervals, and at any in-line bend greater than forty-five degrees (45°).

D. Separation Requirements: Sewer lines shall be separated from water lines in accordance with NNPDWR § 1508(D).

E. Materials: Sewer pipes and pipe-fittings must conform to applicable ASTM and American Water Works Association standards. Ductile iron pipe is required when a sewer line is located within roadways with fewer than three (3) feet of cover and in all other areas with fewer than two (2) feet of cover.

F. Depth: Sewage collection lines must be deep enough to provide at least three (3) feet of soil cover within roadways and two (2) feet of soil cover in other areas. Also, the sewer depth shall provide at least a two percent (2%) slope for all connecting service lines. Collection lines located within roadways with fewer than two (2) feet of cover are prohibited.

G. Testing: All newly-constructed sewer lines shall be tested for the following:

1. deflection on all flexible pipes, to ensure that the installation meets or exceeds the manufacturer's recommendations;

2. leakage, following applicable ASTM standards; and

3. uniform slope, by lamp lighting, remote camera, or similar method approved by the Director.

H. Manholes:

1. Manholes shall be located at each change of sewer line grade, size, or alignment; at the end of each line; at all pipe intersections; and at intervals not greater than four hundred (400) feet for sewers fifteen (15) inches or fewer in diameter, and five hundred (500) feet for sewers greater than fifteen (15) inches to thirty (30) inches in diameter. Greater intervals may be permitted in larger sewers. Manholes shall not be located in depressions or drainages, or within four (4) feet of the roadway gutter.

2. Straight through manholes shall have the same slope as the adjoining pipe and should consist of the lower half of the pipeline with a grout shelf. All other manholes shall provide at least a 0.1 foot drop through the manhole. In the case of a lateral entering a straight through manhole, the lateral must have a 0.1 foot drop from the lateral inlet to the manhole outlet. Bending inverts shall be formed so that the transition is smooth and the flow remains in the channel without ponding or dropping solids.

3. Whenever an invert cannot be formed for an incoming line, a drop manhole shall be constructed. The maximum in-manhole drop shall be limited to two (2) feet.

4. Manholes shall be at least four (4) feet in inside diameter, and constructed of sufficient strength to withstand traffic. Manholes located outside of roadways shall have a rim elevation approximately six (6) inches higher than the surrounding land surface. Steps shall be provided for all manholes and shall be spaced vertically a maximum of sixteen (16) inches center to center.

5. Service lines shall not enter a manhole, but shall enter the main line at least two (2) feet away from the manhole.

6. Cleanouts may be permitted in lieu of a manhole on certain dead end lines and stub-outs if they are shorter than two hundred (200) feet and serve fewer than ten (10) homes.

7. Metering manholes, if installed, shall be the straight through type, with the lower half of the pipe forming the invert. At least fifty (50) feet of pipe on either side of the metering manhole shall be at the same slope.

8. Manholes shall be tested for water tightness. Testing procedures and acceptance criteria must be included in the construction specifications, pursuant to Section 205(A)(2)(c), to be reviewed and accepted by the Director as part of the construction permit application process. The responsible engineer shall certify that the test results meet the approved acceptance criteria, and shall include those test results in the final inspection package submitted pursuant to Section 208(B)(2).

I. Force Mains: The installation of force mains is not encouraged. If the situation warrants, however, a force main shall be designed and installed so as to meet the following requirements:

1. Flow velocity shall be a minimum of three (3) feet per second and maximum of seven (7) feet per second.

2. Appropriate valves and controls shall be provided to prevent drain back to the lift station. The control system may, however, allow manual or automatic drain back as necessary to drain the sewer back to the lift station during cold weather to prevent freezing.

3. Air release valves shall be provided at high points along the line to eliminate air accumulation and prevent vacuum during drain back.

4. Joint restraints and thrust blocks shall be provided to prevent the movement of force mains due to water hammer and pressure surge.

J. Lift Stations: A lift station shall include the following components:

1. At least two pumps, each with the capacity and arrangement to pump the design flow independently. If they are not grinder pumps, they shall be capable of passing a sphere 2.5 inches in diameter.

2. An alternate power source or a standby generator.

3. A wet well with adequate capacity, but that will not allow sewage retention of over thirty (30) minutes so as to prevent a septic condition. Measures shall be taken to prevent the formation of hydrogen sulfide.

4. An alarm system to indicate excessively high or low levels of sewage in the wet well.

K. Revegetation: Within the disturbed area of a new or renovated wastewater collection and conveyance system, care shall be taken not to cover the exposed soil with plant species having roots that are likely to reach and damage the sewer system, impair its operations, or prevent visual and vehicular access to any manhole.

§ 405. Municipal Wastewater Treatment Facilities

A. General Requirements: A municipal wastewater treatment facility shall be designed, constructed, and operated so as to ensure the greatest degree of discharge reduction achievable through use of the best available demonstrated control technology, treatment processes, operating methods, or other alternatives, including, where practical, a technology permitting no discharge of pollutants. To determine how to achieve the best performance possible, the Director shall take into account any treatment process contributing to the discharge, site-specific hydrologic and geologic characteristics and other environmental factors, opportunities for water conservation or augmentation, and the economic and environmental impacts of the use of alternative technologies, processes, or operating methods on an industry-wide basis. To this end:

1. The Director may specify in the operating permit, pursuant to Section 301, alert levels, discharge limitations, design specifications, and operation and maintenance requirements, based on information provided by the owner or operator of the facility, applicable NNEPA regulations, and the Director’s determination of industry-wide best practices.

2. Pursuant to Section 302, the permittee shall ensure that the facility is operated by a person who is appropriately certified, at the level determined by the Director.

3. Pursuant to Section 303, the owner or operator of the facility shall maintain, on site and readily accessible, an approved and updated O&M Manual.

4. The owner or operator of the facility shall not bypass or release sewage or partially treated sewage that has not completed the treatment process.

5. The owner or operator of the facility shall not allow the facility to emit an offensive odor on a persistent basis that extends beyond the setback distances provided in the design.

B. Treatment Performance Requirements: The owner or operator of a new municipal wastewater treatment facility shall ensure that the facility meets the following treatment performance requirements upon discharge of the treated wastewater at the outfall:

1. Secondary Treatment Levels:

a. BOD_5 is less than thirty (30) mg/l (thirty-day average) and forty-five (45) mg/l (seven-day average), or $CBOD_5$ is less than twenty-five (25) mg/l (thirty-day average) and forty (40) mg/l (7-day average);

b. TSS is less than thirty (30) mg/l (thirty-day average) and forty-five (45) mg/l (seven-day average);

c. pH is maintained between six (6.0) and nine (9.0) standard units; and

d. the removal efficiency is eighty-five percent (85%) for BOD_5, $CBOD_5$, and TSS.

2. Total nitrogen in the treated wastewater is less than ten (10) mg/l (five-month rolling geometric mean). If an applicant demonstrates, using appropriate monitoring, that soil aquifer treatment will produce a total nitrogen concentration of less than ten (10) mg/l in wastewater that percolates to groundwater, the Director may approve soil aquifer treatment for removal of total nitrogen as an alternative to meeting the treatment performance requirement of ten (10) mg/l at the outfall.

3. Pathogen removal:

a. For a municipal wastewater treatment facility with a design flow of fewer than two hundred fifty thousand (250,000) gallons per day, at a site where the depth to the seasonal high groundwater table is greater than twenty (20) feet and there is no karstic or fractured bedrock at the surface:

i. The concentration of fecal coliform organisms in four of the wastewater samples collected during a week is less than two hundred (200) cfu/100 ml, or the concentration of E. Coli bacteria in four of the wastewater samples collected during the week is less than one hundred twenty-six (126) cfu/100

ml, based on a sampling frequency of seven (7) daily samples per week;

ii. the single sample maximum concentration of fecal coliform organisms in a wastewater sample is not greater than eight hundred (800) cfu/100 ml, or the single sample maximum concentration of E. Coli bacteria in a wastewater sample is not greater than five hundred four (504) cfu/100 ml; and

iii. an owner or operator of a facility may request a reduction in the monitoring frequency required in Section 405(B)(3)(a)(i) if equipment is installed to continuously monitor an alternative indicator parameter, and the owner or operator demonstrates that the continuous monitoring will ensure the reliable production of wastewater meeting, at the discharge point, the concentration levels specified in Section 405(B)(3)(a)(i) and (ii).

b. For any other municipal wastewater treatment facility:

i. No fecal coliform organisms, or no E. Coli bacteria, are detected in four of the wastewater samples collected during the week, based on a mandatory sampling frequency of seven (7) daily samples per week;

ii. the single sample maximum concentration of fecal coliform organisms in a wastewater sample is not greater than twenty-three (23) cfu/100 ml, or the single sample maximum concentration of E. Coli is not greater than fifteen (15) cfu/100 ml; and

iii. the owner or operator of the facility may request a reduction in the monitoring frequency required in Section 405(B)(3)(b)(i) if equipment is installed to continuously monitor an alternative indicator parameter, and the owner or operator demonstrates that the continuous monitoring will ensure the reliable production of wastewater meeting, at the discharge point, the concentration levels of Section 405(B)(3)(b)(i) or (ii).

c. The owner or operator may use unit treatment processes, such as chlorination-dechlorination, ultraviolet, or ozone to achieve the pathogen removal performance requirements specified in Section 405(B)(3)(a)(i) and (ii) and Section 405(B)(3)(b)(i) and (ii).

d. The Director may approve soil aquifer treatment for the removal of fecal coliform or E. Coli bacteria as an alternative to meeting the treatment performance requirements of Section 405(B)(3)(a)(i) and (ii) or Section 405(B)(3)(b)(i) and (ii), if the soil aquifer treatment process will produce, in wastewater that percolates to groundwater, a fecal coliform or E. Coli bacteria concentration less than that allowed under Section 405(B)(3)(a)(i) and (ii) or Section 405(B)(3)(b)(i) and (ii).

4. A municipal wastewater treatment facility shall remove the following pollutants to

the greatest extent possible:

a. Substances listed by the Secretary of the U.S. Department of Health and Human Services pursuant to 42 U.S.C. § 241(b)(4) (most recent biennial report), which are substances known to be carcinogens or may be reasonably anticipated to be carcinogens, and

b. Substances listed in 40 C.F.R. § 261.33(e) ("acute hazardous wastes"), as updated from time to time, regardless of whether the substance is a "hazardous waste" subject to regulation under the Resource Conservation Recovery Act, 42 U.S.C. §§ 6901 *et seq.*

5. The requirements of Section 405(B)(4) shall be met by achieving pretreatment standards through:

a. setting, monitoring, and enforcing limits on pollutant concentrations prior to their release into a sewage system;

b. meeting the pretreatment standards promulgated under 4 N.N.C. § 1327 (NNCWA § 307); and/or

c. for municipal wastewater treatment facilities without significant input from industrial discharges, conducting periodic monitoring to detect industrial discharges.

6. An owner or operator of a municipal wastewater treatment facility shall minimize trihalomethane compounds (generated as disinfection byproducts) by using chlorination-dechlorination, ultraviolet, or ozone as the disinfection system, or by using a technology demonstrated to have an equivalent or better performance for removing or preventing trihalomethane compounds.

7. The maximum seepage rate shall be fewer than five hundred fifty (550) gallons per day per acre for all containment structures within a treatment works. A municipal wastewater treatment facility that consists solely of containment structures and has no other form of discharge shall be considered to meet the requirements of this Section 405 if the seepage rate is kept below five hundred fifty (550) gallons per day per acre.

C. An existing municipal wastewater treatment facility shall not be required to implement physical upgrades to meet the requirements of Section 405(B) unless the facility is found by the Director to create or contribute to a public health hazard or to violate any provision of the NNCWA. In addition, as provided by Section 201(A), when a substantial modification to an existing municipal wastewater treatment facility is proposed, the Director may require the facility to comply with the requirements of § 405(B) unless adequate justification is provided for obtaining relief from those requirements.

§ 406. Wastewater Lagoon Systems

A wastewater lagoon system shall be of the total retention type and adhere to the requirements listed below. As provided by Sections 201(A) and 202(B), variations from these requirements may be approved by the Director on a case-by-case basis.

A. Siting: The lagoons shall be located downhill from the proposed service area such that the wastewater will flow under gravity and lift stations are not necessary. Other factors to be considered include future development, wind direction, surface runoff, and site access.

B. Configuration: A common configuration of a lagoon system is a three-cell system comprising two treatment cells and one disposal (seepage) cell. More treatment cells and/or more disposal cells may be added, as warranted, at the discretion of the responsible engineer.

C. Sizing: A lagoon system shall be sized small enough to maintain adequate water in the treatment cells and big enough to remain of the total retention type.

D. Organic loading: Lagoon surface loading rates in the primary treatment cell shall be less than one hundred fifty (150) pounds of BOD_5 per acre per day, and such that mechanical equipment is not required.

E. Treatment Cells: Seepage from the treatment cells shall be minimized by installing a compacted soil liner, a synthetic liner, or other liner system. Seepage from the liner shall be fewer than five hundred fifty (550) gallons per acre per day. Depending on the soil and groundwater conditions at the site of an individual lagoon system, a higher seepage rate for a compacted soil liner may be approved by the Director, on a case-by-case basis.

    1. Compacted soil liners shall be:

        a. resistant to swelling, shrinking, and cracking;

        b. at least one (1) foot thick, compacted to a uniform density of ninety-five (95%) percent of the Standard Proctor Density under ASTM D698; and

        c. protected upon installation to prevent desiccation.

    2. Synthetic liners shall be:

        a. made of at least thirty-mil (30-mil) geomembrane or sixty-mil (60-mil) high density polyethylene, or a comparable substitute, that has a seepage rate of fewer than five hundred fifty (550) gallons per acre per day;

        b. chemically compatible with the wastewater;

        c. resistant to the ultraviolet rays in sunlight; and

d. anchored in an engineered anchor trench.

3. A construction quality assurance and quality control program shall be developed to address site and sub-grade preparation, inspection procedures, field testing, laboratory testing, and final inspection to ensure the functional integrity of the liner.

F. Disposal cell: If the disposal cell is unlined and utilizes seepage as a disposal method in addition to evaporation, the design of the system must consider the seasonal dry and wet cycles to maintain the capacity of the cell. Permeability of soil in the disposal cell shall not exceed one hundred (100) feet per year.

G. Soil exploration: Soil exploration for a wastewater lagoon system shall consist of the following, at a minimum:

1. soil borings to ten (10) feet below the lagoon floor, one (1) in each treatment cell and two (2) in each disposal cell, as documented by borehole logs;

2. sieve analysis and Atterberg limits for soil classification, with documentation of each soil type encountered;

3. Proctor compaction curves (ASTM D698 or D1557) for the representative soils to be utilized for dike construction and soil liner;

4. results of permeability tests, performed on the representative soils to be utilized for the compacted soil liner on the treatment cells and the bottom soil of the disposal cell;

5. strength parameters for the representative soils to be utilized for dike construction if the dike is higher than ten (10) feet above the natural ground.

H. Dikes: Dikes shall be earthen embankments compacted to a uniform density of at least ninety-five percent (95%) of the Standard Proctor Density (ASTM D698). Their top width shall be at least twelve (12) feet. Their side slopes shall be stable. If the dike is higher than ten (10) feet above the natural ground, the slope stability of the dike shall be evaluated.

I. Freeboard: A minimum freeboard of three (3) feet shall be maintained at all times.

J. Fencing: Lagoons shall be fenced to restrict access to authorized personnel only. The fence shall be located outside the downstream toe of the dike to allow for maintenance of the downstream slope. Warning signs shall be placed on the gate and around the perimeter.

K. Closure Requirements: Pursuant to Section 201(F), the owner or operator shall notify the Director in writing of his or her intent to close the wastewater lagoon system, and shall provide a closure plan. The Director must approve the plan before any work begins in

the field.

The closure plan shall address the need to inspect the liner for evidence of holes, tears or cracks, or defective seams. If evidence of a potential leak is discovered, its extent and effect on groundwater shall be investigated, and a groundwater remediation plan must be provided as necessary for the Director's review and approval. If there is no evidence of leakage, the liner shall be covered in place if the lagoon is below ground, or removed and disposed of elsewhere if the lagoon is above ground. The lagoon shall be filled with dirt and graded to prevent the impoundment of water.

The engineer supervising the lagoon system closure must notify the Director, in writing and within ninety (90) days of approval of the closure plan, that the work in the field has followed the approved plan and is now complete.

§ 407. On-Site Wastewater Treatment Systems

A. Soil and Groundwater Requirements

1. Soil and Bedrock Requirements:

a. In an area where an on-site wastewater treatment system is to be constructed, the soil cover must be adequate to ensure at least forty-eight (48) inches of soil between the bottom of the absorption system excavation and bedrock formations or impervious strata. For the purposes of these regulations, soil or bedrock formations are unsuitable if:

i. they are so slowly permeable that they effectively prevent the downward passage of effluent, or

ii. they exhibit open joints or solution channels that permit such rapid flow that effluent is not renovated. These formations exhibit coarse particles such as gravel, cobbles, or angular rock fragments with insufficient soil to fill the voids between the particles. Moreover, solid or fractured bedrock such as shale, sandstone, limestone, basalt, or granite is unacceptable for an absorption system.

b. Suitable soil for an absorption system meets the following criteria:

i. it has the capacity to adequately disperse the designed effluent loading, as determined by field percolation rates or by other approved soil tests;

ii. it does not exhibit swelling or collapsing (which would inhibit the flow and renovation of effluent);

iii. it does not visually exhibit a jointed or fractured pattern of underlying bedrock;

iv. it is not consolidated, cemented, or indurated, or plugged by a buildup of secondary deposited calcium carbonate (caliche); and

v. it is an effective filter of effluent, within its depth, for the removal of pathogenic organisms.

2. Groundwater Requirements:

a. In areas where an absorption system is to be constructed, the anticipated maximum groundwater table shall be at least twenty-four (24) inches below the bottom of the absorption system excavation and at least forty-eight (48) inches below finished grade.

b. The maximum groundwater table shall be determined by one or more of the following methods:

i. direct visual observation of the maximum groundwater table in a soil exploration pit;

ii. direct visual observation, in a soil exploration pit, of salt crystals left by the maximum groundwater table or of mottled coloration due to chemically reduced iron in the soil; and/or

iii. regular monitoring of the groundwater table or "groundwater table, perched" in an observation well for a period of one year, or for the period of maximum groundwater table. Groundwater monitoring shall be required where the anticipated maximum groundwater table, including an irrigation-induced water table, might be expected to rise closer than forty-eight (48) inches to the bottom of an on-site wastewater system, or to the bottom of any alternative site for such a system.

c. If, over the full operating life of an on-site wastewater treatment system, the highest elevation that the top of the groundwater table or "groundwater table, perched" is anticipated to reach for any reason, including an irrigation-induced water table, within twenty-four (24) inches of the bottom of the absorption system excavation, the use of a conventional system in the area under consideration shall be prohibited.

d. Historical groundwater and climatological records or other information may be consulted for each site proposed for an on-site wastewater treatment system and may be used to adjust the observed maximum groundwater table elevation to determine the anticipated maximum groundwater table elevation.

3. Soil Exploration Requirements: Suitable soil exploration pits, of sufficient size to permit visual inspection, and to a minimum depth of ten (10) feet or at least forty-

eight (48) inches below the bottom of the proposed on-site wastewater treatment system, shall be dug at each absorption system site to determine the groundwater table and subsurface soil and bedrock conditions. A log of the soil and bedrock formations thus encountered must be submitted to the Director, describing the texture, structure, and depth of each soil type, and indicating the maximum elevation of the groundwater table and the depth of any groundwater encountered. Soil logs should be prepared in accordance with the U.S. Department of Agriculture Soil Classification System.

4. Percolation Test Requirements: At least one (1) stabilized percolation test for a design flow of fewer than two thousand (2,000) gallons per day, or three (3) tests if the design flow will be of or greater than two thousand (2,000) gallons per day, shall be performed on the site of each proposed absorption system to determine the minimum required absorption area. More tests may be required where the soil structure varies, where limiting geologic conditions are encountered, or where proposed property improvements will require large wastewater treatment systems. Percolation tests shall be performed per Section 408. An absorption system shall not be permitted in areas where the soil percolation rate is slower than sixty (60) minutes per inch or faster than one (1) minute per inch.

B. Septic Tanks

1. General Requirements: Septic tanks shall be constructed of sound, durable, and watertight materials that are not subject to excessive corrosion, frost damage, or decay. They shall be designed and constructed to be watertight, to withstand all expected physical forces, to provide room for the settling of solids and the accumulation of sludge and scum, and to be accessible for inspection and cleaning.

2. Overall Construction and Design Features:

   a. A septic tank may be constructed of the following materials:

      i. precast reinforced concrete;

      ii. fiberglass;

      iii. polyethylene;

      iv. poured-in-place concrete; or

      v. any other material approved by the Director on a case-by-case basis.

   b. A septic tank may have single or multiple compartments and may be oval, circular, rectangular, or square, provided that the distance between the inlet and outlet of the tank is at least equal to the liquid depth of the tank. In general, the tank length should be at least two-to-three (2-3) times the tank width.

c. A septic tank may have an effluent filter installed at the tank outlet. The filter shall prevent the passage of solid particles larger than a nominal⅛ -inch diameter sphere. The filter should be easily removed for routine servicing through watertight access from the surface, or be bypassed with a piping arrangement.

3. Plans for Septic Tanks: Plans for all septic tanks shall be submitted to the Director for review and approval, and shall show all materials, dimensions, capacities, reinforcing, and other pertinent data as may be required pursuant to Sections 205(A)(2)(d) (construction specifications) and 205(A)(3)(e) (material specifications). Septic tank construction and installation shall conform to these approved construction and material specifications, as well as to the approved construction plans of Sections 204(E) and (F), and shall be accomplished under the supervision of a professional engineer licensed in Arizona, New Mexico, or Utah.

4. Tank Capacity for Single-Family Dwellings: The minimum liquid capacity of a septic tank for a single-family dwelling shall be one thousand (1,000) gallons (liquid capacity up to the outlet invert). For homes having more than five (5) bedrooms or housing more than ten (10) people, 175 gallons additional liquid capacity is required for each additional bedroom or for every additional two (2) people. No consideration shall be given to the number of common household appliances in a single-family dwelling, such as washers and dishwashers, since these appliances are already taken into account in the requirements listed above.

5. Tank Capacity for Commercial, Institutional, and Recreational Facilities, and Multiple-Family Dwellings: The minimum liquid capacity of a septic tank serving a commercial, institutional, or recreational facility, or multiple-family dwellings, shall be determined as follows:

   a. For design flows up to five hundred (500) gallons per day, as estimated from Table 1, the liquid capacity of the tank shall be at least one thousand (1,000) gallons.

   b. For design flows between five hundred (500) and fifteen hundred (1,500) gallons per day, as estimated from Table 1, the liquid capacity of the tank shall be at least one-and-one-half (1.5) times the daily estimated sewage flow, but in no case less than (1,000) gallons.

   c. For wastewater flows between fifteen hundred (1,500) and five thousand (5,000) gallons per day, as estimated from Table 1, the liquid capacity of the tank shall equal at least one thousand one hundred twenty-five (1,125) gallons plus seventy-five percent (75%) of the daily wastewater flow.

6. Precast Reinforced Concrete Septic Tanks: The walls and base of a precast tank shall be securely bonded and designed to meet all applicable American Concrete Institute (ACI) standards. The concrete shall be Class A, with a twenty-eight-day (28-day)

strength of at least four thousand (4,000) pounds per square inch.

7. Poured-In-Place Concrete Septic Tanks: The top of a poured-in-place septic tank shall be at least four (4) inches thick for a tank with a liquid capacity of up to one thousand two hundred fifty (1,250) gallons, and at least six (6) inches for a tank with a liquid capacity of greater than one thousand two hundred fifty (1,250) gallons. The walls and floor of a poured-in-place septic tank shall be at least six (6) inches thick. A six-inch (6-inch) water stop shall be used at the wall-floor juncture to ensure watertightness. All concrete used in poured-in-place tanks shall be Class A, with a twenty-eight-day (28-day) strength of at least four thousand (4,000) pounds per square inch. The tanks shall be adequately reinforced.

8. Fiberglass Septic Tanks: A fiberglass septic tank shall comply with the criteria for acceptance established in the "Interim Guide Criteria For Glass-Fiber-Reinforced Polyester Septic Tanks," of the International Association of Plumbing and Mechanical Officials, 5032 Alhambra Avenue, Los Angeles, California 90032. The identifying seal of the association must be embossed in the fiberglass as evidence of compliance. Inlet and outlet tees shall be attached to the tank by a rubber or synthetic rubber ring seal and compression plate. The septic tank shall be installed in accordance with the manufacturer's recommendations.

9. Polyethylene Septic Tanks: A polyethylene septic tank shall comply with the criteria for acceptance established in "Prefabricated Septic Tanks and Sewage Holding Tanks, Can3-B66-M79" by the Canadian Standards Association International, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3. The certifying marks of the association must be embossed in the polyethylene as evidence of compliance. The septic tank shall be installed in accordance with the manufacturer's recommendations.

10. Identifying Marks: All prefabricated or precast septic tanks that are commercially manufactured shall be plainly, legibly, and permanently marked or stamped on the exterior, at the outlet end and within six (6) inches of the top of the wall, with the name and address or nationally registered trademark of the manufacturer and the liquid capacity of the tank in gallons. Both the inlet and outlet of all such tanks shall be plainly marked as IN and OUT, respectively.

11. Liquid Depth of Tanks: The liquid depth of any septic tank shall be at least thirty (30) inches.

12. Tank Compartments: A septic tank may be divided into compartments, provided each compartment meets the applicable requirements of this Section 407(B), including the following criteria:

    a. The volume of the first compartment must equal or exceed two-thirds (2/3) of the total required volume for the septic tank.

    b. No compartment shall have an inside horizontal distance of fewer than twenty-

four (24) inches.

c. Inlets and outlets shall be designed as specified in Section 407(B)(14), but where a partition wall is used to construct a multi-compartment tank, an opening in the partition may serve to ensure flow between compartments, provided: the minimum dimension of the opening is four (4) inches, its cross-sectional area is not less than that of a six-inch (6-inch) diameter pipe (28.3 square inches), and its midpoint falls below the liquid surface a distance approximately equal to forty percent (40%) of the liquid depth of the tank.

d. There shall be no more than three (3) compartments in a tank.

13. Tanks in Series: Additional septic tank capacity over one thousand (1,000) gallons may be obtained by joining un-compartmented tanks in series to obtain the required capacity, provided the following requirements are met:

a. No tank in the series shall be smaller than seven hundred fifty (750) gallons.

b. The capacity of the first tank must equal or exceed two-thirds (2/3) of the total required volume for the septic tank.

c. The outlet of each successive tank shall be at least two (2) inches lower than the outlet of the preceding tank, and shall be unrestricted except for the inlet to the first tank and the outlet for the last tank.

d. There shall be no more than three (3) tanks in series.

14. Inlets and Outlets: The inlets and outlets of tanks or their compartments shall meet the material and minimum diameter requirements for building sewers. They shall be teed or baffled with the objective of diverting influent toward the tank bottom and minimizing as much as possible the discharge of sludge or scum in the effluent. They also shall comply with the following criteria:

a. Inlets and outlets shall be located on opposite ends of the tank. The invert of the flow line for the inlet shall be located at least two (2) inches (and preferably three (3) inches) above the invert of the outlet to allow for a momentary rise in the liquid level during discharge to the tank.

b. An inlet baffle or sanitary tee of wide sweep design shall divert the incoming sewage downward. This baffle or tee is to penetrate at least six (6) inches below the liquid level, but the penetration is not to be greater than that allowed for the outlet device (baffle or tee).

c. For tanks with vertical sides, outlet baffles or sanitary tees shall extend below the liquid surface a distance equal to approximately forty percent (40%) of the liquid depth. For horizontally cylindrical tanks and tanks of other shapes, that distance

shall be reduced to approximately thirty-five percent (35%) of the liquid depth.

d. All baffles shall be constructed from sidewall to sidewall, or shall be designed as a conduit.

e. All inlet and outlet devices shall be permanently fastened in a vertical, rigid position. Inlet and outlet pipe connections to the septic tank shall be sealed with a bonding compound that will adhere to the tank and pipes to form watertight connections, or watertight sealing rings.

f. Inlet and outlet devices shall not include any design features preventing the free venting of gases generated in the tank or absorption system back through the roof vent in the building plumbing system. The top of the baffles or sanitary tees must extend at least six (6) inches above the liquid level to provide scum storage, but no closer than one (1) inch to the inside top of the tank.

g. Multiple outlets from septic tanks shall be prohibited.

h. A gas deflector may be added at the outlet of the tank to prevent suspended solids from entering the outlet pipe of the tank.

15. Scum Storage: Scum storage volume shall be fifteen percent (15%) or more of the required liquid capacity of the tank and shall be provided in the space between the liquid surface and the top of the inlet and outlet devices.

16. Accessibility of Tank: A septic tank shall be installed where it may be easily serviced and cleaned, and shall have no structure or other obstruction placed over it that would interfere with such activities. A septic tank should be installed between the dwelling and the street, whenever possible, to facilitate connection to a sanitary sewer at such time one is installed.

17. Access to the Tank Interior:

a. Access to the interior of a septic tank, or to each compartment thereof, shall be provided through properly placed manhole openings not less than eighteen (18) inches (and preferably twenty-two (22) inches) in minimum horizontal dimension, or by means of an easily removable lid.

b. Access to inlet and outlet devices shall be provided through properly spaced openings not smaller than twelve (12) inches in minimum horizontal dimension, or by means of an easily removable lid.

c. The top of the tank shall be at least six (6) inches below finished grade.

d. All manholes shall be extended to within at least four (4) inches of the finished grade. The manhole extensions shall be constructed of durable and structurally sound

materials designed to withstand whatever physical loads and corrosive forces may reasonably be expected to be imposed upon them.

e. Manhole covers shall have adequate handles and shall be designed and constructed in such a manner that they cannot fall through the openings, and when closed will be childproof; prevent entrance of surface water, dirt, or other foreign material; and seal odorous gases in the septic tank.

f. No septic tank shall be located under paving unless extensions to the access openings are extended up through the paving and the manholes are equipped with a locking-type cover.

18. Tank Cover: A septic tank cover shall be sufficiently strong to support whatever load may reasonably be expected to be imposed upon it, and sufficiently tight to prevent the entrance of surface water, dirt, or other foreign matter, and to seal the odorous gases of digestion in the septic tank.

19. Tank Excavation and Backfill: The hole receiving a septic tank shall be large enough to permit the proper placement of the tank and backfill. Tanks shall be installed on a level, solid base that will not settle. Where rock or other undesirable protruding obstructions are encountered, the bottom of the hole should be excavated an additional six (6) inches and backfilled to the proper grade with sand, crushed stone, or gravel. Backfill around and over the septic tank shall be placed in such a manner as to prevent undue strain or damage to the tank or connected pipes.

20. Maintenance Requirements: A septic tank shall be adequately maintained to ensure that it functions properly per Section 407(F).

C. Discharge to Absorption Systems

1. General Requirements: Septic tank effluent shall be conducted to the absorption system through watertight pipe and fittings which meet the material, diameter, slope, and separation requirements of Section 404. Tees, wyes, ells, or other distributing devices may be used as needed.

2. Tees and Wyes: Tees and wyes shall be installed level to permit equal flow to the branches of the fitting.

3. Drop Boxes: Drop boxes may be used to distribute effluent within the absorption system on either level or sloping topography, and are thus usually installed in the middle or at the head end of each trench. They shall be watertight, constructed of concrete or other durable material, and designed to accommodate an inlet pipe, an outlet pipe leading to the next drop box (excepting the last drop box), and one (l) or two (2) distribution pipes leading to the absorption system. Drop boxes shall meet the following requirements:

a. The inlet pipe to the drop box shall be at least one (1) inch higher than the outlet pipe leading to the next drop box.

b. The invert of the distribution pipes(s) shall be four-to-six (4-6) inches below the outlet invert. If there is more than one distribution pipe, their inverts shall be at exactly the same elevation. Drop boxes shall be installed level, and the flow from multiple distribution lines should be checked by filling the drop box with water up to the outlets.

c. The inlet and outlet of the drop box shall be sealed watertight to the sidewalls of the drop box.

d. The drop box shall be accessible. The lid shall be of compatible construction and material to that of the drop box and adequate to prevent the entrance of water, dirt, or other foreign material, but shall be removable for observation and maintenance of the system. The top of the drop box shall be at least six (6) inches below finished grade.

e. The drop box must be installed on a level, solid foundation to ensure against tilting or settling. To minimize frost action and reduce the possibility of movement once installed, drop boxes should be set on a bed of sand or pea gravel at least twelve (12) inches thick.

f. Unused "knock-out" holes in concrete drop boxes shall be completely filled with concrete or mortar.

4. Distribution Boxes: Distribution boxes may be used on level or nearly level ground, and shall be watertight and constructed of concrete or other durable material. They shall be designed to accommodate an inlet pipe and the necessary distribution line(s), and shall otherwise meet the same requirements as for drop boxes, except that the outlet inverts of the distribution box shall be not less than two (2) inches below the inlet invert.

5. Identifying Marks: Commercially manufactured drop boxes and distribution boxes shall be plainly and legibly marked, on an interior wall above the level of the top of the inlet pipe, with the name of the manufacturer.

D. Absorption Systems

1. General Requirements:

a. The soil absorption area shall be determined by dividing the design flow by the applicable soil absorption rate (SAR). If the soil characterization and percolation test methods yield different SAR values, the lowest SAR value shall be used unless a higher SAR value is presented and justified by the responsible engineer, and accepted by the Director. In addition, the soil absorption area shall also be

checked for organic loading by reference to Table 4-3 of EPA/625/R-00/008 Onsite Wastewater Treatment Systems Manual, February 2002. The SAR shall be determined as follows:

i. If the percolation rate is available, the SAR shall be determined from Table 2.

ii. If soil characteristics obtained from geotechnical investigation are available, the SAR can be determined by answering the questions in Table 3. The questions are read in sequence starting with "A." The first "yes" answer determines the SAR.

TABLE 2
DETERMINATION OF THE SOIL ABSORPTION RATE (SAR)
BASED ON THE PERCOLATION RATE

Percolation Rate from Percolation Test (minutes/inch)	**SAR for Trench (gal./day/sq.ft.)**	**SAR for Bed (gal./day/sq.ft.)**
1.00 to less than 3.00	1.20	0.93
3.00	1.10	0.73
4.00	1.00	0.67
5.00	0.90	0.60
7.00	0.75	0.50
10.00	0.63	0.42
15.00	0.50	0.33
20.00	0.44	0.29
25.00	0.40	0.27

30.00	0.36	0.24
35.00	0.33	0.22
40.00	0.31	0.21
45.00	0.29	0.20
50.00	0.28	0.19
55.00	0.27	0.18
55.00+ to 60.00	0.25	0.17

b. Distribution pipe for gravity-flow absorption systems shall be in straight lengths and four (4) inches in diameter. The pipe shall be perforated, that is, penetrated by at least two (2) rows of round holes, each one quarter (¼) to one half (½) inch in diameter, and located at approximately six-inch intervals. When installed on a level or nearly level grade, the perforations should be located at about the five o'clock and seven o'clock positions on the pipe to permit nearly equal drainage along its length, and the open ends of the pipes shall be capped.

c. Distribution pipe and pipe fittings shall be constructed of materials capable of withstanding physical loads and corrosion by sewage and sewage-generated gases, and shall meet applicable ASTM and other national standards for compressive strength and corrosive action.

TABLE 3
DETERMINATION OF SAR BASED ON SOIL CHARACTERISTICS

Sequence of Soil Characteristics Questions	**SAR for Trench, Chamber (gal./day/sq.ft.)**	**SAR for Bed (gal./day/sq.ft.)**
A. Is the horizon gravelly coarse sand or coarser?	site-specific SAR required	site-specific SAR required
B. Is the structure of the horizon moderate or strongly platy?	site-specific SAR required	site-specific SAR required

C. Is the texture of the horizon sandy clay loam, clay loam, silty clay loam, or finer and the soil structure weak platy?	site-specific SAR required	site-specific SAR required
D. Is the moist consistency stronger than firm or any cemented class?	site-specific SAR required	site-specific SAR required
E. Is the texture sandy clay, clay, or silty clay of high clay content and the structure massive or weak?	site-specific SAR required	site-specific SAR required
F. Is the texture sandy clay loam, clay loam, silty clay loam, or silty loam and the structure massive?	site-specific SAR required	site-specific SAR required
G. Is the texture of the horizon loam or sandy loam and the structure massive?	0.20	0.13
H. Is the texture sandy clay, clay, or silty clay of low clay content and the structure moderate or strong?	0.20	0.13
I. Is the texture sandy clay loam, clay loam, or silty clay loam and structure weak?	0.20	0.13
J. Is the texture sandy clay loam, clay loam, or silty clay loam and the structure moderate or strong?	0.40	0.27
K. Is the texture sandy loam, loam, or silty loam and the structure weak?	0.40	0.27
L. Is the texture sandy loam, loam, or silty loam and structure moderate or strong?	0.60	0.40
M. Is the texture fine sand, very fine sand, loamy fine sand, or loamy very fine sand?	0.40	0.27

N. Is the texture loamy sand or sand?	0.80	0.53
O. Is the texture coarse sand?	1.20	site-specific SAR required

d. Absorption system laterals designed to receive equal flows of wastewater shall have approximately the same absorption area. Many different designs may be used in laying out absorption systems, the choice of design depending on the size and shape of the available area, the capacity required, and the topography of the disposal site.

e. In gravity-flow absorption systems with multiple distribution lines, the sewer pipe from the septic tank shall not be in direct line with any one of the distribution lines, except where drop boxes or distribution boxes are used.

f. Any section of distribution line laid with non-perforated pipe shall not be considered in determining the required absorption area.

g. Absorption systems may be machine excavated provided that the soil in the bottom and sides of the excavation is not compacted. Strict attention shall be given to protect the natural absorption properties of the soil. For instance, absorption systems shall not be excavated when the soil is wet enough to smear or compact easily. Also, open absorption system excavations shall be protected from surface runoff to prevent the entrance of silt and debris. If it is necessary to walk in the excavation, a board laid temporarily on the bottom should prevent damage from excessive compaction, although some smearing damage is likely to occur. All smeared or compacted surfaces should be raked to a depth of one inch, and loose material removed, before the filter material is placed in the absorption system excavation.

h. The top of the stone or “gravel” filter material shall be covered with an effective pervious material such as a synthetic filter fabric, unbacked fiberglass building insulation, a two-inch layer of compacted straw, or similar material, before being covered with earth backfill to prevent the infiltration of backfill into the filter material.

i. Absorption systems shall be backfilled with soil free from stones ten (10) inches or more in diameter. The first four-to-six (4-6) inches of soil backfill should be hand-filled. Distribution pipes shall not be crushed or disaligned during backfilling. The backfilled soil should be mounded slightly above the surface of the ground to allow for settlement and to prevent depressions leading to the surficial ponding of water.

j. Heavy equipment shall not be driven in or over absorption systems during construction or backfilling.

k. A diversion valve may be installed in the sewer line after the septic tank to allow the use of rotating absorption systems. Such duplicate systems may be allowed in lieu of replacement areas. The valve shall be accessible from the finished grade.

l. Installation in Sloping Ground: The construction of absorption systems on slopes in excess of fifteen percent (15%) but not greater than twenty-five percent (25%) may be allowed if subsoil profiles indicate the absence of restrictive layers of soil, and that there is at least ten (10) feet of undisturbed earth measured horizontally from the bottom of the distribution line to the ground surface. Where the addition of fluids is foreseen to create an unstable slope, absorption systems will be prohibited.

m. Replacement Area for an Absorption System: Adequate and suitable land shall be reserved and kept free of permanent structures, traffic, or adverse soil modification for the complete replacement of each absorption system.

2. Standard Absorption Trenches: Standard trenches consist of a series of trenches designed to distribute septic tank effluent into the perforated pipe and gravel fill from which the effluent percolates through the trench walls and bottoms into the surrounding subsurface soil. The following requirements must be met:

a. The effective absorption area of standard trenches shall be considered as the total bottom area of the excavated trench system in square feet.

b. The minimum required effective absorption area for standard trenches shall be determined per Section 407(D)(1)(a).

c. The design and construction of standard trenches shall be as specified in Table 4.

d. The stone or "gravel" fill used in absorption trenches shall consist of crushed stone, gravel, or similar material, ranging from one half (½) to two-and-one-half (2½) inches in diameter. It shall be free from fines, dust, sand, or organic material; durable; and resistant to slaking and dissolution.

TABLE 4
STANDARD ABSORPTION TRENCH DESIGN CRITERIA

Standard Trench	**Minimum**	**Maximum**
number of trenches	1 (2 recommended)	-----
length of trench(es)[1]	-----	100 feet
bottom width of trench	12 inches	36 inches

trench absorption area (sq. ft. of absorption area per linear foot of trench)	-----	11 sq. ft.
depth of cover over aggregate material surrounding disposal pipe	9 inches	24 inches[2]
thickness of aggregate material over disposal pipe	2 inches	2 inches
thickness of aggregate material under disposal pipe	12 inches	-----
slope of disposal pipe	level	level
disposal pipe diameter	3 inches	4 inches
spacing of trenches (between nearest side walls)	2 × effective depth[3] or 5 feet, whichever greater	-----

Notes:

1. If unequal trench lengths are used, proportional distribution of wastewater is required.
2. For more than twenty-four (24) inches, SDR-35 or equivalent strength pipe is required.
3. The effective depth is the distance between the bottom of the disposal pipe and the bottom of the trench bed.

3. Absorption Beds: Absorption beds consist of large excavated areas, usually rectangular, provided with "gravel" filter material in which two (2) or more distribution lines are laid. They may be used in lieu of other approved absorption systems where conditions justify, and shall conform to the requirements applying to standard absorption trenches, except as follows:

   a. The effective absorption area of absorption beds shall be considered as the total bottom area of the excavation.

   b. The minimum required effective absorption area for absorption beds shall be determined per § 407(D)(1)(a).

   c. The design and construction of absorption beds shall be as specified in Table 5.

   d. Absorption beds should be installed where the slope of the ground surface is relatively level, sloping no more than about six (6) inches from the highest to the lowest point in the installation area. The bottom of the entire absorption bed shall be essentially level, at the same elevation, and the distribution pipes shall be interconnected to produce a continuous system.

TABLE 5
ABSORPTION BED DESIGN CRITERIA

Gravity Beds	**Minimum**	**Maximum**
number of disposal pipes	2	-----
length of bed	-----	100 feet
distance between disposal pipes	4 feet	6 feet
spacing of beds measured between nearest sidewalls	2 × effective depth[1] or 5 ft whichever greater	-----
width of bed	10 feet	12 feet
distance from disposal pipe to sidewall	3 feet	3 feet
depth of cover over disposal pipe	9 inches	14 inches
thickness of aggregate material under disposal pipe	12 inches	-----
thickness of aggregate material over disposal pipe	2 inches	2 inches
slope of disposal pipe	level	level
disposal pipe diameter	3 inches	4 inches
Note: 1. The effective depth is the distance between the bottom of the disposal pipe and the bottom of the trench bed.		

4. Gravelless Trenches: Gravelless trenches consist of the installation of proprietary pipe and geocomposite or open bottom chamber instead of the distribution pipe and aggregate fill used in standard trenches. Gravelless trenches may be used if suitable gravel is unavailable or unduly expensive. The following requirements shall be met:

   a. The top of the gravelless disposal pipe or similar disposal mechanism is at least six (6) inches below the surface of the native soil, and twelve to thirty-six (12-36) inches below finished grade if an approved fill is placed on top of the installation.

   b. Backfill shall be placed in a manner to prevent settlement and ponding of rainfall over the trenches.

   c. The disposal pipe shall be constructed of material that will not decay, deteriorate, or leach chemicals or byproducts when exposed to sewage or the subsurface soil environment.

   d. Installation of disposal pipe or chamber shall follow the manufacturer's instructions, which shall be submitted for the Director's review and approval.

5. Individual Lagoons: Individual lagoons may be built in lieu of trenches and absorption beds if the SAR is very low, thus requiring an extremely large drainfield. These lagoons may be lined or unlined depending on site conditions. The dikes must be stable and prevent surface runoff. The lagoons must be fenced for safety.

6. Seepage Pits/Cesspools: Seepage pits and cesspools are prohibited on the Navajo Nation. U.S. Environmental Protection Agency publications (for example, EPA 909-F-01-001, "Seepage Pits May Endanger Ground Water Quality," April 2001) provide information about the hazards posed by these disposal systems.

7. Other methods of effluent disposal from septic tanks may be permitted by the Director on a case-by-case basis.

E. Setback Distance: The following minimum setbacks must be provided, and any necessary easements obtained, when locating septic tanks, absorption systems, or individual lagoons:

TABLE 6
MINIMUM SETBACKS

Setback Distance from . . .	**. . . to Septic Tank**	**. . . to Drainfield**	**. . . to Individual Lagoon**
public water well[1]	100 feet	100 feet	100 feet
property lines	10 feet	10 feet	25 feet
House	5 feet	10 feet	300 feet
water line[2]	10 feet	25 feet	100 feet
perennial/intermittent stream	100 feet	100 feet	100 feet
lake, reservoir, canal	100 feet	100 feet	100 feet
wash[3]	50 feet	50 feet	50 feet

Notes:
1. Per NNPDWR § 1506(D)(1)(a).
2. Per NNPDWR § 1508(D).
3. May be reduced to twenty-five (25) feet if natural or constructed erosion protection available.

F. Recommended Inspection and Maintenance:

1. Septic tanks should be cleaned before too much sludge or scum is allowed to

accumulate and seriously reduce the tank volume settling depth. If either the settled solids or floating scum layer accumulate too close to the bottom of the outlet baffle or the sanitary tee pipe, solid particles will overflow into the absorption system and eventually clog the soil, thus ruining its absorption capacity.

2. A septic tank that receives normal loading should be inspected at yearly intervals to determine if it needs emptying. Although there are wide differences in the rate that sludge and scum accumulate, a septic tank for a private residence will generally require cleaning every three to five years. Actual measurement of scum and sludge accumulation is the only sure way to determine when a tank needs to be cleaned. Experience with a particular system may indicate the desirability of longer or shorter intervals between inspections. Scum and sludge (solids) accumulations can be measured as follows:

    a. Scum can be measured with a long stick to which a weighted flap has been hinged, or any device that can be used to determine the bottom of the scum mat. The stick is forced through the scum, the hinged flap falls into a horizontal position, and the stick is lifted until resistance from the bottom of the mat is felt. With the same tool, the distance to the bottom of the outlet device can be found.

    b. Sludge can be measured with a long stick wrapped with rough white toweling, which is lowered into the bottom of the tank. The stick should be narrow enough in diameter so it can be lowered through the outlet device to avoid scum particles. After several minutes, if the stick is carefully removed, the height to which the solids have built up can be distinguished by black particles clinging to the toweling.

3. The tank should be pumped out if either the bottom of the floating scum mat is within three (3) inches of the bottom of the outlet device or the sludge level has built up to approximately twelve (12) inches from the bottom of the outlet device. Little long-term benefit is derived by pumping out only the liquid waste in septic tanks. All three (3) wastewater components (scum, sludge, and liquid waste) should be removed. Tanks should not be washed or disinfected after pumping. A small amount of sludge should be left in the tank for seeding purposes.

4. If multiple tanks or tanks with multiple compartments are in use, care should be taken to ensure that each tank or compartment is inspected and cleaned.

5. The digestion of sewage solids gives off explosive, asphyxiating gases. Therefore, extreme caution should be observed if entering a tank for cleaning, inspection, or maintenance. Forced ventilation or oxygen masks and a safety harness should be used.

6. Immediate replacement of broken-off inlet or outlet fittings in the septic tank is essential for the system's effective operation. On occasion, paper and solids become compacted in the vertical leg of an inlet sanitary tee. Corrective measures include

replacement with a nonplugging sanitary tee of wide sweep design or a baffle.

7. Following septic tank cleaning, the interior surfaces of the tank should be inspected with a strong light for leaks or cracks. Distribution boxes, if provided, should be inspected and cleaned at the same time that the septic tank is cleaned.

8. The owner of an on-site wastewater treatment system should keep a written record of all cleaning and maintenance to the septic tank and absorption system.

9. The functional operation of septic tanks is not improved by the addition of yeasts, disinfectants or other chemicals, and therefore use of these materials is not recommended.

10. Waste brine from water softening units, soaps, detergents, bleaches, drain cleaners, and other similar materials, as normally used in a home or small commercial establishment, will have no appreciable adverse effect on a conventional system. If the septic tank is adequately sized as required, the available dilution factor will suffice to overcome any harmful effects that might otherwise occur.

11. The economic use of water helps prevent the overloading of a conventional system, which could shorten its life and necessitate expensive repairs. Plumbing fixtures should be checked regularly to find and repair any leaks which can add substantial amounts of water to the system. Industrial wastes, and other liquids that may adversely affect the operation of the on-site wastewater disposal system, should not be discharged into one. Paper towels, facial tissue, newspaper, wrapping paper, disposable diapers, sanitary napkins, coffee grounds, rags, sticks, and similar materials also should be excluded from the septic tank because they do not readily decompose, and can clog both the plumbing and the absorption system.

12. Crushed, broken, or plugged distribution pipes should be replaced immediately.

G. Closure: When a dwelling served by an on-site wastewater treatment system is connected to a public sewer, the on-site wastewater treatment system shall be closed. Additionally, the Director may order the closure of a discontinued or abandoned on-site wastewater treatment system.. Closure must meet the following requirements:

1. Sewage from the onsite wastewater treatment system shall be removed and disposed of in a lawful manner.

2. Electrical and mechanical components shall be disconnected and removed.

3. The top of any tank or containment structure shall be removed or collapsed, and a hole shall be punched in the bottom of the tank or containment structure if the bottom lies below the seasonal high groundwater table.

4. The tank or containment structure, or any cavity resulting from its removal, shall be

filled with earth, sand, gravel, concrete, or other approved material.

5. The ground surface shall be re-graded to drain away from the closed area.

6. Both ends of the abandoned sewer pipe between the building and the septic tank shall be cut and plugged.

7. Written notification, providing the details of closure, shall be submitted to the Director within (30) thirty days of the closure, as provided by Section 201(F).

§ 408. Percolation Tests

Percolation testing and the submittal of test results shall comply with the procedures described in this section. An alternative but equivalent test method may be approved by the Director on a case-by-case basis.

A. Percolation tests shall be performed at points and elevations selected as typical of the area in which the absorption system will be located. Consideration should be given to the finished grades of building sites so that the test results will represent the percolation rate of the soil in which the absorption systems will be located. After the suitability of an area has been evaluated, and the area has been approved for construction, no grade changes shall be made unless the Director is notified in advance and the area's suitability is re-evaluated prior to construction.

B. Percolation test reports shall include:

1. a signed statement certifying that the tests were conducted in accordance with Section §408 or the approved alternative method;

2. the name of the individual conducting the tests;

3. the date of the test(s);

4. the location of the property;

5. the depth and rate of each test in minutes per inch;

6. logs of the soil exploration pits, including descriptions of soil explorations to a depth of ten (10) feet. In the event that an absorption system will be deeper than six (6) feet, soil exploration must extend to a depth of at least four (4) feet below the bottom of the proposed absorption system;

7. a statement of the present and anticipated maximum groundwater table; and

8. all other factors affecting the percolation test results.

C. Percolation tests shall be conducted by or under the supervision of a qualified person such as a licensed environmental health scientist, or a civil, environmental or geotechnical engineer registered in Arizona, New Mexico, or Utah, in accordance with the following criteria:

1. Conditions Prohibited for Test Holes: Percolation tests shall not be conducted in test holes that extend into groundwater, bedrock, or frozen ground.

2. Soil Exploration Pit Prerequisite to Percolation Tests: Because the appropriate percolation test depth depends on the soil conditions at a specific site, a percolation test should be conducted only after a soil exploration pit has been dug and examined for suitable, porous strata and groundwater table information. Percolation test results should be related to the soil conditions found.

3. Number and Location of Percolation Tests: One or more tests shall be made in separate test holes on the site of the proposed absorption system to ensure that the results are representative of the soil conditions present.

4. Test Holes to Commence in Specially-Prepared Excavations: All percolation test holes should commence in specially-prepared larger excavations (preferably made with a backhoe), of sufficient size, which extend to a depth approximately six (6) inches above the strata to be tested.

5. Type, Depth, and Dimensions of Test Holes: Test holes shall be dug or bored, preferably with hand tools such as shovels, augers, or the like, and shall have horizontal dimensions ranging from four (4) to eighteen (18) inches (preferably eight to twelve (8-12) inches). The vertical sides of the test holes shall be at least twelve (12) inches deep, terminating at an elevation six (6) inches below the bottom of the proposed absorption system or unlined lagoon.

6. Preparation of Percolation Test Hole: The bottom and sides of the hole shall be carefully roughened or scratched with a knife blade or other sharp-pointed instrument in order to remove any smeared soil surfaces and to provide an open, natural soil interface into which water may percolate. All loose soil is to be removed from the bottom of the hole. The addition of two to three (2-3) inches of clean coarse sand gravel will protect the bottom of the hole from scouring or sealing with sediment when water is added. Caving or sloughing in some test holes can be prevented by placing a wire cylinder or perforated pipe in the test hole, and surrounding it with clean coarse gravel.

7. Saturation and Swelling of the Soil: It is important to distinguish between saturation and swelling. Saturation means that the void spaces between soil particles are full of water. This can happen in a relatively short period of time. Swelling, however, is a soil volume increase caused by the intrusion of water into the individual soil particles. This is a slow process, especially in clay-type soil, and is the reason for requiring a prolonged swelling period, as in Paragraph (11) below.

8. Placing Water in Test Holes: Water should be placed carefully into the test holes by means of a small-diameter siphon hose or other suitable method to prevent the sides of the hole from washing down.

9. Percolation Rate Measurement: The necessary equipment may consist of a timepiece and a tape measure (with at least one-sixteenth-inch (1/16-inch) calibration) or a float gauge. All measurements shall be made from a fixed reference point (near the top of the test hole) to the surface of the water.

10. Test Procedure for Sandy or Granular Soils: For tests in sandy or granular soils containing little or no clay, the hole shall be carefully filled with clear water to a minimum depth of twelve (12) inches above the gravel, and the time for this amount of water to seep away shall be measured. The procedure shall be repeated. If the water from the second filling of the hole, also at least twelve (12) inches above the gravel, seeps away in ten (10) minutes or fewer, the test may proceed immediately as follows:

    a. Water shall be added to a point not more than six (6) inches above the gravel.

    b. Thereupon, from the fixed reference point, water levels shall be measured and recorded at ten (10) minute intervals for a period of one (1) hour.

    c. If six (6) inches of water seeps away in fewer than ten (10) minutes a shorter time interval between measurements shall be used, but in no case shall the water depth exceed six (6) inches.

    d. The drop that occurs during the final measurement period shall be used to calculate the percolation rate.

11. Test Procedure for Other Soils Not Meeting the Above Requirements: The hole shall be carefully filled with clear water and a minimum depth of twelve (12) inches shall be maintained above the gravel for at least four (4) hours by refilling whenever necessary. Water remaining in the hole after four (4) hours shall not be removed. Immediately following this saturation period, the soil shall be allowed to swell not fewer than sixteen (16) hours and not more than thirty (30) hours. Immediately following this soil swelling period, percolation rate measurements shall be made using the following procedures:

    a. Any soil which has sloughed into the hole shall be removed, and the water shall be adjusted to six (6) inches over the gravel.

    b. Thereupon, from the fixed reference point, water levels shall be measured and recorded at approximately thirty-minute (30-minute) intervals over four (4) hours unless two (2) successive water level drops do not vary more than one-sixteenth (1/16) of an inch and thus indicate that an approximate stabilized rate has been obtained.

c. The hole shall be filled with clear water to a point not more than six (6) inches above the gravel whenever it becomes nearly empty.

d. Adjustments of the water level shall not be made during the last three (3) measurement periods except to the water level at the beginning of the immediately preceding measurement period.

e. When the first six (6) inches of water seep away in fewer than thirty (30) minutes, the time intervals between measurements shall be ten (10) minutes, and the test run for one (1) hour.

f. The water depth shall not exceed six (6) inches at any time during the measurement period.

g. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

12. Calculation of Percolation Rate: The percolation rate is equal to the time elapsed in minutes for the water column to drop, divided by the distance the water dropped in inches and fractions thereof.

13. Using Percolation Rate to Determine Absorption Area: The minimum or slowest percolation rate shall be used in calculating the required absorption area.