250-RICR-150-05-3

TITLE 250 – DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

CHAPTER 150 – WATER RESOURCES

SUBCHAPTER 05 – WATER QUALITY

PART 3 – Groundwater Quality Rules

3.1 Purpose

It is the purpose of these Rules to protect and restore the quality of the state's groundwater resources for use as drinking water and other beneficial uses, and to assure protection of the public health and welfare and the environment.

3.2 Authority

These rules are promulgated pursuant to the requirements and provisions of R.I. Gen. Laws Chapters 46-12, Water Pollution; 46-13.1, Groundwater Protection; 23-18.9, Refuse Disposal; 23-19.1, Hazardous Waste Management Act: 42-17.1, Environmental Management; 42-17.6, Administrative Penalties for Environmental Violations; in accordance with 42-35, Administrative Procedures.

3.3 Liberal Application

The terms and provisions of these rules shall be liberally construed to allow the Department to effectuate the purposes of state and federal laws, goals, and policies.

3.4 Severability

If any provision of these rules, or the application thereof to any person or circumstances, is held invalid by a court of competent jurisdiction, the validity of the remainder of the rules shall not be affected thereby.

3.5 Applicability

A. These rules apply to all of the groundwater of the state.

B. Persons subject to these rules may also be subject to other regulations of the Department and may also be subject to federal regulations. Obligations of facility owners and facility operators hereunder shall be joint and several.

C. These rules shall be construed in harmony with other Department regulations and the regulations of federal agencies. Nothing in these rules shall affect the Director's power and duty to issue or require any form of groundwater monitoring,

groundwater remediation, enforcement action or other action pursuant to any other regulatory program administered or enforced by the Director.

D. Construction Standards for Monitoring Wells: Monitoring wells installed pursuant to these rules shall be in compliance with the construction standards in § 3.22 of this Part.

E. Abandonment procedures: Private drinking water wells, monitoring wells, piezometers and other subsurface borings shall be abandoned in accordance with the procedures in § 3.22 of this Part.

F. The Director may require any facility owner or operator subject to these rules to provide any information deemed necessary to determine compliance with these rules. Failure to disclose such information shall be cause for initiating appropriate enforcement action and shall constitute valid cause for denial of any Departmental approvals under these rules or the suspension of any approval issued hereunder.

G. Nothing in these rules shall affect the Director's power and duty to issue an immediate compliance order or take any other action pursuant to the R.I. Gen. Laws.

3.6 Incorporated Materials

A. These Regulations hereby adopt and incorporate American Society of Testing Materials C150/C150M-18, Standard Specification for Portland Cement, ASTM International, West Conshohocken, PA (2018) by reference, not including any further editions or amendments thereof and only to the extent that the provisions therein are not inconsistent with these Regulations.

B. These Regulations hereby adopt and incorporate 40 C.F.R. §§ 141.60 through 141.66, and § 141.80 (2021~~2018~~) by reference, not including any further editions or amendments thereof and only to the extent that the provisions therein are not inconsistent with these Regulations.

3.7 Definitions

A. As used in these rules, the following terms shall, where the context permits, be construed as follows:

1. "Annular space seal" means the material placed above the top of the filter pack or the filter pack seal up to the ground surface seal and between the well casing and the adjacent formation.

2. "Aquifer" means a geologic formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.

3. "Bedrock" means solid rock, commonly called ledge, which forms the earth's crust, including fracture zones within said rock.

4. "Best management practices" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices designed to prevent or reduce the degradation of the state's groundwater to the maximum extent possible.

5. "Community water supply well" means a well that serves a community water system.

6. "Community water system" means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

7. "Degradation" means a deterioration or decline in groundwater quality.

8. "Department" means the Rhode Island Department of Environmental Management or its successor.

9. “Direct push well” means a well that is advanced into the subsurface without drilling.

10. "Director" means the Director of the Rhode Island Department of Environmental Management or the Director's designee.

11. "Discharge to groundwater" means the intentional, negligent, accidental, or other release of any pollutant onto the land surface in a location where it may enter the groundwater of the state, or such release of any pollutant beneath the land surface.

12. "Effluent" means liquid that is discharged from a facility.

13. "Emergency response" means any action undertaken immediately following the discovery of a release in order to completely or partially contain, clean up or treat the released material to prevent an immediate or substantial threat or risk of acute or chronic adverse effect on human health or to prevent an immediate or substantial significant adverse impact to the environment.

14. "Facility" means any parcel of real estate or a contiguous series or parcels of real estate together with any and all structures, facility components, improvements, fixtures and other appurtenances located therein or thereon which constitutes a distinct geographic unit.

15. "Filter pack" means the sand, gravel, or both placed in direct contact with the well screen.

16. "Filter pack seal" means the sealing material placed in the annular space above the filter pack and below the annular space seal to prevent the migration of annular space sealant into the filter pack.

17. "Groundwater" means water found underground which completely fills the open spaces between particles of sediment and within rock formations.

18. "Groundwater quality classification" means the categorization of groundwater as usable for particular purposes on the basis of its physical, chemical, and hydrogeologic characteristics; also, the particular class (GAA, GA, GB, or GC) assigned to a particular volume of groundwater within specific geographic boundaries.

19. "Groundwater quality standards" means concentrations of specific chemical, biological, and radiological constituents and narrative statements which describe the quality of groundwater which shall be met in a particular groundwater quality classification.

20. "Groundwater reservoirs" means those stratified drift deposits having a saturated thickness greater than or equal to 40 feet and a transmissivity greater than or equal to 4000 feet squared per day which have been designated by the Director to be potentially significant sources of water.

21. “Grout” means a low permeability material consisting of bentonite, neat cement or a neat cement-bentonite mixture.

22. "Hazardous waste" means hazardous waste as defined in the Rhode Island Department of Environmental Management Rules and Regulations for Hazardous Waste Management Part 140-10-1 of this Title.

23. "Hydraulic conductivity" means a measure of the ability of an aquifer to transmit a fluid; it is expressed as the volume of water at the existing kinematic viscosity that will move in a unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

24. "Licensed solid waste landfill" means any solid waste disposal facility consisting in whole or in part of a landfill, which facility is operating pursuant to a valid department license issued pursuant to a final action of the Director as to which all applicable appeals periods have expired.

25. "Monitoring well" means a well that is specifically located, designed, constructed, and emplaced to sample groundwater quality; the monitoring well may also be used to measure water table elevations.

26. "Monitoring well abandonment" means to remove a monitoring well from service in such a manner that vertical movement of water within the well

bore and within the annular space surrounding the well casing is effectively and permanently prevented.

27. “Neat cement” means a mixture of Portland cement (American Society of Testing Materials C150 Standard Specification for Portland Cement, incorporated above at § 3.6(A) of this Part) and water in the proportion of 5 to 6 gallons of clean water per bag (94 pounds or 1 cubic foot).

28. “Neat cement-bentonite mixture” means a mixture of 6 to 7 gallons of water per 94-pound bag of Portland cement (American Society of Testing Materials C150 Standard Specification for Portland Cement, incorporated above at § 3.6(A) of this Part) with up to 10% (by dry weight of cement) of unaltered dry bentonite powder added after the initial mixing of cement and water.

29. “Non-aqueous phase liquid” means any pollutant that is present as a separate phase liquid, including, but not limited to sheens.

30. "Non-community water supply well" means a well that serves a non-community water system.

31. "Non-community water system" means a public water system that is not a community water system.

32. "Non-transient non-community water supply well" means a well that serves a non-transient non-community water system.

33. "Non-transient non-community water system" means a non-community water system that regularly services at least 25 of the same persons over six months per year.

34. "Onsite wastewater treatment system" means any system of piping, tanks, dispersal areas, alternative toilets or other facilities designed to function as a unit to convey, store, treat or disperse wastewater by means other than discharge into a public sewer system.

35. "Operator" means any person or persons having control or having legal responsibility for operating or maintaining any facility, which is subject to these rules.

36. "Owner" means any person who holds exclusive or joint title to, or lawful possession of real or personal property, which is subject to these rules.

37. "Person" means an individual, trust, firm, joint stock company, corporation (including a quasi-governmental corporation), partnership, association, syndicate, municipality, municipal or state agency, fire district, club, non-profit agency, or any subdivision, commission, department, bureau, agency or department of state or federal government (including quasi-

governmental corporation), or any interstate or international body, or any agent or employee thereof.

38. “Petroleum” means crude oil, any fraction of crude oil, any substance refined or derived from crude oil, or any mixture thereof, including, but not limited to, gasoline, petroleum solvents, kerosene, aviation fuels, diesel oils, fuel oils, waste oils, lubricants, tar and asphalt.

39. "Piezometer" means a well with a short screen that allows measurement of the water level at a particular depth in the aquifer.

40. "Pollutant" means any material or effluent which may alter the chemical, physical, biological, or radiological characteristics and/or integrity of water, including but not limited to, dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, cellar dirt or industrial, municipal, agricultural, or other waste or material, petroleum or petroleum products, including but not limited to oil.

41. "Pollutant discharge zone" means a departmentally designated, three-dimensional zone within which the pollutant concentrations resulting from an active discharge to groundwater are allowed to be greater than the groundwater quality standards.

42. "Pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

43. "Preventive action limit" means a concentration of a substance that is equal to 50% of the numerical groundwater quality standard.

44. "Private well" means a well that is established to meet all or part of a person's potable water needs provided said well does not supply a public water system.

45. "Public water system" means a system for the provision to the public of piped water for human consumption, provided such a system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year; and shall include all sources and facilities involved in collecting, treating, storing, and distributing the water.

46. "Public well" means a well that serves a public water system.

47. "Recharge area" means the land surface from which water is added to the zone of saturation. The recharge area for a particular well or aquifer, for instance, is that land surface from which water moves to the well or aquifer or may move to the well or aquifer under certain hydraulic conditions.

48. "Release" means any spilling, leaking, pumping, pouring, emitting, emptying, injecting, escaping, leaching, dumping, or disposing of any pollutant onto or below the land surface. For purposes of these Rules, release also includes any storage, disposal, or abandonment of any substance or material in a manner that presents a substantial threat of release as herein defined.

49. "Remediation" means prevention and control of pollutant migration to, within, or from the groundwater or the removal of a pollutant from the groundwater.

50. "Residual zone" means a departmentally designated, three-dimensional zone within which the pollutant concentrations remaining in the groundwater after remediation activities are allowed to be greater than the groundwater quality standards.

51. "Sanitary sewage" means any human or animal excremental liquid or substance, any putrescible animal or vegetable matter or any garbage and filth, including, but not limited to, any gray water or black water discharged from toilets, washing machines, sinks and dishwashers as well as the content of septic tanks, cesspools, or privies.

52. "Saturated thickness" means the thickness of an aquifer measured from the water table to an essentially impermeable boundary; such boundary is typically taken to be the top of the bedrock surface.

53. "Saturated zone" means the subsurface zone in which all open spaces are filled with water.

54. "Sludge" means residue, whether partially solid or solid, treated or untreated, resulting from the treatment of sewage, including, without limitation, such residues from the cleaning of sewers, by processes, such as settling, flotation, filtration and centrifugation, and shall not meet the criteria for a hazardous waste as found in the Rhode Island Department of Environmental Management Rules and Regulations for Hazardous Waste Management, Part 140-10-1 of this Title.

55. "Sole source aquifer" means an aquifer designated by the United States Environmental Protection Agency as the sole or principal source of drinking water for the area above the aquifer and including those lands where the population served by the aquifer live; that is, an aquifer which is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should the aquifer become polluted.

56. "Solid waste" means solid waste as defined in the Rhode Island Department of Environmental Management Solid Waste Regulations No.1 through No.8 Parts 140-05-1 through 8 of this Title; and which shall

include garbage, refuse and other discarded solid materials generated by residential, institutional, commercial, industrial and agricultural sources but does not include solids or dissolved materials in domestic sewage or sewage sludge, nor does it include hazardous waste. Solid waste shall also include non-hazardous liquid, semi-solid, and containerized gaseous waste.

57. "Static water table" means the water table under natural, non-pumping conditions.

58. "Stratified drift" means predominantly sorted sediments deposited in layers by meltwater from a glacier.

59. "Till" means predominantly unsorted, unstratified sediments deposited directly by a glacier.

60. “Transient non-community water supply well” means a well that serves a transient non-community water system.

61. “Transient non-community water system” means a non-community water system that does not regularly serve at least 25 of the same persons over 6 months per year.

62. "Transmissivity" means a measure of the ability of an aquifer to transmit a fluid through a unit volume of the aquifer. It can be quantified as the hydraulic conductivity multiplied by the saturated thickness.

63. "Unconfined aquifer" means an aquifer that is not under pressure beneath a relatively impermeable layer. The groundwater in an unconfined aquifer is under atmospheric pressure, and its upper surface is the water table.

64. “Watercourse” means any river, stream, brook, pond, lake, swamp, marsh, bog, fen, wet meadow, area subject to storm flowage, or any other standing or flowing body of water, including such watercourses that may be affected by the tides.

65. "Water table" means the upper surface of the saturated zone in an unconfined aquifer.

66. "Well" means a bored, drilled, or driven shaft or a dug hole, with a depth that is greater than its largest surface dimension, through which groundwater flows, has flowed, or may flow under natural or induced pressure.

67. "Wellhead protection area" means the critical portion of a three-dimensional zone surrounding a public well or wellfield through which water will move toward and reach such well or wellfield as designated by the Director.

3.8 Prohibitions and Other General Requirements

A. Groundwater shall be maintained at a quality consistent with its classification. No person shall take actions that violate or cause to violate the standards established in these rules.

B. No person shall cause or allow a discharge of any pollutant to groundwater without the approval of the Director pursuant to these and other Department Rules and Regulations.

C. No person shall operate or maintain a facility in a manner that may result in a discharge of any pollutant to groundwater without the approval of the Director.

D. The establishment of new solid waste landfills is prohibited in areas where the groundwater is classified GAA or within a wellhead protection area designated in accordance with § 3.16 of this Part.

E. The establishment of new facilities that are required to be permitted as treatment, storage or disposal facilities or require Letters of Authorization for temporary storage and/or transfer areas of hazardous waste pursuant to the Rhode Island Rules and Regulations for Hazardous Waste Management Part 140-10-1 of this Title is prohibited within the areas listed below in §§ 3.8(E)(1) through (3) of this Part. This prohibition does not apply to the following: generators of hazardous waste as defined in the Rhode Island Rules and Regulations for Hazardous Waste Management Part 140-10-1 of this Title; emergency permits for the treatment of hazardous waste under the Rhode Island Rules and Regulations for Hazardous Waste Management Part 140-10-1 of this Title; and treatment of hazardous waste as part of an emergency permit or a remedial action approved pursuant to the Part 140-30-1 of this Title.

1. Where the groundwater is classified GAA;

2. Within a wellhead protection area designated in accordance with § 3.16 of this Part; and

3. Within areas where the groundwater is classified GA where public water is not available to all surrounding properties.

F. The establishment of new facilities or new locations for the temporary or permanent storage of road salt or salt/sand mixtures is prohibited where the groundwater is classified GAA or GA unless the storage meets the following conditions:

1. Within a weatherproof structure if the pile is larger than 100 cubic yards, otherwise a secured, durable, waterproof covering is sufficient;

2. On an impermeable base; and

3. Runoff from the operational area around the salt or salt/sand storage is controlled by best management practices.

G. At locations where road salt or salt/sand mixtures have been stored annually over groundwater classified GAA or GA prior to April 17, 2005, storage of road salt or salt/sand mixtures at these locations must, at minimum be covered with a secured, durable, waterproof cover to protect the salt from precipitation.

H. No person shall install underground storage tanks (as defined in the Rhode Island Rules and Regulations for Underground Storage Facilities Used for Petroleum Products and Hazardous Materials) within the wellhead protection area of community water supply wells designated in accordance with § 3.16 of this Part. However, such underground storage tanks that have been registered prior to October 22, 2002 and have not been abandoned or removed from the ground for more than 180 days shall be permitted to be replaced with a tank(s) of equivalent size or less, and substance stored in accordance with the provisions of the Rhode Island Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials, Part 140-25-1 of this Title.

3.9 Groundwater Classification

A. Definitions: The Director shall classify the groundwater resources of Rhode Island using the four classes established in R.I. Gen. Laws Chapter 46-13.1 and which are further defined below:

1. Groundwater classified GAA shall be those groundwater resources which the Director has designated to be suitable for public drinking water use without treatment and which are located within the areas described in §§ 3.9(A)(1)(a) through (c) of this Part below.

   a. Groundwater reservoirs and portions of their recharge areas as delineated by the Department.

   b. Wellhead protection areas for community water supply wells delineated in accordance with § 3.16 of this Part. Wellhead protection areas for community water supply wells will by definition be considered reclassified to GAA at the time of approval of the community water supply well by the Rhode Island Department of Health.

   c. Groundwater dependent areas that are physically isolated from reasonable alternative water supplies and where the existing groundwater supply warrants the highest level of protection. Block Island is the only area currently designated pursuant to this provision.

2. Groundwater classified GA shall be those groundwater resources which the Director has designated to be suitable for public or private drinking water use without treatment and which are not described in §§ 3.9(A)(1)(a) through (c) of this Part.

3. Groundwater classified GB shall be those groundwater resources designated by the Director which may not be suitable for public or private drinking water use without treatment due to known or presumed degradation. Groundwater located beneath the following areas may be classified GB:

   a. Highly urbanized areas of the state with dense concentrations of historic industrial and commercial activity, wherein a public water supply is readily available;

   b. The permanent waste disposal area as approved by the Director in accordance with the Part 140-30-1 of this Title at the sites of historically permitted or approved inactive landfills and inactive land disposal sites for solid waste, hazardous waste, or sewage sludge;

   c. Active sites that are permitted for the land disposal of sewage sludge, unless such disposal site is associated with a licensed solid waste landfill; or

   d. The area immediately surrounding the area classified GB in accordance with §§ 3.9(A)(3)(b) and (c) of this Part which the Director has determined is not suitable for public or private drinking water use or the area immediately surrounding the area classified GC in accordance with § 3.9(A)(4) of this Part, which the Director has determined is not suitable for public or private drinking water use.

4. Groundwater may be classified GC in those areas which, because of present or past land use or hydrogeological conditions, the Director has determined to be more suitable for certain waste disposal practices than for development as a drinking water supply.

   a. Groundwater located beneath the following areas may be classified GC:

      (1) At licensed solid waste landfills -- The currently permitted area for waste disposal as established in a valid operating license issued by the Department, including a license issued pursuant to a court order;

      (2) At licensed solid waste landfills -- Areas surrounding the permitted area for waste disposal that the Director determines are potentially suitable for waste disposal based

on the hydrogeologic environment, groundwater quality, groundwater use off-site, and surrounding surface water quality and use; and

(3) Areas that have been reclassified pursuant to § 3.10(F) of this Part for solid waste landfills and facilities for the disposal of hazardous waste.

b. At the point in time when a license for a solid waste landfill or facility for the disposal of hazardous waste has lapsed or the facility is no longer being operated, then by definition the site shall be considered reclassified to GB, unless the Director determines that the GC classification is appropriate for the site.

B. Classification Boundary Disputes: If the boundaries of the groundwater classification areas shown on groundwater classification maps produced by the Department are in dispute, the burden of proof shall be on the person disputing the boundary locations as shown on such map to show, pursuant to § 3.10 of this Part, that the boundary locations are incorrect. In determining the accuracy of the Director's delineations, the regional hydrogeologic conditions beyond the boundaries of the specific site in question and the seasonal fluctuations in the water table shall be considered.

C. The Director shall adopt groundwater classification maps designating groundwater classification pursuant to these rules. See § 3.23 of this Part for a statewide map showing groundwater classifications. Groundwater classifications can be viewed in greater detail on the DEM website at www.dem.ri.gov.

3.10 Modification of Groundwater Classification

A. Application for Modification of Groundwater Classification: Any person may apply to the Director to modify the classification assigned to particular groundwaters of the state. The applicant for groundwater reclassification shall submit to the Department a narrative explaining the need and justification for a reclassification, a detailed site plan, groundwater flow direction, groundwater quality data, the area to be reclassified and shall prove by clear, convincing and scientifically valid evidence that a reclassification is consistent with §§ 3.10(C) through (F) of this Part.

B. Reclassification Considerations: In evaluating a reclassification petition in accordance with §§ 3.10(C) through (F) of this Part, the Director shall consider the factors below, in addition to other relevant information, provided by the facility owner or operator for the location in question:

1. Actual or potential threats to public health or the environment;

2. Surrounding groundwater and surface water quality;

3. Surrounding groundwater and surface water quality standards;

4. Current and potential future uses of surrounding property, groundwater, and surface water;

5. Local and regional groundwater flow direction; and

6. Feasibility of groundwater remediation to a quality consistent with the standards in § 3.11 of this Part.

C. Upgrading Groundwater Classification: Where it has been proven by clear, convincing and scientifically valid evidence that the groundwater quality of an area meets the standards of a higher quality groundwater classification than the current classification or that the classification delineation pursuant to §§ 3.9(A)(2), 3.9(A)(3)(b), or 3.9(A)(3)(c) of this Part is incorrect, the Director shall initiate rule-making procedures to upgrade the groundwater classification.

D. Downgrading Groundwater Classified GAA to GA: Where it has been proven by clear, convincing and scientifically valid evidence that groundwater classified GAA is not in an area described in §§ 3.9(A)(1)(a) through (c) of this Part, the Director shall initiate rule-making procedures for reclassification of such groundwater to GA.

E. Downgrading Groundwater Classified GAA or GA to GB: The Director may initiate rule-making procedures for reclassification of groundwater to GB, provided that it has been demonstrated by clear, convincing and scientifically valid evidence that the area in question meets the criteria below:

1. Site conditions are such that the groundwater is known or presumed likely to not meet the standards for groundwater classified GAA or GA;

2. There is no use of groundwater for drinking water, and public water is readily available to all properties within the area to be reclassified to GB; and

3. The area in question is located within one of the areas described below:

a. Contiguous with an existing area classified GB pursuant to § 3.9(A)(3)(a) of this Part, provided that the land use activities in the area in question represent a similar degree of threat to groundwater quality as the contiguous area classified GB;

b. Within the permanent waste disposal area as approved by the Director in accordance with the Rhode Island Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases at sites of historically permitted or approved inactive landfills or inactive disposal sites for solid waste, hazardous waste, or sewage sludge, where the Director has

determined that groundwater remediation to drinking water quality is not feasible or practical; or

c. The area immediately surrounding the area classified GB in accordance with §§ 3.9(A)(3)(b) or (c) of this Part which the Director has determined is not suitable for public or private drinking water use or the area immediately surrounding the area classified GC in accordance with § 3.9(A)(4) of this Part, which the Director has determined is not suitable for public or private drinking water use.

F. Downgrading of Groundwater Classification to GC

1. Groundwater reclassification to GC is required for proposed sites for solid waste landfills and proposed sites for hazardous waste disposal facilities. Such facilities are the only uses for which groundwater will be reclassified to GC.

2. Groundwater reclassification to GC will not be considered until an application for a solid waste disposal license has been filed with the Department pursuant to the Solid Waste Regulations No.1 through No.8 Parts 140-05-1 through 8 of this Title; and amendments thereto, or until an application for a hazardous waste disposal facility has been filed with the Department pursuant to the Rhode Island Rules and Regulations for Hazardous Waste Management Part 140-10-1 of this Title.

3. Groundwater classified GA and GB may be reclassified to GC for proposed sites for solid waste landfills and proposed sites for hazardous waste disposal facilities. Groundwater classified GAA shall not be reclassified to GC.

4. In order to reclassify groundwater to GC, the applicant must submit to the Department a site-specific study which demonstrates by clear, convincing, and scientifically valid evidence that the groundwater quality standards for GC in § 3.11(C) of this Part will be met. The study shall include, but not be limited to, the following:

a. A locus map using the U.S. Geological Survey 7.5-minute quadrangle map;

b. Site plan at an appropriate scale (minimum scale of 1 inch equals fifty feet (1"=50')) to adequately show the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, watercourses, wells, water lines, sewer lines, onsite wastewater treatment systems and other waste disposal areas, and any other significant site features;

c. Depth to groundwater, water table elevations, hydraulic gradient, groundwater flow direction, groundwater flow velocity, and water table map;

d. Description of the unconsolidated materials (in both the unsaturated and saturated zones), including permeability, porosity, degree of stratification, and the capacity for pollutant attenuation;

e. Depth to bedrock and bedrock characteristics, to include, but not be limited to, weathering, jointing, faulting, fracture orientation and density;

f. Aquifer characteristics including saturated thickness, hydraulic conductivity, and transmissivity;

g. Groundwater quality on-site and surrounding the site;

h. The hydraulic connection between nearby surface waters and groundwater;

i. Location and distance off-site of the nearest surface water body that will receive runoff from the site and that surface water body that will receive groundwater flow from the site and the water quality classification of these surface water bodies.

j. Public and private wells:

(1) Determine the number and location of public wells within 3 miles of the site and the number and location of private wells within 1 mile of the site, or the number and location of such wells within alternative distances agreed upon by the Director;

(2) Determine or estimate the well depths;

k. Current and most probable future uses of surrounding groundwater and surface water;

l. History of site ownership and operation;

m. Volume and characteristics of the waste to be disposed of on the site;

n. Specific methods and procedures to be utilized in the construction, operation, and maintenance of the facility necessary to contain or prevent migration of pollutants;

o. Evaluation of the potential for migration of pollutants from the site and identification of potential impacts to groundwater and associated surface waters from the proposal.

3.11 Groundwater Quality Standards and Preventive Action Limits

A. Class GAA and class GA Groundwater Quality Standards: Class GAA and class GA groundwater are suitable for drinking water use without treatment, and therefore, both classes are subject to the same groundwater quality standards below in §§ 3.11(A)(1) through (4) of this Part. Exceedances of the groundwater quality standards that are determined by the Director to be caused by naturally occurring conditions will not be considered a violation of the groundwater quality standards. In those areas where the groundwater is classified GAA or GA and the groundwater does not meet the groundwater quality standards, the groundwater classification remains GAA or GA with the goal to regain compliance with the groundwater quality standards.

1. Pollutants shall not be in groundwater classified GAA or GA, except within an approved pollutant discharge zone or residual zone (as provided for in §§ 3.12(D) and (E) of this Part respectively), in any concentration which will adversely affect the groundwater as a source of safe and potable drinking water or which will adversely affect other beneficial uses of the groundwater, to include but not be limited to recreational, agricultural and industrial uses and the preservation of fish and wildlife habitat through the maintenance of surface water quality.

2. The numerical groundwater quality standards for specific substances in class GAA and class GA shall be the federal maximum contaminant levels for drinking water established by the United States Environmental Protection Agency National Primary Drinking Water Regulations 40 C.F.R. §§ 141.60 through 141.66 and § 141.80, incorporated above at § 3.6(B) of this Part. For a substance with no maximum contaminant level, the groundwater quality standard for class GAA and GA groundwater shall be determined by the Director on an interim basis in accordance with R.I. Gen. Laws § 46-13.1-4, and such standard shall be consistent with the contaminant level determined by the Rhode Island Department of Health pursuant to R.I. Gen. Laws § 46-13-10. The Department shall notify the public of such interim standard. The Department shall initiate rulemaking, pursuant to R.I. Gen. Laws § 42-35-2.7, to incorporate a standard for a substance with no maximum contaminant level into these regulations within six months of making the interim determination. The interim standard shall remain in effect until a final standard has been incorporated into these Rules. The Director has established the following GAA and GA groundwater quality standards for contaminants that do not have a maximum contaminant level established:

a. Methyl tertiary butyl ether (MTBE) -- 0.04 milligrams per liter;

b. Naphthalene -- 0.1 milligrams per liter;

c. [PFOS] +[PFOA] + [PFNA] + [PFDA] + [PFHxS] + [PFHpA] ≤ 20 nanograms per liter

Where,

PFOS = perfluorooctane sulfonate

PFOA = perfluorooctanoic acid

PFNA = perfluorononanoic acid

PFDA = perfluorodecanoic acid

PFHxS = perfluorohexane sulfonic acid

PFHpA = perfluoroheptanoic acid

~~c. Perfluorooctanoic Acid (PFOA) -- 0.07 micrograms per liter;~~

~~d. Perfluorooctane Sulfonate (PFOS) -- 0.07 micrograms per liter; and~~

~~e. Total of PFOA and PFOS -- 0.07 micrograms per liter.~~

3. Pollutants shall not be in groundwater classified GAA or GA that exceed levels which the Director has determined render the groundwater so impaired for taste, odor or color that a person cannot reasonably be expected to consume or otherwise use it.

4. Groundwater classified GAA and GA shall be of a quality which the Director determines does not violate or have any reasonable potential to cause a violation of surface water quality standards established by the Rhode Island Water Quality Regulations Part 1 of this Subchapter.

5. Groundwater classified GAA and GA shall not have non-aqueous phase liquids present in either a mobile or immobile state at or below the surface of the water table.

B. Class GAA and GA Preventive Action Limits: Class GAA and class GA groundwater are subject to the preventive action limits defined below:

1. The preventive action limits shall be set at 50% of the numerical groundwater quality standards established pursuant to § 3.11(A)(2) of this Part.

2. The preventive action limits shall be used in monitoring discharges to groundwater approved by the Director and monitoring groundwater that

may be impacted by such discharges. Preventive action limits are not applicable in determining groundwater remediation objectives.

C. Class GB and GC Groundwater Quality Standards: Classification of groundwater as GB or GC does not convey the right to degrade groundwater quality. Limited degradation of groundwater quality may occur as a result of legally authorized activities related to siting, permitting and remediation where groundwater is classified GB or GC. In those areas where the groundwater is classified GB or GC and the groundwater does not meet the GB or GC groundwater quality standards, the groundwater classification remains GB or GC with the goal to regain compliance with the groundwater quality standards. Groundwater classified GB and GC shall be of a quality which the Director determines does not:

1. Threaten public health or the environment;

2. Violate or have a reasonable potential to cause a violation of surrounding groundwater quality standards;

3. Adversely impact or have a reasonable potential to adversely impact current or future uses of property, groundwater, or surface water;

4. Violate or have any reasonable potential to cause a violation of surface water quality standards established by the Rhode Island Water Quality Regulations, Part 1 of this Subchapter; and

5. Have non-aqueous phase liquids present in either a mobile or immobile state at or below the surface of the water table.

D. Proposed activities where the groundwater is classified GB in accordance with §§ 3.9(A)(3)(b) through (d) of this Part that would otherwise be prohibited in the surrounding areas where the groundwater is classified GA or GAA may at the Director's discretion be subject to the Department's review to ensure that the surrounding groundwater quality is protected.

E. In determining compliance with the groundwater quality standards for class GB and class GC at a facility, the Director may consider the factors below, in addition to other relevant information, provided by the facility owner or operator:

1. Surrounding groundwater quality;

2. Groundwater classification surrounding the facility;

3. Surface water classification within the facility boundaries and surrounding the facility;

4. Current and proposed future uses of groundwater and surface water at or within the facility boundaries;

5. Current and proposed future uses of the facility;

6. Uses of surrounding property, groundwater and surface water;

7. Hydrogeologic characteristics of the facility and surrounding the facility, including, but not limited to, groundwater flow direction, hydraulic gradient, type of subsurface materials, and depth to bedrock;

8. Actual and potential routes for human exposure and points of human exposure to the pollutant(s);

9. Man-made pathways for pollutant movement off-site, e.g., underground utility lines; and

10. Persistence and mobility of the pollutant(s) in the subsurface and the toxicity of the pollutant(s).

3.12 Determination of Compliance with Groundwater Quality Standards and Preventive Action Limits

A. Compliance with the groundwater quality standards and preventive action limits shall be determined through analytical tests of unfiltered groundwater samples. Groundwater quality samples shall be collected in a manner to be representative of groundwater quality.

B. Groundwater Monitoring

1. All facilities that are required by the Director to monitor groundwater quality pursuant to these Rules shall implement a groundwater monitoring plan approved by the Director. Groundwater monitoring plans approved pursuant to other Rhode Island Department of Environmental Management Rules and Regulations shall be exempt from this requirement.

2. The groundwater monitoring plan shall include, at minimum, the following:

   a. A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;

   b. Site plan at an appropriate scale (minimum scale of 1 inch equals fifty feet (1"=50')) to adequately show the monitoring well locations, well casing elevations, and the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, watercourses, wells, water lines, sewer lines, onsite wastewater treatment systems and other waste disposal areas, and any other significant site features;

c. A sufficient number of wells (minimum of 3) at the appropriate locations and depths to permit detection of any pollutants in the groundwater;

d. Well logs with detailed lithologic and well construction information; and

e. Sampling schedule.

3. Monitoring well construction shall be in compliance with the standards set forth in § 3.22 of this Part.

4. Minimum site monitoring requirements:

a. The static water table elevation shall be recorded at the time of monitoring; and

b. A log containing static water table elevations and the sample analyses shall be maintained on-site by the facility owner or operator.

5. Copies of sample results and water table measurements shall be submitted to the Director within 30 days of the receipt of such information by the facility owner or operator.

6. An approved groundwater monitoring plan shall be valid for a duration specified by the Director.

7. There shall be no change in a groundwater monitoring plan without the approval of the Director. The Director may require a change in an approved monitoring plan where such change is necessary to determine compliance with the groundwater quality standards.

8. Any person transferring ownership or control of a facility having an approved groundwater monitoring plan shall notify the Director of such transfer not less than 30 days prior to the effective date of such transfer.

9. Groundwater monitoring required by the Director shall not be terminated without the approval of the Director.

10. When groundwater monitoring has been terminated, the monitoring wells shall be abandoned in accordance with the procedures established in § 3.22 of this Part.

C. Points of compliance with the groundwater quality standards and preventive action limits must be approved by the Director. The Director may designate any point where groundwater is withdrawn for use or monitored as a point of compliance. Points of compliance shall be within the area of known or suspected

groundwater pollution unless a pollutant discharge zone or residual zone is designated pursuant to §§ 3.12(D) and (E) of this Part, respectively. If a pollutant discharge zone or residual zone is designated, the points of compliance shall be at the boundary of such zone.

D. Pollutant Discharge Zone: In determining compliance with the groundwater quality standards and preventive action limits in these rules for a discharge to groundwater where the groundwater is classified GAA or GA, the Director may approve, deny, or modify a pollutant discharge zone proposed by a facility owner or operator. Within this pollutant discharge zone, the pollutant concentrations in groundwater are allowed to be greater than the groundwater quality standards.

1. The facility owner or operator proposing a pollutant discharge zone shall provide the Director with sufficient information on the site's hydrogeology and the characteristics of the discharge to groundwater to support the proposed pollutant discharge zone delineation.

2. A groundwater monitoring plan shall be submitted to the Director at the same time that a pollutant discharge zone is proposed, unless the Director determines that groundwater monitoring is not necessary.

3. Prior to approval of a pollutant discharge zone, the facility owner or operator shall demonstrate by clear, convincing, and scientifically valid evidence that:

a. All practical alternatives to a discharge to groundwater have been evaluated and no technically or economically feasible alternative exists;

b. Every practical effort has been made to limit the pollutant concentrations in the discharge to groundwater by such means as, but not limited to, reducing the quantity of potentially contaminating substances in use, use of alternative substances, changes in the operational procedures at the facility, and pretreatment of the effluent;

c. The pollutant discharge zone is limited to the smallest area that is technically and economically feasible;

d. The facility owner or operator has acquired rights to the pollutant discharge zone as evidenced by ownership of the land within the pollutant discharge zone, ownership of an easement to such land, or otherwise controls such land to the Director's satisfaction. Any such easement or other control mechanism shall prohibit use of the groundwater for a drinking water supply and provide the right to enter the pollutant discharge zone for groundwater monitoring and, if necessary, remediation activities.

e. The discharge to groundwater and the resulting groundwater quality in the pollutant discharge zone do not represent a threat to public health or the environment;

f. There will be no violation of the groundwater quality standards established in § 3.11 of this Part beyond the pollutant discharge zone as a result of the proposed discharge;

g. There will be no adverse impact on existing public or private wells as a result of the proposed discharge; and

h. The groundwater within the pollutant discharge zone will not cause a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations Part 1 of this Subchapter as a result of the proposed discharge.

4. For a discharge to groundwater from an onsite wastewater discharge system permitted pursuant to the Rhode Island Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems, Subchapter 10 Part 6 of this Chapter, the pollutant discharge zone shall be defined by the separation distance required in those rules between the edge of the leachfield and a private well.

5. For a discharge to groundwater from a stormwater treatment system permitted pursuant to the Rhode Island Stormwater Design and Installation Rules, Subchapter 10 Part 8 of this Chapter, the pollutant discharge zone shall be defined by the separation distances required in the Manual between the edge of a stormwater treatment system and a private well.

E. Residual Zone: In determining compliance with the groundwater quality standards in these rules for groundwater remediation activities where the groundwater is classified GAA or GA, the Director may designate or approve, deny, or modify the designation of a residual zone proposed by the facility owner or operator.

1. Within this residual zone, the pollutant concentrations in groundwater are allowed to be greater than the groundwater quality standards. The Director may require that the groundwater quality within the residual zone be monitored.

2. Prior to approval of a residual zone, the facility owner or operator shall demonstrate by clear, convincing and scientifically valid evidence that:

a. The source of the pollutants has been removed or controlled to the satisfaction of the Director and every practical effort has been made to decrease the pollutant concentrations in the residual zone;

b. The residual zone is limited to the smallest area that is technically and economically feasible;

c. The facility owner or operator has acquired rights to the residual zone as evidenced by ownership of the land within the residual zone, ownership of an easement to such land, or otherwise controls such land to the Director's satisfaction. Any such easement or other control mechanism shall prohibit use of the groundwater for a drinking water supply and provide the right to enter the residual zone for groundwater monitoring and remediation activities;

d. The pollutant concentrations in the groundwater within the residual zone do not or will not represent a threat to the public health or the environment;

e. There will be no adverse impact on existing public or private wells as a result of the residual zone;

f. There will be no violation of the groundwater quality standards established in § 3.11 of this Part beyond the residual zone; and

g. The groundwater within the residual zone will not cause a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations, Part 1 of this Subchapter.

3.13 Notification to DEM of Violations of Preventive Action Limits and Groundwater Quality Standards

A. Exemptions from Notification Requirements:

1. Persons subject to the notification and reporting requirements of other state or federal rules are exempt from the provisions of § 3.13 of this Part.

2. Owners of property served by private wells used exclusively for residential purposes are exempt from the provisions of § 3.13 of this Part.

B. Notification: Facility owners or operators shall notify the Department within 15 days of the discovery when any of the following occur:

1. A preventive action limit has not been met at any point of compliance at a facility that has a discharge to groundwater approved by DEM where the groundwater is classified GAA or GA;

2. A groundwater quality standard has not been met at any point of compliance at a facility in any groundwater classification;

3. An alternative notification level established under a groundwater monitoring plan approved by the Director or the federal government has not been met; or

4. The facility owner or operator, or any person or entity that may have caused a discharge to groundwater at any location in the state, has reasonable cause to believe that a discharge or release has occurred that may result in the violation of groundwater quality standard.

C. Notification Contents: Notification shall include, but not be limited to, the following:

1. Name, address, telephone number of person notifying the Department and of the facility owner or operator;

2. Date and time of the discovery and the circumstances surrounding the discovery of the occurrence requiring notification;

3. Groundwater classification of the site;

4. Location of the occurrence and a legal description of the site (plat and lot);

5. Concentration of the pollutant(s) identified in the groundwater when notification is pursuant to §§ 3.13(B)(1) through (3) of this Part;

6. Identification of the pollutant(s) in the discharge or release when notification is pursuant to § 3.13(B)(4) of this Part;

7. Initial determination of the source of the pollutant(s) and an estimate of the extent of pollution; and

8. Measures taken or proposed to be taken at the time of notification.

3.14 Facility Owner or Operator Responses to Violations of Preventive Action Limits and Groundwater Quality Standards

A. When a preventive action limit has not been met in the monitoring of discharges approved by the Director, the facility owner and operator are responsible for taking actions, which shall be subject to the approval of the Director, to meet the following objectives at the point of compliance:

1. Minimize the concentration of the pollutant in the groundwater where technically and economically feasible;

2. Regain and maintain compliance with the preventive action limit, unless the Director determines that it is not technically or economically feasible to attain the preventive action limit concentration, in which case the owner or

operator shall achieve compliance with the lowest possible concentration that is technically and economically feasible; and

3. Ensure that the groundwater quality standard is met at any point of compliance.

B. When a preventive action limit has not been met at a point of compliance, the Director may require the facility owner or operator to take any one or more of the responses below:

1. Resample groundwater quality at the point of compliance;

2. Collect and submit additional data on groundwater quality on site or surrounding the site, hydrogeologic characteristics, or facility practices;

3. Require a revision of the operational procedures at the facility;

4. Require a change in the design or construction of the facility; or

5. Require an alternate method of waste treatment or disposal.

C. When a groundwater quality standard has not been met, the facility owner and operator are responsible for taking actions, which shall be subject to the approval of the Director, to regain and maintain compliance with the groundwater quality standard at the point of compliance.

D. When a groundwater quality standard is not met at a point of compliance or a discharge or release is suspected that may result in the violation of a groundwater quality standard, the Director may require the facility owner or operator to take any one or more of the responses below:

1. Resample groundwater quality at the point of compliance.

2. Collect and submit additional data on groundwater quality on site or surrounding the site, hydrogeologic characteristics, or facility practices.

3. Arrange for the sampling of private wells which may be adversely affected. Notify public water systems that may be adversely affected and reimburse the public water systems for the costs of additional water quality monitoring necessary to ensure public health.

4. Install and sample monitoring wells. Such wells shall be in compliance with the construction standards in § 3.22 of this Part, unless otherwise approved by the Director.

5. Require the establishment of a groundwater monitoring plan pursuant to § 3.12(B) of this Part or require a change in an existing groundwater monitoring plan.

6. Require a revision of the operational procedures at the facility.

7. Require a change in the design or construction of the facility.

8. Require an alternate method of waste treatment or disposal.

9. Require prohibition of an activity.

10. Require the facility owner or operator to provide drinking water to those persons that do not have a potable water supply (for violation of groundwater quality standard only).

11. Require the facility owner or operator to conduct a groundwater investigation and prepare a report pursuant to § 3.14(F) of this Part. Such report shall be subject to the Director's review and approval.

12. Require remedial action to restore groundwater quality to levels established by the Director pursuant to § 3.15 of this Part.

E. Groundwater Investigation Report

1. A groundwater investigation report required pursuant to § 3.14(D)(11) of this Part shall be prepared by a person with appropriate qualifications, and it shall include, but not be limited to, the following information, unless otherwise specified by the Director:

   a. All information previously reported to the Director pursuant to § 3.13 of this Part;

   b. A locus map using the U.S. Geological Survey 7.5 minute quadrangle map;

   c. Description of past and present activities on the site, including a list of past owners and operators of the site and approximate time periods of occupancy;

   d. A compliance history of the site including any and all past environmental enforcement actions and documentation of any past discharges or releases;

   e. Site plan at an appropriate scale (minimum scale of 1 inch equals fifty feet (1"=50')) to adequately show the location on and immediately surrounding the site of the following: property boundaries, buildings and other structures, roads, surface topography, watercourses, wells, water lines, groundwater monitoring wells, materials storage areas (including underground storage tanks), sewer lines, onsite wastewater treatment systems and other waste disposal areas;

f. Names and addresses of the owners and tenants of all properties that abut the site;

g. Description of the site's hydrogeology, including, but not limited to, depth to groundwater, groundwater flow direction, and a description of the unconsolidated materials, including soil characteristics, depth to bedrock and bedrock characteristics;

h. Location and distance off-site of the nearest surface water body that will receive runoff from the site and the water quality classification of this surface water;

i. Location of public wells within 3 miles of the site or within an alternative distance of the site agreed upon by the Director;

j. Information regarding private water supply as follows:

(1) Location of private wells on those properties that are wholly or partially within 500 feet of the site or a greater distance specified by the Director;

(2) A description of the water supply sources and services available beyond 500 feet from the site and up to 1 mile from the site. The Director may require more specific detail.

k. Identification of the pollutant(s) and an estimate of the geographic extent and volume of the affected area;

l. A description of evidence of possible groundwater pollution, including, but not limited to, free liquids, stained soil, stressed vegetation, and the presence and volume of excavated materials.

m. Results of any analytical testing of groundwater or soil on the site, including identification of methods used and sampling protocols; and

n. Recommendations for further groundwater investigation, groundwater remediation, or other actions.

2. Monitoring wells installed to collect groundwater quality data shall be in compliance with the construction standards in § 3.22 of this Part, unless otherwise approved by the Director.

3. The groundwater investigation report and any associated progress reports shall include the following statements signed by an authorized representative of the party specified:

a. A statement signed by an authorized representative of the person who prepared the groundwater investigation report certifying, to the best of their knowledge, the accuracy of the information contained in the report; and

b. A statement signed by the facility owner or operator responsible for the submittal of the groundwater investigation report certifying, to the best of their knowledge, that the report is a complete and accurate representation, and that it includes all known facts about the discharge to groundwater or the release that has, or may result in, the violation of a preventive action limit or groundwater quality standard.

3.15 Groundwater Remediation

A. The requirements below are for facility owners or operators not subject to other Department regulations or federal laws and regulations that require groundwater remediation.

B. Groundwater Remediation Objectives: When groundwater remediation is required by the Director, the facility owner and operator are jointly and severally responsible for designing and implementing efforts to remediate the groundwater to achieve pollutant concentrations established by the Director. Groundwater remediation activities shall be designed to meet the following objectives:

1. Protect public health and the environment;

2. Ensure compliance with the groundwater quality standards for the classification assigned to the groundwater of concern;

3. Eliminate or contain the source of groundwater pollution and minimize the impacted area;

4. Achieve pollutant concentrations that are consistent with proposed and anticipated future uses of the site;

5. Prevent an adverse impact on surrounding uses of property, groundwater and surface water;

6. Prevent the violation of surrounding groundwater quality standards; and

7. Prevent the groundwater at the remediation site from causing a violation of the surface water quality standards established by the Rhode Island Water Quality Regulations, Part 1 of this Subchapter.

C. Groundwater Remediation Plan: Where required by the Director, a groundwater remediation plan shall be prepared by the facility owner or operator.

1. The groundwater remediation plan shall consist of, at minimum, the following:

    a. Groundwater investigation report pursuant to § 3.14(E) of this Part and any additional information the Director shall require;

    b. Proposed method for remediation, to include, but not be limited to, the following:

        (1) Justification of the ability of the method to meet the remediation objectives;

        (2) Design standards and technical specifications for the design and construction of any equipment necessary for the proposed remediation;

        (3) Diagrams of any piping routes, instrumentation, and process flows; and

        (4) Proposed plans for the disposal of any products or by-products from the remediation activities;

    c. Proposed schedule for implementation of the remediation plan; and

    d. Proposed groundwater monitoring plan.

2. The groundwater remediation plan and any associated progress reports shall include the following statements signed by an authorized representative of the party specified:

    a. A statement signed by an authorized representative of the person who prepared the groundwater remediation plan certifying, to the best of their knowledge, the accuracy of the information contained in the plan; and

    b. A statement signed by the facility owner or operator responsible for the preparation and submittal of the groundwater remediation plan certifying, to the best of their knowledge, that the plan is complete and accurate.

D. Department Review of Groundwater Remediation Plan: Groundwater remediation activities shall be proposed and implemented by the facility owner or operator, and they shall be done in a manner approved by the Director.

1. Upon review of the groundwater remediation plan, the Director shall approve the plan, approve the plan with conditions, require revisions to the plan, or deny approval of the plan based on a determination of the plan's

ability to meet the groundwater remediation objectives in § 3.15(B) of this Part.

2. Any person transferring ownership or control of a facility having an approved groundwater remediation plan shall notify the Director of such transfer not less than 30 days prior to the effective date of such transfer.

3. Implementation of remedial activities approved by the Director does not discharge or otherwise release the facility owner or operator from responsibility for any adverse impacts to public health and the environment caused by pollutants in the groundwater at the site.

3.16 Wellhead Protection

A. Delineation of Wellhead Protection Areas

1. Wellhead protection areas for each public well in Rhode Island approved by the Rhode Island Department of Health shall be established by the Department of Environmental Management. A DEM approved wellhead protection area will be effective at the time of the well's approval by the Rhode Island Department of Health. See § 3.24 of this Part for a statewide map showing wellhead protection areas. Wellhead protection areas can be viewed in greater detail on the DEM website at www.dem.ri.gov. Wellhead protection areas are delineated in accordance with the following:

   a. The wellhead protection area for community and non-transient non-community water supply wells completed in stratified drift will be determined by DEM review of hydrogeologic models submitted by a well owner. If such delineation is not available at the time of the well's approval by the Department of Health, an interim wellhead protection area shall be designated as a 2000 foot radius circle, until such time that a delineation is accepted by the Department of Environmental Management.

   b. The wellhead protection area for wells completed in bedrock (community and non-community water supply wells) is a calculated fixed radius based on the Rhode Island Department of Health approved pump rate with a minimum radius of 1750 feet. See § 3.16(A)(1)(b)(1) of this Part for a list of pump rates and corresponding wellhead protection area radii. For pumping rates not provided in § 3.16(A)(1)(b)(1) of this Part, the wellhead protection area radius shall be calculated using the formula below in § 3.16(A)(1)(b)(2) of this Part.

      (1) Wellhead Protection Area Radius for Bedrock Wells

Pumping Rate (gallons per minute)	Radius (feet)	Pumping Rate (gallons per minute)	Radius (feet)
≤10	1750	23	2411
11	1820	24	2440
12	1872	25	2466
13	1920	30	2568
14	1965	35	2638
15	2008	40	2689
16	2087	45	2729
17	2153	50	2760
18	2211	60	2806
19	2261	70	2875
20	2305	80	2985
21	2344	90	3068
22	2380	100	3133

(2) Where: s = drawdown (1 foot); Q = well pumping rate; T = transmissivity (374 gallons per day per ft); S = storage coefficient (.01 (dimensionless)); t = time (200 days); W(u) = well function (dimensionless); and r = distance from pumped well. 114.6 and 1.87 are coefficients generated for conversion from metric to English units and conducting some simplifying calculations.

$$s = \frac{114.6Q}{T}W(u)$$

$$u = \frac{1.87r^2S}{Tt}$$

c. The wellhead protection area for any other groundwater source used as a public water system, including springs, wells completed in till deposits, transient non-community water supply wells completed in stratified drift, and any well where the geologic formation supplying the water is unknown, will be a radius of 1750 feet.

2. Wellhead protection areas in Rhode Island include those portions of wellhead protection areas for public wells in Connecticut and Massachusetts that extend into Rhode Island as a result of delineations done in accordance with Connecticut or Massachusetts state environmental or health department requirements or policies.

3. If the boundary of a wellhead protection area established by the Department is in dispute, the burden of proof shall be on the person disputing the boundary to show to the satisfaction of the Department a more accurate delineation. If the wellhead protection area in question is for a community water supply well, the procedure in § 3.10 of this Part for Modification of Groundwater Classification must be followed.

B. Refined Wellhead Protection Areas: The Department, water suppliers, or other state or federal agencies may delineate refined wellhead protection areas, which are prepared using more complex methods or additional data than that used in the initial or most recent delineation. Requests for Department approval of refined delineations shall follow the procedure below:

1. Requests for approval of refined wellhead protection areas shall include, at minimum:

a. A map of the well location and proposed refined wellhead protection area using the United States Geological Survey 7.5 minute quadrangle map (scale of 1:24000);

b. Detailed description of the mapping methodology;

c. List of data sources;

d. Detailed description of field methods and results for such activities as pump tests and water table measurements;

e. Detailed description of modelling method, assumptions, results, and principal model input and output values; and

f. Water table map used in the refined wellhead protection area mapping;

2. Additional information may be required by the Director in order to adequately review a proposed refined wellhead protection area.

3. If approved, the refined wellhead protection area delineation shall supersede the initial or most recent wellhead protection area delineation.

C. Deletion of Wellhead Protection Areas: A public well and its wellhead protection area delineation will be deleted from the Department's Wellhead Protection Area map and no longer subject to provisions of these rules when the Rhode Island Department of Health has determined that the well is no longer an approved public drinking water supply and the Director has determined that maintaining the wellhead protection area no longer serves the public interest.

D. Addition of Wellhead Protection Areas: A public well and its wellhead protection area delineation will be added to the Department's Wellhead Protection Area map and subject to the provisions of these Rules at the time of approval by the Rhode Island Department of Health as a public drinking water supply or if the Director has determined that it serves the public interest to add a wellhead protection area for a well site not yet approved by the Department of Health, but which will likely be used for public drinking water supply in the future.

3.17 Variances

A. Variance Requests: A facility owner or operator may submit a written request to the Director for a variance from any of the provisions of these Rules. Such request for a variance shall include at a minimum:

1. Name and address of the facility owner or operator, and the name and location of the facility for which the owner or operator seeks a variance;

2. A list of the names and addresses of the owners and tenants of all properties that abut the facility;

3. Identification of the specific Rule or Rules from which a variance is requested;

4. A statement of the reasons for which the facility owner or operator seeks a variance. This statement shall specify the reasons that the facility owner or operator is unable to comply with these Rules, why a variance is necessary, and the reasons why a hardship is alleged. The person seeking the variance should separately and by number list each reason

and any other mitigating factors he believes the Director should consider; and

5. An explanation that the alternative procedures requested are substantially equivalent to the Rules herein in achieving protection of the public health and the environment.

B. Variance Decisions

1. The Director may issue a variance under this Rule when the facility owner or operator proves by clear, convincing and scientifically valid evidence that:

   a. Compliance with these Rules would cause unreasonable or undue hardship;

   b. The issuance of the variance will have no adverse effect on public health and the environment; and

   c. The alternative procedures requested are substantially equivalent to the Rules herein in achieving protection of the public health and the environment.

2. If the Director determines that there is widespread public interest or that the variance request raises major issues that could affect other facilities, then the Director may schedule a public hearing to solicit public comment prior to rendering a decision on the variance request.

3. The Director's decision to grant or deny a variance shall be in writing and may, as a condition of granting the variance, impose appropriate requirements necessary to protect the public health and the environment.

3.18 Enforcement

A. Where the Director has reason to believe that a violation of any part of the Rules herein has occurred, the Director may issue a notice of violation or immediate compliance order pursuant to R.I. Gen. Laws Chapter 42-17.1.

B. For violations that are of a continuing nature, each and every day that the violation exists shall constitute a separate and distinct violation.

3.19 Appeals

Any person affected by a decision of the Director pursuant to these Rules may, in accordance with the Rhode Island Rules and Regulations for the Administrative Adjudication Division Part 10-00-1 of this Title, file a claim for an adjudicatory hearing to review the decision. All appeals shall be in writing and shall be filed with and received by the Department's Administrative Adjudication Division within

thirty (30) days after the effective date of the denial of the subject application. The party appealing a Department decision bears the burden of proving that their application complies with all requirements of the Rules herein.

3.20 Superseded Regulations

On the effective date of these Rules, all previous Rules and Regulations, and any policies regarding the administration and enforcement of the Groundwater Protection Act (R.I. Gen. Laws Chapter 46-13.1) shall be superseded. However, any enforcement action taken by, or application submitted to, the Department prior to the effective date of these rules shall be governed by the Rules and Regulations in effect at the time the enforcement action was taken, or application filed.

3.21 Penalties

Penalties will be assessed in accordance with the Rhode Island Rules and Regulations for Assessment of Administrative Penalties Part 130-00-1 of this Title, for any violation of these rules.

3.22 Construction Standards for Monitoring Wells and Abandonment Procedures for Private Drinking Water Wells, Monitoring Wells, Piezometers and Other Subsurface Borings

A. Purpose: Provide minimum standards for the construction of monitoring wells for the procurement of samples representative of groundwater and abandonment procedures for private drinking water wells, monitoring wells, piezometers and other subsurface borings.

B. Applicability:

1. The construction standards apply to monitoring wells installed pursuant to these rules. The construction standards shall not apply to drinking water wells or other subsurface borings that are used for purposes other than monitoring groundwater quality.

2. The abandonment procedures apply to private drinking water wells, monitoring wells, piezometers and other subsurface borings that intersect the seasonal water table at some time of the year.

C. Prevention of Groundwater Pollution: During well construction and abandonment, every appropriate precaution shall be taken to prevent introducing pollutants into the groundwater. This shall include, but not be limited to, steam cleaning and washing of drilling equipment and proper cleaning and storage of well casing. Only unpolluted water shall be used in well construction and abandonment unless otherwise approved by the Director.

D. Deviation from the Standards: The Director may waive the requirements and allow deviation from these procedures where such deviations will result in procurement of representative groundwater samples or, in the case of well abandonment, will not result in a reasonable potential for groundwater pollution.

E. Drilled Wells: Monitoring wells constructed using conventional drilling methods shall be installed in accordance with the requirements below. Monitoring wells completed into bedrock without a well screen (open bore hole) are exempt from the requirements of §§ 3.22(E)(3), (4) and (5)(a) of this Part, but must comply with all other requirements in § 3.22(D) of this Part. Bedrock monitoring wells shall have a well casing extending a minimum of 5 feet into the bedrock.

1. Borehole Diameter: The borehole diameter in the overburden shall be a minimum of 4 inches greater than the diameter of the well casing.

2. Well Casing (or Riser): The well casing shall be constructed of PVC material. Monitoring wells less than 100 feet in depth shall be constructed using a minimum of schedule 40 PVC. Wells greater than 100 feet deep shall be constructed using a minimum of schedule 80 PVC. The Director may allow alternate well casing material if the pollutant concentrations or geologic setting require an alternative construction. Alternative materials include, but are not limited to: Teflon, stainless steel, or uncoated or galvanized steel.

    a. Assembly and Installation: All casing shall be constructed of flush threaded joints or threaded coupling joints. All joints shall be fitted with an "O" ring or wrapped with teflon tape. Glued or solvent welded joints are not permissible without prior written permission of the Director.

    b. Cap: The well casing shall be fitted with a plug or cap.

3. Well Screen: The well screen slot size shall retain at least 90% of the grain size of the filter pack or at least 90% of the grain size of the collapsed formation when no filter pack is used in accordance with § 3.22(E)(4) of this Part. Well screens shall not exceed the length necessary to collect a representative groundwater sample. Well screens shall be factory slotted or continuous wrapped wire-wound. A bottom cap and sump sediment trap shall be installed.

4. Filter Pack: The filter pack shall be clean, chemically inert, well rounded and well sorted glass beads or silica-based sand or gravel of uniform grain size. The filter pack must minimize the amount of fine material entering the well and shall not inhibit the flow of water or movement of pollutants into the well. The filter pack shall be installed by bottom-up tremie methods. The filter pack shall extend from 6 inches beneath the bottom of the well screen to a distance above the well screen equivalent to 20% of

the well screen but not less than 2 feet. A collapsed formation may be used as the filter pack if the well screen retention requirement of § 3.22(E)(3) of this Part is met and a filter pack cannot be installed.

5. Sealing Requirements

   a. Filter Pack Seal: All monitoring wells installed with a filter pack shall be constructed with a filter pack seal of bentonite pellets or slurry in a manner that does not disturb the filter pack. The seal shall extend to approximately 3 to 5 feet above the filter pack and shall be properly hydrated and set.

   b. Annular Space Seal: All monitoring wells shall be installed with an annular space seal using neat cement, neat cement-bentonite mixture, bentonite slurry or bentonite that is properly hydrated and set. Granular bentonite in dry form or powdered bentonite in dry form shall not be used in the saturated zone. The annular space seal shall extend to the ground surface seal, except where a road box meeting the requirements of § 3.22(E)(7) of this Part is used.

   c. Ground Surface Seal: All monitoring wells shall be constructed with a continuous pour concrete ground surface seal. To avoid frost heaving and to anchor the well, the ground surface seal shall extend to a minimum of 40 inches below the land surface, unless the seal would interfere with proper placement or functioning of the well screen or a road box is installed in accordance with § 3.22(E)(7) of this Part. The ground surface seal shall be flared such that the diameter at the top is greater than the diameter at the bottom. The top of the ground surface seal shall be sloped away from the well casing and shall be large enough to allow drainage away from the well.

6. Protective Casing: The protective casing shall consist of a minimum 4 inch diameter metal casing with locking cap. The protective casing shall extend from the bottom of the ground surface seal to a minimum of 24 inches above the land surface, allowing for 4 to 6 inches clearance between the top of the well casing and the cap of the protective casing. A ¼ inch diameter drain hole shall be drilled into the protective casing 6 inches above the ground level. Dry bentonite pellets, granules or chips shall then be placed in the annular space below ground level within the protective casing. Coarse sand or washed pea gravel or both shall be placed above the dry bentonite to a depth covering the drain hole. A high visibility guard post may be required. The Director may request additional protective devices as necessary.

7. Road Box: Road boxes are acceptable in locations where protective casings installed in accordance with § 3.22(E)(6) of this Part are not

suitable. All road boxes shall be secured and water tight and shall prevent easy access to the well. The well casing shall be fitted with a locking, watertight cap. The ground surface seal for the road box shall be competent such that vehicle traffic will not cause it to fail. The annular space seal shall extend upward to 1 foot below the ground surface seal. Permeable material shall be emplaced between the ground surface seal and the annular space seal in order to allow for the drainage of runoff which may leak into the road box from the ground surface. The road box cover plate shall clearly indicate that the well is a groundwater monitoring well.

8. Well Development: Development of all monitoring wells shall be performed no earlier than 24 hours after completion and before the initial water quality samples are taken. Well development shall continue until the water has stable pH, temperature, and specific conductivity readings and has turbidity values less than 5 NTUs (nephelometric turbidity units). If a well does not meet the goal of 5 NTUs, it must be demonstrated to the satisfaction of the Director that proper well completion and well development have been employed. Groundwater sampling shall not occur until at least 24 hours after well development, in order to allow natural groundwater flow to be re-established.

9. Monitoring Well Designation: Each monitoring well shall be clearly and permanently labeled as a monitoring well with the well number using such techniques as etching in the protective casing or in the cement of the ground surface seal.

F. Single Rod Direct Push Wells: Wells installed using single rod direct push methods shall be installed in accordance with the requirements below:

1. Annular space seal -- If the screen and riser are of the same diameter and are advanced such that they remain in contact with the formation during installation (exposed screen wells) no annular space seal is created. If the drive rod is smaller in diameter than the sampler body (protected screen wells) an annular space is created that must be sealed in accordance with § 3.22(E)(5)(b) of this Part above;

2. Ground surface seal shall be constructed in accordance with § 3.22(E)(5)(c) of this Part;

3. Protective casing or road box shall be installed in accordance with §§ 3.22(E)(6) or (7) of this Part, respectively. In order to provide a locking, water-tight cap on a small diameter well casing in a road box as required by § 3.22(E)(7) of this Part, a 2 inch PVC casing can be placed over the well riser extending 3 to 4 feet below grade;

4. Well must be developed in accordance with § 3.22(E)(8) of this Part; and

5. Well shall be properly designated in accordance with § 3.22(E)(8) of this Part.

G. Two-tube Direct Push Wells: Monitoring wells installed using two-tube direct push methods create an annular space the length of the well, thus requiring a filter pack, seals and other provisions similar to conventional drilled wells. Two-tube direct push wells shall be installed in accordance with the requirements below:

1. The outside diameter of the borehole shall be a minimum of 1 inch greater than the outside diameter of the well casing;

2. Well casing (or riser) shall meet the requirements of § 3.22(E)(2) of this Part;

3. Well screen shall meet the requirements of § 3.22(E)(3) of this Part;

4. Filter Pack: The filter pack shall be clean, chemically inert, well rounded and well sorted glass beads or silica-based sand or gravel of uniform grain size. The filter pack must minimize the amount of fine material entering the well and shall not inhibit the flow of water into the well. The filter pack shall be installed by bottom-up tremie methods, or it can be a pre-packed manufactured unit. A collapsed formation may be used as the filter pack if the well screen retention requirement of § 3.22(E)(3) of this Part is met and a filter pack cannot be installed.

5. Grout Barrier: All direct push monitoring wells installed with a filter pack shall be constructed with a grout barrier immediately above the screened interval to prevent annular space sealants from entering the screened interval. The grout barrier shall extend a minimum of 2 feet above the screened interval. The grout barrier may be constructed by gravity or tremie installation of fine sand, or by installation of a modular system. Alternatively, collapse of the natural formation may be used to create a natural barrier when the formation material is of appropriate grain size and cohesion.

6. Filter pack seal shall be constructed in accordance with § 3.22(E)(5)(a) of this Part;

7. The annular space shall be sealed in accordance with § 3.22(E)(5)(b) of this Part or a modular system may be used;

8. Ground surface seal shall be constructed in accordance with § 3.22(E)(5)(c) of this Part;

9. Protective casing or road box shall be installed in accordance with §§ 3.22(E)(6) or 3.22(E)(7) of this Part, respectively;

10. Well must be developed in accordance with § 3.22(E)(8) of this Part; and

11. Well shall be properly designated in accordance with § 3.22(E)(9) of this Part.

H. Abandonment of Private Drinking Water Wells, Monitoring Wells, Piezometers and Other Subsurface Borings

1. Private drinking water wells, monitoring wells, piezometers and other subsurface borings shall be abandoned in accordance with this Rule. or alternate procedures approved in writing by the Director prior to abandonment. Abandonment shall take place within 60 days after use has been terminated or within a timeframe approved by the Director.

2. Abandonment Procedures for Monitoring Wells and Borings Constructed with an Annular Space:

a. The borehole shall be inspected from the land surface through its entire depth before it is sealed, to ensure against the presence of any obstructions that will interfere with sealing operations.

b. The casing shall be removed by pulling or overdrilling. If the casing cannot be removed, the screen and casing shall be suitably perforated from top to bottom allowing for the plugging material (see § 3.22(H)(2)(c) of this Part) to penetrate the annular space and formation. If the casing remains, it shall be cut off at least 4 feet below the ground surface where practicable.

c. The remaining casing or borehole shall be filled with neat cement or neat cement grout applied under pressure.

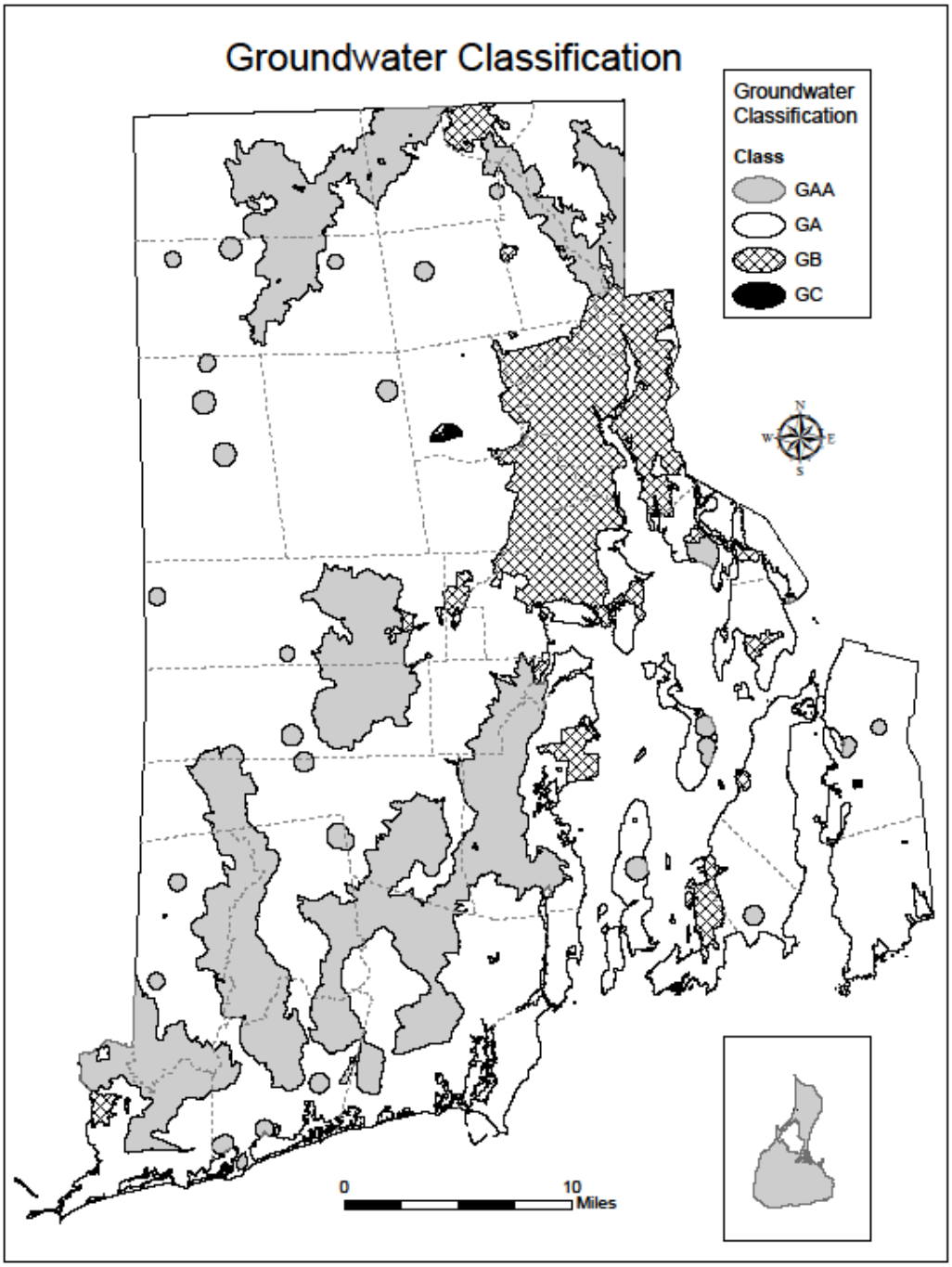
3. Abandonment Procedures for Monitoring Wells and Borings Constructed without an Annular Space:

a. The borehole shall be inspected from the land surface through its entire depth before it is sealed, to ensure against the presence of any obstructions that will interfere with sealing operations.

b. If the casing is to be removed, the remaining borehole shall be filled with neat cement or neat cement grout applied under pressure.

c. If the casing remains in the ground, it shall be cut off at least 4 feet below the ground surface. The remaining casing shall be filled with neat cement or neat cement grout applied by bottom-up tremie methods.

3.23 Groundwater Classification Map



3.24 Wellhead Protection Area Map

