



APPENDICES

Appendices

14 | Appendices

14.1 Table of Regulated Land Uses¹

REGULATED ACTIVITY	INCLUSIONS/ EXCEPTIONS	TYPICAL LAND USE ²	ACTIVITY (A)/ CHEMICAL (C) OF CONCERN
Underground Storage or Transmission of Oil, Petroleum or Hazardous Material RCSA Sec. 22a-354i-1(34)(A)	Includes all except: 1. Activities preempted by federal law (pipelines, etc.) 2. An underground storage tank that contains #2 fuel oil and is located more than 500 feet from an APA well 3. Underground electrical facilities such as transformers, breakers, or cables containing oil for cooling or insulation purposes which are owned and operated by a public service company	Gas station, automotive or fleet garage, misc. businesses	A Tank, pipeline or joint leaks or breaks C Liquid fuel, hazardous material
Oil or Petroleum Dispensing RCSA Sec. 22a-354i-1(34)(B)	Includes all retail, wholesale or fleet use except above-ground storage of <2,000 gallons, subject to conditions – see RCSA Sec. 22a-354i 5(c)(6)	Gas station, automotive or fleet garage, fuel oil dealers, misc. businesses	A Leaks, drips, tank ruptures C Hydrocarbons, benzene and other contaminants
Wholesale Hazardous Materials RCSA Sec. 22a-354i-1(34)(C)	Includes all on-site storage of hazardous materials for the purpose of wholesale sale	Chemical warehouses, bulk storage facility, tank farm	Large volumes of various materials and products handled, stored and distributed that might contaminate groundwater as a result of accidents, poor management practices, flooding or fires. Solvents, organic and inorganic chemicals, and hydrocarbon contamination threats
Vehicle Repair or Maintenance RCSA Sec. 22a-354i-1(34)(D)	Includes all repair or maintenance of vehicles or internal combustion engines of vehicles, involving the use, storage or disposal of hazardous materials, including solvents, lubricants, paints, brake fluids, transmission fluids or the generation of hazardous wastes	Auto service, car dealers, auto body repair, aircraft repair, boat or marine dealer repair, fleet or municipal garage, marine, recreational, motorcycle dealer, construction equipment repair or rental, tractor and lawn mower repair, and related uses	A Fuel storage, use and storage of oils, paints, thinners, various solvents, brake and transmission fluids C Hydrocarbons, solvents, benzene
Salvage Operations RCSA Sec. 22a-354i-1(34)(E)	Includes all salvage operations of metal or vehicle parts	Junkyards, salvage yards	A Fuel storage, use and storage of oils, paints, thinners, various solvents, brake and transmission fluids C Hydrocarbons, solvents, benzene

¹ Please note that the intent of this table is to provide guidance, therefore the language of the regulation is simplified for ease of use. See Regulations of Connecticut State Agencies (RCSA) Sec. 22a-354i-1 for specific language.

² This is not an exhaustive list of land uses, just examples of the types of land use to clarify categories.

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

REGULATED ACTIVITY	INCLUSIONS/ EXCEPTIONS	TYPICAL LAND USE	ACTIVITY (A)/ CHEMICAL(C) OF CONCERN
Non-Domestic Wastewater Discharges to Ground RCSA Sec. 22a-354i-1(34)(F)	Includes all except: 1. domestic sewage 2. stormwater (see BMPs) 3. the following if they have a DEEP discharge permit: (i) a pump and treat system for groundwater remediation, (ii) a potable water treatment system, (iii) heat pump system, (iv) non-contact cooling water system, or (v) swimming pools	Miscellaneous industrial businesses or commercial service facilities	A Discharge of non-biodegradable waste to groundwater C Persistent organic and inorganic compounds
Chemical Production RCSA Sec. 22a-354i-1(34)(H)	Includes all production or refining of chemicals, including hazardous materials or asphalt	Chemical, petroleum, asphalt, pesticide manufacturers	A Storage, use & production of chemicals, equipment cleaning and maintenance, hazardous waste generation C Organic and inorganic chemicals
Clothes or Cloth Cleaning Service RCSA Sec. 22a-354i-1(34)(I)	Includes clothes or cloth cleaning services which involves the use, storage or disposal of hazardous materials, including dry-cleaning solvents	Dry cleaners	Dry cleaning solvents, storage, use and disposal. Industrial strength cleaning solvents/ agents
Power Generation RCSA Sec. 22a-354i-1(34)(K)	Includes all generation of electrical power by means of fossil fuels except generation: 1. by an emergency engine (as defined in Sec. 22a-174-22(a)(3) of the RCSA) 2. by means of natural gas or propane	Power plants	Risks associated with fuels storage/use, large quantities of waste generation, machine shops, equipment maintenance
Electrical, Electronics Production RCSA Sec. 22a-354i-1(34)(L)	Includes production of electronic boards, electrical components, or other electrical equipment involving the use, storage or disposal of any hazardous material or involving metal plating, degreasing of parts or equipment, or etching operations	Electrical equipment or electronics manufacturer	A Storage and use of hazardous material, hazardous waste generation, equipment cleaning and maintenance, machine shops C Heavy metals, chlorinated solvents, strong acids and alkalis, paint and thinner wastes and waste oils

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

REGULATED ACTIVITY	INCLUSIONS/ EXCEPTIONS	TYPICAL LAND USE	ACTIVITY(A)/ CHEMICAL(C) OF CONCERN
Furniture Stripping RCSA Sec. 22a-354i-1(34)(N)	Includes furniture stripping operations which involve the use, storage or disposal of hazardous materials	Furniture strippers	<p>A General use of cleaning solvents, hazardous materials</p> <p>C Chlorinated solvents</p>
Hazardous Waste Storage, Treatment or Disposal Facility RCSA Sec. 22a-354i-1(34)(P)	Includes all storage, treatment or disposal of hazardous waste subject to a permit under Sec. 22a-449(c)-100 to Sec. 22a-449(c)-110, inclusive, of the RCSA	Hazardous waste storage, treatment or disposal facility	<p>A Spills, leaks, and possible leachate from storage and processing of wastes</p> <p>C Various potential organic and inorganic contaminants</p>
Pest Control Services RCSA Sec. 22a-354i-1(34)(R)	Includes pest control services which involve storage, mixing or loading of pesticides or other hazardous materials	Lawn care, pest control services	<p>A Storage and mixing of chemicals, equipment cleaning, equipment fueling and maintenance</p> <p>C Various pesticides</p>
Production or Fabrication of Metal RCSA Sec. 22a-354i-1(34)(T)	Includes production or fabrication of metal products which involves the use, storage or disposal of hazardous materials including (i) metal cleaning or degreasing with industrial solvents, (ii) metal plating, or (iii) metal etching	Metal foundry, finisher, machine shop, fabricator, plater	<p>A Storage and use of hazardous material, hazardous waste generation, equipment cleaning and maintenance, machine shops</p> <p>C Heavy metals, chlorinated solvents, strong acids and alkalis, waste oils, phenols, PCBs, Cyanides</p>
Printing RCSA Sec. 22a-354i-1(34)(U)	Includes printing, plate making, lithography, photoengraving, or gravure, which involves the use, storage or disposal of hazardous materials	Printer or publisher	<p>A Storage and use of ink chemicals, equipment cleaning, engraving</p> <p>C Chlorinated solvents, phenols, hydrocarbon compounds</p>
Waste Recycling Facility RCSA Sec. 22a-354i-1(34)(V)	Includes accumulation or storage of waste oil, antifreeze or spent lead-acid batteries which are subject to a general permit issued under § 22a-208(i) and 22a-454(e)(1) of the CGS	Recycling facility, collection or transfer station	<p>A Released leachate generation from waste collection and storage</p> <p>C Numerous chemical constituents</p>
Rubber or Resin Production RCSA Sec. 22a-354i-1(34)(W)	Includes production of rubber, resin cements, elastomers or plastic, which involves the use, storage or disposal of hazardous materials	Rubber, resin, elastomer or plastic manufacturer	<p>A Raw material storage, process hazardous waste generation, machine shops</p> <p>C Waste oils, solvents, phenols, strong organic and inorganic wastes</p>

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

REGULATED ACTIVITY	INCLUSIONS/ EXCEPTIONS	TYPICAL LAND USE	ACTIVITY(A)/ CHEMICAL(C) OF CONCERN
Storage of Deicing Chemicals RCSA Sec. 22a-354i-1(34)(X)	Includes all unless storage takes place within a weather-tight waterproof structure for the purpose of retail sale or for the purpose of deicing parking areas or access roads to parking areas	Salt storage facility, fleet state or municipal garage	A Stockpiling of road salt for deicing of roads and parking areas C Sodium chloride, de-caking agents
Solid Waste Facility RCSA Sec. 22a-354i-1(34)(Y)	Includes accumulation, storage, handling, recycling, disposal, reduction, processing, burning, transfer or composting of solid waste which is subject to a permit issued by the Commissioner pursuant to § 22a-207b, 22a-208a, and § 22a-208c of the CGS except a potable water treatment sludge disposal area	Solid waste facilities, landfill, transfer station, composting facilities, processing centers	A Spills, leaks, and leachate from storage, processing and disposal of wastes C Various potential organic and inorganic contaminants
Textiles Production RCSA Sec. 22a-354i-1(34)(Z)	Includes dyeing, coating or printing of textiles, or tanning or finishing of leather, which activity involves the use, storage or disposal of hazardous materials	Textile manufacturer, tannery	A Storage and use of hazardous materials, equipment cleaning, and hazardous wastes C Strong acids and alkalis, dyes, solvents, metals and hydrocarbons
Reconstituted Wood Production, Wood Treatment RCSA Sec. 22a-354i-1(34)(AA)	Includes production of wood veneer, plywood, reconstituted wood or pressure-treated wood, which involves the use, storage or disposal of hazardous materials	Reconstituted wood manufacturing, wood treatment	A Chemical treatment of wood, chemical storage C Creosotes, tars, trichlorophenol, pentachlorophenol, metals, solvents, oils
Pulp Production RCSA Sec. 22a-354i-1(34)(BB)	Includes pulp production processes that involve bleaching	Pulp, paper, cardboard manufacturer	A Storage and use of hazardous and nonhazardous materials, large quantities of waste generation C Toxic organic and inorganic chemicals metals, chlorinated hydrocarbons

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

The following are Regulated Activities unless all wastewater from such activity is lawfully disposed of through a public sewer.

REGULATED ACTIVITY	INCLUSIONS/EXCEPTIONS	TYPICAL LAND USE
Car or Truck Washing RCSA Sec. 22a-354i-1(34)(G)	Includes all	Car and truck washes, possibly vehicle sales or service
Industrial Laundry Service RCSA Sec. 22a-354i-1(34)(J)	Includes industrial laundry service which involves the cleaning of clothes or cloth contaminated by hazardous material (but does not use dry-cleaning solvents for cleaning; dry cleaners are regulated under RCSA Sec. 22a-354i-1(34)(I))	Industrial laundries
Embalming or Crematory Services RCSA Sec. 22a-354i-1(34)(M)	Includes embalming or crematory services which involve the use, storage or disposal of hazardous materials	Funeral homes, crematories
Furniture Finishing RCSA Sec. 22a-354i-1(34)(O)	Includes furniture finishing operations which involve the use, storage or disposal of hazardous materials (but not stripping; furniture stripping is regulated under RCSA Sec. 22a-354i-1(34)(N))	Furniture manufacturer or repair
Biological or Chemical Testing RCSA Sec. 22a-354i-1(34)(Q)	Includes biological or chemical testing, analysis or research which involves the use, storage or disposal of hazardous material except on-site testing of a public supply well by a water utility	Biological or chemical laboratories
Photographic Finishing RCSA Sec. 22a-354i-1(34)(S)	Includes photographic finishing which involves the use, storage or disposal of hazardous materials	Photographic finishing laboratories

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

Non-Regulated, Conditional Exceptions		
ACTIVITY	CONDITIONS	POTENTIAL EXAMPLES
<p>Any regulated activity provided all the following conditions are satisfied RCSA Sec. 22a-354i-5(c)(4)</p>	<ol style="list-style-type: none"> such activity does not involve cleaning of metals with chlorinated solvents at the facility such activity takes place solely within an enclosed building in an area with an impermeable floor any hazardous material used in connection with such activity is stored in such building at all times, and such activity does not involve (i) repair or maintenance of internal combustion engines, including without limitation, vehicles, or equipment associated with such vehicles, (ii) underground storage of any hazardous material, or (iii) above-ground storage of more than one hundred and ten (110) gallons of such lubricating oil and associated hazardous waste 	<p>Shop with machinery that requires lubrication to run, but does not handle hazardous materials in process.</p>
<p>Any regulated activity solely involving the use of lubricating oil provided all the following conditions are satisfied RCSA Sec. 22a-354i-5(e)(5)</p>	<ol style="list-style-type: none"> such activity does not involve cleaning of metals with chlorinated solvents at the facility such activity takes place solely within an enclosed building in an area with an impermeable floor any hazardous material used in connection with such activity is stored in such building at all times, and such activity does not involve (i) repair or maintenance of internal combustion engines, including without limitation, vehicles, or equipment associated with such vehicles, (ii) underground storage of any hazardous material, or (iii) above-ground storage of more than 110 gallons of such lubricating oil and associated hazardous waste 	<p>Shop with machinery that requires lubrication to run, but does not handle hazardous materials in process.</p>
<p>Any regulated activity involving the dispensing of oil or petroleum from an above-ground storage tank(s) with an aggregate volume of 2,000 gal. or less, provided all the following conditions are satisfied RCSA Sec. 22a-354i-5(c)(6)</p>	<ol style="list-style-type: none"> such dispensing activity takes place solely on a paved surface which is covered by a roof the above-ground storage tank (or tanks) is a double-walled tank with overfill alarms, and all associated piping is either above ground, or has secondary containment 	<p>Small fleet facility</p>

14 | Appendices

14.1 Table of Regulated Land Uses (continued)

Non-Regulated Exceptions		
ACTIVITY	CONDITIONS	POTENTIAL EXAMPLES
Residential RCSA Sec. 22a-354i-5(c)(1)	Any regulated activity conducted at a residence without compensation	Home maintenance of vehicles, home hobbies
Minor Hazardous Material Use RCSA Sec. 22a-354i-5(c)(2)	Any regulated activity involving the use or storage of no more than two and one-half (2.5) gallons of each type of hazardous material on-site at any one time, provided the total of all hazardous materials on-site does not exceed fifty-five (55) gallons at any one time	Small research and development businesses, misc. retail, schools and other small institutions
Agriculture RCSA Sec. 22a-354i-5(c)(3)	Any agricultural activity regulated pursuant to § 22a-354m(d) of the Connecticut General Statutes (agriculture whose annual gross sales are \$2,500.00 or more)	Farming, dairying, forestry, raising or harvesting livestock (including horses, bees, poultry, fur-bearing animals and wildlife, oysters, clams, mussels, other shellfish and fish), fruits, vegetables, plants, mushrooms, maple sugar/syrup, lumber

14 | Appendices

14.2 Principal Groundwater Contaminants Table

Principal Groundwater Contaminants				
CONTAMINANT (with examples)	SOURCES	ENVIRONMENTAL FATE	HEALTH EFFECTS	TREATMENT OPTIONS
Solvents <ul style="list-style-type: none"> • naphthalene • toluene • benzene • tetrachloroethylene • trichloroethane • vinyl chloride 	<ul style="list-style-type: none"> • industry • vehicle maintenance • metal parts cleaning, degreasing • dry cleaning • furniture finishing • printing • gasoline additives • cleaning products • improper disposal in septic systems • septic tank cleaners 	Surface: volatilize readily Soil: resist biodegradation; breakdown products may be toxic Groundwater: very mobile and persistent; some are denser than water and move downward to bedrock	Vinyl chloride and benzene are known human carcinogens; some others, especially chlorinated solvents, are suspected carcinogens; can cause a range of other health effects, including central nervous system effects, irritation of respiratory and gastrointestinal systems	Evaporation by aeration (public supplies); carbon filtration
Petroleum Products <ul style="list-style-type: none"> • gasoline • motor oil • fuel oil 	<ul style="list-style-type: none"> • vehicle maintenance • automobile service stations • heating fuel tanks • industrial machinery 	Surface: light oils, gasoline volatilize readily Soil: low solubility, may persist in pore spaces and be leached into groundwater by precipitation for long period Groundwater: gasoline and light oils float on water table; heavy oils less mobile; move down to bedrock	Petroleum products can produce a variety of toxic effects, including central nervous system damage, irritation of respiratory and gastrointestinal systems; benzene, a gasoline additive, causes leukemia in humans	Same as solvents
Pesticides <ul style="list-style-type: none"> • chlorinated hydrocarbons (chlordane, EDB) • carbamates (Aldicarb) • organophosphates (Malathion) 	<ul style="list-style-type: none"> • agriculture • lawn applications • pesticide manufacture, storage 	Highly variable: chlorinated hydrocarbons tend to be very persistent, highly susceptible to leaching, and produce toxic breakdown products; other pesticides may be degraded to inert forms or bound to soil particles	Wide range of toxicity to humans; many pesticides are highly toxic, cause central nervous system damage, or are suspected carcinogens	Some can be removed by carbon filtration or aeration
Nitrates	<ul style="list-style-type: none"> • agriculture (fertilizers and manures) • lawn care • septic systems • sewage treatment and collection systems 	Soil: highly soluble, very mobile; can be taken up by growing plants Groundwater: very mobile and persistent	Nitrates react with blood hemoglobin, impairing ability to transport oxygen; infants can be fatally affected at relatively low concentrations.	Reverse osmosis (small quantities)

14 | Appendices

14.2 Principal Groundwater Contaminants Table (continued)

Principal Groundwater Contaminants				
CONTAMINANT (with examples)	SOURCES	ENVIRONMENTAL FATE	HEALTH EFFECTS	TREATMENT OPTIONS
Biological Pollutants <ul style="list-style-type: none"> • bacteria • viruses • parasites 	<ul style="list-style-type: none"> • septic and sewage systems • agriculture (manures) 	Soil: bacteria and parasites readily removed by soil filtration	Bacteria cause gastrointestinal diseases (cholera, typhoid, enteritis, hepatitis); viral disease from groundwater uncommon, but no good lab tests available	Disinfection by boiling, chlorination or other methods
Salt (sodium chloride)	<ul style="list-style-type: none"> • road salt storage application • home water-softener backwash • saltwater intrusion (near coast) 	Soil: very soluble, highly mobile Groundwater: mobile and persistent	Excessive sodium intake has been linked with high blood pressure and hypertension	Reverse osmosis (small quantities)
Metals <ul style="list-style-type: none"> • lead • chromium • silver • mercury • aluminum • iron • manganese 	<ul style="list-style-type: none"> • metal finishing and metal working industries • photo and X-ray processing • printing, painting • automobile radiator and body shops 	Soil and Groundwater: metals readily removed by reactions with soil particles under neutral to basic conditions, but soluble and mobile in acidic waters	Some heavy metals (e.g., lead, chromium) are highly toxic, cause developmental and nervous system effects; iron, manganese low in toxicity	pH adjustment to neutralize water and filtration of precipitate
Acids/Bases	<ul style="list-style-type: none"> • industry • photo processing • printing • painting • automobile radiator and body shops 	Soil and Groundwater: mobile and persistent except in presence of natural pH buffers (e.g., limestone)	Acids and bases are rarely a significant health hazard in themselves, but they affect the solubility of toxic metals	pH adjustment

14.3 | Inspection Guidelines

This section is intended to serve as a guide for conducting inspections of land use activities within aquifer protection areas to identify conditions that may negatively impact the quality of groundwater. This document can be used by both water utility personnel and APA Agency staff in accordance with the municipal Aquifer Protection Area Regulations.

Aquifer inspection is one part of a multi-faceted approach for the protection of groundwater used for public drinking water supplies. Other important components include site plan and application reviews, water quality monitoring, and cooperative land use planning and education efforts with water utilities, municipal officials and state agencies.

Purpose

Inspections are performed to identify existing and potential conditions that could impact the quality of groundwater. This is accomplished by determining if facilities are in compliance with Aquifer Protection Areas, and other environmental regulations, and suggesting best management practices and/or procedural changes in order to mitigate potential risks to the aquifer. In addition, aquifer inspections educate and increase the awareness level of property owners on water quality issues and other environmental regulations. Property owners can become an asset in source protection through education on pollution prevention and water quality concerns.

Procedure

Inspections may be initiated as a result of one of the following:

- a. Review of the land use inventory of the aquifer protection area to determine potential regulated activities
- b. As part of a routine inspection program
- c. Response to a complaint
- d. Review of an application

1. Routine Inspections

An inspection program targets high-risk sites, such as automotive service stations, fuel or chemical storage sites and industrial properties, and should concentrate on those sites closest to the wellfield. Prioritizing inspection sites will allow for the wisest use of limited resources. A general "windshield" survey of the aquifer should be conducted at least on an annual basis. Two people together will allow the passenger to view aquifer maps, identify boundaries, and observe changes or developments on properties.

The process for performing inspections should include the following:

- **Identification of site within APA** – Determine sites located within the Aquifer Protection Area. A general

survey of the aquifer should be conducted at least on an annual basis.

- **Site File Review** – Review of existing APA, planning, and zoning files on the site to be inspected. In addition, this could include Department of Energy and Environmental Protection (DEEP) files, the local or regional health department, and local water utility files.
- **Review of on-site activities** – Viewing the activities that occur on the property and the processes involved in those activities will allow the inspector to ask appropriate and pertinent questions and evaluate the answers to those questions. Generic background information on industrial activity can be obtained from trade journals and DEEP publications such as "Best Management Practices for the Protection of Groundwater," DEEP, 1992. "The 1989 Aquifer Protection Task Force Report Land Use/Activities of Concern" also lists land uses and the activity or chemicals of concern to groundwater.
- **Inspections** – The local aquifer protection agent, health/zoning department should consider contacting the water utility or water department to request their assistance in inspecting a facility. This would improve the inspection by having people with different areas of expertise present and would add an additional set of eyes to observe site conditions.
- **Educational Materials** – Obtain pamphlets and brochures concerning septic system maintenance, proper hazardous waste disposal, environmentally friendly cleaners/pesticides, and general information concerning aquifers and groundwater. These materials should be distributed during the inspection.

Inspectors should be familiar with statutes and guidelines that apply to aquifer protection, including the Aquifer Protection Area Regulations, state and local environmental regulations concerning underground storage tanks, floor drain and wastewater discharges, chemical handling and disposal, and the Public Health Code.

Local police departments should be informed of routine inspections within a given area. Canvassing a neighborhood may lead residents to report suspicious activities to the police. Proper identification and prior contact with the police department will alleviate potential negative interactions with local departments.

14.3 Inspection Guidelines (continued)

2. Complaint Inspections

Inspections conducted in response to complaints should follow the same procedures as regular inspections, including location of site within APA, review of files, and contact with other interested agencies.

Cooperation of the property or business owner is necessary in order to perform an investigation of a complaint. The inspector responding to a complaint may find himself in an antagonistic situation. A calm and professional approach in a potentially hostile environment is necessary. Complaint inspections should be performed with two inspectors, one acting as the spokesperson and one as an observer/witness.

If access onto a property is denied, politely leave without aggravating the business or property owner. This refusal should be documented in writing, and followed-up with a written request to inspect the property. Copies of the letter should be mailed to the property owner (if different), DEEP, Department of Public Health (DPH), and the local health department. Make a follow-up phone call to determine if an alternate inspection time can be arranged; if not, request assistance from the local health department. If an imminent contamination problem is known or suspected on the property, also seek assistance from DEEP. Municipal APA regulations may include provisions for inspecting properties where access was denied and the site is subject to a registration or permit.

Documentation/Follow-up

Observations made during the inspection should be recorded on an inspection form. (See the Aquifer Protection Inspection Report found in the Forms and Applications section of this manual. This will assist in evaluating the risks of the site to the aquifer. Documentation of existing conditions with photographs may be very helpful in the event that formal action is taken. Photographs should be labeled with the location, date, time, a brief description, and the signature of the inspector. This will assist regulatory agencies by allowing them to examine the problem prior to conducting a site visit.

Many water quality concerns can be remediated by the business or property owner without the need for regulatory intervention. Outdoor storage of liquid chemicals can be moved inside. An outdoor storage tank can be equipped with secondary containment.

Environmental concerns that cannot be corrected through Best Management Practices (BMPs) or procedural changes, such as failing septic systems, floor drains with unknown discharges, leaking tanks and chemical spills, need to be brought to the attention of a regulatory agency. Depending upon the type of environmental problem, regulatory agencies such as the

DEEP, local Aquifer Protection Agency, local health department, planning and zoning and inland wetlands commissions may need to be notified. Property/business owners should be informed as to who will be notified in the event that a water quality concern is noted on the property.

Every effort should be made to keep the owner informed as to what steps are to be taken after an inspection. Telephone calls to an Agency should be followed by letters, with copies going to the owner. Contact these agencies periodically to determine the status of these violations.

Recordkeeping

A file should be maintained for each site inspected. This will reduce the need to repeatedly collect background information and, over time, will give a historical account of the site. The site file should contain a written account of inspections, background information on the site, and correspondence concerning the site.

Information obtained during an inspection should include:

1. Site Background Information

- Names, addresses and phone numbers of business owner, property owner and contact person for inspections
- Address of inspection site
- Inspector's name and date of the inspection

2. Facility Information

- Type of business and activities that occur on-site
- Information on water supply, sewage disposal, type of heating fuel, and the number and locations of buildings
- A hand-drawn location map to assist in identifying locations of buildings, storage areas, water supply wells, septic system leaching fields, underground storage tanks, etc.

3. Chemical Handling

- Types and amounts of chemicals stored on-site, storage and transfer areas, types of waste streams and disposal methods
- Age, size, location and contents of underground and above-ground tanks and distribution lines

4. Drainage Information

- Location and discharge points for floor drains, sumps, sloop sinks and other wastewater sources should be identified
- Stormwater management system, including discharge points, catch basins and drywells, should be examined

14.3 Inspection Guidelines (continued)

Review Elements

Aquifer inspections of industrial and commercial facilities have several common elements. These elements can contribute to the degradation of water quality. They should be evaluated to determine if they are, or could possibly cause, a water quality problem.

The following elements should be reviewed during an aquifer inspection:

A. Heating Source

If oil is used, determine whether the tank is stored above or below the ground. The age, size, type and location of the oil tank and distribution lines should be identified.

1. Above-ground Storage Tanks

Tanks stored above ground outside should have secondary containment designed to contain 110 percent of the volume of the tank. The storage area should be within a structure or roofed to prevent rain water from collecting in the containment area. Tanks in basements should be situated on an impervious floor. A basement sump pump can be an avenue for oil to enter the environment in the event of a leak. Oil should be prevented from entering a sump or floor drain by means of a berm around the tank. Tanks should have level indicators and overflow protection.

2. Underground Storage Tanks

Nonresidential underground tanks for on-site heating or intermittent stationary power production, with a capacity of 2,100 gallons or more, must be registered with the DEEP and must comply with all technical standards and testing requirements in the registration regulations (§ 22a-449(d)-(1) of the Connecticut General Statutes). In addition, all underground tanks of any size, containing petroleum liquids other than those used for on-site heating or intermittent stationary power production (e.g., waste oil, oil for resale, and gasoline), must be registered with the DEEP and must also comply with all technical standards testing and inventory requirements. Refer to the DEEP's manual regarding nonresidential underground storage tank regulations for further information; or contact the DEEP's Underground Storage Tank Program. Also check for compliance with any applicable local and federal regulations for underground storage of fuel, oil and chemicals. Underground storage tanks for #2 fuel oil located greater than 500 feet from the well field are not regulated under the Aquifer Protection Area regulations.

B. Drainage Systems

1. Interior

Determine if floor drains are present and, if so, note their discharge point. Discharges other than to the sanitary sewer or holding tank are illegal. Domestic wastes from bathroom and kitchen floor drains are allowed per the Public Health Code. Note any violations. In many cases, e.g., vehicle maintenance areas, floor drain discharges to the sanitary sewer require a DEEP General Permit and pretreatment in a 1,000-gallon oil and grit separating tank prior to discharge.

Holding tanks may, in some cases, also be regulated under State DEEP Underground Petroleum Storage Tank Regulations.

2. Exterior

Inquire as to the drainage discharge points for swimming pool backwash water and water softeners, if present. It is illegal to discharge these wastes into septic systems.

Contact the DEEP for further information and guidelines on swimming pool wastewaters. Examine stormwater catch basins for their discharge points and evidence of illegal disposal. Stormwater discharge to drywells or leaching structures should be examined and limited to clean water, such as from roofs. Stormwater contact with materials and wastes should be prevented. Stormwater discharge, including overland flow, swales, open channels, basins, roofs and parking lots, should discharge to the land surface.

C. Chemical Handling and Storage

Inquire as to the facility's hazardous waste generator status. Hazardous wastes need to be manifested when transported to a disposal site. Material and wastes should be stored within secondary containment. Note any signs of leakage or spills. Stormwater contact should be prevented. Recommend that spill containment equipment be stored on-site and that employees be trained to deploy it. Check nearby catch basins, streams, etc. for signs of illegal discharges such as oil slicks, and hydrocarbon and septic or chemical odors.

D. Outside Observations

Look at general conditions of the property, and note conditions of refuse storage and outdoor work areas. Certain outdoor activities, such as minor maintenance, may be of little concern on paved soils, but inappropriate on unpaved soil. On-site equipment, such as steam cleaners or power washers, should not be used outdoors on a regular basis and can pose a water quality threat to the aquifer.

14.3 Inspection Guidelines (continued)

E. General Survey

A general survey is an overall inspection of the aquifer. It consists of a drive-by “windshield survey” of the entire aquifer protection zone to identify changes in land use or other activities, water courses, aquifer boundaries, and vacant or non-developed lots susceptible to dumping.

1. Dumping

Check dirt and logging roads or vacant lots for illegal dumping, abandoned motor vehicles and parts, fuel or waste drums, and other debris.

2. Water Bodies

Note the existence of nearby ponds or watercourses, and inspect for possible impacts from activities occurring on the inspected property. Problems noted on streams and ponds can be indicators of problems upland.

3. Erosion and Sedimentation

Look for signs of erosion and sedimentation that may be affecting nearby watercourses or drainage systems. Although not an aquifer issue, work with the property owner, local inland wetlands and zoning agencies, and the Natural Resource Conservation Service to see that any problems are corrected. Inspect control measures for proper maintenance. Note any violations.

4. Stormwater

The basic stormwater principles for Aquifer Protection Areas are to prevent inadvertent pollution discharges/releases to the ground, while encouraging recharge of stormwater where it does not endanger groundwater quality. Prevent illicit discharges to stormwater, including fuel/chemical pollution releases to the ground. Provide necessary pavement in stormwater “hot spots” or areas where potential pollutant release to the ground is high including: storage and loading areas, fueling areas, intense parking areas and roadways. Minimize impervious coverage and disconnect large impervious areas with natural or landscaped areas. Direct paved surface runoff to above-ground type land treatment structures – sheetflow, surface swales, depressed grass islands, detention/retention and infiltration basins, and wet basins. (See 14.4.1 BMPs for Stormwater Management.)

5. Construction/Development Property

Significant storage of fuel and maintenance chemical fluids for excavation vehicles and equipment (as well as any other hazardous materials) should be off-site

(out of the Aquifer Protection Area). If necessary, movable fuel storage tanks should be stored on an impervious surface. If possible, they should be stored in a secured area. Spill response equipment should be available on-site for spills and leaks.

6. Septic Systems

Chemicals should not be disposed of via the septic system. Chemicals can pollute groundwaters and inhibit the biological breakdown of wastes and, thus, negatively affect the normal operation of the system. Hazardous waste should be stored and disposed of properly, and household hazardous waste may be disposed of at collection centers. Local health authorities should be notified of any improperly functioning septic system.

Agricultural Property is currently not regulated under the Aquifer Protection Agency until DEEP develops regulations; however, this land use is regulated by DEEP under their wastewater and pesticide programs.

Concerns include USTs, fertilizer/pesticide use, manure storage, exposed soils, silage.

1. Animals

If livestock (horses, cows, etc.) are present, determine proximity to watercourses, wetlands and the well field; and determine whether the method of manure storage and disposal or erosion could impact these resources, thus reducing the ability of a wetland to remove pollutants from runoff or releasing pollutants to the aquifer through stormwater or storage.

2. Fertilizers/Pesticides

Inspect storage and mixing areas of pesticides and fertilizers, especially at farms, nurseries and orchards. Storage and mixing areas should be impervious, with no floor drains, covered (preferably indoors), and secure. Recommend that paved areas and storm drains be avoided when applying fertilizers and pesticides, and that buffer strips be left in between the application area and wetlands, watercourses and the well field.

Note: Most agricultural operations will be regulated under the Aquifer Protection Agency Farm Resource Management Plan Regulations when adopted, and will be administered by the state and federal agricultural agencies.

14.4.1 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Controlling Stormwater from Parking Lots in Aquifer Protection Areas

- 1 Do not use direct infiltration structures (galleries, drywells, trenches), as these do not allow for attenuation of salt or other soluble compounds that may be contained in parking lot runoff.
- 2 Non-structural measures to dissipate and treat runoff are encouraged, including sheetflow from uncurbed pavement and vegetated swales/basins. These provide an opportunity for volatilization of volatile organic compounds to the extent possible before the stormwater can infiltrate into the ground.
- 3 If a stormwater collection system must be installed, it should discharge to an above-ground outlet point (swales, detention/retention basins or surface waters).
 - (a) Any catch basins installed should have deep sumps to trap sediments and hoods to trap oil and grease.
 - (b) If more than 1 acre of pavement drains to a common discharge point, a gross particle separator should also be installed. Advanced designs for gross particle separators have been developed, such as Vortech, Downstream Defender and Stormceptor, which the Department believes are very effective in retaining medium to coarse grained sediments as well as floatables. The last type of separator is designed to treat runoff from areas up to approximately 1 acre in size, while the former two can be sized to accommodate flow from larger areas. It is recommended that the appropriate variety of this or similar type of unit with a cyclonic design be installed in conjunction with each outfall, depending on the size of the drainage area.
- 4 Provisions should be made for the periodic maintenance that will be required to ensure continued effectiveness of these control measures.

For more information regarding the design of stormwater collection systems, contact DEEP Permitting Enforcement & Remediation Division at 860-424-3850.

14.4.2 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Disposal of Snow Accumulations from Roadways and Parking Lots

Purpose

These guidelines have been developed to clarify DEEP recommendations to state and municipal officials, and others, regarding the removal and disposal of snow accumulations from roadways and parking lots. For purposes of these guidelines, snow accumulations refers to snow banks and snow piles that are removed by front-end loader or by loading on trucks for disposal. These guidelines do not apply to normal snowplowing operations that must, inevitably, discharge some snow into wetlands and watercourses.

Problem

Current road maintenance activities include removal of snow accumulations from bridges, roads and parking areas for the purpose of providing more space for subsequent snowstorms and for ease of travel and parking. Sometimes this snow is moved by truck or with a front-end loader and deposited directly into surface waters of the state, including streams, wetlands and Long Island Sound. This practice is not recommended due to the presence of dirt, salt, litter and other debris, which are routinely mixed in with the accumulated snow.

Under normal conditions of snowmelt, the majority of these contaminants remain on or next to the paved surface or may be captured in stormwater catch basins. These contaminants can then be swept from streets and bridges or vacuumed from catch basin sumps. However, when accumulated snow is collected and dumped into surface waters, this mixture of snow, sand and debris may smother aquatic life in the bottom of streams and rivers and degrade the aesthetics of the surface water with silt plumes and litter. Large quantities of snow (and the sand and debris) may also cause blockage of storm drainage systems, resulting in increased chance for localized flooding.

Recommended Management Practice

Snow accumulations removed from roadways, bridges, and parking lots should be placed in upland areas only, where sand and other debris will remain after snowmelt for later removal. Care must be exercised not to deposit snow in the following areas:

- freshwater or tidal wetlands or in areas immediately adjacent to such areas where sand and debris may be flushed during rainstorms;
- on top of storm drain catch basins;
- in storm drainage swales;
- on stream or river banks that slope toward the water, where sand and debris can get into the watercourse; and,
- in areas immediately adjacent (within at least 100 feet) of private or public drinking water well supplies (due to the possible presence of road salt).

Implementation

The Department recognizes that there is a considerable need for flexibility in implementation of this policy. There is no intent to interfere with snow plowing operations. Where trucking and snow dumping operations are undertaken, the Department recommends these guidelines be followed.

For more information, contact the Bureau of Water Protection and Land Reuse at 860-424-3020.

14.4.3 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Road & Highway Construction/Reconstruction in Aquifer Protection Areas

Introduction

A plan for road construction or reconstruction should have a siting and design assessment to avoid or mitigate potential impacts. A stormwater management plan considering both the quality and quantity of runoff should be developed. The plan should be described, at least on a conceptual level, in a CEPA or similar document.

Overall, a stormwater management plan shall consider measures to reduce or mitigate water quality impacts to the groundwater aquifer. While the emphasis should be to protect groundwater quality, the plan should also consider impacts to surface waters and runoff rates.

The DEEP Aquifer Protection Area regulations require stormwater management plans for all permits, and can also be required for registrations. The management plans shall assure that stormwater runoff is managed to prevent groundwater pollution and shall meet the requirements of the DEEP Commercial Stormwater General Permit, including:

- Facility information: primary activity
- Stormwater discharge information: number and type of conveyance
- Stormwater management measures: pollution prevention, pavement sweeping, outdoor storage and washing restriction, illicit discharges, spill control/response, and maintenance and inspection of stormwater structures.

The basic stormwater principles for Aquifer Protection Areas (and other groundwater drinking supply areas) are to prevent inadvertent pollution discharges or releases to the ground, while encouraging recharge of stormwater where it does not endanger groundwater quality.

Management Measures Include:

- Prevent illicit discharges to stormwater, including fuel/chemical pollution releases to the ground.
- Provide necessary impervious pavement in high potential pollutant release areas. These “stormwater hot spots” include certain land use types or storage and loading areas, fueling areas, intensive parking areas and roadways.
- Direct paved surface runoff to above-ground-type land treatment structures – sheet flow, surface swales, depressed grass islands, detention/retention and infiltration basins, and wet basins. These provide an opportunity for volatilization, breakdown and attenuation of volatile organic compounds to the extent possible before the stormwater can infiltrate into the ground.
- Do not use direct subsurface recharge structures such as dry wells, galleries, or leaching trenches to directly infiltrate runoff, unless it is solely from clean areas such as rooftops or other clean surfaces. These structures do not adequately allow for attenuation of salts, solvents, fuels or other soluble compounds in groundwater that may be contained in runoff.
- Minimize pavement deicing chemicals; use an environmentally suitable substitute or alternative deicing agent such as calcium chloride or calcium magnesium.

14.4.3 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Road & Highway Construction/Reconstruction in Aquifer Protection Areas (continued)

Road and Highway Aquifer Protection Provisions

- 1 Planning and siting of roads, stormwater outfalls and other drainage structures.
 - Avoid aquifer areas and consider alternative routes
 - Maintain minimum separation from the well field (200' minimum, 500' where possible)
- 2 Drainage system design criteria
 - Select stormwater management methods from the DEEP Stormwater Quality Manual based on treatment effectiveness and low groundwater pollution potential
 - Stormwater discharge points should outlet to above-ground land surface or basin type structures – sheetflow, swales, basin collection is encouraged where possible.
 - Catch basins, curbs or other collection may be used in the immediate wellhead area to divert and control runoff and spills away from wellhead.
 - Dry wells, galleries, leaching trenches or similar subsurface structures should not be used for stormwater disposal from roadways. Existing subsurface structures that have high potential to pollute groundwater should be removed or converted.
 - Critical discharge points should have a basin designed with a forebay (tight soil or lined) capable of containing a 8,000-10,000 gallon spill volume and 3-6 feet above water table, 4 feet above bedrock.
- 3 Deicing management areas should be established, including low salt use areas, alternative chemical or other methods.
- 4 Wellhead protection signs shall be posted in clear visibility of the highway at the Aquifer Protection Area entrance and exit points and at half-mile intervals.
- 5 Potential strategic groundwater monitoring may need to be considered in very critical areas or circumstances.
- 6 Temporary construction measures
 - Significant fuel, chemical or other hazardous materials storage and handling should be located outside well field area and Aquifer Protection Area if possible.
 - Any necessary temporary storage should be above ground, protected from rainfall, and on a impervious containment surface.
 - An emergency spill and response plan should be developed, including coordination with the water supplier.

For more information, contact the Bureau of Water Protection and Land Reuse at 860-424-3020.

14.4.4 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Road Salt Storage

In order to prevent a salt storage facility from becoming a source of pollution, practice the following guidelines when siting a new salt storage facility.

Location of Salt Storage Areas

A salt storage facility should not be located in any of the following areas:

- Within a 100-year flood plain
- Within 250 feet of a well that is utilized for potable water
- Within an Aquifer Protection Area
- Where adjacent surface water bodies are tributary to public water supply reservoirs, unless it is not feasible to locate the facility in a less sensitive area
- In areas where the groundwater has been classified as GAA or GA, unless it is not feasible to locate the facility in a less sensitive area.

Storage and Handling:

- Salt should be stored on an impervious surface under a roof.
- Mixtures of salt and sand should also be stored on an impervious surface under a roof, or kept covered by a waterproof material such as polyethylene.
- For guidance on mixing salt and sand, consult the Snow and Ice Policy Manual (Connecticut Department of Transportation), as revised on an annual basis.

Stormwater Management:

- It is preferable to discharge stormwater runoff to surface waters rather than to groundwater resources that are host to potable water wells.
- Runoff to the facility from rainfall should be diverted around the facility by berms, swales, or drains.
- Obtain necessary general permits for stormwater discharges.

For more information on salt storage, call 860-424-3020. For more information on general permits for stormwater discharges, call 860-424-3018.

14.4.5 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Sand and Gravel Operations in Aquifer Protection Areas

Issues and Concerns

Potential groundwater quality concerns associated with sand and gravel mining operations are mostly related to the accessory operations of the earth removal itself. Sand and gravel mining operations are not on the list of regulated activities under the State of Connecticut Department of Energy and Environmental Protection's (DEEP) Aquifer Protection Area (APA) Regulations. However, other activities that may be associated with sand and gravel mining are regulated activities under the APA regulations. Activities such as fuel dispensing, vehicle maintenance, underground storage tanks, and wastewater discharges are restricted in APAs. Other aquifer concerns may include unauthorized waste disposal, excavation close to or below the water table, and planned reuse of the site.

Recommendations

For the protection of groundwater quality at sand and gravel mining operations in Aquifer Protection Areas, DEEP recommends the following:

- Storage of fuel and maintenance chemical fluids for excavation vehicles and equipment (as well as any other hazardous materials) should be off-site (out of the Aquifer Protection Area).
- Vehicle maintenance and refueling should be conducted outside the Aquifer Protection Area to the extent possible. If it is necessary to conduct equipment refueling or minor maintenance activities on-site, precautions should be taken to prevent and contain any potential chemical or fuel spillage. Refueling from mobile fuel trucks and minor or emergency vehicle maintenance should be on an impervious containment pad.
- A spill control plan should be in place and emergency containment materials should be available on-site.
- The site access should be adequately secured at all times to prohibit any unauthorized disposal of waste materials.

A vertical separating distance of 5 feet between the excavation and the seasonal high water table, and 10 feet between the excavation and the bedrock is recommended. This is a general guideline, based on the desire to maintain an unsaturated water quality protective zone above the aquifer, to help maintain natural hydrologic conditions, and to allow planned reuse of the site and future on-site needs for sewage disposal, if needed. These recommendations may vary based on specific soil characteristics and planned reuse of the site. If excavation is to occur below the above vertical separation guidance, it is recommended that a hydrogeologic assessment of the project be conducted. This assessment should be done by an engineer, soil scientist, geologist or hydrologist, and should further assess associated changes to pollutant renovation properties of the remaining soil layer and site hydrology.

Water quantity (versus water quality) effects are not directly regulated under the DEEP Aquifer Protection Area regulations (but may be regulated under DEEP authority, such as diversion regulations). A sand and gravel mining project, as with any proposed site development or construction project, can alter site hydrology positively or negatively, depending on the existing and proposed conditions. An assessment of the hydrologic changes to site should be done, especially when creation of a permanent water body or wetland area is proposed below the water table. Evaluation of pre-site and post-site conditions should be done, looking at changes to the water budget of site including runoff, infiltration, evapotranspiration, water storage, groundwater table and groundwater flow.

For more information, contact the Bureau of Water Protection and Land Reuse at 860-424-3020.

14.4.6 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Sewage Disposal and Groundwater Quality in Aquifer Protection Areas

Introduction

On-site sewage disposal systems, normally conventional septic systems, are a commonly used method for disposing of domestic wastewaters in suburban and rural areas. Many residential, commercial and some industrial facilities use septic systems for domestic waste disposal. When properly located, designed, constructed, used and maintained, septic systems provide a very effective, sustainable and efficient way to treat domestic sewage and protect water quality. They also help maintain groundwater recharge. The primary disadvantages of on-site systems are that proper land conditions are necessary, and the system does require some care and maintenance.

Discussion

Water Quality

Historically, most problems with septic systems were the result of hydraulic overloading of a site (too much sewage volume for the site or poor site hydraulic conditions), and most failures from this resulted in surface water, as opposed to groundwater, quality impacts. Groundwater quality impacts are more commonly the result of misuse of the system by illicitly discharging non-domestic wastewaters, industrial wastewaters, or hazardous wastes or chemicals, which are not well-treated by soil. Groundwater quality concerns related to on-site drinking wells were also historically the result of very old development areas, where minimum health code siting and separation requirements were not met for wells and septic systems. Modern health and environmental regulations, and strict administration of them, has helped eliminate many of these concerns. Although land area or lot size is an important factor, the “character” of the lot (soils, geology, hydrologic conditions) is what primarily determines a site capacity for sewage disposal.

Regulation

Regulation of on-site sewage disposal systems is carried out on the local or state level, depending on the type and size of the system. Community septic systems and large (5,000 GPD) systems require a State DEEP Discharge Permit. The DEEP permit requires a site-specific hydraulic and pollution renovation analysis, as well as water quality monitoring. The limiting pollutant of concern from domestic sewage usually is nitrate (from both an environmental and health standpoint), so usually the site pollutant renovation analysis is targeted to ensure that this pollutant is addressed. The permit process may also include the pretreatment of discharges prior to groundwater discharge to meet water quality standards.

During development of the DEEP Aquifer Protection Area (APA) Regulations (RCSA Sections 22a-354i-1 to 22a-354i-10) in 2000, issues related to the discharge of domestic sewage were reviewed, including the potential impacts, the existing regulatory system, and the advantages and disadvantages of sewerage Aquifer Protection Areas. After consideration, the APA regulations did not further regulate or restrict domestic sewage, but instead reinforced the existing regulatory controls, made exceptions for certain high-strength commercial wastewaters on public sewer, and prohibited non-domestic waste discharge (which is not allowed in any groundwater drinking supply areas statewide), and relies on the existing state and local sewage disposal permitting system.

14.4.6 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Sewage Disposal and Groundwater Quality in Aquifer Protection Areas (continued)

Another issue related to sewage disposal and aquifer protection has been the use by some towns of a maximum gallon per acre per day requirement in local zoning regulations for aquifer protection purposes. In old aquifer reports from the late 1970s (the 208 program), a planning number of 360 gallons per acre per day was used. The number was a general overall planning number for aquifers and was not intended to be applied as a site-specific limit. The use of a maximum gallon per acre per day requirement is not recommended for site-specific use. If the local Agency chooses to continue to use a "gallon per acre per day" requirement in their local zoning regulations, it should further qualify any number as a planning number and, when exceeded, the applicant may be required to perform a sewage renovation analysis for the site.

Public Sewer Service

Public sewers can help protect groundwater quality by removing the wastewater discharge concerns, especially where high-volume or high-strength wastewaters are concerned. Public sewers are used to solve wastewater problems from historic high-density development with failing septic systems and to address sewage disposal needs for planned suburban and urban growth areas. However, sewers can have the secondary effect of increasing the type and density of land use, resulting in increases in non-point sources of pollution (such as stormwater runoff, chemical spills and leaks, waste handling, lawn care, and other miscellaneous land use related releases). In fact, the secondary effect of sewers can intensify the type and the density of land uses and non-point pollutants to the point that it may obscure any water quality improvements from the wastewater removal and further degrade groundwater quality. A 1993 US Geological Survey report, which studied the effects of land use on groundwater quality in unsewered and sewer areas in Connecticut, verified this concern. The report showed that in residential, commercial and industrial areas, the groundwater in sewer areas generally had poorer groundwater quality than in those areas not sewer. For this reason, sewer areas is not the primary solution, and any sewer plans need to be accompanied by careful land use planning and management. Sewers can also have a negative affect on groundwater recharge by exporting water out of the aquifer, and sewerline failure or leaky lines can potentially exfiltrate pollutants. It is general state policy to avoid new sewage collection systems in Aquifer Protection Areas, except when essential to solve existing area-wide problems, and to limit state funding to a level necessary to solve pollution problems associated with existing development and avoid further intensive development on the aquifer, and disapprove sewer plans that are excessively sized or that extend to areas where alternative measures are possible.

For more information, contact the Bureau of Water Protection and Land Reuse at 860-424-3020.

14.4.7 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Storage (only) of Batteries in Aquifer Protection Areas

Recommendations

- 1** Verify that the business is wholesale, not retail; if it is wholesale, then we would consider it a regulated activity under activity definition C – on-site storage of hazardous material for the purpose of wholesale sale.
- 2** Since it is just storage, transfer and delivery (no manufacturing, processing, acid filling, handling), the registration and MMP should be simple, with much of the information being not applicable.
- 3** Primary BMPs would be: a sound inside storage building area and floor, no floor drains, impervious transfer/loading dock area, and an emergency response plan, which they should already have in some manner per the fire marshal.

For more information on storage of batteries, contact DEEP Solid Waste Recycling Program at 860-424-3374.

14.4.8 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Temporary Construction and Reconstruction Operations in Aquifer Protection Areas

Issues and Concerns

Potential groundwater quality concerns include stormwater, fuel, and other maintenance chemicals associated with vehicles, machinery, and equipment.

Guidance/Recommendations

For the protection of groundwater quality at construction operations in Aquifer Protection Areas, DEEP recommends the following:

Temporary Construction Measures:

- Significant fuel, chemical or other hazardous materials storage and handling should be located outside well field area and Aquifer Protection Area if possible.
- Any necessary temporary storage should be above ground, protected from rainfall, and on an impervious containment surface.
- An emergency spill and response plan should be developed, including coordination with the water supplier.
- The site access should be adequately secured at all times to prohibit any unauthorized disposal of waste materials.

Stormwater Pollution Prevention Measures:

- Ways to minimize pollutant load (sand, salt, etc.) should be examined.
- Deicing management areas should be established, including low salt use areas, alternative chemical or sand methods.
- Wellhead protection signs shall be posted in clear visibility of the highway at the entrance and exit points of the Aquifer Protection Area and at half-mile intervals.

Drainage System Design Criteria:

- Select best management practices from the DEEP stormwater manual based on treatment effectiveness and low groundwater pollution potential.
- Sheetflow and swale collection is encouraged, where possible, outside of immediate well field area.
- Catch basins and curbs should be used in immediate wellhead area to divert and control runoff and spills away from wellhead.
- Dry wells or similar subsurface leaching structures should not be used for stormwater disposal from paved or other areas that have high potential to pollute groundwater; existing structures that have high potential to pollute groundwater should be removed or converted.
- Gross particle/oil separators (swirl concentrator type) may be used for pretreatment of consecutive catch basins. Deep catch basins (minimum 4' deep and tight construction, with baffles, may also be used).
- Stormwater discharge points shall outlet to above-ground land surface or basin type structures. Significant or critical discharge points should have a basin designed with a forebay (tight soil or lined) capable of containing an 8,000-10,000 gallon spill volume and 3-6 feet above water table, 4 feet above bedrock.
- Potential strategic groundwater monitoring should be considered.

14.4.9 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Turf Management for Golf Courses, Athletic Fields and Large Residential Housing Developments (Condominiums)

Turf Management – Nutrient and Integrated Pest Management (IPM) Plans

Integrated Pest Management (IPM) is defined as the use of all available pest control techniques, including judicious use of pesticides, when warranted, to maintain a pest population at or below an acceptable level, while decreasing the use of pesticides. IPM includes the combined use of many techniques.

Some of these techniques include:

- Site scouting or monitoring
- Correct pest and damage identification
- Use of resistant turf cultivars and varieties
- Proper cultural practices (irrigation, mowing, soil aeration and thatch management)
- Soil and plant tissue testing
- Nutrient management
- Weather monitoring
- Physical controls
- Biological controls
- Identification of beneficial organisms
- Recordkeeping
- Equipment calibration and maintenance
- Good communication
- Precise timing and proper selection of pesticides

A nutrient management plan should also be developed that addresses the timing and placement of fertilizers based on seasonal demand or usage of specific turf species, landscape position and weather. Areas of seasonally high water tables should be flagged during typically wet periods in spring and fall. Special care should then be taken in the timing of applications to these areas, since they become surface runoff zones during storms.

A full discussion of IPM recommendations is beyond the scope of this fact sheet. Some specific BMPs related to water quality are listed on the following pages. For more information see "Integrated Pest Management for Golf Courses," available through the EPA, "Model Integrated Pest Management Plan for Connecticut State Agencies, Ornamental and Turf," available through CT DEEP, "Professional Guide for IPM in Turf for Massachusetts," available through UMass, or "University of Connecticut Turfgrass Nutrient and Integrated Pest Management Guide for Turfgrass" (December 2001), available through UCONN.

For more information contact the Bureau of Water Protection and Land Reuse at 860-424-3020.

14.4.9 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Turf Management for Golf Courses, Athletic Fields and Large Residential Housing Developments (Condominiums) (continued)

Specific BMPs for Turf Management

- Do not apply fertilizer to soggy areas until the water table is lowered enough for the turf to be able to absorb the nutrients. These areas are typically in converging and flatter areas in the landscape, which can be detected during wet periods such as late winter/early spring.
- Avoid spraying pesticides when the soil is saturated or when heavy rains are imminent, or under any other conditions where surface runoff may result.
- Establish pesticide-free zones around water bodies and near drinking water wells.
- Spray pesticides when the wind is calm. Be careful to avoid drifting of pesticides toward sensitive areas or water.
- Locate compost piles away from surface waters, wetlands and floodplains, and not on steep slopes. Store and maintain vehicles and equipment on covered, sealed, impervious areas.
- Fueling facilities should be located on concrete paved areas (not asphalt), in paved, roofed areas and equipped with spill containment and recovery facilities.
- Floor drains must be eliminated unless they drain to storage tanks.
- Equipment washing areas must drain to an oil/water separator, and from there, to a sanitary sewer or holding tank.
- Keep containment booms and absorbent materials on hand for the cleanup of spills.
- Employees should be familiar with the locations of all underground structures, such as storage tanks, septic fields and storm drains.
- Provide secondary containment for all hazardous materials, including liquid fertilizer storage areas.
- Store all hazardous materials in sealed, locked areas or buildings. Identify locations for these materials on the site plan. Register all materials with the fire marshal.
- Locate pesticide, fertilizer and hazardous material storage, mixing and loading areas at least 200 feet away from surface water resources or high water table areas and drinking water wells.
- Locate pesticide, fertilizer and hazardous material storage, mixing and loading areas in separate areas so that they cannot be confused with one another.
- Provide impervious surfaces in mixing areas.
- Dispose of hazardous materials in a manner consistent with the label and regulations.
- Buy fertilizers and pesticides in limited quantities and do not store large volumes of chemicals on-site.
- Minimize the use of underground fuel storage and eliminate chemical storage tanks in drinking water groundwater supply areas.
- Fueling should be carried out away from surface waters and drinking water wells. Fueling areas should be protected from surface runoff.

14.4.9 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Turf Management for Golf Courses, Athletic Fields and Large Residential Housing Developments (Condominiums) (continued)

Spill Response

The goal of a spill response plan is to have a series of steps in place so employees can respond to an emergency spill safely and swiftly. The policy should be written, employees should be acquainted with it, and it should be posted in an easily accessible place. See example of a spill response plan.

Specific BMPs for Hazardous Spill Response

- Develop plans to be followed in case chemical materials are spilled. Tailor the plans to the specific potential hazards posed by each chemical used on-site. The plan should identify all potential hazards, and include safe-handling measures and appropriate spill response procedures.
- Clearly identify the appropriate responding authorities – DEEP, state police, or local emergency response. Maintain a list of people to notify in the event of a spill, including drinking water suppliers, if the site is on a public water supply/water watershed.

Water Quality Monitoring

There are a number of good reasons to set up a water quality monitoring program. Monitoring may help fulfill permit requirements, determine chemical applications and watering schedules, and assess the effectiveness of management techniques. Most important, a carefully designed and executed program ensures the early detection of water quality problems, making the problems easier to solve.

The program's design must not only take into account the various goals of the monitoring effort, but also reflect the extremely site-specific factors that affect the source, flow, destination and chemistry of the water, such as soil type, slope, drainage and vegetation. In most instances, qualified consulting services should be retained to assist in setting up and, in some cases, implementing the program.

There are five basic elements in any water quality monitoring program:

1. Monitoring goal
2. Monitoring network
3. Sampling plan and procedures
4. Data management and evaluation
5. Plan for response if a problem is detected

14.4.9 BEST MANAGEMENT PRACTICE (BMP) RECOMMENDATIONS

Turf Management for Golf Courses, Athletic Fields and Large Residential Housing Developments (Condominiums) (continued)

Identifying the Water Quality Monitoring Goal

The first step in the development of a water quality monitoring program is to identify the monitoring goal. The purpose of the goal is to articulate and define what the monitoring program will be expected to accomplish. A well-defined goal focuses the monitoring effort, both in terms of the water quality parameters to be evaluated and the physical extent of the area to be monitored. Some potential monitoring goals would be to:

- Evaluate the effectiveness of an IPM program;
- Evaluate the frequency and timing of nutrient or pesticide applications;
- Determine baseline water quality;
- Detect any potential problems early to allow adjustment of practices before the impacts are significant;
- Monitor impact on particularly sensitive areas;
- Meet specific local or state regulatory requirements;
- Determine the extent and degree of a known problem; or monitor the effectiveness of remediation or mitigation of a known problem.

For more information, contact the Bureau of Water Protection and Land Reuse at 860-424-3020.



Aquifer Protection Area Program Fact Sheet



What is the purpose of the Aquifer Protection Program?

In Connecticut, over two million people rely, at least in part, on ground water for their drinking supply. Since the late 1970's, numerous public and private wells have been found to be contaminated by various pollutants from land use activities. Aquifers, geologic formations able to yield water to wells, cannot be considered naturally protected.

At particular risk are "stratified drift" (sand and gravel) aquifers supplying our larger public water supply wells. Despite current protection efforts many types of land uses continue to threaten ground water quality. To address this problem, Connecticut established the Aquifer Protection Area Program (C.G.S. 22a-354a et. sec.). The purpose of the program is to identify critical water supply aquifer areas and to protect them from pollution by managing land use.

What is an Aquifer Protection Area?

Aquifer Protection Areas are being designated around all existing wells in stratified drift used by water systems serving over 1000 people. The "aquifer protection area" is the critical portion of the aquifer which provides water to the well (sometimes referred to as a "wellhead protection area"). 122 active well fields (wells or groups of wells) in the state will have protection areas around them. Activities which might contaminate ground water in these areas will be regulated.



How are these areas identified?

Aquifer Protection Areas are identified by DEEP and mapped by water companies that own the wells. Water companies usually hire a ground water consultant to do the mapping which must follow DEEP regulations. DEEP must review and approve the mapping.

The Aquifer Protection Area includes the well field and areas of contribution and recharge. The size of the area can vary from tens of acres to hundreds of acres depending on the well yield and aquifer materials. Once mapped and approved the aquifer protection areas must be adopted by towns.

Aquifer Protection Areas have been identified in 79 towns. Additional protection areas may be designated for sites of future wells.

How will the protected areas be regulated?

Aquifer protection responsibilities will be shared by the state, the municipality, and the water company.

STATE - In addition to overall program implementation, DEEP has or continues to:

- ◆ Established state land use control regulations and standards;
- ◆ Approve aquifer protection areas and local regulations;
- ◆ Oversee municipal aquifer protection agencies and provide training and technical assistance;
- ◆ Regulate facilities that hold discharge permits or RCRA permits, and state and federal facilities; and
- ◆ Provide for education about ground water protection.

MUNICIPALITIES – Responsibilities include the following:

- ◆ Authorize an existing board or agency to serve as the local Aquifer Protection Agency;
- ◆ Adopt local Aquifer Protection Area regulations consistent with state regulations;
- ◆ Delineate Aquifer Protection Areas on the town zoning map; and
- ◆ Regulate land use activity within the Aquifer protection Areas by registering existing regulated activities, issuing permits for new regulated activities and inspecting regulated facilities.

WATER COMPANIES – Besides mapping, the water companies continue to:

- ◆ Inspect Aquifer Protection Areas;
- ◆ Assist towns with their aquifer protection programs; and
- ◆ Plan for land acquisition around well fields.

Did you know?

It only takes a small quantity of some substances to contaminate millions of gallons of groundwater. For instance, only a few ounces of perchloroethylene (a degreasing solvent often used to clean metal parts) can render millions of gallons of water unsafe to drink based on federal standards.

How will businesses be affected?

Land uses and activities that can contaminate ground water quality will be regulated in protected areas. Generally, these are activities which use, store, handle or dispose of hazardous materials and other potential ground water contaminants. There are 28 regulated activities defined in the regulations. New land use activities of these types will be prohibited from locating in aquifer protection areas.

Businesses conducting regulated activities which are already in existence in aquifer protection areas need to register their land use activity and follow best management practices designed to minimize the possibility of a release. This may include implementing new procedures and/or installing new containment equipment. Registered businesses may expand their existing activities, and may apply for a permit to add new regulated activities to their facilities.

Many state and local government operations such as highway maintenance garages, road salt storage, airports, and waste disposal areas will be regulated. Workshops and laboratories in schools and other institutions will also have to follow best management practices.



How will the general public be affected?

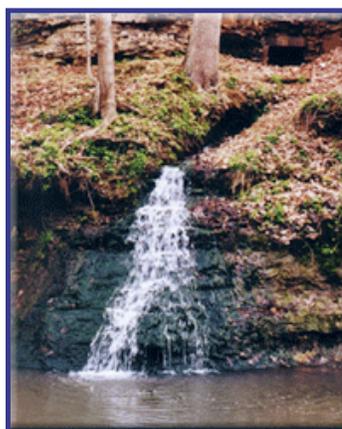
Homeowners may be affected by restrictions on home occupations that use hazardous materials. Residents in protected areas will be educated about the risk to ground water quality from pesticides and fertilizers, improper septic system use, and hazardous cleaning and maintenance materials such as paints, paint thinner and automotive fluids.

The Rewards

Clean water is vital for our very survival. Until recently, people assumed that it would always be plentiful in Connecticut. The events of the past few decades have shown that ground water, like surface water, is increasingly at risk from our chemical-dependent society. The aquifer protection area program requires a major commitment from state and local government, business, water companies, and individual residents, but the reward of clean drinking water for now and the future is well worth the trouble.

Where can I get more information?

The Connecticut Department of Energy and Environmental Protection
 Bureau of Water Protection and Land Reuse
 Aquifer Protection Area Program
 79 Elm Street
 Hartford, CT 06106-5127
 (860) 424-3020
www.ct.gov/deep/aquiferprotection



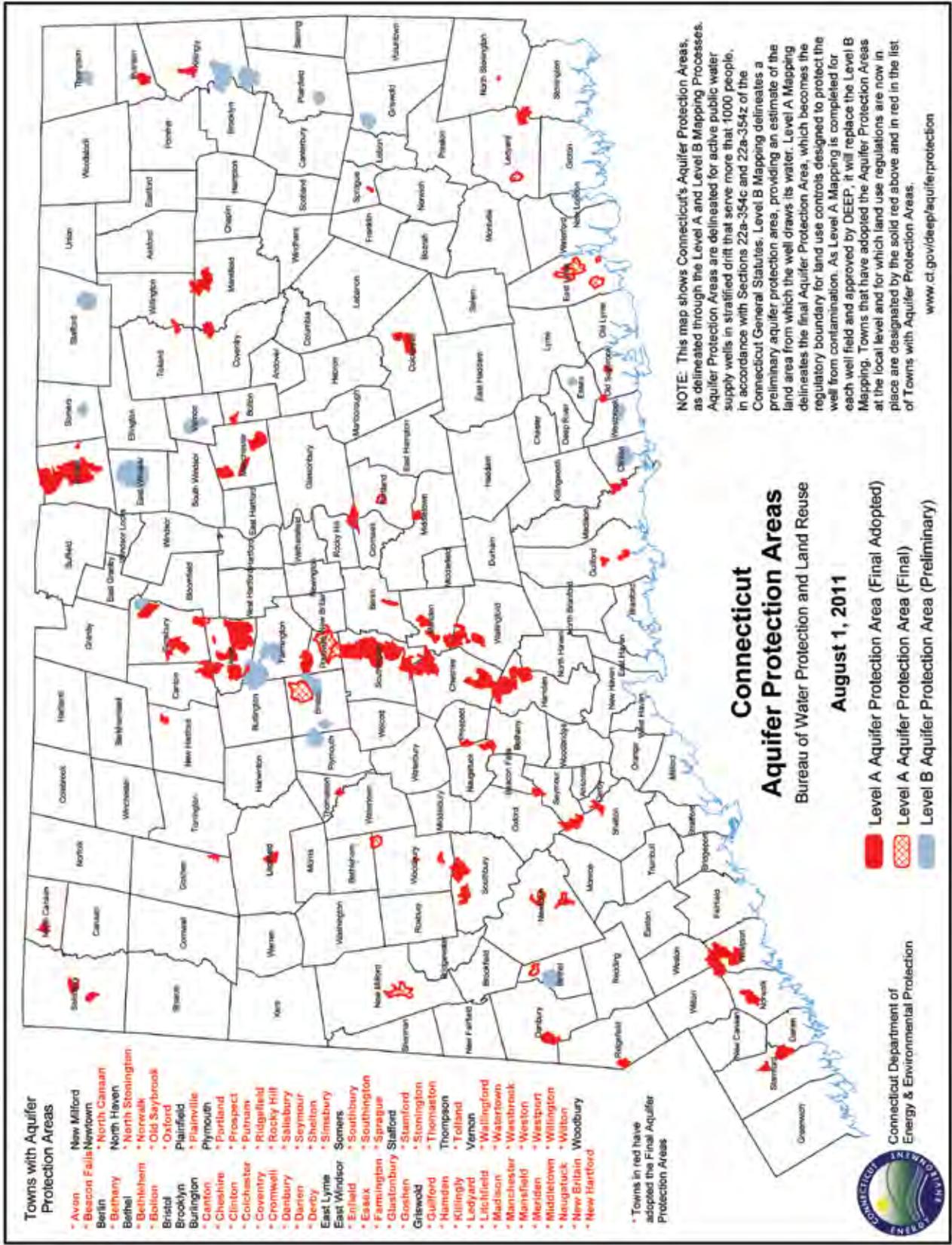
Towns with Aquifer Protection Areas

Avon	Danbury	Madison	Plainfield	Stafford
Beacon Falls	Darien	Manchester	Plainville	Stamford
Berlin	Derby	Mansfield	Plymouth	Stonington
Bethany	East Lyme	Meriden	Portland	Thomaston
Bethel	East Windsor	Middletown	Prospect	Thompson
Bethlehem	Enfield	Naugatuck	Putnam	Tolland
Bolton	Essex	New Britain	Ridgefield	Vernon
Bristol	Farmington	New Hartford	Rocky Hill	Wallingford
Brooklyn	Glastonbury	New Milford	Salisbury	Watertown
Burlington	Goshen	Newtown	Seymour	Westbrook
Canton	Griswold	North Canaan	Shelton	Weston
Cheshire	Guilford	North Haven	Simsbury	Westport
Clinton	Hamden	Norwalk	Somers	Willington
Colchester	Killingly	North Stonington	Southbury	Wilton
Coventry	Ledyard	Old Saybrook	Southington	Woodbury
Cromwell	Litchfield	Oxford	Sprague	

14 | Appendices

14.6 State Map of APAs

14.6 | State Map of APAs



14 | Appendices

14.7 | List of Websites for Aquifer Protection Agencies

Connecticut Department of Energy and Environmental Protection Websites	
Aquifer Protection	www.ct.gov/deep/aquiferprotection
Emergency Response and Spill Prevention	www.ct.gov/deep/spills
Geographic Information Systems	www.ct.gov/deep/gis
Geology	www.ct.gov/deep/geology
Hazardous Waste	www.ct.gov/deep/hazardouswaste
Integrated Pest Management (IPM)	www.ct.gov/deep/ipm
Integrated Water Quality Report	www.ct.gov/deep/iwqr
Laws & Regulations	www.ct.gov/deep/laws-regs
Nonpoint Source Pollution Program	www.ct.gov/deep/nps
Pesticides	www.ct.gov/deep/pesticides
Pollution Prevention	www.ct.gov/deep/p2
Regulating Waste Storage, Treatment, Transportation & Disposal	www.ct.gov/deep/waste
Remediation/Site Cleanup	www.ct.gov/deep/remediation
Solid Waste	www.ct.gov/deep/solidwaste
Stormwater Management	www.ct.gov/deep/stormwater
Underground Storage Tanks	www.ct.gov/deep/ust
Water Quality Standards and Classifications	www.ct.gov/deep/wqsc
Watershed Management	www.ct.gov/deep/watershed
Wetlands	www.ct.gov/deep/wetlands

14 | Appendices

14.7 | List of Websites for Aquifer Protection Agencies (continued)

Other Connecticut State Agencies	
Connecticut Department of Public Health Drinking Water Unit	www.ct.gov/dph/publicdrinkingwater
The Connecticut Licensing Information Center website is an online resource tool that streamlines access to licensing and permitting information across state government.	www.ct-clic.com
Commercial Recording Division Secretary of the State of Connecticut	www.concord-sots.ct.gov
Federal Websites	
U.S. Geological Survey Water Resources	www.usgs.gov/water/
U.S. EPA Ground Water and Drinking Water	http://water.epa.gov/drink/index.cfm
U.S. EPA website with information on nonpoint source pollution	http://epa.gov/nps/outreach.html
U.S. EPA website that contains information on stormwater	http://cfpub.epa.gov/npdes/stormwatermonth.cfm
U.S. EPA website with septic system information for homeowners	www.epa.gov/owm/septic
Other Websites	
National Low Impact Development Clearinghouse	www.lid-stormwater.net/clearinghouse/home.htm
The Groundwater Foundation	www.groundwater.org
The Ground Water Protection Council	www.gwpc.org/home/GWPC_Home.dwt

14 | Appendices

14.8 | Contacts – Telephone Numbers

Connecticut Department of Energy and Environmental Protection

Aquifer Protection Area Program	860-424-3020
General Number	860-424-3000
24-Hour Emergency Spill Reporting	860-424-3338
Oil and Chemical Spill Response Division	860-424-3377

Bureau of Materials Management and Compliance Assurance

Hazardous Waste Compliance Assistance	860-424-4193
Office of Pollution Prevention	860-424-3297
Pesticide Program	860-424-3369
Solid Waste Recycling Program	860-424-3365
Underground Storage Tank Program	860-424-3374

Bureau of Water Protection and Land Reuse

Planning and Standards Division	860-424-3020
Stormwater and Wastewater Discharge Program	860-424-3018
Remediation Program	860-424-3705

Other Numbers

Connecticut Department of Public Health	
Public Drinking Water Systems	860-509-7333
National Response Center	860-424-8802