

N.H. Department of Environmental Services
Alteration of Terrain Program
Using DES's OneStop Web GIS to Locate
Groundwater Protection Areas¹ and Water Supply
Intake Protection Areas²
9/4/09

On January 1, 2009, amendments to the Alteration of Terrain (AoT) rules (Env-Wq 1500) were adopted and include provisions to protect special resource areas called “groundwater protection areas” (GWPA) and “water supply intake protection areas”(WSIPA). GWPA are areas that contribute recharge to public water supply wells or are located above other locally important groundwater resources such as high-yield aquifer areas; WSIPA are critical lands adjacent to public water supply intakes on surface waters. Projects within these areas may need to change how a stormwater system is designed or adhere to minimum stormwater discharge setbacks in order to better protect potential or current public water supply sources. Attachment 1 on page 6 contains a summary of AoT rule requirements within GWPA and WSIPA.

DES's OneStop Web GIS can be used to determine whether a project is within or outside a GWPA or WSIPA. The geographic information available through DES' OneStop Web GIS is of varying age, quality, and completeness; however in most cases the GIS viewer should allow the user to determine whether a project is within or outside a GWPA or a WSIPA. In some cases it may be necessary to use other published technical reports, more detailed mapping or field verification to make determinations. To determine whether a project is within a GWPA or a WSIPA, complete the following steps:

Step 1. Complete DES's OneStop Web GIS Registration

Please follow the registration directions online at: <http://www2.des.state.nh.us/gis/onestop/register.asp>. Access to geographic data regarding public and private water supply wells is restricted, as it is security sensitive; access is provided after a brief security review conducted by DES. In the OneStop Data Provider Registration Form, click “Apply” to the left of the feature titled “Access Public Water Supply Data Layers in OneStop Geographic Information System (GIS).” A box titled “Enter Your Reason for Your Request Here” will appear. In this box, indicate which state or federal regulation(s) or other work-related purpose requires you to have access to the public water supply information. Complete and submit the registration form. After the registration is reviewed, DES issues (via email) a “Pin” and “Password” to provide full access to the DES OneStop Web GIS viewer.

Step 2. Log in and start DES's Onestop Web GIS viewer

From the OneStop Web GIS page, <http://www2.des.state.nh.us/gis/onestop/>, click the earth logo at the bottom of the page titled, “Start GIS”. Once you've been approved you may enter your Pin and Password and click the login button that will launch the Onestop Web GIS in a different “pop up” browser window.

¹ Env-Wq 1502.24 “Groundwater protection areas” means: (a) Wellhead protection areas for active community and non-transient, non-community public water supply wells; and (b) Areas of groundwater reclassified as GA1 or classified as GA2 pursuant to RSA 485-C and Env-Ws 420 or successor rules, Env-Dw 901.

² Env-Wq 1508.01 (a) “Water supply intake protection area” means, for a surface water used as a source by a public water system: (1) The area within 250 feet of the normal high water mark of the surface water source within one-quarter mile radius of the public water system's intake, excluding areas outside the watershed of the surface water; and (2) The area within 250 feet of the normal high water mark of any tributary that is within one quarter mile radius of the public water system's intake, excluding areas outside the watershed of the surface water.

Step 3. Add the “Alteration of Terrain Screening” GIS Data Layers

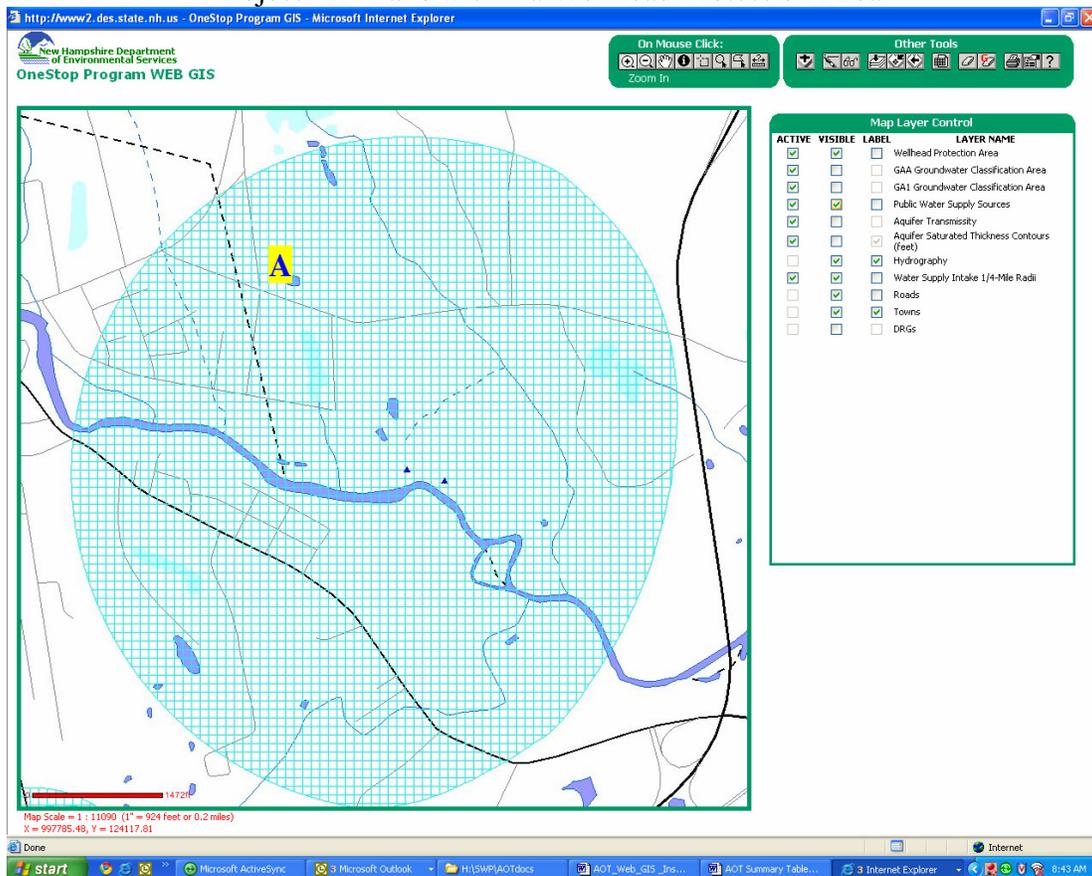
In the OneStop Web GIS viewer, add GIS layers by clicking the “Add/Remove Map Layers” button in the “Other Tools” section of the viewer (indicated by a plus sign, ). Clicking the button will launch a pop-up window with the Add/Remove Map Layers menu to select which GIS data to place in the view. Under the Alteration of Terrain (AoT) heading, select “AoT Screening Layers”, then click the “Add/Remove” button (at the bottom of the pop-up window). In the viewer, use the zoom tool () to zoom to your project’s location).

Step 4. View AoT Screening Layers to Determine Whether Your Project is in a GWPA or WSIPA

With the AoT Screening Layers added to the view, determine the project’s location in relation to the GWPAs and WSIPAs. Figures 1 through 4 below show examples of projects located in GWPAs and a WSIPA .

Project “A” (Figure 1) within a Community WHPA: WHPAs are areas directly contributing water to water supply wells and are considered a type of GWPA. The WHPA for a community well (blue cross-hatched) appears with the *Wellhead Protection Area* layer turned on. WHPAs are irregular shapes or circles, usually ranging from 2,600 to 8,000 feet in diameter.

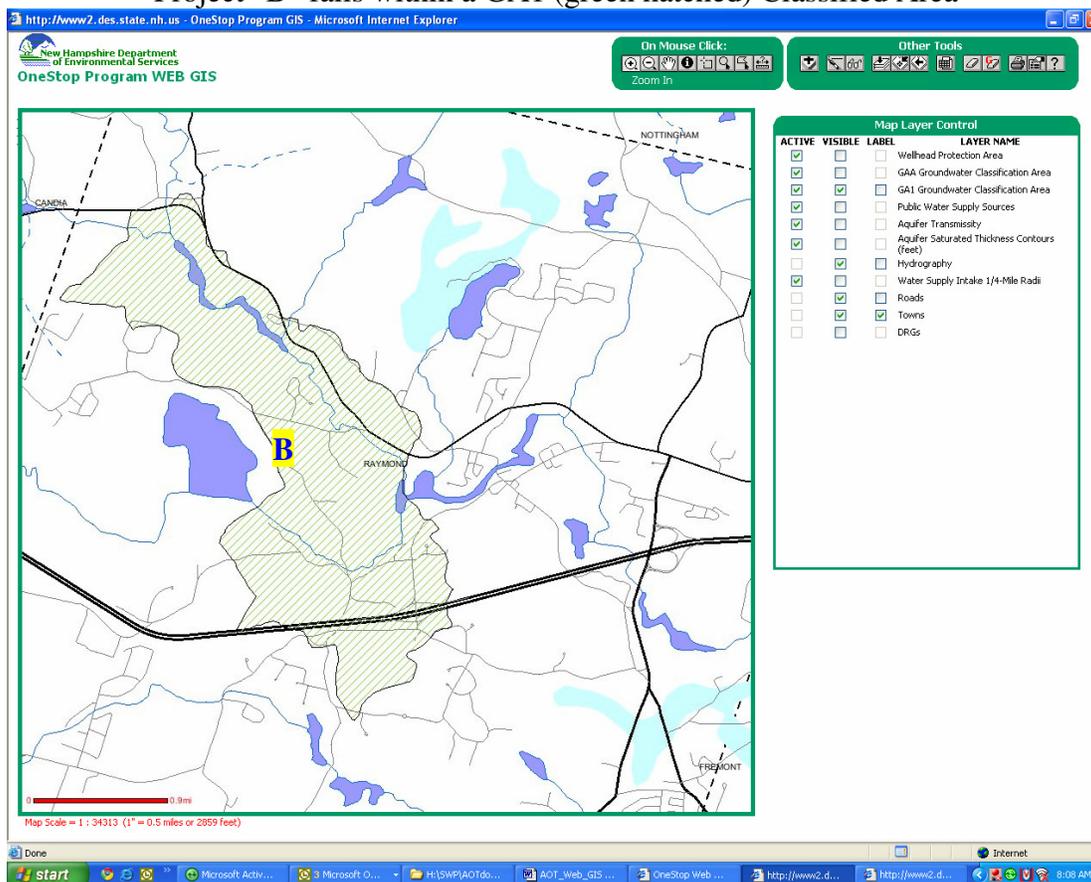
Figure 1
Project “A” Falls within a Wellhead Protection Area³



³ DES identifies community wells and non-transient, non-community public water supplies with the codes “C” or “P” that are available along with other information using the OneStop Web GIS “Identify” tool. See Attachment 2 for an example of information returned using this tool.

Project “B” (Figure 2) within a GA1 Classified Area: Another type of GWPA, areas classified as “GA1” under RSA 485-C:5 have “*high value for present or future drinking water supply.*” GA1 areas (green-hatched) appear with the GA1 Groundwater Classification Area layer turned on. These areas range in size from small (e.g., portions of aquifers) to very large (e.g., the entire town of Stratham).

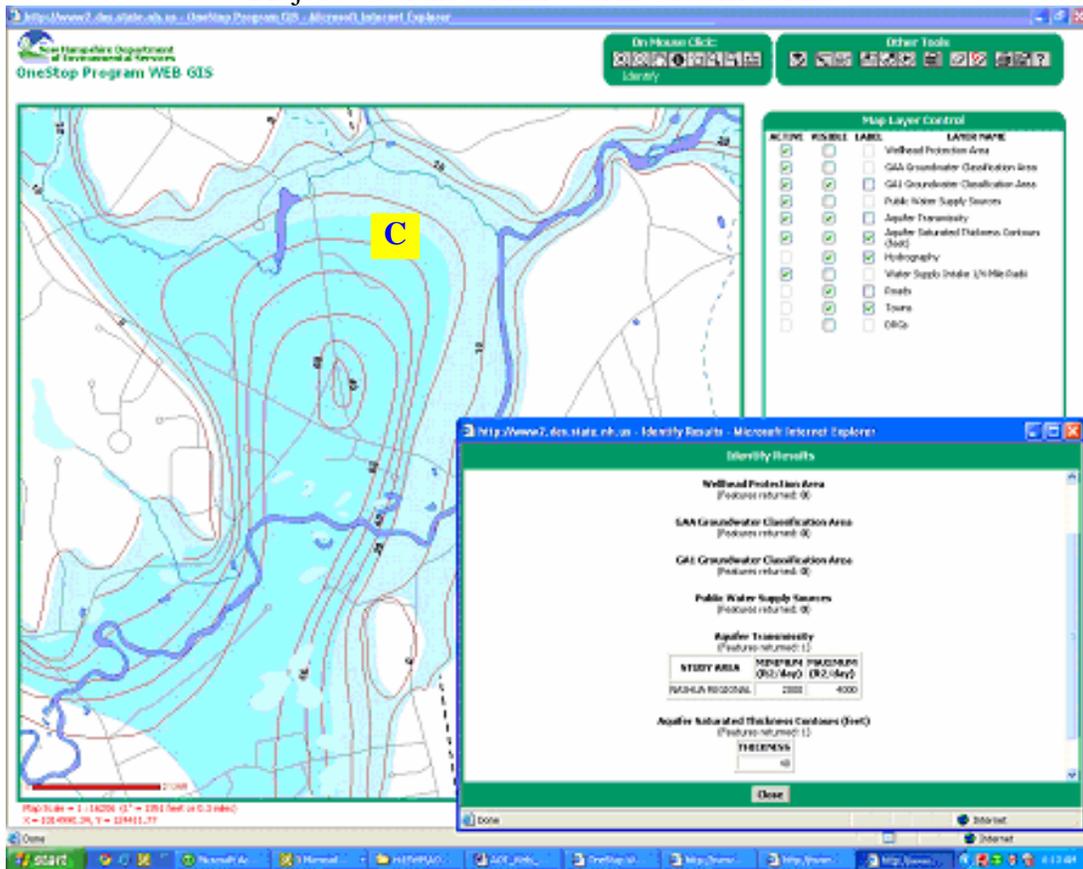
Figure 2
Project “B” falls within a GA1 (green hatched) Classified Area



Project “C” (Figure 3) within a GA2 Classified Area: A third type of GWPA, GA2 classified areas are defined under RSA 485-C:5 as “*zones of stratified drift with a saturated thickness greater than 20 feet, and a transmissivity greater than 1,000 feet squared per day.*” Transmissivity⁴ (blue shades) and saturated thickness contours (20 foot depth intervals visible as red lines) appear with the *Aquifer Transmissivity* and *Aquifer Saturated Thickness Contours* layers turned on. Project C is within a GWPA as its location is within an area that meets the GA2 criteria, i.e., the area has a T value > 1,000 square feet/day and saturated thickness > 20 feet. USGS reports containing maps and narrative concerning transmissivity and saturated thickness are available either online (<http://pubs.er.usgs.gov/>) or in paper format from the USGS in Pembroke, NH (603) 226-7800 or from DES’ Public Information Center at (603) 271-2975.

⁴ Aquifer transmissivity is defined as the rate at which water at the prevailing kinematic viscosity can be transmitted through a unit width of an aquifer under a unit hydraulic gradient (Lohman and others, 1972). The transmissivity (T) of an aquifer is equal to the saturated thickness (b) multiplied by the horizontal hydraulic conductivity (K, a directional measure of the permeability) and is expressed in feet squared per day. Some blue shaded areas displaying transmissivity with the OneStop GIS viewer represent areas having less than 1,000 sq. ft / day. Consult the USGS maps and the original reports for further details.

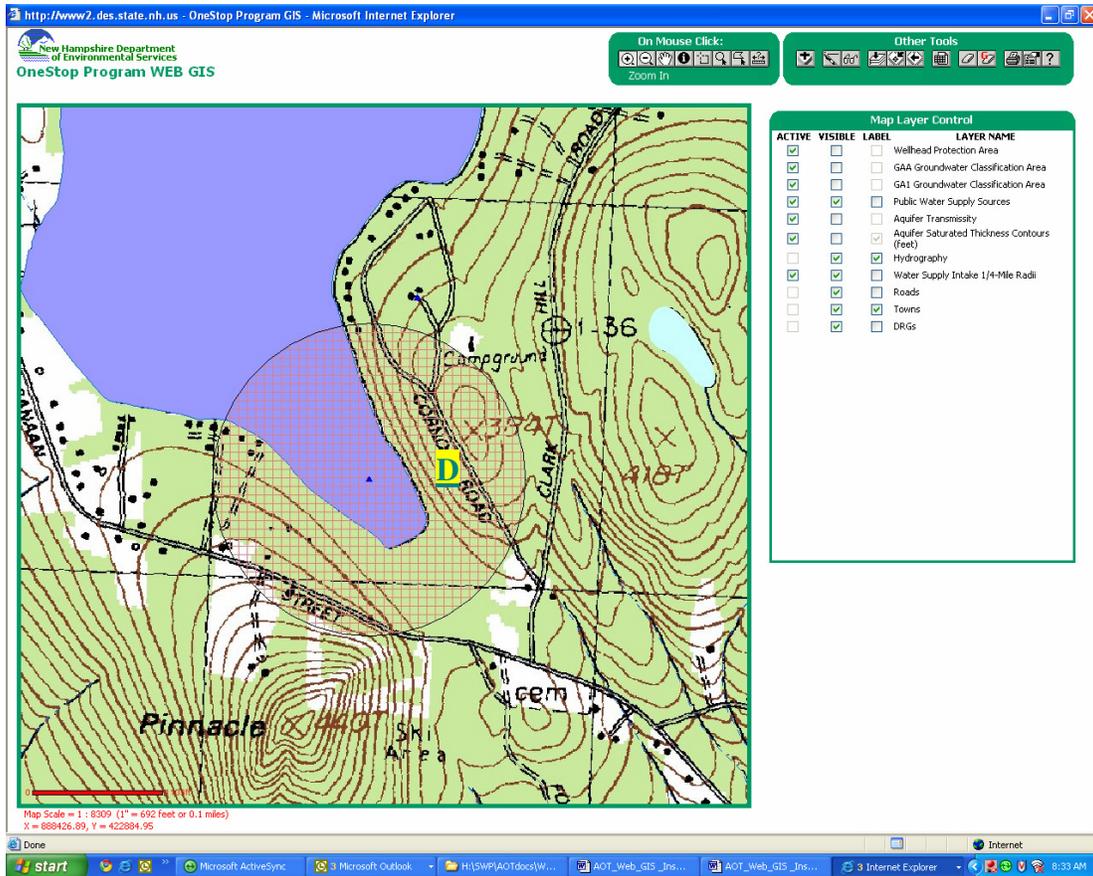
Figure 3
Project “C” falls within a GA2 Classified Area



Project “D” (Figure 4) within a Water Supply Intake Projection Area (WSIPA). A WSIPA includes the area within 250 feet of the normal high water mark of the surface water source (e.g. the river or lake shoreline) and its tributaries, within a one-quarter mile radius of the public water system’s intake, excluding areas outside the watershed of the surface water.

The Water Supply Intake 1/4 Mile Radii layer consists of circles with one-quarter mile radii (red cross hatch) extending from each active surface water intake point serving as public water supply. Within this quarter-mile zone, review the elevation contour lines and/or conduct field verification to determine drainage patterns and *exclude portions of the circle that do not drain to the surface water source* (i.e., not in the watershed). USGS “DRG” (digital raster graphics – topo map) information is available in the viewer and can be added to the view through the Map Layer Control menu. Next, determine whether your project is within 250 feet of the reference line of the water supply source or its tributaries in that area. If your project is within a WSIPA, additional AoT stormwater design and setback requirements apply that limit discharge from a stormwater practice near a surface water serving as a source for a public water supply, or near any tributaries leading to the source that are within the WSIPAs. See Attachment 1 for a summary.

Figure 4
Project "D" falls within a WSIPA



Attachment 1
Summary of Groundwater and Water Supply Protection in the
DES Alteration of Terrain Rule

Protected Resources	Protection Measures	
	Stormwater from “High-load Areas” (1502.26)	Stormwater From Other Areas (not High-load areas)
All areas	<ul style="list-style-type: none"> No filtering (1508.06(b)(4)) or infiltration practices (1508.05(a)(5)) allowed from gasoline dispensing areas at locations with DES registered USTs/ASTs; Stormwater from high-load areas shall not be directed to unlined detention ponds (1508.16(a)), or unlined swales, (1508.18(a)); Source control plan required (1503.11(e) and 1504.07)¹ 	<ul style="list-style-type: none"> Infiltration practices must have 3 ft of vertical separation between the bottom of the practice and the seasonal high water table (1508.05(h)) Filtering practice must have an impermeable liner or 1 ft of separation from the bottom of the filter course to the SHWT (1508.06(i)) Pretreatment is required prior to all filtering or infiltration practices (1508.06(c), 1508.05(c))
	<ul style="list-style-type: none"> No infiltration or unlined filtering practices within areas identified by DES with contaminated soils or groundwater as defined under Env-Or 600. (1508.05(a)(3)), (1508.05(a)(4), (1508.06(b)(2), (1508.06(b)(3)) 	
Water Supply Wells	<ul style="list-style-type: none"> Minimum setbacks (75’ to 400’, depending on type and well volume, includes private wells) between stormwater discharge and wells per 1508.02(a), Table 1508-1. 	<ul style="list-style-type: none"> Exemption to setback for stormwater management systems receiving runoff from areas less than 0.5 acre (1508.02(c))
	<ul style="list-style-type: none"> No infiltration practices can receive stormwater from high-load areas. (1508.05(a)(2)) Filtering practices must have an impermeable liner to receive stormwater from high-load areas. (1508.06(b)(1)) 	<ul style="list-style-type: none"> Infiltration practices must have 4 ft of vertical separation between the bottom of the practice and the seasonal high water table (1508.05(i)); Filtering practice must have impermeable liner or at least 1 ft. separation from the bottom of the practice and seasonal high water table, (1508.06(i)); or 1ft of separation from the bottom of the filter course and twice the depth of filter course material typically recommended (1508.06(j)(2))
“Water Supply Intake Protection Areas” (1508.01(a)) <ul style="list-style-type: none"> 250 feet from high water mark of any tributary or water supply source within ¼ mile of a water supply intake 	<ul style="list-style-type: none"> Minimum 100 ft setback from a stormwater practice discharge (1508.02(b)). Filtering practice must have impermeable liner or at least 1 ft separation between the bottom of the practice and seasonal high water table (1508.06(j)(1)); or have 1 ft from the bottom of the filter course and twice the depth of filter course material typically recommended (1508.06(j)(2)) Infiltration practices must have 4 ft of vertical separation between the bottom of the practice and the seasonal high water table (1508.05(i)) 	
	Shut-off mechanism required where bulk oil or hazardous material is transferred (1508.02(d))	Exception to 100 ft minimum discharge setback (1508.02(b) for stormwater systems receiving runoff from less than 0.5 acre. (1508.02(c))

¹ “Source control plans” will be required within all AOT applications that include high-load areas if regulated substances, as defined in Env-Wq 401, may be exposed and come in contact with stormwater. The Source Control Plan, defined under AOT Env-Wq 1504.07, will detail necessary structural controls and/or operational best management practices to minimize contact between stormwater and regulated substances.

Attachment 2 OneStop Web GIS “Identify” Tool

The Identity tool (📍) in the OneStop GIS Web viewer returns information based upon whether the location point selected by the user. Information returned below can be used to determine if the selected project location point is within a GWPA or a WSIPA and subject to the additional AoT rule requirements.

Identify Results

LOCATION: Latitude: 43° 8' 35.13" NH SP X: 1034605.35
Longitude: -71° 28' 40.78" NH SP Y: 234433.66

Wellhead Protection Area
(Features returned: 0)

GAA Groundwater Classification Area
(Features returned: 0)

GA1 Groundwater Classification Area
(Features returned: 0)

Public Water Supply Sources
(Features returned: 1)

MASTER ID	PWS ID	SYSTEM NAME	ADDRESS	TOWN	SYSTEM ACTIVE	SOURCE ACTIVE	SYSTEM TYPE	SOURCE TYPE	WELL TYPE	RECORD SOURCE/WATER TYPE	POPULATION SERVED
52439	0266180-001	GRANITE ST GYMNASTICS CENTER	71 RIVER RD	BOW	A	A	N	G	BRW	SG	25

Aquifer Transmissivity
(Features returned: 1)

STUDY AREA	MINIMUM (ft ² /day)	MAXIMUM (ft ² /day)
UPPER MERRIMACK	2000	4000

Aquifer Water Table Elevation (feet)
(Features returned: 1)

ELEVATION
200

Water Supply Intake Protection Area
(Features returned: 0)

Close

