B & C ASSOCIATES INC.

WETLAND CONSULTANTS

80 Harris Street

Vernal Pool Study

Acton, Massachusetts

Prepared for

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A vernal pool is defined as seasonally-flooded depression which does not have an above ground outlet. These depressions may occur in both the wetland and upland. A vernal pool holds water for two to three months, typically in the spring and early summer. Vernal pools may also occur in the fall. Vernal pools usually dry up during the summer. This prevents a breeding fish population from becoming established within these pools.

Vernal pools range in size from small areas which may not be any larger than a cubicle to more than an acre. Vernal pools are important to organisms which must use these depressions for breeding. These organisms are defined as obligate vernal pool species because they do not breed in any other type of habitat. These species are mole salamanders, fairy shrimp and Wood Frogs. Other frogs and insects may also breed within vernal pools. However, these species are considered facultative vernal pool species because they also breed in other wetland habitats that provide areas of calm standing water during the spring and summer.

The length of time that a depression holds water is critical in determining if that depression may be a vernal pool. Obligate vernal pool species (usually Wood Frogs) begin breeding as soon as snow and ice have receded enough to create an area of open water within a depression. The eggs will hatch fairly quickly after mating. Once the eggs are hatched, the Wood Frog tadpoles generally require sixty days of standing water so that they may develop enough to leave the depression. If the depression begins to dry up without providing the sixty days of water, the mortality rate of the Wood Frog is extremely high.

In the State of Massachusetts, the Wetlands Protection Act (MGL Chapter 131 section 40) defines a vernal pool as a "confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions". The only areas presumed to be vernal pool by the Wetlands Protection Act are those areas which have been certified by the State of Massachusetts Division of Fish and Wildlife - Natural

Heritage & Endangered Species Program. The protected area of a certified vernal pool ends at the edge of the wetland resource area which means the protected area never extends into the adjacent upland.

STUDY AREA

The study area is located at 80 Harris Street in Acton, Massachusetts. The study area is located to the west of a pond, approximately, 190 feet from the southwest corner of the existing building. The topography slopes down, from north to the south and east. The study area is a large depression which holds water seasonally. The depression does overtop and water flows into the adjacent pond.

The dominant upland plant community is a White Pine - Oak forest type. The only wetland is located in the southwestern corner of the property. The wetlands can be classified as a Wooded Deciduous Swamp bordering on a pond.

The purpose of this study was to determine if this depression could be considered a potential vernal pool under the Town of Acton Wetlands Bylaw.

Prior to beginning the actual field study, several resources were researched in order to find any indications that there had been any previous vernal pool analysis.

The Massachusetts Department of Environmental Protection wetland maps do not indicate that this depression (and Bordering Vegetated Wetlands) even exists. The USDA Natural Resources Conservation Service soil maps do not indicate the presence of any hydric soils where the depression is located. Finally, the State of Massachusetts Natural Heritage & Endangered Species Program maps do not indicate the presence of any certified or potential vernal pools anywhere within this property. In addition, these maps do not indicate the presence of any Priority or Endangered Species Habitats within 2000 feet from the subject area.

METHOD

This potential vernal pool was visited numerous times during the spring breeding season. Dip netting was performed during these walks in order to find any obligate vernal pool species, egg masses, tadpoles, fairy shrimp or other indicators that the area was a vernal pool.

We used the Obligate Species and the Facultative Amphibian Species Methods in evaluating this depression as a potential vernal pool.

The Obligate Species Method requires finding one of the six obligate species or evidence of breeding by any of the six obligate species (see Certification & Documentation Requirement pages).

The Facultative Amphibian Species Methodology requires observing two or more of the four facultative amphibian species or evidence of their breeding.

In both of these methodologies, there is also physical criteria which must be met. The criteria are a pool without a permanently flowing outlet and without a reproducing fish population. This depression did not meet all of the physical criteria of a potential vernal pool.

The study started on March 3, 2010 and ended on May 18, 2010. On March 3rd, the area was completely flooded with over three feet of water.

Over the next eight weeks the weather was extremely wet with a record rainfall for the spring. The water in the depression fluctuated between two and three feet during these eight weeks.

During this eight week period, the depression was constantly connected to the adjacent pond. There is a known fish population within this pond. Currently, there is a viable population of Brown Bullhead Catfish (*Ictalurus nebulosus*) living in the pond.

Since the depression was connected to the pond by such a deep water level, there was the possibility that the Catfish could reach the depression quite easily. Due to that possibility, the depression did not meet all of the physical criteria of a potential vernal pool.

After April 27th, the weather became more spring like with warm temperatures and average rainfall. There were longer dry periods then previously.

Beginning near the end of April, the water level began to drop rapidly. Within three weeks, there was no standing water within the depression.

RESULTS

There were no obligate species observed within the depression. One Wood Frog (*Rana sylvatica*) was observed within the vicinity of this depression. There was also no verification of any obligate species breeding within this depression. Further, there were no observations of any of the facultative amphibian species required to certify the depression as a vernal pool. There was, once again, no confirmation of breeding by any facultative amphibian species within this depression. Bullfrog (*Rana catesbeiana*) tadpoles were observed within the depression. However, Bullfrogs are not considered to be facultative vernal pool species. Moreover, this depression did not meet all of the physical criteria during the majority of the spring breeding season.

SUMMARY

There was no evidence found that would indicate that this depression was being utilized by obligate or facultative vernal pool species.

Further, once the weather conditions returned to normal, the water level within the depression dropped dramatically. The water level fell more than three feet in a little more than three weeks. Based upon this evidence, the depression is unlikely to hold water long enough to support a viable vernal pool specie population. In a normal April, with normal rainfall, this depression should begin to dry up early

in the month and would not be expected to have any standing water present by the end of April or beginning of May. Consequently, even if a vernal pool specie did breed within this depression (and there is no evidence that any do so), by the beginning of the month of May, there would not be enough water present to allow for successful breeding. The mortality rate would be 100%. All the evidence suggests that this depression does not hold water for the required two continuous months in a year with normal rainfall amounts.

In conclusion, there is no evidence to indicate that this depression is a potential vernal pool. There is also no evidence that this depression even holds the required amount of water for two continuous months each spring.

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director* March 2009

NHESP Guidelines for the Certification of Vernal Pool Habitat

II. CERTIFICATION CRITERIA & DOCUMENTATION REQUIREMENTS

Please read and understand the **CERTIFICATION CRITERIA** and **DOCUMENTATION REQUIREMENTS** in the following sections before submitting Vernal Pool Field Observation Form(s) and supporting documentation.

Certification Criteria

Vernal pool certification is possible only after the appropriate **biological** AND **physical** criteria have been met and documented by one of the two certification methods described below:

A) OBLIGATE SPECIES METHOD

Biological Criteria

- Breeding evidence of obligate amphibian species OR the presence of fairy shrimp (see table on pg. II.2).

AND

Physical Criteria

- Evidence of a pool with no permanently flowing outlet (i.e., photo of the pool holding water).

B) FACULTATIVE AMPHIBIAN SPECIES METHOD

Biological Criteria

- Breeding evidence of 2 or more facultative amphibian species (see table on pg. II.2).

AND

Physical Criteria

- Evidence of a pool with no permanently flowing outlet (i.e., photo of the pool holding water).

AND

- Evidence that there is no established, reproducing fish population (i.e., photo of the pool dry).

The **Obligate Species Method** is the most direct way to certify a vernal pool. If documentation submitted is inconclusive, or if the physical documentation appears to show inappropriate habitat, the pool may not be certified or additional documentation may be requested. Since **facultative amphibians** can use a variety of wetland habitats it is especially important when using this method that the pool photos demonstrate the physical characteristics necessary to sustain a vernal pool environment (e.g., depth, size, vegetation). If there is any doubt, the NHESP may require additional evidence.

THE NHESP STRONGLY RECOMMENDS THAT LANDOWNER PERMISSION BE OBTAINED PRIOR TO COLLECTING CERTIFICATION DOCUMENTATION. IT IS THE SOLE RESPONSIBILITY OF AN INDIVIDUAL PROVIDING VERNAL POOL CERTIFICATION INFORMATION TO ENSURE THAT ALL ACTIVITIES ASSOCIATED WITH GATHERING SAID INFORMATION COMPLY WITH LAW.

A. Obligate Species Method ~ Biological and Physical Criteria & Evidence Accepted for Certification:

BIOLOGICAL CRITERIA		PHYSICAL CRITERIA	
Obligate Species Accepted - one or more of the following	**Breeding Evidence Accepted** - one or more of the following from at least one obligate species must be documented by photos, video, or audio (chorusing)	**Physical Features Accepted**	**Physical Evidence Accepted**
Wood frog *(Lithobates sylvaticus)* **Spotted salamander** *(Ambystoma maculatum)* **Blue-spotted salamander *** *(A. laterale)* **Jefferson salamander *** *(A. jeffersonianum)* **Marbled salamander *** *(A. opacum)*	**Adult wood frogs -** • Full chorus (calls constant, continuous, & overlapping) - map location of chorus (pool) and site where recording was taken; **OR** • 5+ mated pairs **OR** **Adult salamanders -** • Congressing **OR** • Spermatophores **OR** • Marbled salamander attending a nest **OR** **Egg masses -** • TOTAL of 5 egg masses - any combination, regardless of species **OR** • 1 egg mass of a MESA-listed salamander or nest and eggs of marbled salamander **OR** **Larvae -** • Any number of larvae **OR** **Transforming juveniles -** • Still in pool with tail and/or gill remnants.	Pool with no permanently flowing outlet.	Good quality photos or video of the entire pool holding water including any inlets or outlets (e.g., any streams, culverts, etc). *See 'Tips for Photographing Evidence Required for Vernal Pool Certification' on page 4.*
Fairy shrimp *(Anostraca: Eubranchipus)*	Photo or video of adult specimen(s).	Same as above.	Same as above.

*Species listed under the Massachusetts Endangered Species Act Regulations (MESA) (321 CMR 10.90). If observed, please document and fill out a *Rare Animal Observation Form* (available at www.nhesp.org) to be submitted to the NHESP.

B. Facultative Amphibian Species Method ~ Biological and Physical Criteria & Evidence Accepted for Certification:

BIOLOGICAL CRITERIA		PHYSICAL CRITERIA	
Facultative Species Accepted - two or more of the following	**Breeding Evidence Accepted** - one or more of the following from at least two facultative species must be documented by photos, video, or audio (chorusing)	**Physical Features Accepted**	**Physical Evidence Accepted**
Spring peeper *(Pseudacris crucifer)* **Gray treefrog** *(Hyla versicolor)* **American toad** *(Anaxyrus americanus)* **Fowler's toad** *(Anaxyrus fowleri)*	**Adults –** • Full chorus (calls constant, continuous, & overlapping) - map location of chorus (pool) and site where recording was taken; **OR** • 5+ mated pairs **OR** **Egg masses –** • Any number of egg masses **OR** **Larvae –** • Any number of larvae **OR** **Transforming juveniles –** • Still in pool with tail remnants.	Pool with no permanently flowing outlet. **AND** Evidence that there is no established, reproducing fish population.	Good quality photos or video of the entire pool holding water including any inlets or outlets (e.g., any streams, culverts, etc.). **AND** Good quality photos or video of the entire pool dry. *See 'Tips for Photographing Evidence Required for Vernal Pool Certification' on page 4.*

Documentation Requirements

Documentation of the biological and physical evidence listed in the **CERTIFICATION CRITERIA** (pg. II.2, A and/or B) must be submitted for official certification of a vernal pool. Photographic prints are the preferred method of documentation but video of evidence or audio recording of chorusing frogs or toads are acceptable. Field notes are encouraged and helpful, but are not accepted as the sole source of evidence.

A. BIOLOGICAL DOCUMENTATION – Photos, Video, or Audio of Amphibian Breeding Evidence or Fairy Shrimp:

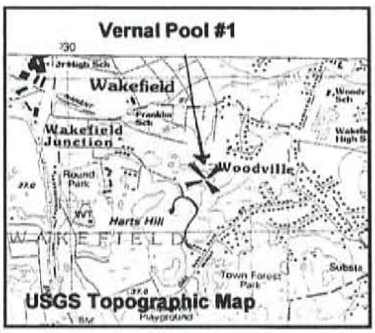
- Photos, video, or audio must be of suitable quality (resolution, focus, clarity, indicators of scale (e.g., coin, lens cap, ruler)) so species identification can be confirmed. Please see *"Tips for Photographing Evidence Required for Vernal Pool Certification"* (pg. II.4).
- Photos, video, or audio must be labeled with pool location (town), pool name or tracking # (e.g. VP#1, Elm St. VP), date taken, & observer's name.
- Each individual egg mass or mated pair required for certification (e.g., all 5 wood frog egg masses) must be photographed or videotaped. If more than the minimum required number is observed, photo the required number, and count or estimate the total number and indicate this on the Vernal Pool Field Observation Form.
- Only audio tapes of full amphibian choruses (calls are constant, continuous & overlapping) are accepted (see Protocol Description at: http://www.pwrc.usgs.gov/naamp/) provided the location of chorusing (i.e., exact pool location) and the location of your recording site are accurately mapped.
- Documentation must be collected within 3 years prior to submittal to NHESP.

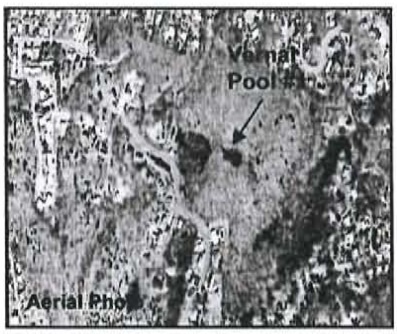
B. PHYSICAL DOCUMENTATION – Photos or Video of Pool Holding Water and Dry:

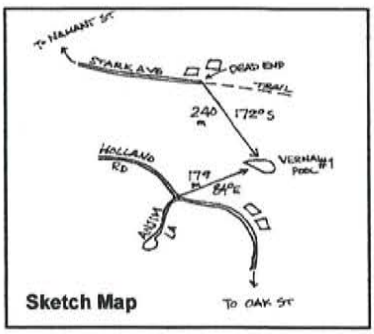
- Photograph(s) or video of the entire pool including any inlets or outlets (e.g., any streams, culverts) are required and must be of suitable quality (resolution, focus, scale) so pool features can be reliably assessed. One or more identifying landmarks (e.g., stand of trees, stumps, boulders, rock walls, etc.) to authenticate the pool location must be included. If unable to photograph the entire pool in a single photo, take a "panorama" series. Please see *"Tips for Photographing Evidence Required for Vernal Pool Certification"* (pg. II.4).
- Photo(s) or video must be labeled with pool location (town), pool name or tracking # (e.g. VP#1, Elm St. VP), date taken, & observer's name.
- Documentation must be collected within 3 years prior to submittal date to NHESP.

C. MAPPING REQUIREMENTS - THREE types of maps are required for certification and the pool locus must be clearly delineated and identified (your pool name or tracking #) on each map:

1. **U.S. Geological Survey topographic map** (copy) (1:24,000 or 1:25,000 scale) - topos can be downloaded from MassGIS at www.mass.gov/mgis/mapping.htm - scroll down to "Browser Based Mapping Applications", then to "Quick Links" and select "USGS Topographic Maps".
2. **Color orthophotos** (copy) (1:12,000 scale or better) - orthophotos can be downloaded from MassGIS at www.mass.gov/mgis/mapping.htm - scroll down as described above and select "Color Ortho Imagery 2005".
3. **One additional map or form of location data** to help clarify the pool's location, as follows:
   - **Sketch map -** directions and distances from landmark(s), readily identifiable in the field, should be marked and clearly described on the map; if submitting a breeding chorus, the location of the chorus (pool) and recording site can be delineated on this map, **OR**
   - **Assessors map -** available from local tax assessor's offices, include the map and parcel #'s, **OR**
   - **Professional survey, OR**
   - **GPS longitude/latitude coordinates.**







March 3, 2010

March 12, 2010

April 2, 2010

April 27, 2010

May 7, 2010

May 18, 2010

March 3, 2010

March 12, 2010

April 2, 2010

April 27, 2010

May 7, 2010

May 18, 2010

Connected to pond - March 3, 2010

Connected to pond - March 12, 2010

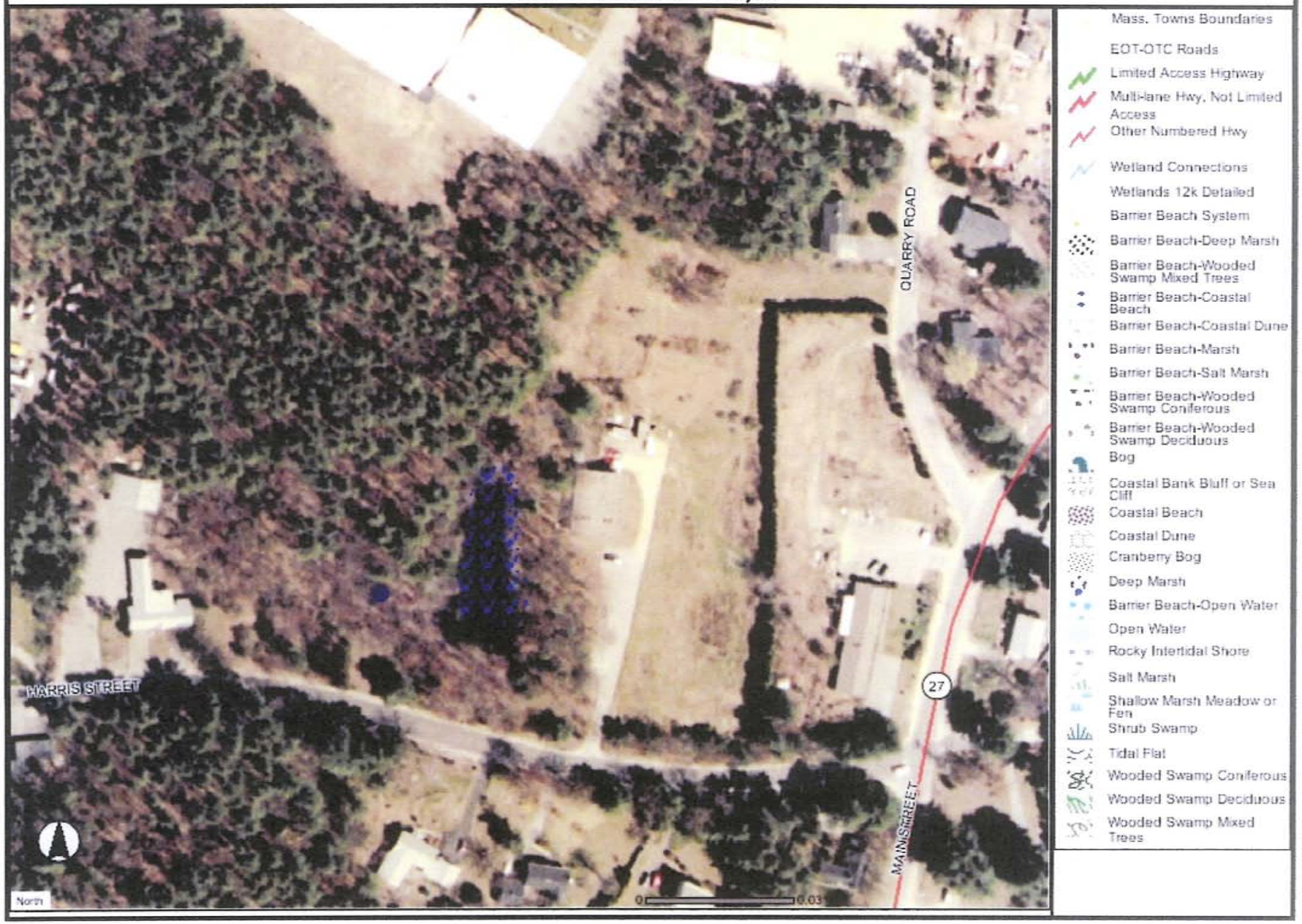
Connected to pond - April 27, 2010

Connection lost - May 7, 2010

Bullfrog tadpole - April 2, 2010

Wood Frog - April 27, 2010

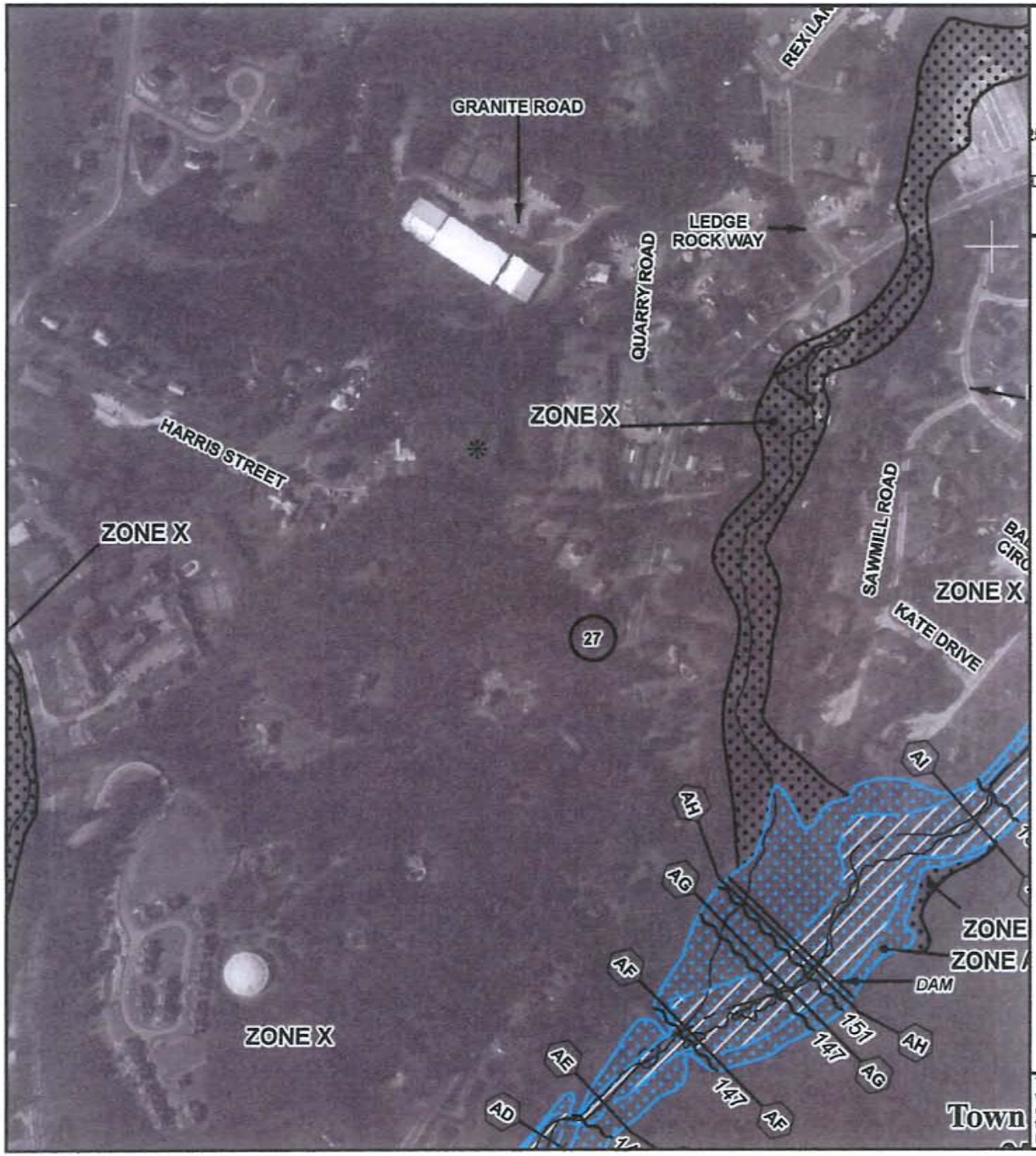
DEP Wetlands 1:12,000



Soil Map—Middlesex County, Massachusetts
(80 Harris Street)

Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
253B	Hinckley loamy sand, 3 to 8 percent slopes	5.1	29.7%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	0.5	3.1%
422B	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony	2.2	12.6%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	5.0	29.0%
656	Udorthents-Urban land complex	4.4	25.6%
Totals for Area of Interest		**17.2**	**100.0%**



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0243E

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 243 OF 656

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ACTON, TOWN OF	250176	0243	E
LITTLETON, TOWN OF	250200	0243	E
WESTFORD, TOWN OF	250225	0243	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

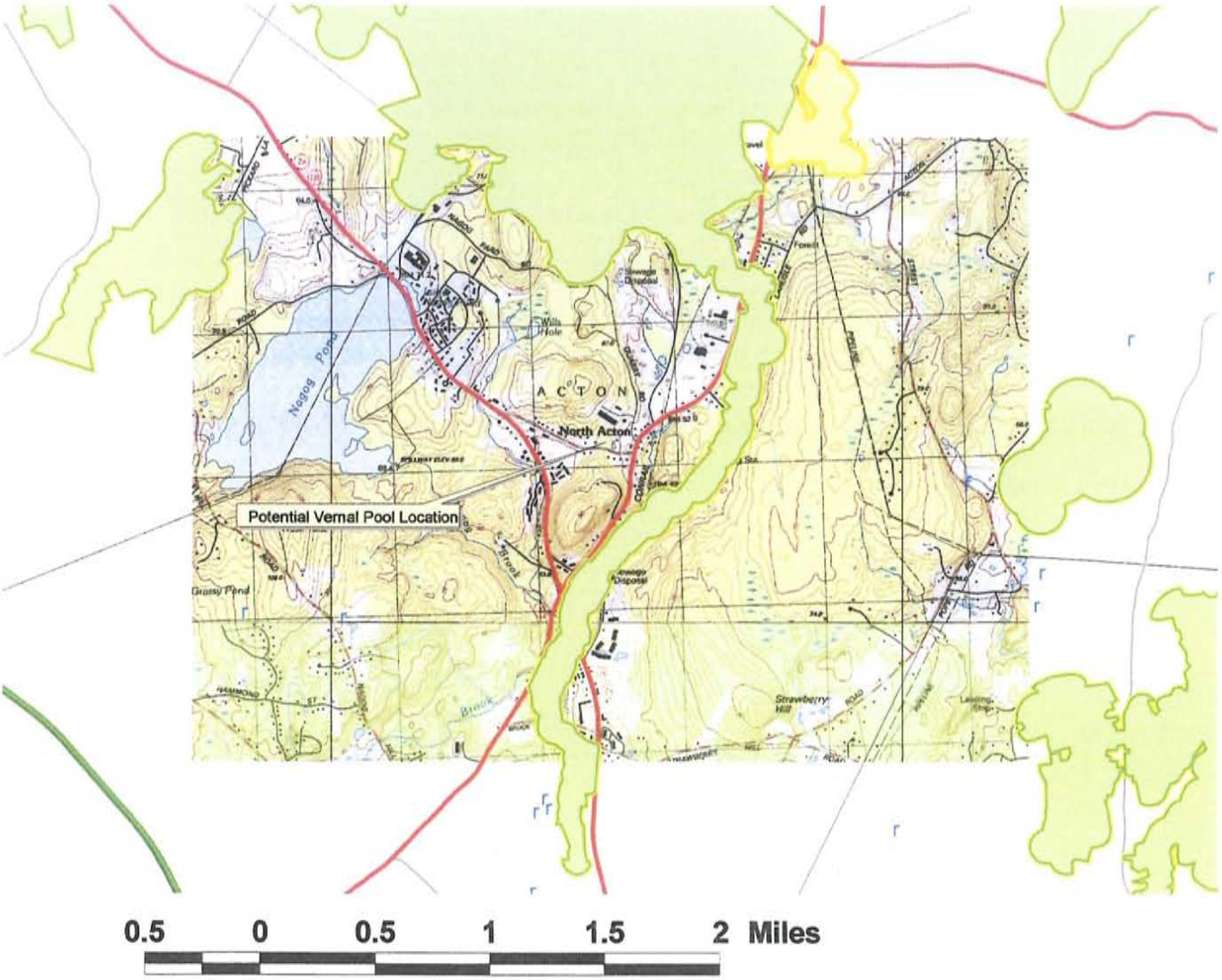
MAP NUMBER
25017C0243E

EFFECTIVE DATE
JUNE 4, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Acton Priority & Endangered Species Habitats



0.5 0 0.5 1 1.5 2 Miles

NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
NHESP Certified Vernal Pools
Maj EOT-OTP Rds by Class - most detailed
Limited Access Highway
Multi-lane Hwy, not limited access
Other Numbered Hwy
Non-numbered Major Road
MA Town Boundaries

N
W E
S

Name: BILLERICA
Date: 8/2/2010
Scale: 1 inch equals 2000 feet

Location: 042° 30' 41.12" N 071° 24' 57.60" W
Caption: Potential Vernal Pool Location
80 Harris Street
Acton, Massachusetts

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