

# **NOTICE OF INTENT**

## **TOWN OF BELLINGHAM, WELL #10 ACCESS ROAD**

### **HIGH STREET, BELLINGHAM**

**SUBMITTED TO:**

Bellingham Conservation Commission  
10 Mechanic Street  
Lower Level  
Bellingham, MA 02019

**SUBMITTED ON BEHALF OF:**

Bellingham Department of Public Works  
26 Blackstone Street  
Bellingham, MA 02019

**PREPARED BY:**

Caron Environmental Consulting, LLC  
247 Bragg Hill Road  
Westminster, MA 01473

**PROJECT ENGINEER:**

Wright Pierce  
78 Blanchard Road; Suite 404  
Burlington, MA 01803

May 2025

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## PROJECT NARRATIVE

### Project Introduction and Overview

This Notice of Intent is being filed by the Bellingham Department of Public Works (DPW) in accordance with the Massachusetts Wetlands Protection Act (MAWPA) (M.G.L. Chapter 131, Section 40) (the Act), and its implementing regulations (310 CMR 10.00). As this is a DPW project it is exempt from the Bellingham Wetland Bylaw (the Bylaw). This Notice of Intent (NOI) is being filed for a public water supply project consisting of the installation of a large diameter test well, maintenance of an existing access road, the construction of a 560-foot extension to the existing access road, and a prolonged pump test.

If the pump and well testing yield acceptable results, and the well is approved by DEP as a new public water supply source, this initial NOI will be amended to include all of the features that will be necessary to establish a permanent well site. This would include, but not be limited to, stormwater management features, water lines, utility lines, the permanent well, and the necessary controls and pumps (possibly in a small structure). If the prolonged pump test does not yield acceptable results or if the establishment of a new water supply is not approved by DEP, the extension to the existing access road and the well site will be restored in accordance with the attached Restoration Sequence.

### Site History and Existing Conditions

The site is located south of High Street and north of the Charles River. The town acquired the well site in the early 1970's. The majority of the well site itself is an abandoned gravel pit and consists of low excavated areas and large areas of uneven terrain that consists of spoil piles from the gravel removal operation, along with some natural areas. Enough time has passed since the gravel operation that the majority of the well site parcel is wooded.

The well site is currently proposed to be accessed through a parcel owned by Varney Brothers Sand and Gravel, Inc. (Varney). That parcel has similar conditions to those described for the well-site. There is an existing access through the Varney property that was used during the gravel removal operation. It is proposed to utilize the access road for this project, although it needs to be extended by approximately 560 feet to reach the well site. The existing access road does, however, need maintenance. The maintenance will include cutting back brush from the edges and the smoothing of the surface. Some very minor re-alignments to the existing access road are proposed, all outside of jurisdictional areas.

The Town of Bellingham Conservation Commission owns the property to the west. In the 1960's or early 1970's an access easement along the eastern edge of the

Commission's land was created to provide for access to the well site. When this office and Wright-Pierce began working on this project it was intended to utilize that easement for access. It was found, however, that establishing an access road in that location would require extensive grading, work outside of the easement, the crossing of a Bordering Vegetated Wetland (BVW) and the crossing of an intermittent stream within 100 feet of a potential vernal pool. The existing easement has multiple sharp bends in it, and an access road with curves suitable for trucks can't be fit within it. In addition, due to side-slopes along much of the route, grading would need to extend well-outside of the easement. The work outside of the easement, onto an open space parcel, would likely require approval under Article 97 of the Commonwealth's Constitution and under the Public Lands Preservation Act.

Given the potential level of wetland and open space impacts, the extensive construction required, and the likely regulatory hurdles, the option of utilizing the Varney property was explored. It was found that the existing access road would provide for access to close to the well site, without the need to wetland impacts and with minimum amount of maintenance. Accordingly, the DPW held discussion with Varney and have obtained permission for at least temporary access for this project.

### **Wetland Resource Areas and Jurisdiction**

The wetlands on the site have been delineated by this office. They consist of BVW, intermittent streams, isolated wetlands and Riverfront Area. There is also Bordering Land Subject to Flooding (BLSF) on portions of the site.

The C, D, H and I wetland series demarcate the edge of BVW, and a limited stretch of Bank of an intermittent stream. These areas are jurisdictional wetlands with 100-foot buffer zones around them.

The F, G and J-series demarcate isolated wetlands. The F and G-series are clearly areas which were over-excavated into the groundwater table during the gravel removal operation. The J-series was also likely an excavation, although not definitively so. These areas are not BVW and should not be subject to regulation under the Act. For most projects these areas would be regulated as wetlands, with associated buffer zones, under the Bylaw. DPW projects, however, are exempt from the Bylaw. For this project, however, we have shown the isolated wetlands, have shown the buffer zones around them and are proposing erosion controls to protect them. It should be understood, however, that strict compliance with the Bylaw standards regarding these areas is not required.

There is a 200-foot Riverfront Area along the Charles River.

BLSF occurs along the Charles River near the well site and access road. In the vicinity of the well site the terrain is elevated and the edge of BLSF falls closely along the BVW line,

and does not encompass the access road extension or the well site. A finger of BLSF also extends into the site in the vicinity of the H and I-series wetlands. BLSF crosses the existing access road from approximately Stations 6+70 to 7+70.

The extent of Federal wetland jurisdiction continues to be confusing and uncertain. Fortunately, as no wetland alteration is proposed for this project, it is not necessary to sort out the federal status of the various wetland areas.

This project qualifies as a Limited Project per 310 CMR 10.53 (3) o.

### **Proposed Work**

The long-term purpose of this project is to establish a new public water supply well. This initial step of the project is the installation of a large diameter test well and to perform a prolonged pump test. The well site is located entirely within the Riverfront Area and the 100-foot buffer zone.

To access the well site with drilling equipment it will be necessary to establish an access road from High Street to the well site. As described above, the initial 1750 feet of the access road from High Street will utilize an access road that was created when there was an earth removal operation on the site. The existing access road will require maintenance including cutting back brush along the edges and the smoothing of the surface. In a couple of locations minor changes to the alignment will be made. These locations are outside of the state-jurisdictional buffer zones, BLSF and the Riverfront Area.

From Station 17+50 to the well site (approximately Station 23+10) it will be necessary to construct and extension to the access road. Portions of the access road extension will be within the 100-foot buffer zone and within the Riverfront Area.

After the installation of the large diameter well and prolonged pump test will be conducted. The discharge from the pump test needs to be discharged at a location at least 300 feet from the well. The specifics of that location need to be worked out with and approved by DEP. The discharge will be of completely clean water and an energy dissipation device will be installed on the outlet to prevent erosion.

If the pump and well testing yield acceptable results, and the well is approved by DEP as a new public water supply source, this initial NOI will be amended to include all of the features that will be necessary to establish a permanent well site. This would include, but not be limited to, stormwater management features, water lines, utility lines, the permanent well, and the necessary controls and pumps (possibly in a small structure). If the prolonged pump test does not yield acceptable results or if the establishment of a new water supply is not approved by DEP, the extension to the existing access road and the well site will be restored in accordance with the attached Restoration Sequence.

## **Project Impacts and Performance Standards**

All of the proposed work is a Limited Project Per 310 CMR 10.53 (3) o.

### ***Riverfront Area:***

There is a Riverfront Area along the Charles River which is located to the south of the site. A 250-foot section of the access road extension and the proposed well site are located within the Riverfront Area, resulting in the proposed alteration of 13,150 square feet. Approximately 2,500 square feet of that area was disturbed as part of the past gravel removal operation and lacks topsoil. There is approximately 317,000 square feet of Riverfront Area on the site.

The work in the Inner Riparian Zone will impact approximately 5,350 square feet, of which approximately 2000 square feet lacks topsoil as a result of the past earth removal.

The work in the Outer Riparian Zone will impact 7,800 square feet, of which approximately 500 square feet lacks topsoil as a result of the past earth removal.

### ***Alternatives Analysis:***

The alternatives for this project are limited. The areas with suitable water quality, rates and surrounding protection for a public water supply well are extremely limited. In addition, this is a site that the town has had set-aside for this purpose for close to 60 years. Accordingly, the option of conducting this project on a different site do not practicably exist.

Accordingly, the alternatives of the options are practicably restricted to how to access the well location. As the well site is located in the Riverfront Area, any access route will require work in the Riverfront Area.

The proposed access route has been selected to utilize the existing access road and then to extend it along the terrain with the most practical approach to the well site. This results in about 250 feet of the access road being located within the Riverfront Area.

The alternative routes would need to come into the well site from a more directly from the north. One of those would be to follow close to the western edge of the isolated wetland. The terrain in that area is extremely uneven and steep so construction would require extensive grading and the road would need to be right next to the isolated wetland. This route would only shorten the length of access road in the Riverfront Area by 10 or 20 feet, and might result in a greater area of impact due to the less favorable topography.

The other alternative route would be to bring the access road through the isolated wetland. This would reduce the length of access road in the Riverfront Area to about 100 feet. This route, however, would obviously have far greater environmental impacts. It would require a large area of alteration (several thousand square feet) of a wetland area typically jurisdictional under the Bylaw and which has historically, and may still be, federally jurisdictional.

Accordingly, the proposed access route is the most practicable option, with the least overall impact.

*Riverfront Area Summary:*

The proposed work in the Riverfront Area will take place on a parcel of land that the Town of Bellingham has intended to use as part of its public water supply system since the 1960, and which was acquired in 1973. No other practicable sites are available.

The access road to the well site has been sited to minimize the overall environmental impacts by avoiding an isolated wetland and avoiding the areas with the worst terrain.

Most of the well site itself was altered by the past earth removal operation, and lacks topsoil and significant vegetation.

The proposed work in the Riverfront Area will impact 4% of the Riverfront Area on the site.

If the use of the well as a public water supply is not found to be viable all of the disturbed areas in the Riverfront Area, including the already altered areas at the well site, will be restored and allowed to hence regrow naturally.

**BLSF:**

BLSF crosses the existing access road from approximately Stations 6+70 to 7+70. The work in this area will solely consist of the maintenance of the existing access road including the cutting back of brush on the sides and the smoothing of the surface. No filling or excavation is proposed that would impact flood storage. Approximately 1,740 square feet of area will be disturbed.

There is a 100-year Flood Zone along the Charles River. No work is proposed within this section of Flood Zone. At its closest work will be within 20 ft. of the Flood Zone.

**Buffer Zone:**

Within the buffer zone 28,800 s.f. of the work is proposed within the jurisdictional state buffer zone, with an additional 6,500 square feet proposed in the non-jurisdictional local

buffer zone. This work will consist of the maintenance of the existing access road, the construction of the extension to the access road, the installation of the large diameter well and associated site grading.

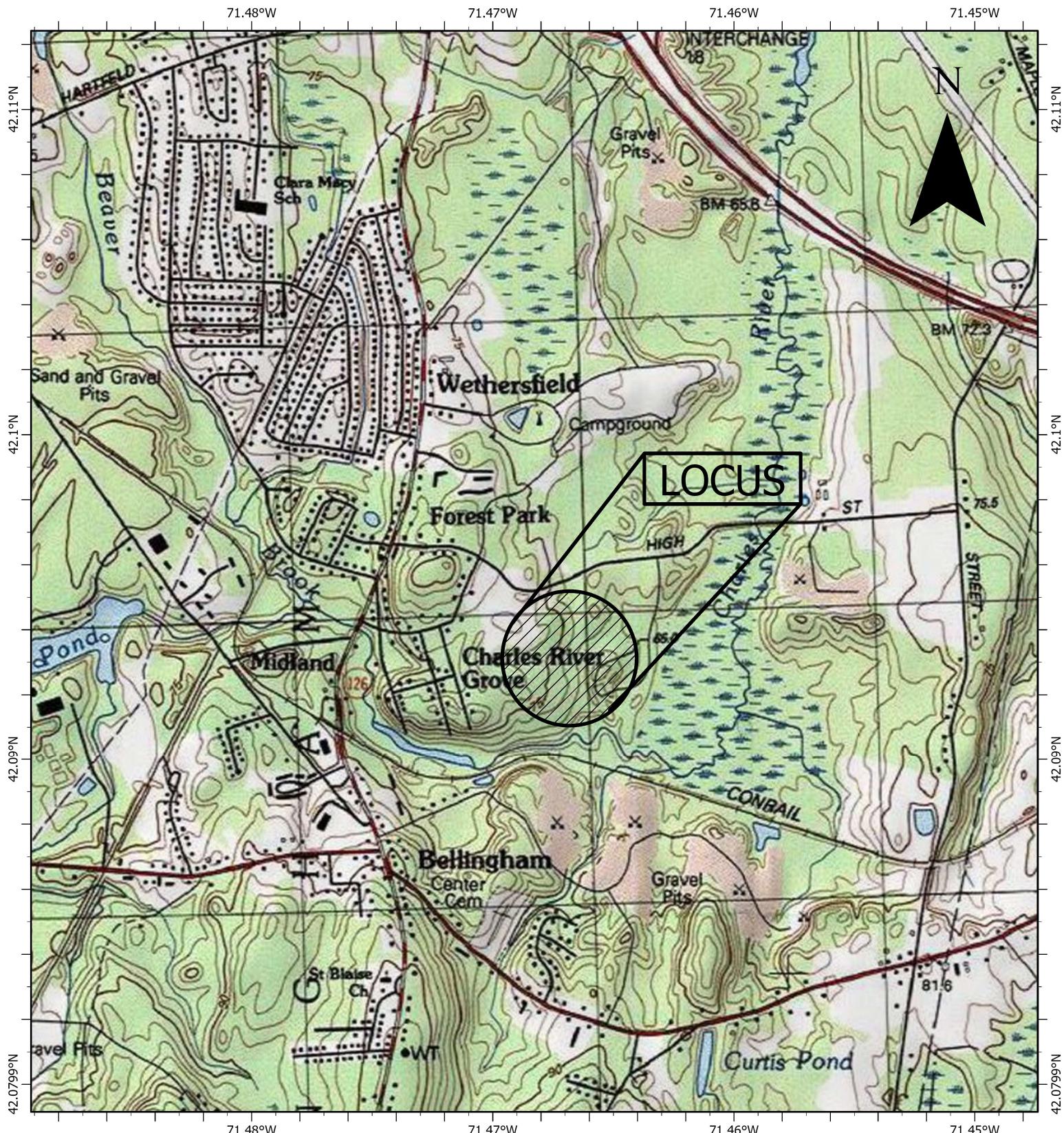
At its closest work will be within two feet the wetland where the existing access drive passes between the H and I-series wetlands. Prior to the work commencing in this area, the wetland adjacent to the work will be staked and marked, and no work will take place within the wetland.

An erosion control barrier will be installed between all work and the wetlands. All disturbed surfaces will be stabilized as soon as possible.

***Stormwater Management:***

A Stormwater Checklist has been prepared for the project, focusing on the construction period impacts of the work. If the well is found to be viable a full stormwater design and report will be prepared and submitted as part of an Amendment request.

# Locus Map: Town of Bellingham, Well #10 Access Road; High Street, Bellingham





## **TOWN OF BELLINGHAM**

*Assessment Administration Office*  
Municipal Center - 10 Mechanic Street  
Bellingham, Massachusetts 02019  
508-657-2862 \* FAX 508-657-2894  
Email: [Assessors@bellinghamma.org](mailto:Assessors@bellinghamma.org)  
[www.bellinghamma.org](http://www.bellinghamma.org)

May 21, 2025

**THE PROPERTY OWNERS LISTED HEREIN ARE THE KNOWN ABUTTERS TO  
THE PROPERTY OWNERS:**

100 Feet Abutters – Conservation Commission – Map 45/41 Parcel 56/03

Property Address(es): High St.  
Bellingham, MA 02019

Owner(s) of Record: Varney Bros Sand & Gravel  
PO Box 94  
Bellingham, MA 02019

Town of Bellingham/Attn: DPW Water Dept  
10 Mechanic St  
Bellingham, MA 02019

Requested Caron Environmental, LLC  
247 Bragg Hill Rd.  
Westminster, MA 01473

## ABUTTERS ATTACHED

Certified: Michelle Nowlan  
Michelle Nowlan, Principal Clerk

TOWN OF BELLINGHAM  
ASSESSMENT ADMINISTRATION OFFICE  
Bellingham Municipal Center  
10 Mechanic St.  
BELLINGHAM, MA 02019  
PHONE (508) 657-2862 FAX (508) 657-2894

Date of Application 05/20/2025

**REQUEST FOR LIST OF ABUTTERS**

A **\$25.00 Fee PER LIST** is required to process your request. Payment is due at the time of submission of this form. Fees apply to the preparation of a new list or verification or reverification on an existing or expired list. Please allow up to 10 business days from the date of payment and submission of the form for the Assessors office to complete the processing of your request. Checks/Money Orders are made out to: "The Town of Bellingham". Cash payments are accepted in person.

Please indicate with a check

Immediate Abutters-Selectboard  
 Abutter to Abutter within 300 feet -Zoning Board  
 Abutter to Abutter within 300 feet -Planning Board  
 Abutters within 100 feet - Conservation Commission  
 Other — please specify: \_\_\_\_\_

**Map 45/41**

**Parcel(s) 56/03**

Caron Environmental Consulting, LLC

Applicant (please print)

High Street

Location of Property



Signature of Applicant

247 Bragg Hill Road, Westminster, MA 01473

Mailing Address of Applicant

(978) 944-2326

Telephone Number

**ABUTTERS LIST IS VALID FOR THIRTY (30) DAYS AFTER COMPLETION**



EASE

ASE

High St

EASE

Charles River

CSX Transportation Railroad

CSX Transportation Railroad



# 100 feet Abutters List Report

Bellingham, MA

May 21, 2025

## Subject Properties:

Parcel Number: 0041-0003-0000  
CAMA Number: 0041-0003-0000  
Property Address: HIGH ST

Mailing Address: VARNEY BROS SAND + GRAVEL  
PO BOX 94  
BELLINGHAM, MA 02019

Parcel Number: 0045-0056-0000  
CAMA Number: 0045-0056-0000  
Property Address: HIGH ST

Mailing Address: TOWN OF BELLINGHAM/ATTN DPW  
WATER DEPARTMENT  
10 MECHANIC STREET  
BELLINGHAM, MA 02019

## Abutters:

Parcel Number: 0040-0018-0002  
CAMA Number: 0040-0018-0002  
Property Address: 34 HIGH ST

Mailing Address: HALL BRYAN E  
34 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0003  
CAMA Number: 0040-0018-0003  
Property Address: 38 HIGH ST

Mailing Address: CONTI JOHN R LOISELLE DENISE E  
38 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0004  
CAMA Number: 0040-0018-0004  
Property Address: 42 HIGH ST

Mailing Address: SILVESTRI, PAUL R + LYNDA D  
42 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0005  
CAMA Number: 0040-0018-0005  
Property Address: 56 HIGH ST

Mailing Address: FITZGERALD, JOHN R & SHAPIRO,  
JILLIAN D  
56 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0006  
CAMA Number: 0040-0018-0006  
Property Address: 50 HIGH ST

Mailing Address: BISSEN THOMAS M & MYSIUK-BISSEN  
LISA-JO  
50 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0007  
CAMA Number: 0040-0018-0007  
Property Address: 54 HIGH ST

Mailing Address: KELLEY, MICHAEL + KATHLEEN T  
54 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0018-0008  
CAMA Number: 0040-0018-0008  
Property Address: 58 HIGH ST

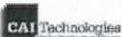
Mailing Address: FASH, ROBERT & BAMBI  
58 HIGH ST  
BELLINGHAM, MA 02019

Parcel Number: 0040-0019-0000  
CAMA Number: 0040-0019-0000  
Property Address: 33 HIGH ST

Mailing Address: TOWN OF BELLINGHAM  
CONSERVATION LAND  
10 MECHANIC STREET  
BELLINGHAM, MA 02019

Parcel Number: 0041-0001-0000  
CAMA Number: 0041-0001-0000  
Property Address: 59 HIGH ST

Mailing Address: ANDREW A SARNO REALTY TRUST  
ANDREW A SARNO-TRUSTEE  
59 HIGH ST  
BELLINGHAM, MA 02019



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are not responsible for any use for other purposes or misuse or misrepresentation of this report.



# 100 feet Abutters List Report

Bellingham, MA

May 21, 2025

Parcel Number: 0041-0001-0001  
CAMA Number: 0041-0001-0001  
Property Address: 57 HIGH ST

Mailing Address: DUNLEA, JAMES R  
57 HIGH STREET  
BELLINGHAM, MA 02019

Parcel Number: 0041-0006-0000  
CAMA Number: 0041-0006-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0041-0007-0000  
CAMA Number: 0041-0007-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0041-0008-0000  
CAMA Number: 0041-0008-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0041-0009-0000  
CAMA Number: 0041-0009-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0041-0010-0000  
CAMA Number: 0041-0010-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0041-0011-0000  
CAMA Number: 0041-0011-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0045-0057-0000  
CAMA Number: 0045-0057-0000  
Property Address: MILL ST

Mailing Address: UNKNOWN OWNERS C/O TREASURER  
10 MECHANIC ST  
BELLINGHAM, MA 02019

Parcel Number: 0046-0005-0000  
CAMA Number: 0046-0005-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0046-0006-0000  
CAMA Number: 0046-0006-0000  
Property Address: HIGH ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0046-0007-0000  
CAMA Number: 0046-0007-0000  
Property Address: MILL ST

Mailing Address: UNITED STATES OF AMERICA ARMY  
CORPS OF ENGINEERS  
696 VIRGINIA RD  
CONCORD, MA 01742-2751

Parcel Number: 0051-0013-0001  
CAMA Number: 0051-0013-0001  
Property Address: MECHANIC ST

Mailing Address: RED MILL ESTATES LLC  
1 CHARLESVIEW RD  
HOPEDALE, MA 01747



[www.cai-tech.com](http://www.cai-tech.com)

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5/21/2025

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**NOTIFICATION TO ABUTTERS UNDER THE  
MASSACHUSETTS WETLANDS PROTECTION ACT  
CHAPTER 131, SECTION 40  
AND  
THE TOWN OF BELLINGHAM WETLANDS PROTECTION BY LAW**

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the Bellingham Wetlands Protection Bylaw, you are hereby notified of the following:

Bellingham, DPW has filed a Notice of Intent/Abbreviated Notice of  
(Applicant)

Intent/ Abbreviated Notice of Resource Area Delineation/Request for Amendment; with  
the Bellingham Conservation Commission for review of the following activity:

Description of Project:

The proposed project is the construction of 2,400-foot temporary access road, the  
construction of a large diameter test well and a prolonged pump test. A portion of the work is  
within the Riverfront Area of the Charles River and the 100-foot buffer zone of wetlands.

The location of the proposed activity is

Assessors Map 45/41 Lot 56/03

Street address: High Street

Copies of the filing may be examined at the Bellingham Conservation Commission office  
during their normal business hours(please call 508-657-2858) OR at the following

Applicant or representative name: Caron Environmental Consulting, LLC

Address: 247 Bragg Hill Road, Westminster, MA 01473

Phone number: (978) 944-2326

Questions regarding the filing may be directed to the Conservation Commission at  
508-657-2858 OR the Applicant's representative (Please see above)

The public hearing will be held at the Bellingham Municipal Center, 10 Mechanic Street,  
Bellingham. Information on the date and time of the hearing may be directed to the  
Conservation Commission or the applicant's representative at the above numbers.

NOTE: Notice of the public hearing, including date, time and place:

1. Will be published at least five (5) days in advance in the Woonsocket Call
2. Will be posted at the Town Clerk's Office and on the town web site no less than  
forty-eight (48) hours in advance of the public hearing.

NOTE: You may also contact the nearest Department of Environmental Protection  
Regional Office for more information about this application or the Wetlands  
Protection Act. To contact DEP, call Central Regional (508)-792-7650

## LICENSE AGREEMENT

This License Agreement (this "License") is entered into on this 12<sup>th</sup> day of April, 2024, by and between **Varney Bros. Sand & Gravel, Inc.** ("Licensor), a Massachusetts corporation having an address of 79 Hartford Avenue, Bellingham, MA 02019, and the **Town of Bellingham** (the "Town"), a Massachusetts municipal corporation, having an address of 10 Mechanic Street, Bellingham, MA 02019.

### Recitals

Whereas, Licensor is the owner of property located on High Street in Bellingham, being Assessor's Map 41, Lot 3-0 (the "Property"); and

Whereas, the Town wants to temporarily travel across the Property in order to access the Town-owned property located at 33 High Street, Bellingham (the "Well Site"), to evaluate the feasibility and sustainability of developing a possible well on the Well Site; and

Whereas, Licensor is amenable to granting the Town temporary access across the Property to access and evaluate the Well Site, subject to the terms and conditions set forth herein.

Now, therefore, Licensor and the Town agree as follows:

### Agreement

1. Right of Entry. Licensor hereby grants the Town and its agents, employees, representatives, contractors and/or consultants a license to enter upon and travel by foot, motor vehicles, and heavy equipment across the portion of the Property depicted as "Option A" on the sketch plan attached hereto as Exhibit A and incorporated herein (the "License Area"), for the purposes of accessing and evaluating the viability of developing a well on the Well Site (the "Project"). The Town may also make modifications to the License Area, including, but not limited to the clearing, cutting and/or removal of trees and/or brush obstructing the License Area, and making other improvements thereto to establish a clear pathway or access way ("Modifications").

2. Consideration. The consideration for this License shall be \$1.00, paid by the Town to Licensor on or before the date of this License.

3. License Term. The rights granted hereunder shall commence on the date of this License and terminate on April 30<sup>th</sup>, 2025, provided, however, that if the Town needs additional time to conduct the Work, Licensor shall grant the Town such reasonable additional time as necessary for the Town to complete said Work.

4. Condition of Property, Release. The Town acknowledges and agrees that it accepts the Property in its "AS IS" condition for the purpose of this License, and that Licensor has made no representation or warranties regarding the fitness of the Property or its suitability for the purposes set forth herein. The Town shall use the Property at its own risk, and agrees



that Licensor shall not be liable to the Town or the Town's agents, employees, representatives, consultants and contractors (with the Town, the "Town Parties") for any injury or harm to person or property, and hereby releases Licensor from any and all claims, demands, damages, and liabilities of any kind or nature, except to the extent that such injury or harm is caused by the negligence of Licensor and/or its agents, employees, contractors, agents and representatives (with Licensor, the "Licensor Parties"). The provisions of this paragraph shall survive the expiration or earlier termination of this License.

5. Terms of Use. The Town shall have the non-exclusive right to enter and use the Property solely for the purpose of accessing the Well Site. The Town shall not construct, place or install any buildings, structures, objects or utilities within Property or remove any improvements on the Property, other than as set forth in Exhibit A, without prior approval of Licensor. The Town shall, promptly after the expiration or termination of this License and/or the Project (with the Town providing written notice of the termination of the Project), repair any damage caused to the Property and/or any improvements thereon by the Town or any of the other Town Parties and restore the License Area to its condition prior to the Town's entry onto the License Area as closely as reasonably practicable, at the Town's sole cost and expense, which obligations shall survive the expiration or termination of this License.

6. No Interference. The Town shall take reasonable measures to ensure that its use of the Property does not interfere unreasonably with the use of the Property by Licensor or others entitled thereto.

7. Termination. This License may be revoked by Licensor upon written notice of termination given to the Town at least sixty (60) days prior to the termination date stated in said notice.

8. Indemnification. The Town shall hold the Licensor harmless, to the extent permitted by law, from and against all claims, demands, suits, actions, costs, expenses, damages, and liabilities (including, without limitation, reasonable attorneys' fees) for personal injury, death, or property damage occurring in or around the Property to the extent caused by the Town's exercise of the rights granted hereunder, any failure by the Town to comply with the provisions hereof or of any applicable laws, rules, regulations, and ordinances, and/or the negligence of any of Town Parties. The provisions of this paragraph shall survive the expiration or the earlier termination of this License.

9. Insurance. Before the Town enters the Property, the Town shall procure and provide Licensor with evidence of commercial general liability insurance with a minimum coverage amount of One Million and 00/100 Dollars (\$1,000,000) per occurrence and Two Million and 00/100 Dollars (\$2,000,000) aggregate limit, and workers compensation insurance as required by law. Said liability insurance shall name Licensor as an additional insured and be provided by the Town's insurance company.

10. Modifications and Amendments. Modifications or amendments to this License shall be in writing and duly executed by both parties hereto to be effective.



11. Notices. For purposes of this License, the parties shall be deemed duly notified in accordance with the terms and provisions hereof, if written notices is given to the Town by attention to its Town Administrator either in hand or by mail at the address set forth above.

12. No Estate or Obligation Created. This License shall not be construed as creating or vesting in the Town any estate in the Property, but only the limited right of use as hereinabove stated.

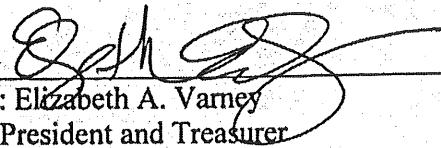
13. Governing Law. This License shall be governed and construed in accordance with the laws of the Commonwealth of Massachusetts and any disputes shall be brought in the courts of the county in which the Property is located.

[signature page follows]

A handwritten signature in black ink, appearing to read "jdt".

Signed by the parties as of the date written above.

LICENSOR: VARNEY BROS. SAND &  
GRAVEL, INC.

By:   
Name: Elizabeth A. Varney  
Title: President and Treasurer

TOWN OF BELLINGHAM,  
By its Town Administrator

By:   
Name: Denis Fraine  
Its: Town Administrator

895829/BELL/0129

# Section 6 Proposed Prolonged Pumping Test

A prolonged pumping test is proposed for the large diameter test well at the Well No. 10 location as detailed below. The overall goals of the test and related activities are to; (1) evaluate the long-term yield of the well; (2) evaluate hydrogeologic aquifer characteristics; (3) test for water quality and (4) to obtain well hydraulic performance for pump design.

## 6.1 Duration, Pumping Rates & Operation of Test

A step drawdown pumping test followed by a constant rate prolonged pumping test is proposed for the large diameter test well constructed at the Well No. 10 location. Data generated during the step test will be used to predict an appropriate pumping rate that will comply with stabilization criteria. Based on the short duration pump test from observation well TW 1-21 and the preliminary estimate of safe yield, it is anticipated that the pumping rate will be between 200 to 400 gallons per minute.

Water levels will be allowed to recover between the step drawdown test and prolonged pumping test. The prolonged pumping test will be conducted for a minimum of 5 consecutive days, until stabilization is reached, or up to 15 days if stabilization is not achieved. Stabilization will be considered when drawdown recorded in the pumping well has not varied more than 0.04-foot during the final 24 hours or the 180-day extrapolation method shows 10% of the water column remains above the top of the screen (minimally 5 feet) of the semi-log plot extrapolation of the time-drawdown curve derived from the final days of the test and extrapolated over a 180-day period.

## 6.2 Monitoring Locations

Water levels will be recorded in the pumping well and existing test wells TW 1-21, MW 1-21, MW 2-21, and TW 2. A series of driven piezometers in wetland areas surrounding Well No. 10 will be installed and monitored. The Piezometers are placed in areas that are inaccessible by a drill rig due to wetland conditions. One upstream piezometer will be used as the background well. Two river staff plates will be installed in the Charles River and outfitted with stilling tubes to monitor surface water levels. All monitoring will have pressure transducers installed and data will be corrected for changes in barometric pressure. Monitoring locations are shown on [Figure 2](#).

All monitoring locations will be surveyed, including a wetlands survey and submitted in the BRP WS-19 submittal.

## 6.3 Antecedent Readings

Water levels will be measured at all monitoring wells, surface water monitoring locations and piezometers for a minimum of five days prior to the start of the prolonged pumping test.

## 6.4 Drawdown Readings

Static water levels will be measured in the pumping well and observation wells immediately prior to the startup of the pumping test. Upon startup of the pumping well, water levels will be measured via a stilling tube and pressure transducers. Continuous readings of barometric pressure will be made and drawdown data from transducers will be adjusted for atmospheric pressure changes. The water level measurement schedule is proposed as the following:

- one-minute observations for up to ten minutes
- two-minute observations for up to 20 minutes
- five-minute observations for up to 60 minutes
- 30-minute observations for up to 180 minutes
- hourly observations up to the end of the test

## 6.5 Recovery Readings

Water levels will be measured in the pumping well and observation wells immediately prior to the end of pumping. Upon shutdown, recovery readings will be measured in the same manner as for drawdown readings noted above. Recovery measurements will be taken for as many days as the pumping well is pumped or until the well has recovered to 95% of the total drawdown during the test.

## 6.6 Flow Measurements

The discharge from the well will be measured using a circular orifice weir at the end of the discharge line. Flow will be recorded in inches and gpm. The pumped water will be discharged to an erosion flow dissipater located approximately 300-feet southeast (Figure 2, Appendix A). Discharge further downstream is unfeasible due to wetland conditions.

## 6.7 Water Quality Testing

Water samples will be collected from a sample tap fitted to the discharge pipe at the wellhead. The samples will be collected immediately prior to the end of the pump test and be tested for the parameters listed on **Table 6-1**. All testing will be performed by a MassDEP certified laboratory. Field tests for pH, odor, specific conductance, carbon dioxide, and temperature will be obtained at the beginning of the test, after 24 hours, and every two days thereafter until the end of the test. Samples of water for total coliform bacteria will be collected at the projected midpoint and end of the test. Water samples for secondary contaminants will be collected one hour after commencement of the pumping test, every other day thereafter and on the final day of the pumping test prior to shut down.

Since the proposed Well No. 10 location is in close proximity to surface water, the groundwater well source will require testing to determine whether it is under the influence from surface water. Sampling for parameters for groundwater under the direct influence of surface (GWUDI) water will be required throughout the duration of the prolonged pump test. This includes macro-particulate analysis (MPA) sampling collected during the last 12 hours of pumping.

**Table 6-1 Water Quality Parameters**

Parameter					
Coliform Bacteria	PFAS	Manganese	Lead	Sodium	Iron
Alkalinity	VOCs	Odor	Nitrate	Thallium	Chromium
Aluminum	SOCs	pH	Nitrite	Radon	Zinc
Calcium	Antimony	Potassium	Perchlorate	Gross Alpha	
Chloride	Arsenic	Silver	Cyanide	Radium 226	
Color	Barium	Sulfate	Fluoride	Radium 228	
Copper	Beryllium	TDS	Mercury	Uranium	
Hardness	Cadmium	Turbidity	Nickel	Selenium	

## **6.8 Rainfall Readings**

Rainfall will be measured using a rain gauge to be located in a clearing near the proposed well. Rainfall data will also be collected from the nearest reliable USGS/NOAA gauging station, if one can be found. Rainfall will be recorded daily beginning 5 days before startup of the pumping test and continue for the duration of the recovery period. Weather conditions will also be recorded during this time.

## **6.9 Reporting**

Following the prolonged pumping test, a Source Final Report (BRP WS-19) will be submitted for the well. The Source Final Report will characterize the impacts on the Charles River and an assessment of induced infiltration observed during the pumping test.



# Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

Maura T. Healey  
Governor

Kimberley Driscoll  
Lieutenant Governor

Rebecca L. Tepper  
Secretary

Bonnie Heiple  
Commissioner

April 10, 2023

Town of Bellingham  
Attn: Denis Fraine, Town Administrator  
10 Mechanic Street  
Bellingham, MA 02019

VIA ELECTRONIC MAIL ONLY  
[dfraine@bellinghamma.org](mailto:dfraine@bellinghamma.org)

Re: PWS Town: Bellingham  
PWS Name: Bellingham Water Div.  
PWS ID#: 2025000  
Program: System Modification–WS17  
MassDEP Transmittal: X288907  
Action: **Approval**

Dear Mr. Fraine:

The Central Regional Office of the Massachusetts Department of Environmental Protection (MassDEP) has reviewed the Bellingham DPW Water Division's application, WS17 - Approval to Site a Source and Conduct a Pumping Test for a Source greater than 70 gallons per minute for a proposed new water source on an 11.5 acre parcel owned by the Town referred to as the Well No 10 site. The application was prepared on the Town's behalf by Wright Pierce, Inc. The original application was submitted in August 2022 and a deficiency letter was issued in October 2022 requesting additional information. A supplement information package was submitted in February 2023.

## Project Description and Background

Bellingham Water Department produces drinking water from fifteen active wells throughout town. One additional source (Well 3.1, 2025000-03G) is inactive. The Town is looking at this site to add an additional source to improve system capacity.

## Site Description

The proposed Well No. 10 Site is located south of High Street in the northeast area of Bellingham. The property directly north of the Site is owned by Varney Bros Sand and Gravel and properties to the east and south are owned by U.S. Army Corps of Engineers. Topography at the Site is highly variable and is bound by the Charles River to the south and wetlands to the east. The Town secured a 400-foot radius of land surrounding the proposed well location and an easement for site access. Three existing small diameter test wells were located at the center of the 400-foot radius. A test well exploration program was completed at the Well No. 10 Site in 2021. A Site Plan developed by the consultant is provided in Appendix A for reference.

### Test Wells

Test Well TW 1-21 was installed at the approximate center of the 400-foot radius and approximately two feet from the existing test wells referred to as OBS-A and OBS-B. This location consisted of brown sand and fine to medium gravel to a depth of 29 feet bgs where refusal was encountered. Groundwater level was measured at approximately 1 feet bgs. TW 1-21 was constructed with 5 feet of 30-slot stainless steel screen from 24 feet to 29 feet bgs and developed with a diaphragm pump. Two monitoring wells (MW 1-21 and MW 2-21) were constructed in the vicinity of TW 1-21 to obtain additional data on subsurface conditions and to serve as monitoring locations for future pump testing. MW 1-21 was constructed approximately 29 feet south of TW 1-21 between the test well and Charles River. And MW 2-21 was constructed approximately 36 feet northwest of TW 1-21.

A short-term pumping test was performed on TW 1-21 to ascertain potential withdrawal capacity. After pumping at 50 gpm for 16 minutes, 0.36 feet of drawdown was observed in the observation well OBS-B resulting in a specific capacity of 139 gallons per minute per foot of drawdown (gpm/ft). Stabilization of drawdown was observed at this rate. Using the specific capacity of 139 gpm/ft, a theoretical production well with 5-feet of screen could theoretically produce 660 gpm. However, a single conventional well could not likely meet these theoretical estimates due to the negative boundary effects would limits yields. Therefore the consultant estimated a realistic yield for this location to be within the range of 200-400 gpm. The test well showed sodium at 25 mg/l and PFOA at 3 ng/l. Iron and manganese were non-detect. The intent is to construct a large diameter test well (8-inch) with 5-7 feet of screen to a depth of approximately 29 feet. A long-term pump test of the large diameter well will be completed to assess water quality under pumping conditions and sustainable yield.

### Site Assessment/Screening Analysis

The proposed production well site is located in an area of wetlands and is approximately 100' from the Charles River. Here were no areas of critical environmental concern, NHESP priority habitats, or vernal pools identified within the Site. Two potential vernal pools were identified to the northwest and northeast of the property and would need to be assessed.

The close proximity of the Charles River will require monitoring to determine river impacts. MassDEP regulations assume a hydraulic connection between the proposed well and the Charles River. As such, the well pumping rate must be less than the 7Q10 flow or less than 50% of the August median flow. The consultant conducted a preliminary analysis using USGS StreamSTATS to show the proposed withdrawal would be no more than 32% of the 7Q10 flows. The amount of infiltration will be further evaluated and quantified during the proposed prolonged pumping test by installing staff plates, piezometers and pressure transduces at various locations and collecting water quality data (including microscopic particulate analysis) to evaluate surface water infiltration.

Land use in the proximity of the proposed well consists of mostly forested area, forested wetlands, and non-forested wetlands. Sand and gravel mining areas are located south of the Charles River and low-density residential areas are located to the south and northwest. Commercial and industrial land use is located about 0.5-mile to the east and west along High Street. A railroad line runs east to west just south of the proposed Zone I and Charles River.

An updated inventory of Potential Contamination Sources (PCSs) was identified through MassDEP Database. The following is a summary of potential contamination sources: Three large quantity toxic users are mapped greater than 0.5 miles from the proposed well site. These sites are Northeast Energy Associates located about 1 mile to the west, Garelick Farms about 1 mile southeast, and Dynisco Instruments about 1.2 miles southeast. Two USTs are located about 0.5 mile from the proposed well Site to the east and southwest and are not a significant threat to water quality for a well source. These sources are not likely to impact the well due to the well being insulted by the Charles River.

### Proposed Pump Test

A step drawdown pumping test followed by a constant rate prolonged pumping test is proposed for the 8" diameter test well. Data generated during the step test will be used to predict an appropriate pumping rate that will comply with stabilization criteria. The anticipated pumping rate will be between 200 to 400 gallons per minute. Water levels will be allowed to recover between the step drawdown test and prolonged pumping test. The prolonged pumping test will be conducted for a minimum of 5 consecutive days, until stabilization is reached, or up to 15 days if stabilization is not achieved. Stabilization will be considered when drawdown recorded in the pumping well has not varied more than 0.04-foot during the final 24 hours. Water levels reading will be recorded as follows: one-minute observations for up to ten minutes, two-minute observations for up to 20 minutes, five-minute observations for up to 60 minutes, 30-minute observations for up to 180 minutes, and hourly observations up to the end of the test. The pumped water will be discharged to an erosion flow dissipater located approximately 300-feet southeast of the well. Upon shutdown, recovery readings will be measured in the same manner as for drawdown readings noted above. Recovery measurements will be taken for as many days as the pumping well is pumped or until the well has recovered to 95% of the total drawdown during the test. A rain gauge will be installed onsite to record precipitation.

Water levels will be recorded in the pumping well and existing test wells TW 1-21, MW 1-21, MW 2-21, and TW 2 (see attached Figure 2). As some areas cannot be accessed with a rig due to wetlands, a series of driven piezometers will be installed in these wetland areas. One upstream piezometer will be used as the background well. Two river staff plates with stilling tubes will be installed in the Charles River to monitor surface water levels. All monitoring will have pressure transducers installed and data will be corrected for changes in barometric pressure. Monitoring will begin 5 days prior to start of pump test.

Field tests for pH, odor, specific conductance, carbon dioxide, and temperature will be obtained at the beginning of the test, after 24 hours, and every two days thereafter until the end of the test. Samples of water for total coliform bacteria will be collected at the projected midpoint and end of the test. Water samples for secondary contaminants will be collected one hour after commencement of the pumping test, every other day thereafter and on the final day of the pumping test prior to shut down. Microscopic particulate analysis will be conducted during the final 12 hours of the pump test. Upon the end of the pump test, the following parameters will be tested: Coliform Bacteria, PFAS, Manganese, Lead, Sodium, Iron, Alkalinity, VOCs, Odor, Nitrate, Thallium, Chromium, Aluminum, SOCs, pH, Nitrite, Radon, Zinc, Calcium, Antimony, Potassium, Perchlorate, Gross Alpha, Chloride, Arsenic, Silver, Cyanide, Radium 226, Color

Barium, Sulfate, Fluoride, Radium 228, Copper, Beryllium, TDS, Mercury, Uranium, Hardness Cadmium, Turbidity, Nickel, and Selenium.

## **Review and Approval**

MassDEP reviewed the application and supporting documentation, and hereby issues the approval. This approval does not convey property rights of any sort or any exclusive privilege. Pursuant to MassDEP's authority under 310 CMR 22.04(7) to require that each supplier of water operate and maintain its system in a manner that ensures the delivery of safe drinking water to consumers, this approval is made subject to the conditions set forth below.

### **General Permit Conditions**

1. **Compliance with MassDEP Approvals** – The Supplier of Water shall conduct activities in accordance with the approved plans, reports, and other submissions, except as may be modified by the conditions set forth in this approval. No material changes in the design or activities described in the approved documents shall be performed without prior written MassDEP approval.
2. **Compliance with Other Approvals** – The activities at this Public Water System shall be performed in compliance with all other applicable local, state and federal laws and regulations. This approval does not relieve the owner or operator of this Public Water System from complying with all other applicable local, state and federal requirements, licenses and permits.
3. **Duty to Mitigate** – The Supplier of Water shall remedy and shall act to prevent all potential and actual adverse impacts to public health or the environment resulting from noncompliance with the terms or conditions of this approval.
4. **Duty to Provide Information** – The Supplier of Water shall furnish to MassDEP, within a reasonable time, any information MassDEP may request, and which is deemed by MassDEP to be relevant in determining compliance with permits, regulations, guidelines and policies.

### **Specific Permit Conditions**

1. **Pump Test Report** – A WS19 application shall be submitted to MassDEP for review and approval of the pumping test results.
2. **Field Sampling** – Field samples noted above shall also include testing for CO2.
3. **Water Quality Samples** – Lab testing shall include Total Organic Carbon and Enterococci, both at end of pump test.
4. **Site Visit** – A site visit will be required to be done before the start of the pump test.

If you have any questions regarding this approval, please contact Randy Swigor of the Drinking Water Program at 508-767-2763 or by email at [randy.swigor@mass.gov](mailto:randy.swigor@mass.gov).

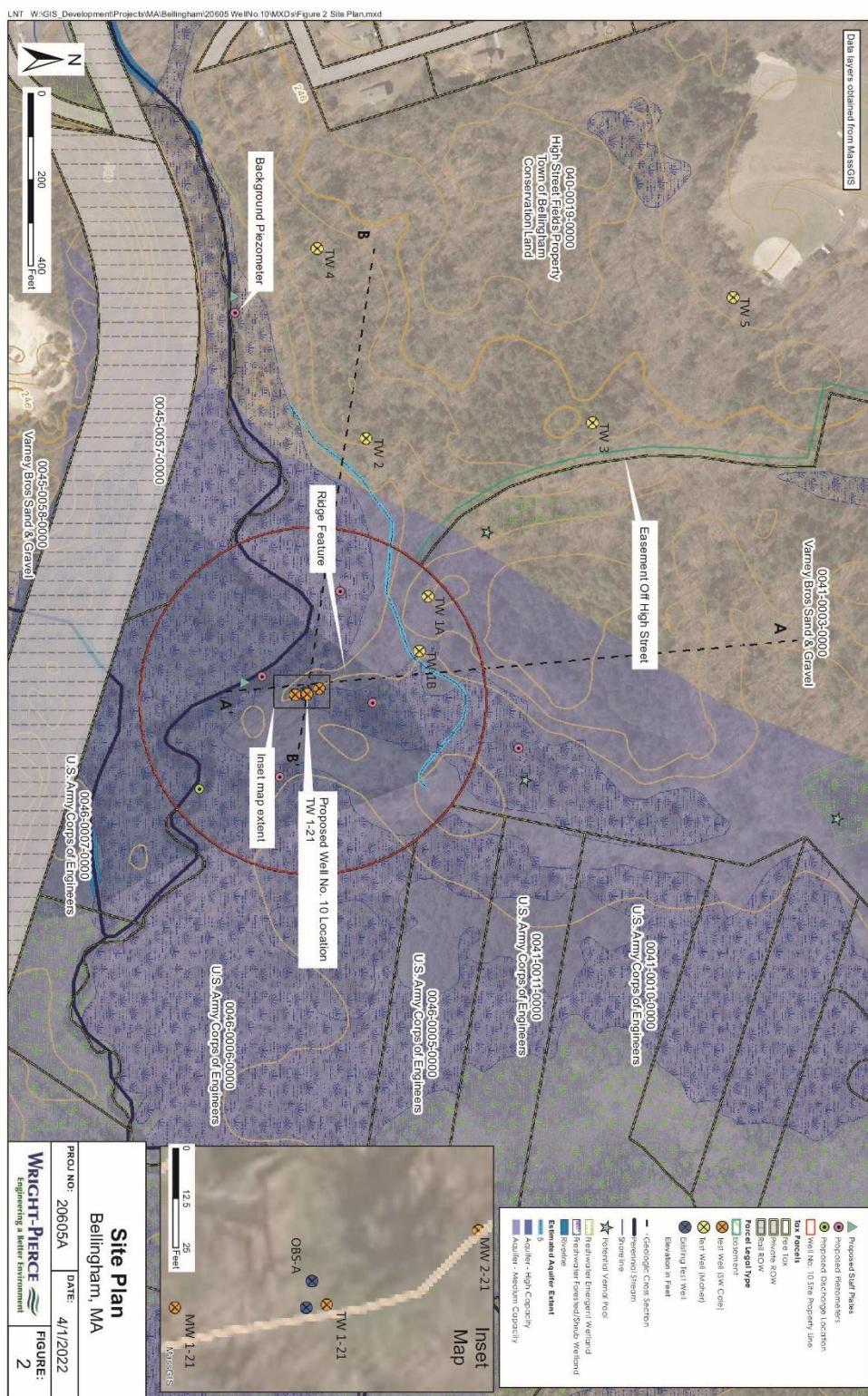
Sincerely,



Robert A. Bostwick  
Section Chief  
Drinking Water Program

Ecc: Drinking Water Program, MassDEP – CERO  
Bruce Wilson, Bellingham Board of Health, [bwilson@bellinghamma.org](mailto:bwilson@bellinghamma.org)  
Jesse Riedle, DPW Director, [jriedle@bellinghamma.org](mailto:jriedle@bellinghamma.org)  
Greg Smith, Wright-Pierce, [greg.smith@wright-pierce.com](mailto:greg.smith@wright-pierce.com)  
James Cray, Wright-Pierce, [jim.cray@wright-pierce.com](mailto:jim.cray@wright-pierce.com)

## APPENDIX A





# Caron Environmental Consulting

Wetlands • Forestry • Permitting • Habitat Studies

December 12, 2024

Mr. James Cray, P.E.  
Wright-Pierce  
78 Blanchard Road; Suite 404  
Burlington, MA 01803

Re: Wetland Delineation  
Off High Street/Bellingham  
Bellingham Well #10

Dear Mr. Cray:

As requested, we have delineated the wetlands on the above-referenced site. The delineation was conducted on March 21 and April 13, 2023 and September 17, 2024. The delineation was based on observations of the soils, the plant communities and hydrology. There was no snowcover at the time.

The edges of Bordering Vegetated Wetlands were delineated with blue flagging labeled A1 to A7, B1 to B18, C1 to C40, D1 to D71, H1 to H14 and I1 to I27. The edges of non-bordering vegetated wetlands were delineated with blue flagging labeled E1 to E4, F1 to F35, G1 to G34 and J1 to J12. All of the wetlands, except the F-series, and all of the uplands are wooded. The well site property and the area to the north of the site were heavily disturbed by gravel removal operations, likely prior to 1973.

The F-series wetland is a ponded area apparently created by over-excavation. It appears that the area typically dries out during the summer during non-drought conditions and therefore is not a pond. It is possibly Isolated Land Subject to Flooding (ISLF), but we believe the small drainage area and soil types indicate that it is not. Your office, however, will need to conduct the necessary calculations to determine if it is ISLF.

At the time of delineation, we anticipated that the non-bordering vegetated wetlands should not be Federally jurisdictional under the Clean Water Act, due to a recent Supreme Court decision. The ramifications of that decision, however, have not yet been experienced in practice.

The Top of Bank of an intermittent stream was delineated with yellow flagging labeled TOB-A1 to TOB-A15 and TOB-B1 to TOB-B18.

The Charles River runs through the southern portion of the site. The river's bank was not flagged due to unsafe access to the high water mark. The 200-foot Riverfront Area should be determined from the aerial photographs, on which the river's bank shows up clearly.

Species which were observed to be dominant primarily in the wetlands include Black Tupelo, Swamp White Oak, Swamp Dogwood, Yellow Birch, Spicebush, Royal Fern, Sensitive Fern, Skunk Cabbage, Tussock Sedge, Winterberry and Sphagnum Moss. Several species are common in both the wetlands and uplands including American Elm, Green Ash, Red Maple, Greenbrier, Sweet Pepperbush, Witch-hazel, Highbush Blueberry, Bittersweet, Poison Ivy, Cinnamon Fern, New York Fern and Barberry. Species abundant primarily in the uplands include Black Cherry, Black Oak, Red Oak, Scarlet Oak, White Oak, American Hazelnut, Sugar Maple, Gray-stemmed Dogwood, Bigtooth Aspen, Shagbark Hickory, White Pine, Sassafras, Hayscented Fern, Lowbush Blueberry, Checkerberry, Parridgeberry, Pennsylvania Sedge and Princess Pine. The attached Bordering Vegetated Wetland Determination Forms provide greater detail on the vegetation, soil conditions and hydrological indicators.

The MassGIS MassMapper does not show any Estimated/Priority Habitat Areas or Certified Vernal Pools on the site. There are potential vernal pools that were flagged with orange flags PVP-A1 to PVP-A3, PVP-B1 to PVP-B13, PVP-C1 to PVP-C11 and PVP-D1 to PVP-D30. The PVP-A series is within the C and D-series wetland, the PVP-B and PVP-C series are within the G-series wetland and the PVP-D series is within the I-series wetland. Only the southern edge of the PVP-A series was flagged.

The delineation was based on features visually apparent and the regulations in place at the time. As you are aware the interpretation of the boundaries of wetlands can vary depending on many factors including the time of year, growth phase of vegetation, groundwater levels, soil conditions, weather, and political factors. As a result, no delineation can be considered definitive until it has been reviewed and verified by all of the relevant approving authorities.

If you have any questions in regards to this matter, please feel free to contact us.

Very truly yours,  
CARON ENVIRONMENTAL CONSULTING

By;



Charles E. Caron

## **BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: Bellingham Well #10 City/Town: Bellingham Sampling Date: 04/13/2023

Applicant/Owner: Town of Bellingham DPW Sampling Point or Zone: C3-W

Investigator(s): Charles Caron Latitude/Longitude: 42.0950N/71.4607W

Soil Map Unit Name: Hinckley Loamy Sand NWI or DEP Classification: PFO1

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? (If yes, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes <u>X</u> No _____	Is the Sampled Area Yes <u>X</u> No _____ within a Wetland?
Hydric Soils criterion met?	Yes <u>X</u> No _____	
Wetlands hydrology present?	Yes <u>X</u> No _____	
Remarks, Photo Details, Flagging, etc.: Paired plots C3 & B14		

**HYDROLOGY**

<b>Field Observations:</b>		
Surface Water Present? Yes <u>X</u> No _____ Depth (inches) <u>&lt;1"</u>		
Water Table Present? Yes <u>X</u> No _____ Depth (inches) <u>Surface</u>		
Saturation Present (including capillary fringe)? Yes <u>X</u> No _____ Depth (inches) <u>Surface</u>		
<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input checked="" type="checkbox"/> Water-stained leaves	<input type="checkbox"/> Hydrological records	<input type="checkbox"/> Direct observation of inundation
<input type="checkbox"/> Evidence of aquatic fauna	<input type="checkbox"/> Free water in a soil test hole	<input checked="" type="checkbox"/> Drainage patterns
<input type="checkbox"/> Iron deposits	<input checked="" type="checkbox"/> Saturated soil	<input type="checkbox"/> Drift lines
<input type="checkbox"/> Algal mats or crusts	<input type="checkbox"/> Water marks	<input type="checkbox"/> Scoured areas
<input type="checkbox"/> Oxidized rhizospheres/pore linings	<input type="checkbox"/> Moss trim lines	<input type="checkbox"/> Sediment deposits
<input type="checkbox"/> Thin muck surfaces	<input type="checkbox"/> Presence of reduced iron	<input type="checkbox"/> Surface soil cracks
<input type="checkbox"/> Plants with air-filled tissue (aerenchyma)	<input type="checkbox"/> Woody plants with adventitious roots	<input type="checkbox"/> Sparsely vegetated concave surface
<input type="checkbox"/> Plants with polymorphic leaves	<input checked="" type="checkbox"/> Trees with shallow root systems	<input checked="" type="checkbox"/> Microtopographic relief
<input type="checkbox"/> Plants with floating leaves	<input type="checkbox"/> Woody plants with enlarged lenticels	<input type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):		

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u>		Plot size <u>r=30'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Red Maple	<i>Acer rubrum</i>	FAC*	85.5	Yes	Yes	
2. American Elm	<i>Ulmus americana</i>	FACW*	10.5	No	Yes	
3.						
4.						
5.						
6.						
7.						
8.						
9.						
						<u>96.0</u> = Total Cover
<u>Shrub/Sapling Stratum</u>		Plot size <u>r=15'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Winterberry	<i>Ilex verticillata</i>	FACW*	3.0	Yes	Yes	
2. Privet	<i>Ligustrum vulgare</i>	FACU	3.0	Yes	No	
3. Spicebush	<i>Lindera benzoin</i>	FACW*	3.0	Yes	Yes	
4. American Hazelnut	<i>Corylus americana</i>	FACU	3.0	Yes	No	
5.						
6.						
7.						
8.						
9.						
						<u>12.0</u> = Total Cover
<u>Herb Stratum</u>		Plot size <u>r=6'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Greenbrier	<i>Smilax rotundifolia</i>	FAC*	20.5	Yes	Yes	
2. Poison Ivy	<i>Toxicodendron radicans</i>	FAC*	20.5	Yes	Yes	
3. Partridgeberry	<i>Mitchella repens</i>	FACU	3.0	No	No	
4. Cinnamon Fern	<i>Osmunda cinnamomea</i>	FACW*	3.0	No	Yes	
5. Canada Mayflower	<i>Maianthemum canadense</i>	FACU	3.0	No	No	
6. Bittersweet	<i>Celastrus orbiculatus</i>	UPL	3.0	No	No	
7. American Hazelnut	<i>Corylus americana</i>	FACU	3.0	No	No	
8. White Pine	<i>Pinus strobus</i>	FACU	3.0	No	No	
9.						
10.						
11.						
12.						
						<u>59.0</u> = Total Cover

## VEGETATION – continued.

Woody Vine Stratum		Plot size <u>r=15'</u>		Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
Common name	Scientific name						
1. Greenbrier	<i>Smilax rotundifolia</i>	FAC*	10.5	Yes	Yes		
2. Poison Ivy	<i>Toxicodendron radicans</i>	FAC*	3.0	No	Yes		
3. Bittersweet	<i>Celastrus orbiculatus</i>	UPL	3.0	No	No		
4.							
						<u>16.5</u>	= Total Cover

Rapid Test:		Do all dominant species have an indicator status of OBL or FACW?			Yes _____ No <u>X</u>
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up $\geq$ 50% of dominant plant species?	
		8	6	Yes <u>X</u>	No _____
Prevalence Index:	OBL species	Total % Cover (all strata)	Multiply by:	Result	
			X 1	=	
			X 2	=	
			X 3	=	
			X 4	=	
		UPL species	X 5	=	
	Column Totals	(A)		(B)	
	Prevalence Index	B/A =		Is the Prevalence Index $\leq$ 3.0?	
				Yes _____	No _____
Wetland vegetation criterion met? Yes <u>X</u> No _____					

## Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

## SOIL

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

<sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input checked="" type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Dark Surface (S7)		<input type="checkbox"/> Other (Include Explanation in Remarks)

**Restrictive Layer (if observed)** Type: \_\_\_\_\_ Depth (inches): \_\_\_\_\_

**Remarks:**

Hydric Soils criterion met? Yes  No

## **BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: Bellingham Well #10 City/Town: Bellingham Sampling Date: 04/13/2023

Applicant/Owner: Town of Bellingham DPW Sampling Point or Zone: C3-U

Investigator(s): Charles Caron Latitude/Longitude: 42.0950N/71.4607W

Soil Map Unit Name: Hinckley Loamy Sand NWI or DEP Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? (If yes, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes _____ No <u>X</u> _____	Is the Sampled Area Yes _____ No <u>X</u> _____ within a Wetland?
Hydric Soils criterion met?	Yes _____ No <u>X</u> _____	
Wetlands hydrology present?	Yes _____ No <u>X</u> _____	
Remarks, Photo Details, Flagging, etc.: Paired plots C3 & B14		

**HYDROLOGY**

<b>Field Observations:</b>		
Surface Water Present? Yes _____ No <u>X</u> _____ Depth (inches) _____		
Water Table Present? Yes _____ No <u>X</u> _____ Depth (inches) _____		
Saturation Present (including capillary fringe)? Yes _____ No <u>X</u> _____ Depth (inches) _____		
<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input type="checkbox"/> Water-stained leaves	<input type="checkbox"/> Hydrological records	<input type="checkbox"/> Direct observation of inundation
<input type="checkbox"/> Evidence of aquatic fauna	<input type="checkbox"/> Free water in a soil test hole	<input type="checkbox"/> Drainage patterns
<input type="checkbox"/> Iron deposits	<input type="checkbox"/> Saturated soil	<input type="checkbox"/> Drift lines
<input type="checkbox"/> Algal mats or crusts	<input type="checkbox"/> Water marks	<input type="checkbox"/> Scoured areas
<input type="checkbox"/> Oxidized rhizospheres/pore linings	<input type="checkbox"/> Moss trim lines	<input type="checkbox"/> Sediment deposits
<input type="checkbox"/> Thin muck surfaces	<input type="checkbox"/> Presence of reduced iron	<input type="checkbox"/> Surface soil cracks
<input type="checkbox"/> Plants with air-filled tissue (aerenchyma)	<input type="checkbox"/> Woody plants with adventitious roots	<input type="checkbox"/> Sparsely vegetated concave surface
<input type="checkbox"/> Plants with polymorphic leaves	<input type="checkbox"/> Trees with shallow root systems	<input type="checkbox"/> Microtopographic relief
<input type="checkbox"/> Plants with floating leaves	<input type="checkbox"/> Woody plants with enlarged lenticels	<input type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):		

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u> Plot size <u>r=30'</u>					
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Black Oak	<i>Quercus velutina</i>	UPL	38.0	Yes	No
2. White Pine	<i>Pinus strobus</i>	FACU	38.0	Yes	No
3. White Oak	<i>Quercus alba</i>	FACU	10.5	No	No
4. Pitch Pine	<i>Pinus rigida</i>	FACU	10.5	No	No
5. Red Maple	<i>Acer rubrum</i>	FAC*	10.5	No	Yes
6. Sugar Maple	<i>Acer saccharum</i>	FACU	3.0	No	No
7.					
8.					
9.					
<u>110.5</u> = Total Cover					
<u>Shrub/Sapling Stratum</u> Plot size <u>r=15'</u>					
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. White Pine	<i>Pinus strobus</i>	FACU	3.0	Yes	No
2. Chokecherry	<i>Prunus virginiana</i>	FACU	3.0	Yes	No
3. Sugar Maple	<i>Acer saccharum</i>	FACU	3.0	Yes	No
4. Crab Apple	<i>Malus coronaria</i>	FACU	3.0	Yes	No
5. Black Cherry	<i>Prunus serotina</i>	FACU	3.0	Yes	No
6. Green Ash	<i>Fraxinus pennsylvanica</i>	FACW*	3.0	Yes	Yes
7. Winterberry	<i>Ilex verticillata</i>	FACW*	3.0	Yes	Yes
8.					
9.					
<u>21.0</u> = Total Cover					
<u>Herb Stratum</u> Plot size <u>r=6'</u>					
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
1. Greenbrier	<i>Smilax rotundifolia</i>	FAC*	10.5	Yes	Yes
2. Poison Ivy	<i>Toxicodendron radicans</i>	FAC*	3.0	Yes	Yes
3. Princess Pine	<i>Lycopodium obscurum</i>	FACU	3.0	Yes	No
4. Lowbush Blueberry	<i>Vaccinium angustifolium</i>	FACU	3.0	Yes	No
5. Sugar Maple	<i>Acer saccharum</i>	FAC*	3.0	Yes	Yes
6. Interrupted Fern	<i>Osmunda claytonia</i>	FAC*	3.0	Yes	Yes
7. Canada Mayflower	<i>Maianthemum canadense</i>	FACU	3.0	Yes	No
8. Partridgeberry	<i>Mitchella repens</i>	FACU	3.0	Yes	No
9. Barberry	<i>Berberis vulgaris</i>	FACU	3.0	Yes	No
10. White Pine	<i>Pinus strobus</i>	FACU	3.0	Yes	No
11.					
12.					
<u>37.5</u> = Total Cover					

## VEGETATION – continued.

Woody Vine Stratum		Plot size <u>r=15'</u>		Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
Common name	Scientific name						
1. Greenbrier	<i>Smilax rotundifolia</i>			FACU	10.5	Yes	No
2.							
3.							
4.							
<u>10.5 = Total Cover</u>							

Rapid Test:		Do all dominant species have an indicator status of OBL or FACW?			Yes _____ No <input checked="" type="checkbox"/>
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up $\geq$ 50% of dominant plant species?	
		20	6	Yes _____	No <input checked="" type="checkbox"/>
Prevalence Index:	OBL species	Total % Cover (all strata)	Multiply by:	Result	
		0.0	X 1	= 0	
		6.0	X 2	= 12	
		30.0	X 3	= 90	
		105.5	X 4	= 422	
	FAC species	X 5	= 190		
FACU species		(B) 714			
UPL species					
Column Totals	(A) 179.5				
Prevalence Index	B/A = 3.98			Is the Prevalence Index $\leq$ 3.0?	
				Yes _____	No <input checked="" type="checkbox"/>
Wetland vegetation criterion met? Yes _____ No <input checked="" type="checkbox"/>					

## Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

## SOIL

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

<sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Dark Surface (S7)		<input type="checkbox"/> Other (Include Explanation in Remarks)

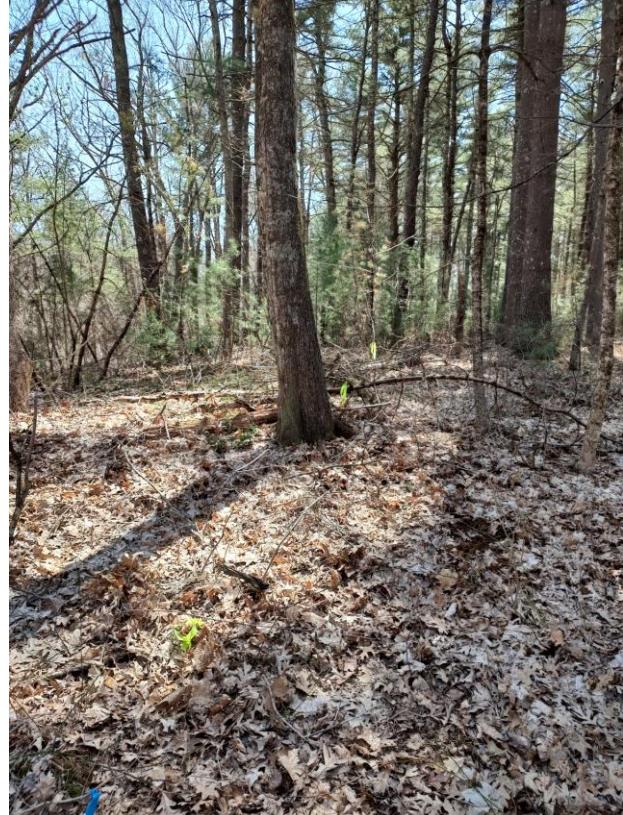
**Restrictive Layer (if observed)** Type: \_\_\_\_\_ Depth (inches): \_\_\_\_\_

**Remarks:**

**Hydric Soils criterion met?** Yes  No



Wetland at Plot C3-W



Upland at Plot C3-U



Soil at Plot C3-W



Soil at Plot C3-U



Wetland at Plot B14-W



Upland at Plot B14-U

## **BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: Bellingham Well #10 City/Town: Bellingham Sampling Date: 04/13/2023

Applicant/Owner: Town of Bellingham DPW Sampling Point or Zone: F26-W

Investigator(s): Charles Caron Latitude/Longitude: 42.0950N/71.4607W

Soil Map Unit Name: Udorthents NWI or DEP Classification: PSS1

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks)

Are Vegetation Yes, Soil Yes, or Hydrology Yes significantly disturbed? (If yes, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes <u>X</u> No _____	Is the Sampled Area Yes <u>X</u> No _____ within a Wetland?
Hydric Soils criterion met?	Yes _____ No <u>X</u> _____	
Wetlands hydrology present?	Yes <u>X</u> No _____	
Remarks, Photo Details, Flagging, etc.: Due to configuration and topography of the site paired plots did not make sense, so traditional wetland/upland plots were done. Wetland and surrounding uplands were created/ altered by a past gravel removal operation.		

**HYDROLOGY**

<b>Field Observations:</b>		
Surface Water Present? Yes <u>X</u> No _____ Depth (inches) <u>0"-12"</u>		
Water Table Present? Yes <u>X</u> No _____ Depth (inches) <u>Surface</u>		
Saturation Present (including capillary fringe)? Yes <u>X</u> No _____ Depth (inches) <u>Surface</u>		
<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input checked="" type="checkbox"/> Water-stained leaves	<input type="checkbox"/> Hydrological records	<input type="checkbox"/> Direct observation of inundation
<input type="checkbox"/> Evidence of aquatic fauna	<input type="checkbox"/> Free water in a soil test hole	<input type="checkbox"/> Drainage patterns
<input type="checkbox"/> Iron deposits	<input type="checkbox"/> Saturated soil	<input type="checkbox"/> Drift lines
<input type="checkbox"/> Algal mats or crusts	<input checked="" type="checkbox"/> Water marks	<input type="checkbox"/> Scoured areas
<input type="checkbox"/> Oxidized rhizospheres/pore linings	<input type="checkbox"/> Moss trim lines	<input type="checkbox"/> Sediment deposits
<input type="checkbox"/> Thin muck surfaces	<input type="checkbox"/> Presence of reduced iron	<input type="checkbox"/> Surface soil cracks
<input type="checkbox"/> Plants with air-filled tissue (aerenchyma)	<input type="checkbox"/> Woody plants with adventitious roots	<input type="checkbox"/> Sparsely vegetated concave surface
<input type="checkbox"/> Plants with polymorphic leaves	<input type="checkbox"/> Trees with shallow root systems	<input type="checkbox"/> Microtopographic relief
<input type="checkbox"/> Plants with floating leaves	<input type="checkbox"/> Woody plants with enlarged lenticels	<input checked="" type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):		

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u>		Plot size <u>r=30'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Red Maple	<i>Acer rubrum</i>	FAC*	38.0	Yes	Yes	
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
						<u>38.0</u> = Total Cover
<u>Shrub/Sapling Stratum</u>		Plot size <u>r=15'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Highbush Blueberry	<i>Vaccinium corymbosum</i>	FACW*	10.5	Yes	Yes	
2. Red Maple	<i>Acer rubrum</i>	FAC*	3.0	Yes	Yes	
3.						
4.						
5.						
6.						
7.						
8.						
9.						
						<u>13.5</u> = Total Cover
<u>Herb Stratum</u>		Plot size <u>r=6'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. White meadowsweet	<i>Spirea alba</i>	FACW*	3.0	Yes	Yes	
2. Highbush Blueberry	<i>Vaccinium corymbosum</i>	FACW*	3.0	Yes	Yes	
3. Red Fescue	<i>Festuca rubra</i>	FACU	3.0	Yes	No	
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
						<u>9.0</u> = Total Cover

## VEGETATION – continued.

Woody Vine Stratum	Plot size _____	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
Common name	Scientific name				
1.					
2.					
3.					
4.					
_____ = Total Cover					

Rapid Test:		Do all dominant species have an indicator status of OBL or FACW?			Yes _____ No <input checked="" type="checkbox"/>
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up $\geq$ 50% of dominant plant species?	
		6	5	Yes <input checked="" type="checkbox"/>	No _____
Prevalence Index:	OBL species	Total % Cover (all strata)	Multiply by:	Result	
			X 1	=	
			X 2	=	
			X 3	=	
			X 4	=	
	UPL species		X 5	=	
Column Totals	(A)		(B)		
Prevalence Index	B/A =				Is the Prevalence Index $\leq$ 3.0?
					Yes _____ No _____
Wetland vegetation criterion met? Yes <input checked="" type="checkbox"/> No _____					

## Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

## SOIL

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

<sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Dark Surface (S7)		<input type="checkbox"/> Other (Include Explanation in Remarks)

**Restrictive Layer (if observed)** Type: \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Remarks: very gravelly

Hydric Soils criterion met? Yes  No  X

## **BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: Bellingham Well #10 City/Town: Bellingham Sampling Date: 04/13/2023

Applicant/Owner: Town of Bellingham DPW Sampling Point or Zone: F26-U

Investigator(s): Charles Caron Latitude/Longitude: 42.0950N/71.4607W

Soil Map Unit Name: Udorthents NWI or DEP Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (If no, explain in Remarks)

Are Vegetation Yes, Soil Yes, or Hydrology Yes significantly disturbed? (If yes, explain in Remarks)

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

Wetland vegetation criterion met?	Yes <u>X</u> No _____	Is the Sampled Area Yes _____ No <u>X</u> within a Wetland?
Hydric Soils criterion met?	Yes _____ No <u>X</u>	
Wetlands hydrology present?	Yes _____ No <u>X</u>	
Remarks, Photo Details, Flagging, etc.: Due to configuration and topography of the site paired plots did not make sense, so traditional wetland/upland plots were done. Wetland and surrounding uplands were created/ altered by a past gravel removal operation.		

**HYDROLOGY**

<b>Field Observations:</b>		
Surface Water Present? Yes _____ No <u>X</u> Depth (inches) _____		
Water Table Present? Yes _____ No <u>X</u> Depth (inches) _____		
Saturation Present (including capillary fringe)? Yes _____ No <u>X</u> Depth (inches) _____		
<b>Wetland Hydrology Indicators</b>		
Reliable Indicators of Wetlands Hydrology	Indicators that can be Reliable with Proper Interpretation	Indicators of the Influence of Water
<input type="checkbox"/> Water-stained leaves <input type="checkbox"/> Evidence of aquatic fauna <input type="checkbox"/> Iron deposits <input type="checkbox"/> Algal mats or crusts <input type="checkbox"/> Oxidized rhizospheres/pore linings <input type="checkbox"/> Thin muck surfaces <input type="checkbox"/> Plants with air-filled tissue (aerenchyma) <input type="checkbox"/> Plants with polymorphic leaves <input type="checkbox"/> Plants with floating leaves <input type="checkbox"/> Hydrogen sulfide odor	<input type="checkbox"/> Hydrological records <input type="checkbox"/> Free water in a soil test hole <input type="checkbox"/> Saturated soil <input type="checkbox"/> Water marks <input type="checkbox"/> Moss trim lines <input type="checkbox"/> Presence of reduced iron <input type="checkbox"/> Woody plants with adventitious roots <input type="checkbox"/> Trees with shallow root systems <input type="checkbox"/> Woody plants with enlarged lenticels	<input type="checkbox"/> Direct observation of inundation <input type="checkbox"/> Drainage patterns <input type="checkbox"/> Drift lines <input type="checkbox"/> Scoured areas <input type="checkbox"/> Sediment deposits <input type="checkbox"/> Surface soil cracks <input type="checkbox"/> Sparsely vegetated concave surface <input type="checkbox"/> Microtopographic relief <input type="checkbox"/> Geographic position (depression, toe of slope, fringing lowland)
Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):		

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION** – Use both common and scientific names of plants.

<u>Tree Stratum</u>		Plot size <u>r=30'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Red Maple	<i>Acer rubrum</i>	FAC*	38.0	Yes	Yes	
2. White Pine	<i>Pinus strobus</i>	FACU	10.5	No	No	
3. Green Ash	<i>Fraxinus pennsylvanica</i>	FACW*	3.0	No	Yes	
4. Black Birch	<i>Betula lenta</i>	FACU	3.0	No	No	
5.						
6.						
7.						
8.						
9.						
						<u>54.5</u> = Total Cover
<u>Shrub/Sapling Stratum</u>		Plot size <u>r=15'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Highbush Blueberry	<i>Vaccinium corymbosum</i>	FACW*	10.5	Yes	Yes	
2. American Hazelnut	<i>Corylus americana</i>	FACU	3.0	No	No	
3. Winterberry	<i>Ilex verticillata</i>	FACW*	3.0	No	Yes	
4. White Pine	<i>Pinus strobus</i>	FACU	3.0	No	No	
5.						
6.						
7.						
8.						
9.						
						<u>19.5</u> = Total Cover
<u>Herb Stratum</u>		Plot size <u>r=6'</u>				
Common name	Scientific name	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)	
1. Red Fescue	<i>Festuca rubra</i>	FACU	20.5	Yes	No	
2. Wild Strawberry	<i>Fragaria vesca</i>	FACU	10.5	Yes	No	
3. Highbush Blueberry	<i>Vaccinium corymbosum</i>	UPL	3.0	No	No	
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
						<u>34.0</u> = Total Cover

## VEGETATION – continued.

Woody Vine Stratum	Plot size _____	Indicator Status	Absolute % Cover	Dominant? (yes/no)	Wetland Indictor? (yes/no)
Common name	Scientific name				
1.					
2.					
3.					
4.					
_____ = Total Cover					

Rapid Test:		Do all dominant species have an indicator status of OBL or FACW?			Yes _____ No <input checked="" type="checkbox"/>
Dominance Test:	Number of dominant species	Number of dominant species that are wetland indicator plants		Do wetland indicator plants make up $\geq$ 50% of dominant plant species?	
		4	2	Yes <input checked="" type="checkbox"/>	No _____
Prevalence Index:	OBL species	Total % Cover (all strata)	Multiply by:	Result	
			X 1	=	
			X 2	=	
			X 3	=	
			X 4	=	
	UPL species		X 5	=	
Column Totals	(A)		(B)		
Prevalence Index	B/A =				Is the Prevalence Index $\leq$ 3.0?
					Yes _____ No _____
Wetland vegetation criterion met? Yes <input checked="" type="checkbox"/> No _____					

## Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub/Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

Cover Ranges	
Range	Midpoint
1-5 %	3.0 %
6-15 %	10.5 %
15-25 %	20.5 %
26-50 %	38.0 %
51-75 %	63.0 %
76-95 %	85.5 %
96-100 %	98.0 %

## SOIL

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

<sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (Check all that apply)		Indicators for Problematic Hydric Soils
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Mesic Spodic (A17)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Dark Surface (F7)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Depleted Dark Surface (F8)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Dark Surface (S7)		<input type="checkbox"/> Other (Include Explanation in Remarks)

**Restrictive Layer (if observed)** Type: \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Remarks: Soil extremely gravelly, Bw-horizon mottling starts below 14"

Hydric Soils criterion met? Yes  No  X



Wetland at Plot F26-W



Upland at Plot F26-U



Soil at Plot F26-W



Soil at Plot F26-U

Map interface with various controls (zoom, info, print, etc.) and a search bar: **Enter a location...**

Map features include:

- High Street and High Street Fields
- Rivers: Nooks River and Franklin River
- Land parcels labeled with codes: A1, A7, B1, B8, C1, D1, E1, E4, F1-F53, D71, C40, and T0B A1-A5 & T0B B1-B18.
- A large green area labeled **Bellingham Water Supply Land**.
- Handwritten notes: "Appears to end at or just north of take A2" and "PVP-A1-A3".
- A north arrow and a scale bar (1:4,514, 50 m, 200 ft).
- A coordinate display: 42.09373, -71.45814 LAT LON
- A bottom navigation bar: **MassMapper** and **Leaflet | MassGIS**.

Table of Contents (Sidebar):

- > Census
- > Coastal and Marine
- > Features
- > Conservation / Recreation
- > Cultural Resources
- > Environmental Monitoring
- > (testing/monitoring sites)
- > Images
- > Index (grids/tiling schemes for certain layers)
- > Infrastructure
- > Physical Resources
- > Political / Administrative Boundaries
- > Regulated Areas
- > Status / Availability (maps showing where data is available or date of data)
- > Tiled Layers

Legend (checked): **Property** **Tax Parcels**





# Caron Environmental Consulting

Wetlands • Forestry • Permitting • Habitat Studies

## RESTORATION SEQUENCE

### **TOWN OF BELLINGHAM DPW WELL 10 LARGE DIAMETER TEST WELL AND ACCESS ROAD**

1. This restoration sequence is to be implemented if the proposed well is not found to be viable and the project does not proceed beyond the prolonged pump test.
2. The areas to be restored will consist of the well site and the access road extension beyond Station 17+50.
3. In the event of conflicts between this sequence and the Order of Conditions, the Order of Conditions shall prevail.
4. All disturbed surfaces shall be smooth removing any ruts, piles, etc.
5. Surface all disturbed surfaces with 4 inches of loam.
6. Seed any slopes exceeding 20% with New England Wetland Plant's *Logging Road Mix* or approved equal.
7. Surface all other disturbed areas with 2 inches of leaf litter.
8. Plant all of the disturbed areas with shrubs on an 8'x8' spacing. The plantings shall have a height of at least 24 inches. The shrub plantings should consist of a mix of as many of the following species as is available: American Hazelnut, Black Huckleberry, Bayberry, Maple-leaf Viburnum, Flowering Dogwood and Chokecherry. The substitution or addition of species shall be pre-approved by the project's wetland consultant.
9. To the extent feasible the restored areas shall be blocked to prevent by vehicles, particularly ATV's.
10. The restored areas shall be monitored each June and September, for two growing seasons, by the project's wetland consultant. A report of each inspection shall be submitted to the Conservation Commission. The area shall be considered to be successfully restored after two growing seasons if all surfaces are stabilized and there has been 75% survival of the plantings. The loss of plantings, however, may be offset by shrub or trees that are becoming naturally established.