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June 7, 2020

Conservation Commission

Town Offices

900 Main Street

Millis, MA 02054

Ref: Emerson Place Subdivision  
Notice of Intent

Dear Members of the Commission:

I am writing to provide a revised subdivision plan, which addresses comments received during the permitting process and the Town's peer review consultant. In addition to a revised subdivision plan and stormwater report, the following items are attached to this letter;

- A FEMA flood profile for Bogastow Brook;
- A report by Goddard Consulting addressing various performance standards and Wetlands Protection Act/Bylaw requirements.

The enclosed subdivision plans reflect a variety of revisions as a result of comments received by BETA and other Boards and Commissions. Most are minor but we did eliminate stormwater basins 3 and 4 in favor of a larger stormwater basin 2. The basins were renumbered accordingly. Additional information regarding the two proposed wetland crossings are included in the revised subdivision plan along with specifications for three box culverts at the intermittent stream crossings. These open-bottom box culverts are provided to restore the stream channels at each of the three crossings (which are now culverted with pipes or much smaller culverts). In order to meet the Applicant's regulatory requirement to control rates and volumes of flow to downstream properties, low-profile weir walls are proposed in each culvert bed to mimic existing flow conditions. The weirs allow for low-flows and wildlife passage while maintaining existing flow patterns.



In addition to the responses found in the Goddard Consulting report, we offer the following responses to certain BETA comments for the Commission's consideration:

1. *Comment: Based on the Project Phase descriptions the Project may not be completed within the life of the Order of Conditions (OOC) and BETA recommends the Applicant obtain Partial Certificates of Compliance (PCOC) that includes an as-built plan at the end of each phase.*

**Response:** The work associated with phase 1 (May Road) includes all work in conservation jurisdictional areas and all stormwater basins. Phase 1 is likely to be completed within the life of the permit. Work on phases 2 and 3 do not involve work in jurisdictional areas. The applicant also has the option of requesting an extension if needed. Asbuilts will be furnished with requests for Certificates of Compliance, whether they be partial requests or the final request.

10. *Comment: The Applicant needs to provide evidence to support their Base Flood Elevation determination.*

**Response:** The attached FEMA flood profile for Bogastow Brook shows that the actual Bogastow Brook backwater 100-year flood elevation is 142.7. FEMA maps are generic in nature and show only rounded flood elevations. The flood profiles provide the most detailed and reliable elevation information. The elevation of 142.9 was used as a conservative measure but could be revised down to 142.7 if desired. As we have noted in past discussion, this the flood elevation on the north side of Causeway Street. The vast storage capacity of the Great Black Swamp (which is a Zone A) means that 100-year flood elevations would be lower on our site. Thus, it is our view that the 100-year Flood Elevation depicted on the plan is conservatively high. Melissa Recos of BETA has already concurred with this assessment.

11. *Comment: Evidence of a high groundwater table observed within the proposed stormwater basin in Lot 26 and the Applicant should re-evaluate current groundwater elevation data used in their stormwater management design in this location. Additional test pits may be required once the basin is re-located.*

**Response:** That basin has since been removed. Melissa Recos of BETA has already reviewed the revised stormwater management system design and found it to be satisfactory.

12. *Comment: Addressed comments from BETA's Stormwater Management Review to be in compliance with the MA Stormwater Management Standards.*

**Response:** Melissa Recos of BETA has already reviewed the revised stormwater management system design and found it to be satisfactory.



Do not hesitate to contact me should you have any questions or comments.

Yours Truly,

LEGACY ENGINEERING LLC

Daniel J. Merrikin, P.E.  
President

cc: File







Millis Conservation Commission  
900 Main Street  
Millis, MA 02054

June 6, 2020

RE: Wetland Resource Area Performance Standards Compliance  
DEP File #: CE225-0407  
Emerson Place Definitive Subdivision

Dear Millis Conservation Commission:

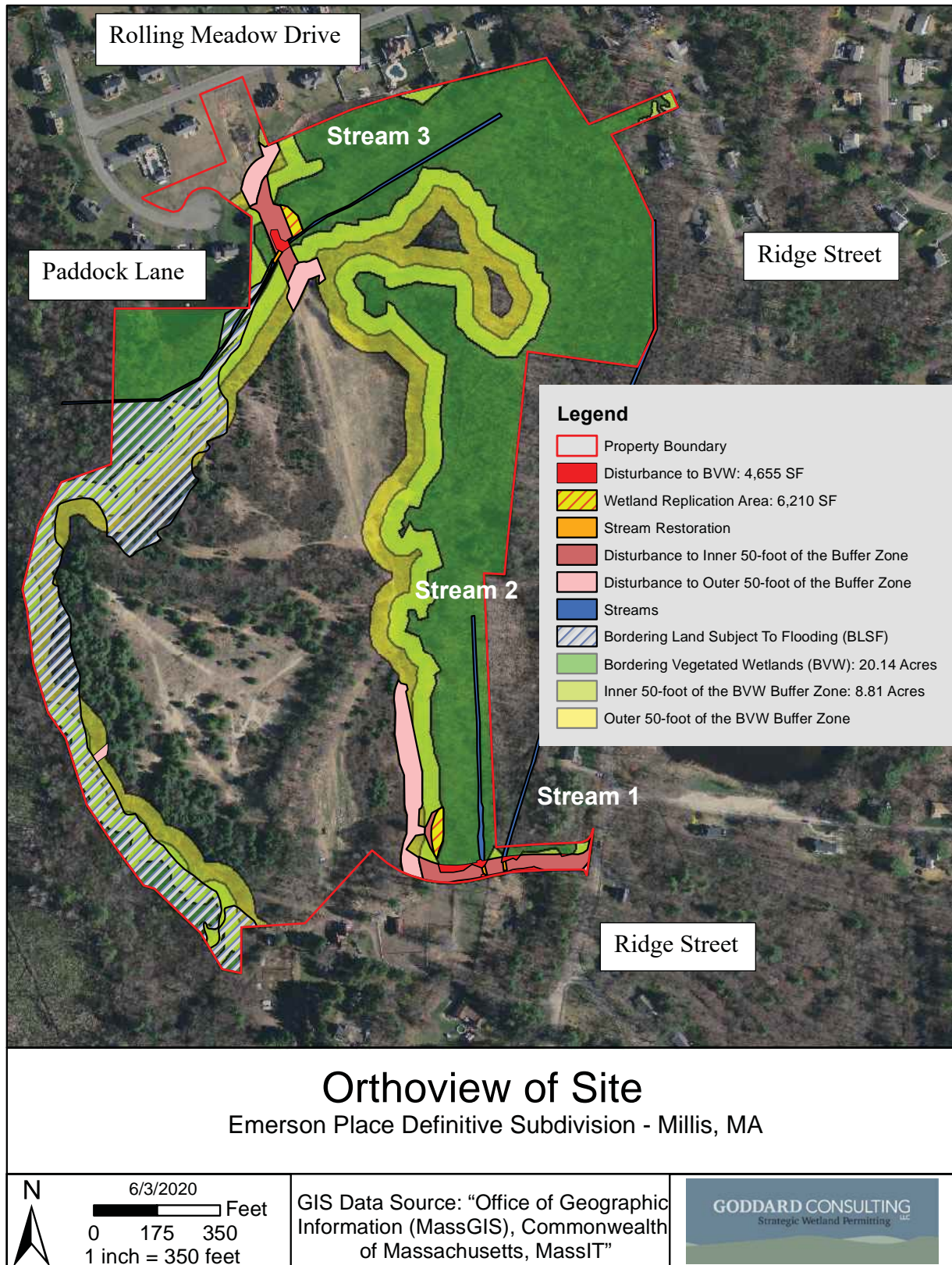
### 1.0 Introduction

On behalf of the applicant, G, J & K LLC, Goddard Consulting, LLC is pleased to submit this Wetland Resource Area Performance Standards Compliance report, including the BVW/stream crossings and mitigation for the proposed wetland impacts on land located between Ridge Street and Rolling Meadow Drive in Millis, MA. The site consists of several land parcels, each of which was assessed for Wetland Resource Areas. The land parcels include: (Map-Parcel) 15-66, 20-25, 20-26, 20-28, 23-04, 20-27, and a portion of 20-53. The existing 61.25-acre site is primarily undeveloped, although portions were previously disturbed. The site includes wooded wetlands, wooded uplands, pasture area and an old gravel pit. To the west of the site lies the Great Black Swamp. The easterly portions of the site contain Bordering Vegetated Wetlands and three intermittent streams.

The proposed construction is for a new Open Space Development which will consist of a 43-lot single family subdivision with paved roadway system, associated utilities, and stormwater features. The work requires the alteration of five jurisdictional wetland resource areas: Bank (impact of 125 linear feet), Bordering Vegetated Wetland (BVW impact of 4,665 SF: 3,669 SF wetland fill, 986 SF temporary disturbance), Bordering Land Subject to Flooding (BLSF, impact of +/- 100 SF), Land Under Water (LUW, impact of +/- 425 SF) and Millis Adjacent Upland Resource Areas (i.e. Buffer Zone, impact 10%). This report will describe each Wetland Resource Area with proposed impacts, and compliance with state and local regulations will be discussed. **Map 1** provides an orthoview of the entire site with graphics highlighting key features that will be referenced throughout this report.

The titles of all enclosed documents are as follows:

- ORAD (CE225-0407), 3/23/2018
- *Wetland Replication Area 1*, 6/3/2020 - Planting Map
- *Wetland Replication Area 2*, 6/3/2020 - Planting Map
- Wildlife Habitat Evaluations
- Response to BETA Peer Review Letter from March 31, 2020
- *Emerson Place Definitive Subdivision Plan* (Sheets C-31 and C-32), Legacy Engineering, Revised June 5, 2020



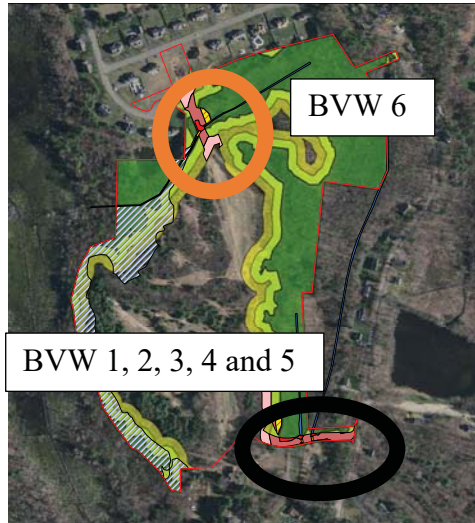
**Map 1:** The orthoview of the site is highlighted with graphics to display the key features that will be discussed throughout this report.



## 2.0 Existing Resource Areas:

### 2.1 Bordering Vegetated Wetlands (BVW)

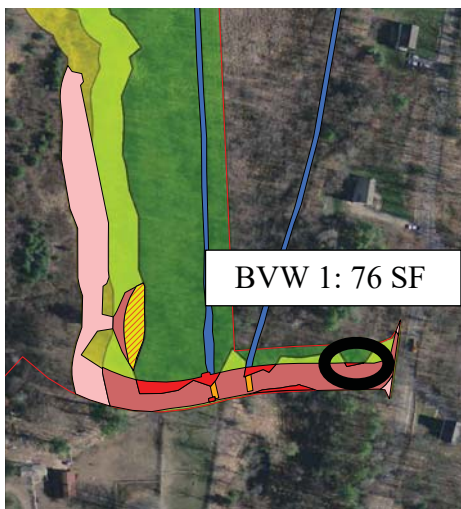
Existing conditions for all BVW impact areas were evaluated and described in this report. **Map 2** shows the general locations of each BVW on this site.



**Map 2:** BVW impact areas 1 through 5 can be found in the black circle at the southeastern portion of the site. BVW 6 can be found in the orange circle at the northern portion of the site.

#### BVW Impact Area 1:

BVW Impact Area 1 (76 SF: 14 SF wetland fill, 62 SF temporary disturbance) is located at the southeast section of the site between wetland flags WF B168 and WF B166 which can be accessed from a gravel path off of Ridge Street. The following list of vegetation is provided with each species' respective percent cover of the area: glossy buckthorn (90%), red maple (75%), quaking aspen (35%), silky dogwood (15%), white pine (15%), sensitive fern (10%), elm (5%), moss (5%), and poison ivy (2%), white ash (2%), burning bush (2%). There are significant amounts of downed woody debris scattered on the forest floor. The BVW's hydric soils are a



**Map 3:** BVW 1 is shown as a bright red area within the black circle.

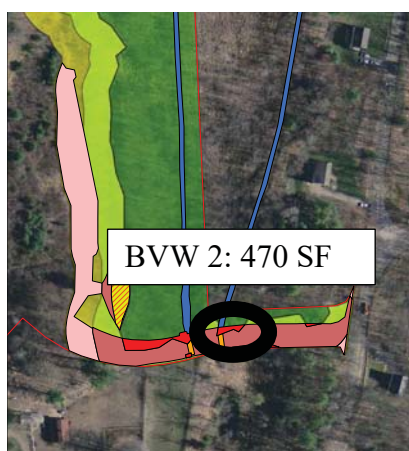


**Photo 1:** Existing conditions of BVW 1.

fine sandy loam, show signs of redox at 6" below the surface, and ground water appears 14" below. BVW 1 is shown on **Map 3** and **Photo 1** shows the existing conditions.

#### BVW Impact Area 2:

BVW Impact Area 2 (470 SF: 324 SF wetland fill, 146 SF temp. disturbance) is located at the southeast section of the site between wetland flags WF B162 and WF BB2 and is adjacent to Stream 1, which can be accessed from the gravel road off of Ridge Street. The following list of vegetation is provided with each species' respective percent cover of the area: white pine (60%), red maple (50%), glossy buckthorn (45%), highbush blueberry (30%), sugar maple (25%), elm (5%), sensitive fern (5%), and burning bush (5%). The BVW's hydric soils are a fine sandy loam and redox is evident 2' below the surface. The top 20" of soil is dark muck (10YR 1/2) and transitions to depleted soils (5YR 7/2) by 24" below. BVW 2 is shown on **Map 4** and **Photo 2** shows the existing conditions.



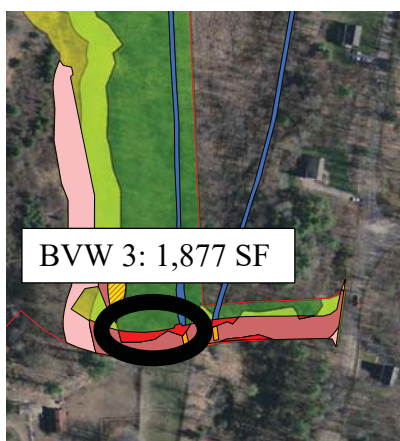
**Map 4:** BVW 2 is shown as a small, bright red area within the black circle.



**Photo 2:** Existing conditions of BVW 2.

#### BVW Impact Area 3:

BVW Impact Area 3 (1,877 SF: 1,456 SF wetland fill, 421 SF temp. disturbance) is located at the southeast section of the site between wetland flags WF B156-WF B151 and is adjacent to



**Map 5:** BVW 3 is shown as a bright red area within the black circle.



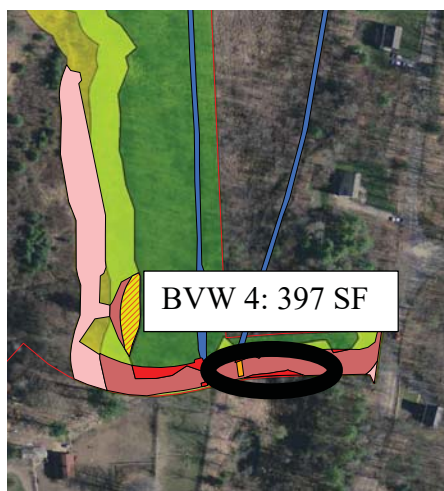
**Photo 3:** Existing conditions of BVW 3.



Stream 2, which can be accessed from the gravel road off of Ridge Street. The following list of vegetation is provided with each species' respective percent cover of the area: white pine (60%), red maple (55%), glossy buckthorn (30%), sensitive fern (25%), highbush blueberry (20%), sugar maple (5%), and poison ivy (5%). Woody debris scatters the forest floor but is not as significant as BVW Impact Area 1. Soils are similar to BVW 2 in that the top 20" of soil is dark muck (7.5YR 1/2) and transitions to depleted soils (5YR 7/2) by 24" below. BVW 3 is shown on **Map 5** and **Photo 3** shows the existing conditions.

#### BVW Impact Area 4:

BVW Impact Area 4 (397 SF: 131 SF of wetland fill, 266 SF temp. disturbance) is located at the southeast section of the site between wetland flags WF 9 and WF 14 which can be



**Map 6:** BVW 4 is shown as a bright red area within the black circle.



**Photo 4:** Existing conditions of BVW 4. The gravel path can be seen at the bottom left corner of the photo.

accessed from the gravel road off of Ridge Street. The following list of vegetation is provided with each species' respective percent cover of the area: cattails (65%), silky dogwood (30%), white pine (20 %), glossy buckthorn (20%), red maple (10%), red oak (5%), rush (5%), elderberry (5%), highbush blueberry (5%), black cherry (5%), sensitive fern (5%), and burning bush (5%). The BVW's hydric soils are inundated and consist of several inches of muck and depleted soils below (5YR 7/2). BVW 4 is shown on **Map 6** and **Photo 4** shows the existing conditions.

#### BVW Impact Area 5:

BVW Impact Area 5 (67 SF: 35 SF wetland fill, 32 SF temp. disturbance) is located at the southeast section of the site. The area is across the existing gravel path, south of wetland flag WF B158; the area itself is not flagged. The majority of the vegetation in the area consists of lawn with a few shrubs growing on a small slope up to the gravel path. BVW 5 is shown on **Map 7** and **Photo 5** shows existing conditions.



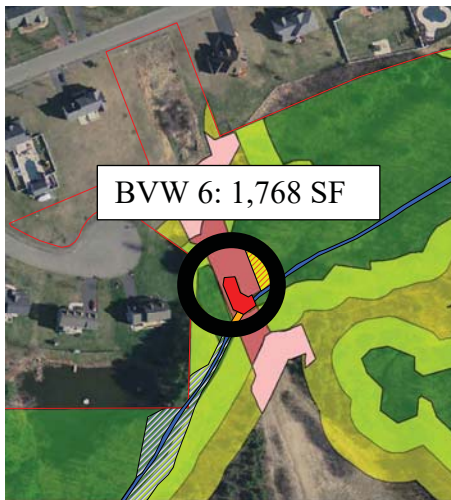
**Map 7:** BVW 5 is shown as a bright red area within the black circle.



**Photo 5:** Existing conditions of BVW 5. The photo was taken from the gravel path. Wetland flag B158 is hung directly across the gravel path.

#### BVW Impact Area 6:

BVW Impact Area 6 (1,768 SF: 1,709 SF wetland fill, 59 SF temp disturbance) is located at the northern section of the site between WF B2 and WF A39 and can be accessed from a gravel path off of Rolling Meadow Drive. The following list of vegetation is provided with each species' respective percent cover of the area: glossy buckthorn (60%), multiflora rose (50%), red



**Map 8:** BVW 6 is shown as a bright red area within the black circle.



**Photo 6:** Existing conditions of BVW 6.

maple (30%), white pine (30%), silky dogwood (30%), Arrowwood (20%), crabapple (10%), black cherry (5%), sensitive fern (5%), skunk cabbage (5%). The BVW's hydric soils consists of 6' of muck and depleted soils below (5YR 6/2). BVW 6 is shown on **Map 8** and **Photo 6** shows the existing conditions.

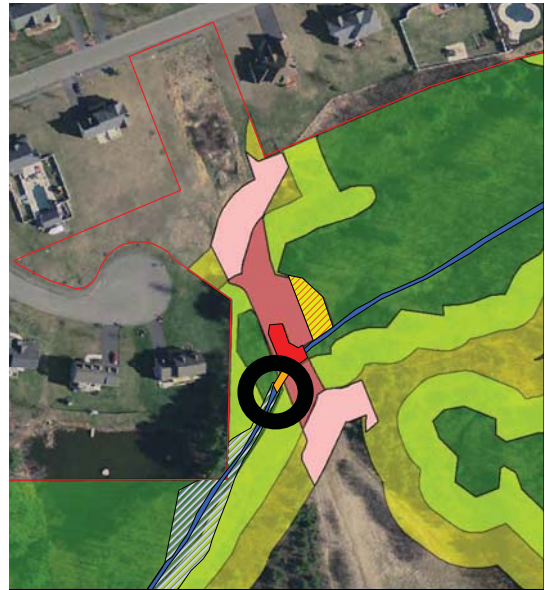


## 2.2 Bordering Land Subject to Flooding (BLSF)

Portions of the westerly side of the site fall within a FEMA Zone A Flood Plain for the Great Black Swamp. While there is no FEMA elevation established, the subdivision plans presume that the 100-year flood elevation is 142.9. The BLSF boundary lies within wooded areas in the westerly portions of the site and is proposed to be impacted in a single instance. 100 SF of BLSF will be impacted for streambed restoration purposes during the stream crossing construction. No BLSF will be filled. The extent of BLSF can be seen on **Map 9** and the BLSF impact area can be seen in **Map 10**.



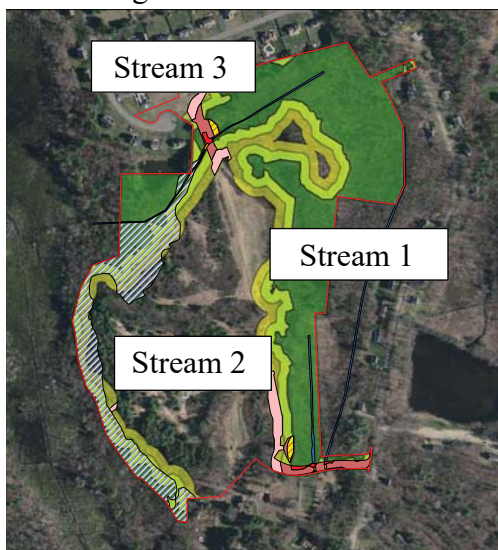
**Map 10:** BLSF is present in the western portion of the site and can be seen as a blue and white hatched area inside of the black circle.



**Map 9:** BLSF will be impacted for stream restoration purposes. Stream restoration will take place in the orange area on the map, within the black circle.

## 2.3 Bank

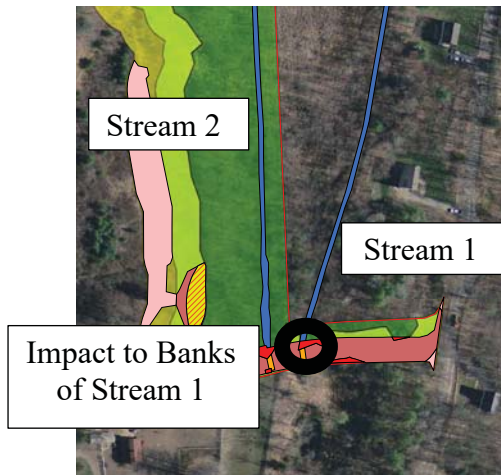
Existing conditions for the Banks of three streams were evaluated and described below. **Map 11** shows the general locations of each stream on site and their associated banks:



**Map 11:** Stream 1 is the southeastern most stream, Stream 2 is the southwestern most stream, and Stream 3 is the northern most stream.

### Banks of Stream 1:

The Banks of Stream 1 are visible from an existing gravel path, 240 feet from Ridge Street. The stream crossing location is between wetland flags WF AA1-WF AA2 and WF BB1-WF BB2. See **Map 12** for the location of the Banks of Stream 1. Banks are secured by moss, leaf



**Map 12:** Impacts to the Banks of Stream 1 are proposed within the boundaries of the BVW impact area shown in the black circle.



**Photo 7:** The existing conditions of the west Bank to Stream 1. The gravel road is not shown in this photo, yet it is just left of this point of view.

litter, and the roots of several species of plants. The following list of vegetation is provided with each species' respective percent cover of the area: white pine (60%), red maple (50%), glossy buckthorn (45%), highbush blueberry (30%), sugar maple (25%), elm (5%), sensitive fern (5%), and burning bush (5%). See **Photo 7** for existing conditions. The Bank's substrate consists of four inches of muck (10YR 2/1), which transitions to a brown A-horizon (7.5YR 3/4) between 4 and 8 inches. More than 8 inches below, the C-horizon is depleted (7.5YR 6/2) and contains 80% redoximorphic features (7.5YR 6/8). See **Photo 8** for soil conditions. Stream bed material



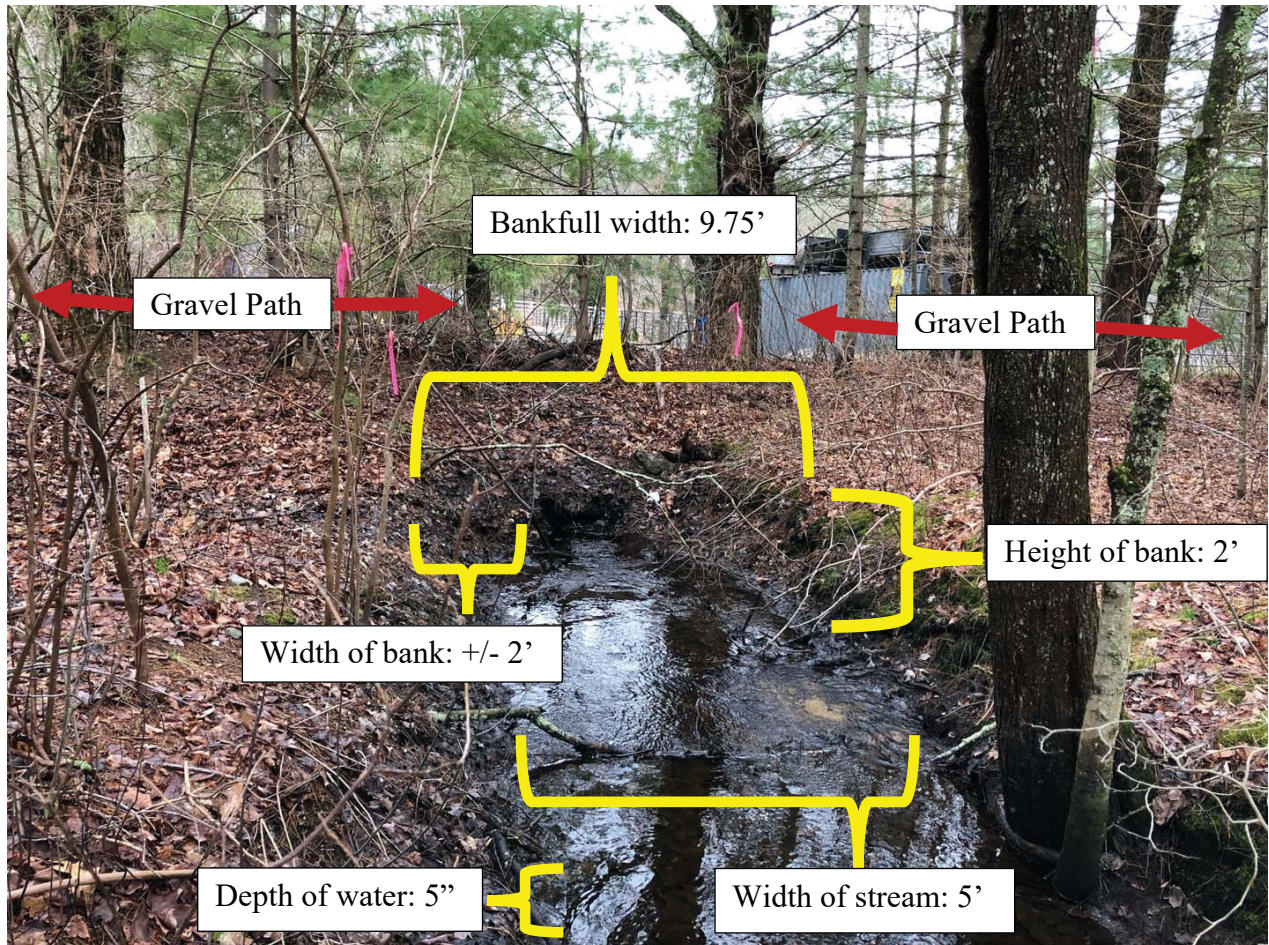
**Photo 8:** More than 8 inches below the surface of Stream 1's Banks, the soils are depleted (7.5YR 6/2) and contain 80% redoximorphic features (7.5YR 6/8).

consists of an organic layer of leaves and twigs with layers of muck and gravel beneath. Banks connect to the edge of the gravel road and the stream diverts into an underground culvert (~3' wide, ~8" tall) with no apparent exit. Bank and stream data are listed in **Table 1** for easy reference. **Photo 9** creates a clear view of how the dimensions were measured.



**Table 1: Stream 1 Dimensions**

Average (Avg.) Width of banks:	+/- 2' (variable)
Avg. height of banks:	2'
Avg. bankfull width:	9.75'
Avg. depth of water:	5" (variable...measurement taken 2/25/2020)
Avg. width of stream:	5'



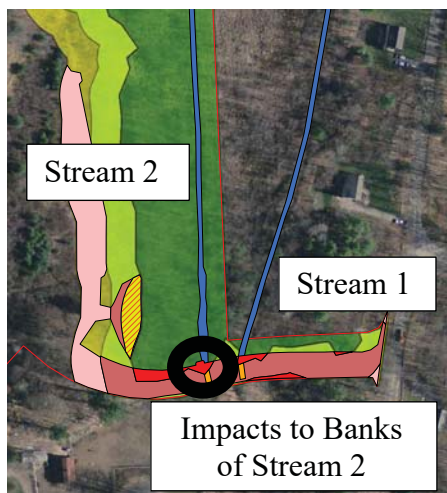
**Photo 9:** The dimensions of Stream 1 and its Banks. Brackets demarcate the general boundaries of each measurement (not drawn to scale). Stream 1 is flowing toward the gravel path and into a culvert in the center of the image.

#### Banks of Stream 2:

The Banks of Stream 2 are visible from an existing gravel road, 300 feet from Ridge Street. The stream crossing location is between wetland flags WF CC1- CC3 and WF DD1- DD2. See **Map 13** for the location of the Banks of Stream 2. Banks are secured by moss, leaf litter, and the roots of several species of plants. The following list of vegetation is provided with each species' respective percent cover of the area: white pine (60%), red maple (55%), glossy buckthorn (30%), sensitive fern (25%), highbush blueberry (20%), sugar maple (5%), and poison ivy (5%). A considerable amount of woody debris covers the banks and cross the stream (see **Photo 10** for



the Bank's existing conditions). The Bank's substrate consists of eight inches of a dark brown A-horizon (7.5YR 2.5/3), which transitions to a light brown B-horizon (7.5YR 4/6) between eight and sixteen inches. More than 16 inches below, the C-horizon is depleted (7.5YR 6/1) and contains 5% redoximorphic features (7.5YR 6/6). See **Photo 11** for existing soil conditions. Stream bed material consists of an organic layer of leaves, twigs, and small woody debris, with layers of muck and gravel beneath. Banks connect to the edge of the gravel road and the stream diverts into an underground culvert (~3' wide, ~8" tall) with no apparent exit (see **Photo 12** for a look at the entrance of the culvert). Bank and stream data are listed in **Table 2** for easy reference. See **Photo 13** creates a clear view of how the dimensions were measured.



**Map 13:** Banks of Stream 2 are located at the head of Stream 2, shown within the black circle.



**Photo 10:** The existing conditions of Stream 2 and its east Bank.



**Photo 11:** More than 16 inches below the surface of Stream 2's Banks, the C-horizon is depleted (7.5YR 6/1) and contains 5% redoximorphic features (7.5YR 6/6).

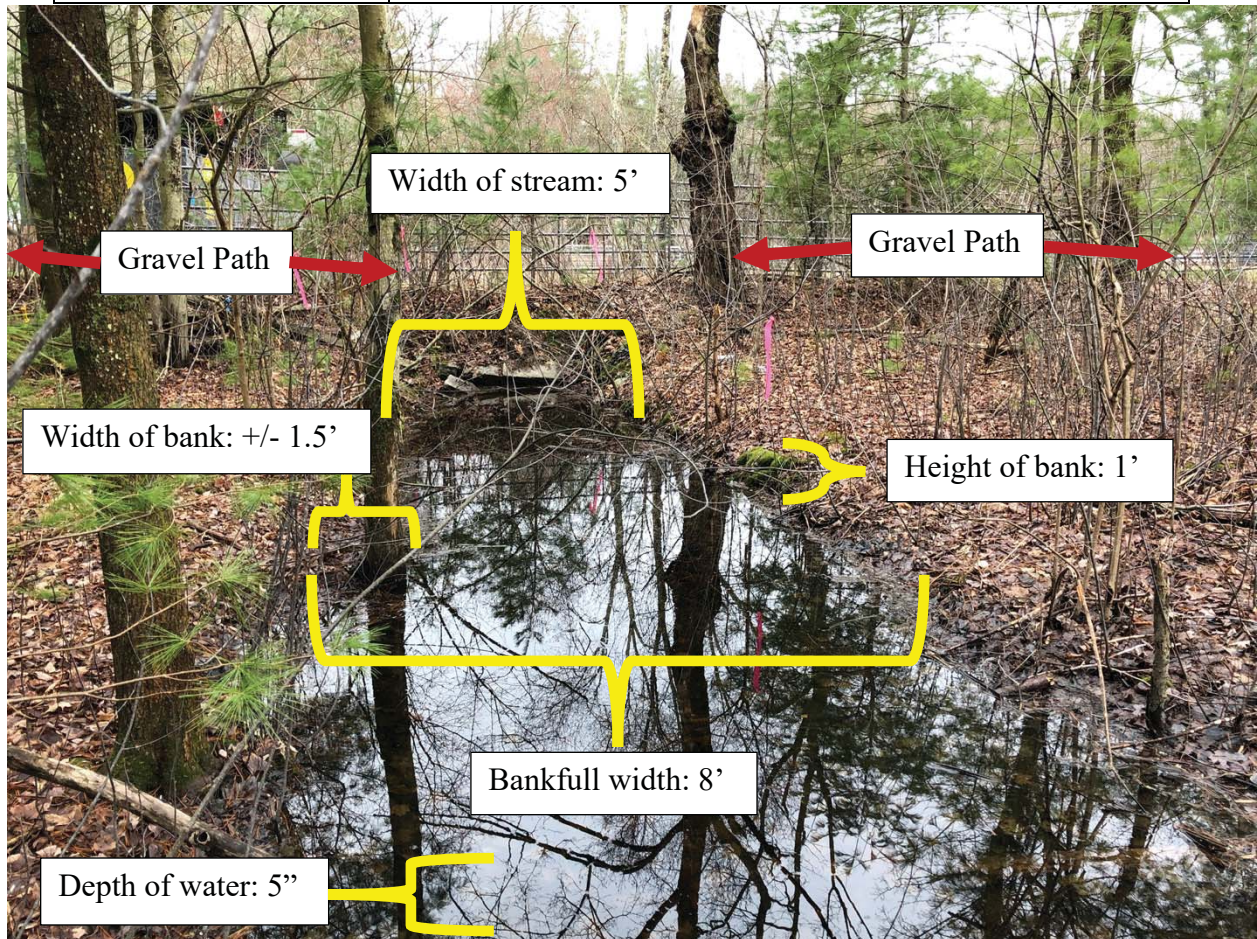


**Photo 12:** The entrance to the culvert is blocked by caved in large granite slabs and organic debris.



**Table 2: Stream 2 Dimensions**

Avg. width of banks:	+/- 1.5' (variable)
Avg. height of banks:	1'
Avg. bankfull width:	8'
Avg. depth of water:	5" (variable...measurement taken 2/25/2020)
Avg. width of stream:	5'



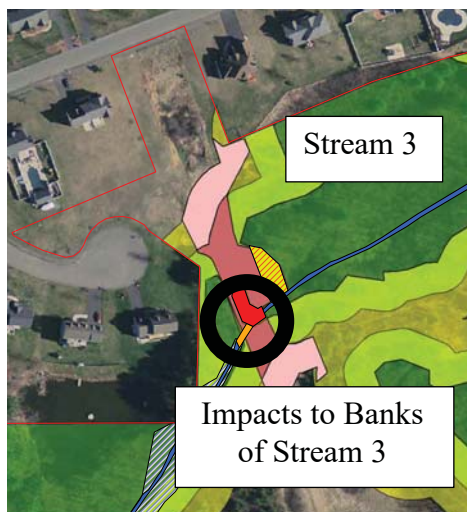
**Photo 13:** The dimensions of Stream 2 and its Banks. Brackets demarcate the general boundaries of each measurement (not drawn to scale). Stream 2 is flowing toward the gravel path and into a culvert in the center of the image.

#### Banks of Stream 3:

The Banks of Stream 3 are visible from an existing gravel road, 480 feet from Rolling Meadows Drive. The stream crossing location is between wetland flags WF H3-H1 and WF HH1-HH4. See **Map 14** for the location of the Banks of Stream 2. Banks are secured by moss, leaf litter, rocks, and the roots of several species of plants. The following list of vegetation is provided with each species' respective percent cover of the area: glossy buckthorn (60%), multiflora rose (50%), red maple (30%), white pine (30%), silky dogwood (30%), Arrowwood (20%), crabapple (10%), black cherry (5%), sensitive fern (5%), skunk cabbage (5%). This vegetation is dense and hangs over the stream, creating shady conditions (see **Photo 14** for the



Bank's existing conditions). The Bank's substrate consists of six inches of muck (10YR 2/1), which transitions to a light brown, gravelly sand (7.5YR 4/6). Stream bed material consists of



**Map 14:** Banks of Stream 2 are located at the head of Stream 2, shown within the black circle.



**Photo 14:** Dense shrub vegetation overhangs Stream 3 and its Banks.

large rocks (1' diameters) and an organic layer of leaves, twigs, and small woody debris, with layers of muck and gravel beneath. Banks connect to the edge of the gravel road and the stream diverts into an underground culvert (2' wide) which passes to the other side of the gravel road and continues downstream (see **Photo 14** and **Photo 15** for a view of the culverts). Bank and stream data are listed in **Table 3** below for easy reference. **Photo 16** creates a clear view of how the dimensions were measured.



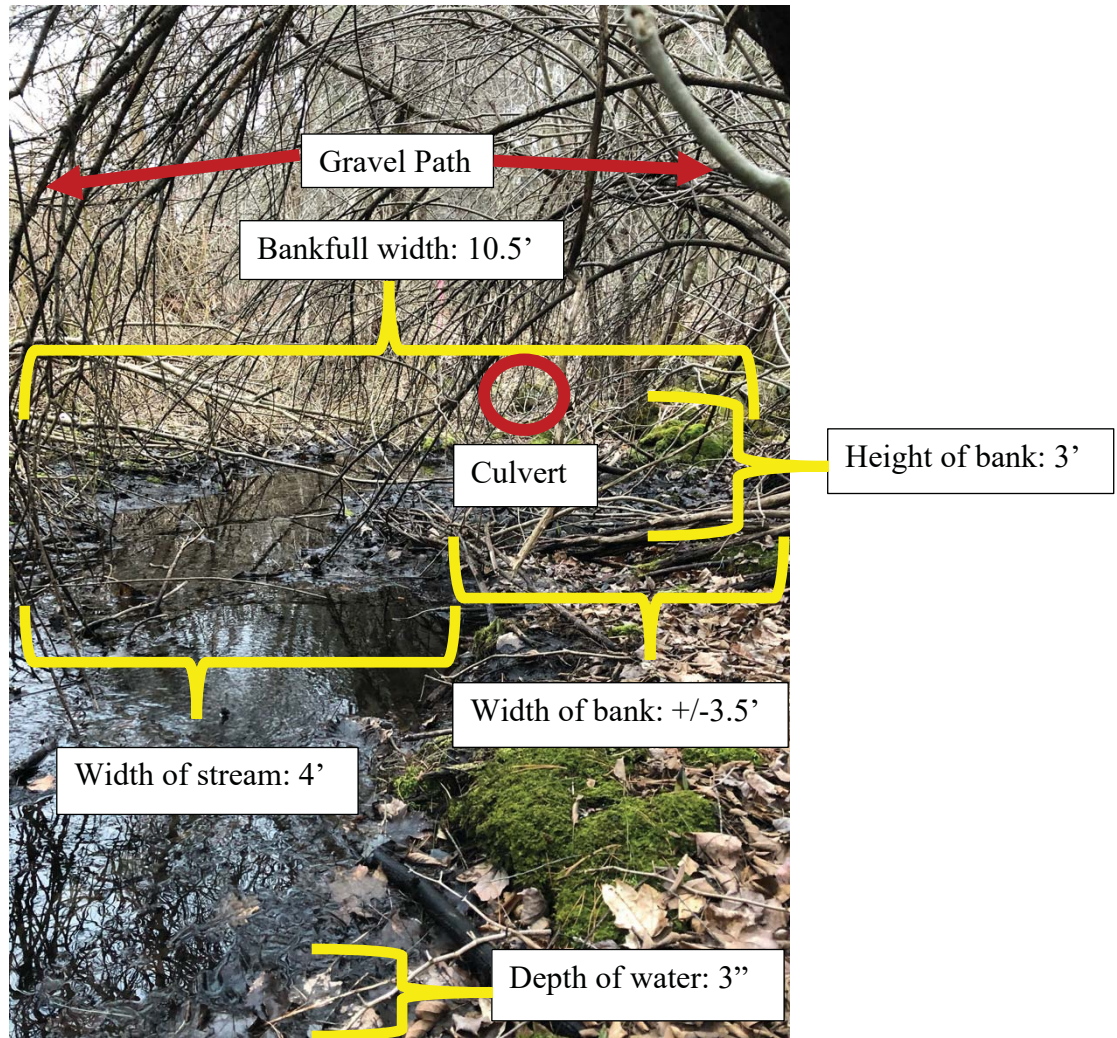
**Photo 14:** Stream 3 enters a two-foot diameter pipe culvert between flags B H1 and B H2.



**Photo 15:** Stream 3 exits a culvert at flag WF D8 and flows to the western portion of the site, eventually reaching the Great Black Swamp on the adjacent property.

**Table 3: Stream 3 Dimensions**

Avg. width of banks:	+/- 3.5' (variable)
Avg. height of banks:	3'
Avg. bankfull width:	10.5'
Avg. depth of water:	3" (variable...measurement taken 2/25/2020)
Avg. width of stream:	4'



**Photo 16:** The dimensions of Stream 3 and its Banks. Brackets demarcate the general boundaries of each measurement (not drawn to scale). Stream 3 is flowing toward the gravel path and into a culvert (seen in the background of the image in the red circle).

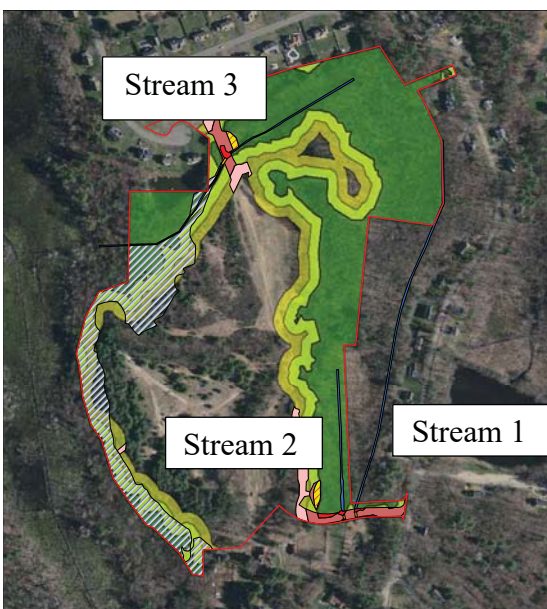


## 2.4 Riverfront Area

The streams on site were determined to have no Riverfront Area based on the regulations set forth in the MA Wetlands Protection Act, which classify the three streams on site as intermittent. Stream 2 is not shown on the USGS map and is therefore presumed to be intermittent, distinguishing it from Stream 1 and Stream 3 which are shown as perennial on the USGS map. Stream 1 and Stream 3 were first proven to be intermittent based on data collected in 2017. This was done under 310 CMR 10.58 (2)(a)1.d which states:

*“Notwithstanding 310 CMR 10.58(2)(a)1.a. through c., the issuing authority shall find that any stream is intermittent based upon a documented field observation that the stream is not flowing. A documented field observation shall be made by a competent source and shall be based upon an observation made at least once per day, over four days in any consecutive 12 month period, during a non-drought period on a stream not significantly affected by drawdown from withdrawals of water supply wells, direct withdrawals, impoundments, or other human-made flow reductions or diversions. Field observations made after December 20, 2002 shall be documented by field notes and by dated photographs or video. Field observations made prior to December 20, 2002 shall be documented by credible evidence. All field observations shall be submitted to the issuing authority with a statement signed under the penalties of perjury attesting to the authenticity and veracity of the field notes, photographs or video and other credible evidence. Department staff, conservation commissioners, and conservation commission staff are competent sources; issuing authorities may consider evidence from other sources that are determined to be competent.”*

Documented field observations showed that each stream was not flowing, qualifying each stream as intermittent. Field observations were made by competent sources. Goddard Consulting, LLC observed Streams 1, 2, and 3 not flowing on September 25<sup>th</sup> and October 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> of 2017 (see **Map 15**).



**Map 15:** Stream 1, Stream 2 and Stream 3 are labeled on the map.

These observations were made once per day, over the course of five days within a consecutive 12-month period. Legacy Engineering collected field observations as well. Their

observations provide photos and videos of Stream 1 and Stream 2 not flowing on August 5<sup>th</sup>, August 6<sup>th</sup>, and September 23<sup>rd</sup> of 2019. Legacy Engineering's observations were made once per day, over the course of 3 days within a consecutive 12-month period. This consecutive 12-month period is still active for another 3 months, until August 5<sup>th</sup>, 2020. The observations were taken during a non-drought period on streams which are not significantly affected by drawdown from withdrawals of water supply wells, direct withdrawals, impoundments, or other human-made flow reductions or diversions. The observations of each stream not flowing is provided below, in **Table 4**.

The Millis Wetlands Protection Rules and Regulation, Section 5, have a slightly revised definition of intermittent. The rule is stated below:

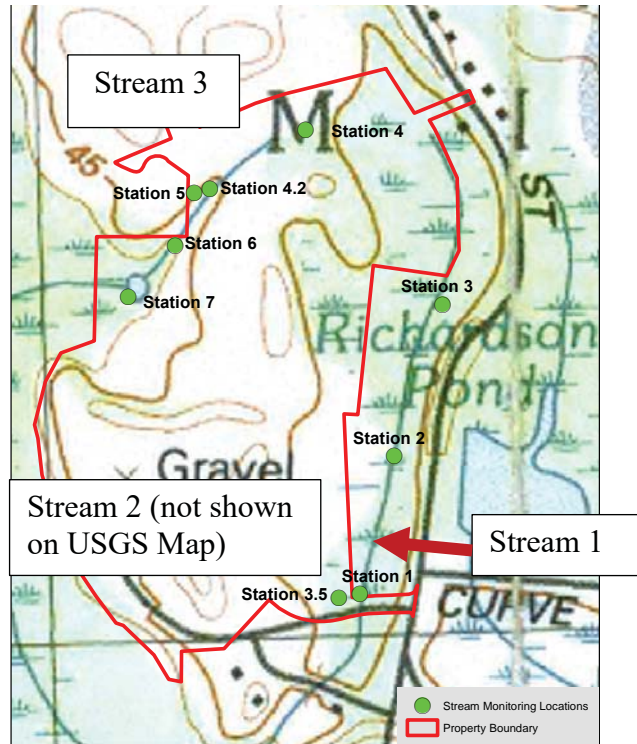
*5.21 Intermittent Stream shall mean a defined channel with a hydraulic gradient through which water flows during part of the year and which either flows out of, into, or within a wetland resource under this Bylaw. A portion may flow through a culvert or under a bridge. The Commission recognizes two types of intermittent streams:*

- *Type I – Stream segments in which continuous standing water disappears for at least five (5) but not more than thirty (30) consecutive days annually.*
- *Type II – Streams in which continuous standing water disappears for more than thirty (30) consecutive days annually.*

*For Type I intermittent stream, based on specific functions and values of the resource, the Commission may use protection guidelines adopted for the 100-foot riverfront area for a perennial stream.*

It is clear that all on-site streams are intermittent per the WPA however the requirements have not fully been met under the Millis Wetlands Protection Rules and Regulation, Section 5. When the streams were being inspected, Goddard Consulting, LLC was unaware of the bylaw language, and focused primarily on satisfying the state regulations. Substantial evidence is set forth to show that these streams are intermittent. There is evidence that each stream had continuous standing water disappear for four consecutive days and during another day just two months prior. These five days may not have been consecutive, but they still show that the streams are capable of showing intermittent characteristics. Also, there was only 0.1 inches of rainfall between the time the observation was made on October 7<sup>th</sup>, 2017 and the end of the day of October 8<sup>th</sup>, 2017 suggesting that no flow could have started (data sourced from wunderground.com). This would have been the 5<sup>th</sup> consecutive day without flow. Finally, Legacy Engineering's observations were made once per day, over the course of three consecutive days within a consecutive 12-month period. Altogether, there is overwhelming evidence that these streams have the capability of drying up for at least five consecutive days per year and they should each be classified as intermittent. Nonetheless, the Millis bylaw does not regulate performance standards related to Riverfront Area more than 100 feet from the river regardless of perennial/ intermittent classification.

**Map 16** shows the location of 9 stream monitoring stations where data was collected to determine each stream's perennial/intermittent classification. **Table 4** presents the findings from the 9 stream monitoring stations marked on **Map 16**. Note that the date is marked in the top right corner of several photographs.







**Map 16:** USGS Map with Stream Monitoring Stations.

**Table 4: Stream Monitoring Pictures**




		Days of Streams Not Flowing							
		September 25 <sup>th</sup> 2017	October 4 <sup>th</sup> 2017	October 5 <sup>th</sup> 2017	October 6 <sup>th</sup> 2017	October 7 <sup>th</sup> 2017	August 5 <sup>th</sup> 2019	August 6 <sup>th</sup> 2019	September 23 <sup>rd</sup> 2019
Stream 1	Monitoring Station 1	x	x	x	x	x	x	x	x
	Monitoring Station 2		x	x	x	x			
	Monitoring Station 3		x	x	x	x			
Stream 2	Monitoring Station 3.5						x	x	x
Stream 3	Monitoring Station 4		x	x	x	x			
	Monitoring Station 4.2		x	x	x	x			
	Monitoring Station 5	x	x	x	x	x			
	Monitoring Station 6		x	x	x	x			
	Monitoring Station 7		x	x	x	x			



Stream #	Monitoring Station #	Date	Picture
Stream 1	Monitoring Station 1	September 25, 2017	 A photograph of a forest floor with green foliage and a tree trunk. The date stamp in the top right corner reads "Sep 25, 2017 12:34:46 PM".
		October 4, 2017	 A photograph of a forest floor with green foliage and a tree trunk. The date stamp in the top right corner reads "Oct 4, 2017 9:58:48 AM".
		October 5, 2017	 A photograph of a forest floor with green foliage and a tree trunk. The date stamp in the top right corner reads "Oct 5, 2017 1:19:01 PM".



Stream 1	Monitoring Station 1 (cont.)	October 6, 2017	
		October 7, 2017	
		August 5, 2019	 See video: IMG_7235.MOV






Stream 1	Monitoring Station 1 (cont.)	August 6, 2019	 <p>See video: IMG_7242.MOV</p>
		September 23, 2019	 <p>See video: IMG_7350.MOV</p>
	Monitoring Station 2	October 4, 2017	

Stream 1	Monitoring Station 2 (cont.)	October 5, 2017	
		October 6, 2017	
		October 7, 2017	






Stream 1	Monitoring Station 3	October 4, 2017	 <p>Oct 4, 2017 10:24:51 AM Millis</p>
		October 5, 2017	 <p>Oct 5, 2017 2:25:23 PM Millis</p>
		October 6, 2017	 <p>Oct 6, 2017 3:53:55 PM Millis</p>

Stream 1	Monitoring Station 3 (cont.)	October 7, 2017	
Stream 2	Monitoring Station 3.5	August 5, 2019	 <p>See Video: IMG 7238.MOV</p>
		August 6, 2019	 <p>See Video: IMG 7245.MOV</p>







Stream 2	Monitoring Station 3.5 (cont.)	September 23, 2019	 <p>See Video: IMG_7353.MOV</p>
Stream 3	Monitoring Station 4	October 4, 2017	
		October 5, 2017	

Steam 3	Monitoring Station 4 (cont.)	October 6, 2017	
		October 7, 2017	
	Monitoring Station 4.2	October 4, 2017	






Stream 3	Monitoring Station 4.2 (cont.)	October 5, 2017	
		October 6, 2017	
		October 7, 2017	



Stream 3	Monitoring Station 5	September 25, 2017	 <p>Sept 25, 2017 11:53:46 AM Millis</p>
		October 4, 2017	 <p>Oct 4, 2017 10:55:16 AM Millis</p>
		October 5, 2017	 <p>Oct 5, 2017 3:22:44 PM Millis</p>
		October 6, 2017	 <p>Oct 6, 2017 4:13:20 PM Millis</p>




Stream 3	Monitoring Station 5 (cont.)	October 7, 2017	 <p>Oct 7, 2017 1:15:40 PM Millis</p>
	Monitoring Station 6	October 4, 2017	 <p>Oct 4, 2017 10:58:24 AM Millis</p>
		October 5, 2017	 <p>Oct 5, 2017 3:24:02 PM</p>



Stream 3	Monitoring Station 6 (cont.)	October 6, 2017	
		October 7, 2017	
	Monitoring Station 7	October 4, 2017	



Stream 3	Monitoring Station 7 (cont.)	October 5, 2017	
		October 6, 2017	
		October 7, 2017	

### 3. ORAD

An Order of Resource Area Delineation was issued on March 23, 2018 for MassDEP file # CE225-0407 (see attached ORAD at the end of the document). Only a portion of the existing conditions and resource areas on site were confirmed in this ORAD. Confirmed resource areas included BVW (A Series, B Series, C Series, D Series, and E Series), Bylaw Mean High Water boundary, Bylaw Adjacent Upland Resource Area (AURA) to BVW, and four Bylaw-protected Vernal Pools within C Series Wetland and one within B Series Wetland. The ORAD states: “the request for the Commission to confirm streams on site as intermittent was withdrawn by the applicant and therefore, Riverfront Area to mapped perennial streams exists on the site but are

not depicted on the plan-of-record.” Due to the withdrawal, Riverfront Area is not bound by the ORAD.

#### **4.0 Proposed Impacts**

The proposed project entails constructing the infrastructure for a 43-lot single-family subdivision between Ridge Street and Rolling Meadow Drive. The proposed project has sought relief in the impact to Wetland Resource Areas by creating an open space development. The open space development attempts to minimize damage to Wetland Resource Areas by consolidating construction to a centralized upland portion of the site. With the exception of roadway crossings, the vast majority of the project is proposed to take place on the upland portion of the site. Roadway crossings are proposed to impact BVW and Bank resource areas, which are jurisdictional under the Massachusetts Wetlands Protection Act and the Millis Wetlands Protection Bylaw. The proposed project has been designed to satisfy their rules and regulations to the greatest extent possible. Due to the limited access to the upland, BVW and Bank alterations are permitted as a limited project based on the qualifications detailed in the Wetland Protection Act 310 CMR 10.53(3)(e):

*“...where reasonable alternative means of access from a public way to an upland area of the same owner is unavailable. Such roadway or driveway shall be constructed in a manner which does not restrict the flow of water. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to conform to 310 CMR 10.54 through 10.58 or to otherwise minimize adverse impacts on resource areas. The issuing authority may require the applicant to utilize access over an adjacent parcel of land currently or formerly owned by the applicant, or in which the applicant has, or can obtain, an ownership interest. The applicant shall design the roadway or driveway according to the minimum length and width acceptable to the Planning Board, and shall present reasonable alternative means of access to the Board. The applicant shall provide replication of bordering vegetated wetlands and compensatory flood storage to the extent practicable.*

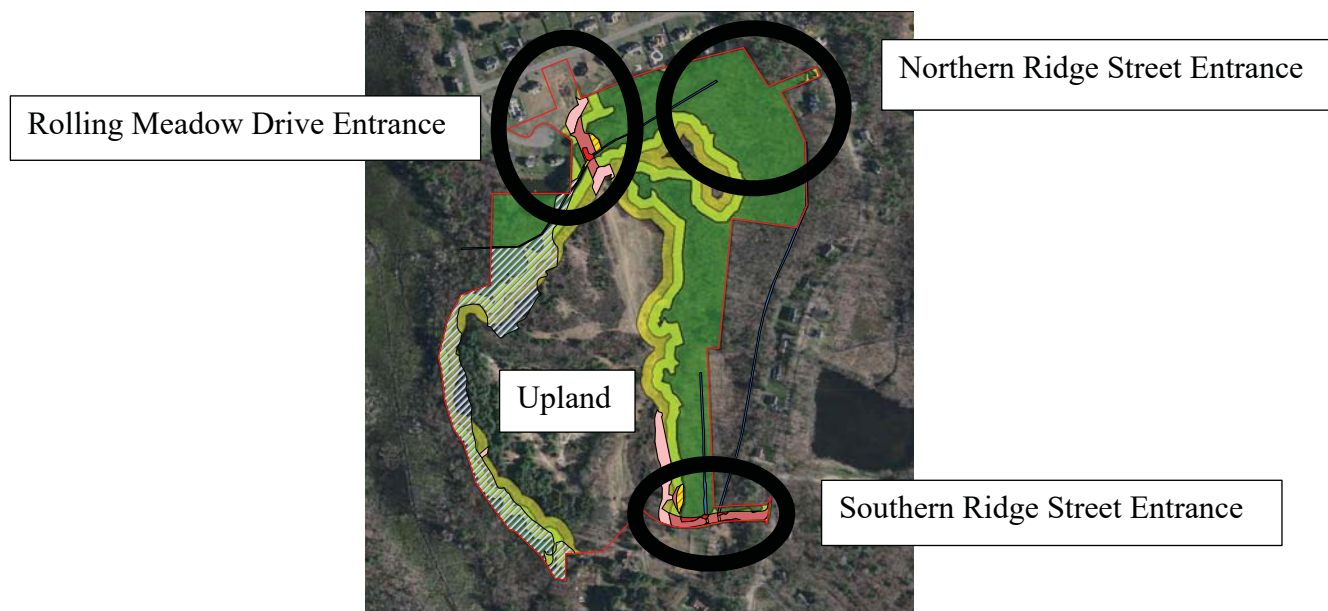
To satisfy the regulations set forth above, the following measures have been taken: alternative means of access have been evaluated, the roadway has been designed according to the minimum length and width acceptable to the Planning Board (50-foot minimum width), stream crossings that comply with the Stream Crossing Standards are proposed on revised plans dated June 5, 2020. To minimize impacts to resource areas, and a replication of BVW has been proposed as mitigation for filling the BVW. Much like the Wetlands Protection Act, the Millis Wetlands Bylaw requires that alternatives be evaluated, impacts are kept to the minimum extent possible, and that replication must occur as mitigation for the impacts to BVW. The following discussion will detail the alternative plans, minimization strategies and mitigation measures considered for the proposed BVW and Bank impacts.

#### **4.1 Proposed BVW Impacts**

Each of the previously discussed BVW impact areas (BVW 1 through 6) are proposed to be filled for the construction of road crossings. In total, 4,655 SF of BVW is proposed to be disturbed. This impact is unavoidable due to the lack of reasonable means for accessing the upland portion of the site. When alternative means of access to the upland are considered, the

alternative with the least amount of impact was chosen for the proposal. Relief was first sought when considering potential access points to the site and the upland portion of the property.

To access the site, there are three available connections from the public roadways: two on Ridge Street and one on Rolling Meadow Drive (see **Map 17**). Each entrance eventually crosses BVW or BVW Buffer Zone before reaching the upland portion of the site.



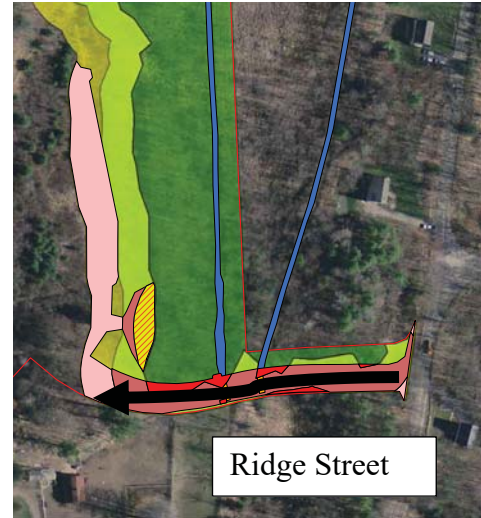
**Map 17:** The three access points to the site are circled in black.

To minimize impacts to BVW and associated BVW Buffer Zones, road construction is proposed on the same footprint as existing gravel paths. Gravel paths off of the Rolling Meadow Drive and southern Ridge Street entrances allow pedestrians and small automobiles to access the upland portion of the site. **Photo 17** and **Photo 18** show the gravel paths at the southern Ridge Street entrance and the Rolling Meadow Drive entrance, respectively. **Map 18** and **Map 19** show the southern Ridge Street entrance and the Rolling Meadow Drive entrance, respectively, with a black arrow representing the general location of each existing gravel path. The gravel paths are narrow and currently do not provide a safe means of accessing the site. In order for a larger automobile or heavy equipment to safely enter the upland portions of the site, paved roads must be constructed through BVW. The minimum allowed width of a road approved by the Millis Planning Board is 50 feet, making BVW impacts unavoidable at each available entrance. The best alternative then becomes the option which proposes the least amount of impact to the BVW. Using existing gravel paths as the proposed roadways is the most reasonable alternative. This will reduce impacts to BVW significantly more than if a new roadway were constructed at the alternative northern Ridge Street entrance.





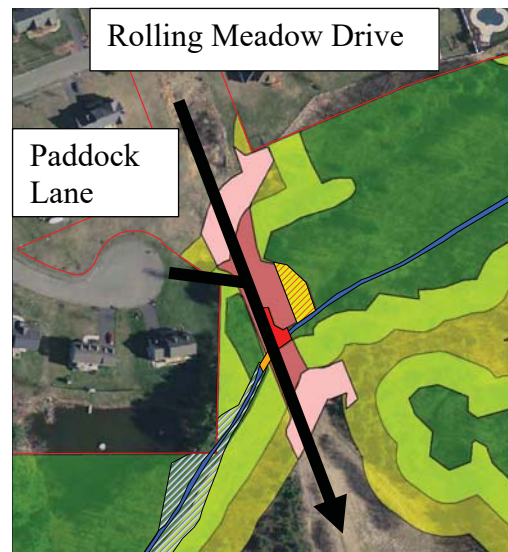
**Photo 17:** The existing gravel path that runs from the southern Ridge Street entrance to the upland portion of the site. BVW 3 can be seen on the right side of the path. A fenced-in field with horses can be seen to the left.



**Map 18:** The southern Ridge Street entrance has an existing gravel path that crosses BVW Buffer Zone to reach the uplands. The black arrow represents the location of the path and the direction in which Photo 17 was taken.



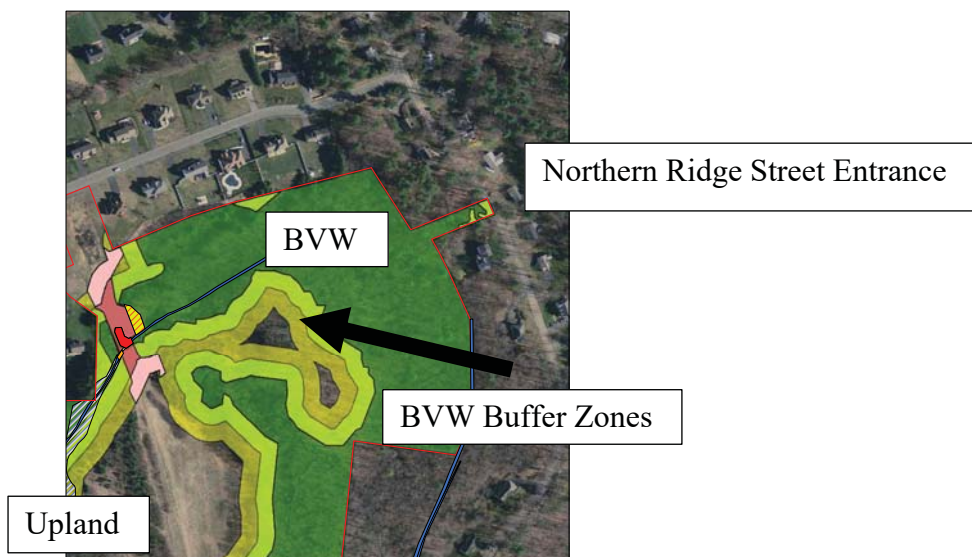
**Photo 18:** The Paddock Lane and Rolling Meadow Drive entrances have an existing gravel path that crosses BVW to reach the uplands.



**Map 19:** The Paddock Lane and Rolling Meadow Drive entrances have an existing gravel path that crosses BVW to reach the uplands. The black arrow represents the location of the path and the direction in which Photo 18 was taken.



The northeast access point on Ridge Street would not be an ideal entry to the uplands due to the extensive amount of BVW that would need to be crossed. Using this alternative access area would also be a financial burden to the project due to the mitigation measures that would need to occur as a result. **Map 20** shows the northern Ridge Street entrance and the expanse of undisturbed BVW between the northern Ridge Street entrance and the large, open upland area.



**Map 20:** The northern Ridge Street entrance. Notice the expanse of undisturbed BVW between Ridge Street and the large, open upland area.

Although the BVW crossings at Rolling Meadow Drive and southern Ridge Street are not ideal, they provide the least amount of impact to BVW as any other alternative entrance (that being the northern Ridge Street entrance). Using the exiting gravel paths as the footprint of the new roads will avoid impacts to previously undisturbed BVW and will minimize the inevitable impacts to each BVW that surrounds the gravel paths.

Much like the rules regarding impacts to BVW, there are rules set forth in the Millis Wetland Bylaw which protect the Inner and Outer 50-foot of the Buffer Zone's of the BVW. Roadway structures are proposed within the inner 50-foot buffer zone which Section 1.4.1 of the local regulations prohibit as stated below:

*No structures shall be placed within the inner 50-foot of the Buffer Zone(s) from the edge of a wetland resource area. A strip of continuous, undisturbed vegetative cover shall be maintained.*

The project requests a waiver from the Millis Conservation Commission (which is allowed under section 1.6 of the Millis Wetlands Protection Rules and Regulations) for the allowance of a structure to be placed within the inner 50-foot of the Buffer Zone. As previously explained, the proposed project avoids alteration to BVW to the fullest extent, yet due to the proposed road crossings, impacts to the inner and outer 50-foot Buffer Zones are unavoidable. Such actions will be in the public interest because the proposed road crossings will update inferior road crossing infrastructure. At the moment, the gravel roads cross BVW, Buffer Zone, and three streams with

a lack of stormwater control and three existing culverts that do not satisfy stream crossing standards. The impacts to the inner 50-foot of Buffer Zone will also be consistent with the intent and purpose of the Bylaw. The purpose of the Bylaw is to protect the interests and values associated with Wetland and Adjacent Upland Resource Areas. It would be in the Commissions best interest to permit a waiver for the allowance of Adjacent Upland Resource Area impact with the intent to spare much greater impacts to the Wetland Resource Areas.

Roadway structures are also proposed within the outer 50-foot of the Buffer Zone. To comply with local regulations on impacts to the outer 50-foot of the Buffer Zone, the proposed project will obey the mitigation requirements under subsection 1.4.1 (2) of the Millis Wetland Rules and Regulations:

*Adjacent Upland Resource Area Performance Standards*

*If a project proposes alteration within this buffer, the Applicant must present a vigorous Alternatives Analysis showing that the proposed project avoids alteration to the fullest extent and has minimized impacts. Any permanent structure so placed within this outer 50-foot portion of the Buffer Zone(s) would cover an area no greater than 30 percent of the calculated area of this outer 50-foot of the Buffer Zone(s) that is within the subject individual property. Mitigation for any and all Buffer Zone Alteration is required.*

Buffer Zones will be converted to roadways to minimize impact to BVW. Since the existing gravel paths run between BVW boundaries, passing through the inner and outer BVW Buffer Zones are inevitable. The Buffer Zone impacts are acceptable under the Millis local regulations because only about 10% of the Buffer Zone on site will be impacted, where the Millis regulations allow up to 30% alteration. Buffer Zone and BVW impacts have been rendered unavoidable and impacts have been minimized, so the final requirement left to follow is providing mitigation for the BVW and Buffer Zone impacts.

### **BVW Mitigation**

Mitigation measures for the BVW and Buffer Zone impacts will comply with the Wetlands Protection Act and the Millis Wetland Bylaw, so the proposed BVW impacts will satisfy the general performance standards set forth for 310 CMR 10.55(4)(b):

*(b) Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:*

- 1. the surface of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area");*
- 2. the ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;*
- 3. The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;*
- 4. the replacement area shall have an unrestricted hydraulic connection to the same water body or waterway associated with the lost area;*



5. the replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;

6. at least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods; and

7. the replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00. In the exercise of this discretion, the issuing authority shall consider the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the extent to which adverse impacts can be avoided, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40.

(c) Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of Bordering Vegetated Wetland when;

1. said portion has a surface area less than 500 square feet;
2. said portion extends in a distinct linear configuration ("finger-like") into adjacent uplands; and
3. in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.

(d) Notwithstanding the provisions of 310 CMR 10.55(4)(a), (b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Energy and Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00: Areas of Critical Environmental Concern. 310 CMR 10.55(4)(e):

1. supersedes the provisions of 310 CMR 10.55(4)(b) and (c);
2. shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;
3. shall not apply to work proposed under 310 CMR 10.53(3)(l); and

shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.

The project will also trigger regulation under Section 4.1 and 4.2 of the Millis Wetland Rules and Regulations:

#### **4.1 WETLAND REPLACEMENT**

Wetland that is proposed to be altered will in all instances require, at a minimum, a replacement equal to 1.5 times the wetland to be altered, preferably the replacement shall be hydrologically connected to the Wetland proposed to be altered. Replacement shall mean to put back in proper place, or to provide an equivalent quality of function and value to the satisfaction of the Commission.

*4.2 REQUIREMENTS Projects involving Wetland Filling and/or permanent Alterations shall meet the requirements of 310 CMR, 10.60 (3) and 10.55 (4) of the Act and the following requirements of these rules and regulations:*

*(1) The proposed Replacement Area design must be submitted to the Commission for approval as part of the submittal of the project Notice of Intent. Applicants are advised to appear before the Commission for preliminary discussion, comments, and review prior to submittal of the Replacement Plan with the Notice of Intent.*

*(2) The Replacement Area must be shown to sufficiently duplicate the functions of the Wetland that is proposed to be altered.*

*(3) The Replacement Area shall be constructed, to the fullest extent possible, immediately after Alteration of the existing Wetland and during the same growing season.*

*(4) The proposed Replacement Area must be clearly flagged for Commission site inspection before the Notice of Intent filing shall be considered complete, and said flagging shall be numerically coded and correspondingly shown on the Plans, according to Section 2.3 (1) (b).*

*(5) The Notice of Intent submittal for a Replacement Area shall include a detailed plan of the proposed replacement showing:*

*(a) Cross-section with indication of groundwater level, soil profile and thickness of organic soil in the existing and proposed Wetlands.*

*(b) Details of plant species, including species found in the area to be altered. Indicate the number, types, and locations of species to be introduced into the Replacement Area. 17 of 23 11/27/2017 Millis Wetlands Rules & Regulations*

*(c) Detail of stabilization plans for banks of the Replacement Area.*

*(d) Wildlife Habitat diversity plan*

*(6) Construction of the Replacement Area shall, in general, follow all requirements as set forth in Section 3, Construction Standards and Restrictions of these Rules and Regulations.*

*(7) If, after three growing seasons, the Commission determines that the Replacement Area has not satisfactorily developed into a Wetland, the Applicant or Owner may be required to submit new Plans to successfully replace said Wetland. No Certificate of Compliance shall be issued until the Commission has determined that a satisfactory Replacement Area has been completed at the end of a three-year period.*

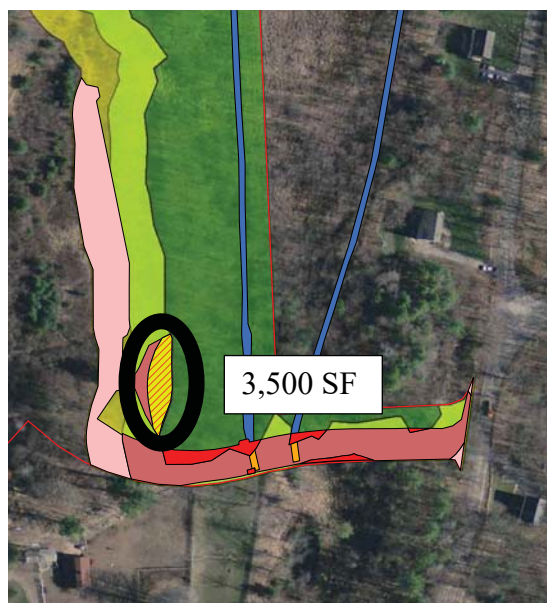
To mitigate for the impacts done to the BVW and Buffer Zones, the WPA and Bylaw call for the construction of wetland replacement areas. To replace the BVW that will be filled, the replacement area will replicate the impacted BVW to the greatest extent plausible. The proposed replication areas are placed in the most reasonable places on site to allow the replication area to fulfill the same values that will be lost by filling in the existing BVW. When determining the details of the replication areas, the WPA and Bylaw lay out several requirements that must be met.

To comply with the rules set forth in the WPA and the Bylaw, the surface area of the replication area will be more than 1.5 times greater to that of the area that will be lost. A total of 6,210 SF will be converted to BVW to mitigate for the filling of 3,669 SF of BVW. Two separate wetland replication areas will be created to meet the criteria; Replication Area 1 is located by the southern Ridge street entrance (see **Map 21**) and Replication Area 2 is located by the Rolling Meadow Drive entrance (See **Map 22**). Creating BVW more than 1.5 times the size



of the lost ones will provide an equivalent quality of function and value as the lost areas. These functions and values include protection of public and private water supply, protection of ground water supply, surface water protection, flood control, erosion and sedimentation control, storm damage prevention, prevention of pollution, and protection of wildlife habitat.

To satisfy the replication area criteria set forth under the WPA, the proposed replication areas are hydrologically connected to the wetlands that the lost ones were connected to (see **Map 21** and **Map 22**). Replication Area 1 is dominated by large specimens of sugar maple and Norway maple. The understory is dominated by glossy buckthorn, white pine, crabapple and Norway maple saplings. Ground cover consists of cinnamon fern and moss. Oriental bittersweet is present but insignificant in size and percent cover. Surface elevations range from 144 to 146. Soil conditions in this area show a Munsell color of 7.5YR 5/3 at depths deeper than 1 foot with 15% redox forming around 16 inches deep (7.5YR 5/8). These hydric soil conditions are promising signs that Replication Area 1 will be a success. **Photo 19** shows the existing conditions of Replication Area 1.



**Map 21:** Wetland Replication Area 1 is located by the southern Ridge Street Entrance. It can be seen in the black circle as a yellow and red hatched area.



**Map 22:** Wetland Replication Area 2 is located by the Rolling Meadow Drive entrance. It can be seen in the black circle as a yellow and red hatched area.



**Photo 19:** The existing conditions of Replication Area 1.



**Photo 20:** The existing conditions of Replication Area 2.

Replication Area 2 is dominated by large specimens of white pine and red maple. The understory is dominated by diseased glossy buckthorn and red maple saplings. Ground cover is sparse but contains cinnamon fern and moss. Grape vines are present on the white pine trees. Surface elevations range from 146 to 150. Soil conditions in this area show a Munsell color of 10YR 6/4 at depths deeper than 2 feet with redox forming around 28 inches deep. **Photo 20** shows the existing conditions of Replication Area 2.

The Wetland Replication General Installation Procedure will complete the description of compliance with the criteria detailed in the WPA and Bylaw. The Wetland Replication General Installation Procedure will commence under the following instructions:

**Supervision:** All work within the replication areas shall be supervised by a qualified wetland scientist with a minimum of five years' experience. Wetland scientist shall submit qualification for approval by the Conservation Commission prior to the commencement of work that requires supervision. The supervisor shall submit monitoring reports to the Conservation Commission as described below. Reports shall contain details of all work performed and photographs of completed conditions.

**Timing:** Work shall take place ideally when the wetland impact area is not saturated. If necessary, a dewatering plan shall be approved by the Conservation Commission. The construction and installation of the replication area should be accomplished during the spring or fall growing seasons (between April 16 and May 31 or between September 16 and October 30). Planting during these periods is highly recommended. The replication area grading is advised not to commence unless the contractor can guarantee completion of the work within the replication area within the same season.

**Step 1: Stake Limits of Work, Confirm Wetland Flags in Place & Install ECB – At Replication Area**

Stake out limits of work and confirm wetland flags are in place for the replication area. Erosion control barriers shall then be installed in the form of staked siltation fence and mulch sock (or similar invasive-free barrier) placed at the limit of work for the replication area. These will remain in place and be maintained until the areas are completely stabilized and then may be removed after approval of the Conservation Commission. Wetland scientist shall have authority to require additional erosion control measures if deemed necessary.



#### Step 2a: Identify Shrubs, Woody Debris, and Boulders to be re-used in Replication Area

The wetland scientist shall identify and flag any native wetland shrubs within the replication areas and the BVW impact areas that may be dug up and stockpiled for use as additional plantings in the replication area. A few plant species that will likely be flagged include, but are not limited to: highbush blueberry, silky dogwood, red maple, and cattail. Any flagged specimens shall be removed and stockpiled in a designated area outside the replication area. Any large woody debris (rotting logs and tree stumps), moss covered boulders/rocks, ferns (sensitive fern and cinnamon fern), and other ground cover shall also be identified and flagged for stockpiling and subsequent addition to the replication area. Wetland trees that lie or stand along the edge of the replication area may be preserved at the discretion of the wetland scientist.

#### Step 2b: Remove Trees and Vegetation

Once flagged trees, shrubs and woody debris specimens have all been removed and stockpiled, clear and remove all remaining vegetation within the replication area and the BVW impact areas in preparation for excavation and grading.

#### Step 3: Excavation of Wetland Soils at BVW impact areas

Prior to any soil excavation, a storage area for soil and leaf litter shall be prepared; soil shall not be stored in buffer zone. Topsoil, leaf litter, and subsoil shall be stockpiled separately. Wetland soils from the BVW impact areas will be excavated and transported to the replication areas.

#### Step 4: Excavation of Replication Area

An excavator or backhoe shall remove existing soils up to the edge of the proposed replication area boundary, to a depth at which redoximorphic features become visible in the C-horizon at the soil surface and at least one foot below proposed final grade, all of which shall be supervised and directed by the wetland scientist. Adjacent wetland elevations by Wetland Replication Area 1 range from 144 to 146. Final grading in Wetland Replication Area 1 will range from 142 feet at the deepest desired depth and will elevate to 145 feet further upgradient. Redoximorphic soils characteristics were discovered 16 inches below elevation 146 so it expected that these features will be revealed as elevations are graded down to 145. Adjacent wetland elevations by Wetland Replication Area 2 range from 145 to 150. Final grading in Wetland Replication Area 2 will range from 145 feet at the deepest desired depth and will elevate to 149 feet further upgradient. Topsoil and subsoil shall be removed from the area for re-use elsewhere in the project site or removed from the site. Subsoil of the C-horizon shall be loosened prior to Step 5 to ensure soils aren't compacted prior to topsoil placement.

#### Step 5: Final Grading of Replication Area

Upon removal of existing soils down to the proper depth (as determined by the wetland scientist), the organic soil from the BVW impact areas will be placed within the replication area. If soils from the impact areas are not sufficient, supplemental soils shall be imported, sourced from composted organic materials, and shall consist of a 50:50 mix of loam and organic material with an organic content between 12 and 20%. Topsoil shall be placed within the replication area to a depth 6-12" and even with the surrounding proposed elevation on design plan, to be determined by the supervising wetland scientist. Final grade shall be confirmed to be proper by the wetland scientist prior to plantings. Placement of soil shall be such that no equipment drives over or compacts placed soils. Final grading will result in micro relief of pits and mounds. Topography will create areas that pool and flood during heavy rain events and also see water near the surface during the wet season.

#### Step 6: Place Woody Debris and Boulders

Woody debris and moss-covered boulders shall be randomly placed throughout the replication area to provide cover for wildlife.

#### Step 7: Planting

Selected species, especially grasses and sedges, may be transplanted from the altered BVW's into the replication area provided that the time of year and duration of plants' time out of soil is appropriate for survival of transplants. Precise citing of plants may be determined by the wetland scientist in the field prior to installation. All plantings (reference the planting list below) shall be distributed randomly throughout the area; trees spaced at 10-15' on center; shrubs spaced at 6-12' on center and herbaceous species 3' or less on center. Shrubs shall be planted in clumps of 4 of same species. As a rule, plants of the same species will be placed in groupings that more closely mimic natural conditions. Trees planted on mounds and shrubs and herbaceous cover in depressions. Stockpiled shrubs will be placed first. All other plantings will be removed from burlap sacks, wire cages and plastic containers prior to planting. Each plant will have its roots loosened prior to planting to encourage root growth away from the planting bulb. Leaf litter shall be spread throughout area if available. Wetland seed mix shall be scattered evenly by hand throughout the replication area. Once all work is complete an erosion control barrier will be installed to enclose the replication area on the access side of the replication area. See the attached planting plan, *Wetland Replication Area 1* and *Wetland Replication Area 2*.

#### Step 8: As-built

Interim as-built plans, complete with one-foot contours, spot elevations, surface area, and cross sections of the replication area shall be prepared by a Registered Professional Land Surveyor of the Commonwealth and submitted to the Commission within 30 days of completion of final grading.

#### Step 9: Erosion Controls Removal

Once replication area is stable a request shall be submitted to the Conservation Commission to remove the erosion controls around wetland replication area. Upon approval of stabilization, erosion controls shall be removed promptly, and any significant disturbance shall be seeded with a wetland seed mix as specified in section C.

#### Step 10: Replication Monitoring

- a. Seasonal monitoring reports shall be prepared for the replication area by a qualified wetland scientist for a period of 3 additional years after installation or every year until a COC is issued by the Millis Conservation Commission. This monitoring program will consist of early summer and early fall inspections and will include photographs and details about the vitality of the replication area. Monitoring reports shall be submitted to the Commission by November 15th of each year. Monitoring reports shall describe, using narratives, plans, and color photographs, the physical characteristics of the replication area with respect to stability, soil characteristics (i.e. horizons, depths, texture, percent gravel and rock, organic matter, Munsell hue, value and chroma, consistence and evidence of hydrologic influence), survival of vegetation and plant mortality, aerial extent and distribution, species diversity and vertical stratification (i.e. herb, shrub and tree layers). Invasive species will be documented if present, monitored and removed.
- b. At least 75% of the surface area of the replication area shall be re-established with indigenous plant species within three growing seasons. If the replication area does not meet the 75% re-vegetation requirement by the end of the second growing season after installation, the Applicant shall submit a remediation plan to the Commission for



approval that will achieve, under the supervision of a Wetland Specialist, replication goals. This plan must include an analysis of why the areas have not successfully re-vegetated and how the Applicant intends to resolve the problem.

**PLANTING LISTS (see attached *Wetland Replication Area 1* and *2* for planting maps):**  
**Proposed Plantings for Replication Area 1 (3,500 s.f.)**

Common Name	Scientific Name	Number	Size
<b>Trees (N=20)*</b>			
Red Maple (FAC)	<i>Acer rubrum</i>	7	4-5'
Swamp White Oak (FACW)	<i>Quercus bicolor</i>	7	4-5'
Hornbeam (FAC)	<i>Carpinus caroliniana</i>	6	4-5'
<b>Shrubs (N=45)*</b>			
Sweet Pepperbush (FAC)	<i>Clethra alnifolia</i>	12	3 gal. pot
Highbush Blueberry (FACW)	<i>Vaccinium corymbosum</i>	11	3 gal. pot
Winterberry (FACW)**	<i>Ilex verticillata</i>	11	3 gal. pot
Silky Dogwood (FACW)	<i>Cornus amomum</i>	11	3 gal. pot
<b>Ground Cover (N=50)*</b>			
Cinnamon Fern (FACW)	<i>Osmundastrum cinnamomea</i>	50	1 gal. pot
<b>Seed Mix</b>			
New England Wetland Plants WETMIX or equivalent*	Replication area	1	2 lbs
New England Wetland Plants CONSERVATION SEEDMIX or equivalent*	Disturbed areas around replication area and access.	1	2 lbs

**Proposed Plantings for Replication Area 2 (2,710 s.f.)**

Common Name	Scientific Name	Number	Size
<b>Trees (n= 15)*</b>			
Red Maple (FAC)	<i>Acer rubrum</i>	5	4-5'
Swamp White Oak (FACW)	<i>Quercus bicolor</i>	5	4-5'
Hornbeam (FAC)	<i>Carpinus caroliniana</i>	5	4-5'
<b>Shrubs (n=35)*</b>			
Sweet Pepperbush (FAC)	<i>Clethra alnifolia</i>	9	3 gal. pot
Highbush Blueberry (FACW)	<i>Vaccinium corymbosum</i>	9	3 gal. pot
Winterberry (FACW)**	<i>Ilex verticillata</i>	9	3 gal. pot
Silky Dogwood (FACW)	<i>Cornus amomum</i>	8	3 gal. pot
<b>Ground Cover (n=35)*</b>			
Cinnamon Fern (FACW)	<i>Osmundastrum cinnamomea</i>	35	1 gal. pot
<b>Seed Mix</b>			
New England Wetland Plants WETMIX or equivalent*	Replication area	1	2 lbs
New England Wetland Plants CONSERVATION SEEDMIX or equivalent*	Disturbed areas around replication area and access.	1	2 lbs

\*Planting species and seedmixes may be substituted with Conservation Commission approval with similar native species with the same wetland indicator status if certain species are unavailable.

\*\*Winterberry shall be planted at a ratio of at least 1 male to 5 females and shall not exceed a 1:1 male to female ratio.

#### 4.2 Proposed BLSF Impacts

Portions of the westerly side of the site fall within a FEMA Zone A flood plain for the Great Black Swamp. There is only one instance where BLSF impacts will occur. At the stream crossing at Stream 3, a pipe culvert will be removed from an existing gravel road. Portions of the existing culvert lie outside of the proposed box culvert footprint. Thus, about 30 LF of new bank will be replicated in the previously degraded cart path footprint which lies in BLSF. This area will be restored to natural conditions including flow and substrate material. Impacts are negligible in square footage (+/- 100 SF) and will not require volumetric additions. The overall extent of BLSF can be seen on **Map 23** and the BLSF impact area can be seen in **Map 24**. No BLSF area will be lost so there is no need to mitigate for the impacts.



**Map 23:** BLSF is present in the western portion of the site and can be seen as the blue and white hatched area inside of the black circle.



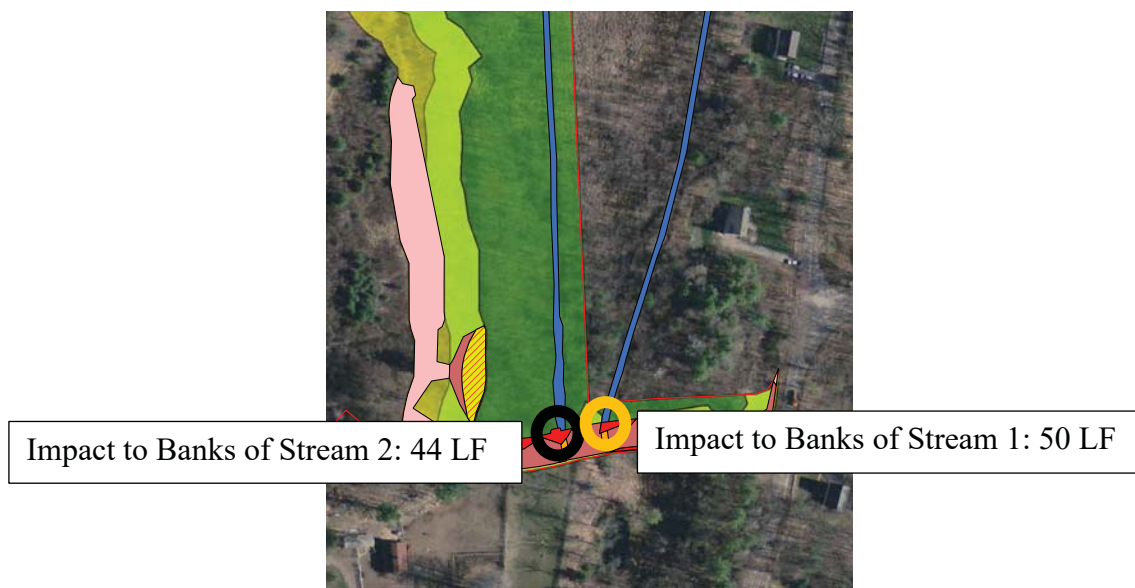
**Map 24:** The BLSF impact will take place in the Stream 3 restoration area, shown as the orange area within the black circle.

#### 4.3 Proposed Bank Impacts

Each of the previously discussed Banks (Banks of Stream 1, 2, and 3) are proposed to be impacted for the construction of road crossings. New site plans were prepared by Legacy Engineering, dated June 5, 2020, and propose box culverts at each of the three stream crossings. This impact is unavoidable due to the lack of reasonable means for accessing the upland portion of the site. When alternative means of access to the upland are considered, the alternative with the least overall amount of impact was chosen for the proposal, which were the Rolling Meadow Drive and southern Ridge Street entrances. By constructing the roadways on the existing footprint of the gravel paths, three streams must be crossed. In doing so, the Banks on each side of each stream will be impacted.



In total, 125 LF of Bank is proposed to be permanently lost: 50 LF of Stream 1, 44 LF of Stream 2, and 31 LF of Stream 3. At Streams 1 and 2, the existing culvert openings are ~3 feet wide and ~8" tall and are covered with debris, restricting flow. The box culverts will replace the existing culverts and will be sized according to the criteria in the stream crossing standards. **Map 25** shows the location of these Bank impacts and **Photo 21** and **Photo 22** show the existing conditions of the Banks. At Stream 3, the existing culvert is 24" in diameter and has restricted flow due to numerous rocks placed at the upstream opening. Similarly, the box culvert will replace the existing pipe culvert and will be sized according to the criteria in the crossing standards. Portions of the existing culvert lie outside of the proposed box culvert footprint. Thus, about 30 SF of new bank will be replicated in the previously degraded cart path footprint. **Map 26** shows the location of these Bank impacts and **Photo 23, 24, and 25** show the existing conditions of the Banks and culverts.



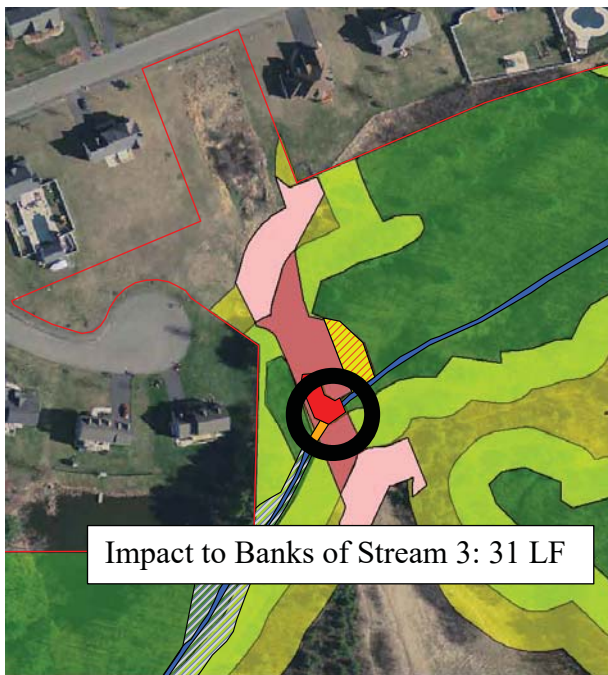
**Map 25:** Bank impacts will take place where Stream 1 and Stream 2 enter the existing culverts under the gravel path. The impact area for the Banks of Stream 1 are seen within the orange circle. The impact area for the Banks of Stream 2 can be seen in the black circle.



**Photo 21:** The Banks of Stream 1 are seen here merging with the gravel path which the stream flows under.



**Photo 22:** The banks of Stream 2 can be seen merging with the gravel path which the stream flows under.



**Map 26:** Bank impacts will take place where Stream 3 enters a culvert under the gravel path. Bank impacts will be consolidated to the area in the black circle.



**Photo 23:** The Banks of Stream 3 can be seen merging with the gravel which the stream flows under. The dense overhanging brush makes the Banks difficult to maneuver and capture in a photo.





**Photo 24:** The existing conditions of the entrance to the culvert.



**Photo 25:** The existing conditions of the exit side of the culvert.

Any proposed work on a Bank is regulated under 310 CMR 10.54(4)(a)&(c):

*(a) Where the presumption set forth in 310 CMR 10.54(3) is not overcome, any proposed work on a Bank shall not impair the following:*

1. *the physical stability of the Bank;*
2. *the water carrying capacity of the existing channel within the Bank;*
3. *ground water and surface water quality;*
4. *the capacity of the Bank to provide breeding habitat, escape cover and food for fisheries;*
5. *the capacity of the Bank to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 50 feet (whichever is less) of the length of the bank found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. In the case of a bank of a river or an intermittent stream, the impact shall be measured on each side of the stream or river. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.*
6. *Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.54(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards by consisting of a span or embedded culvert in which, at a minimum, the bottom of a span structure or the upper surface of an embedded culvert is above the elevation of the top of the bank, and the structure spans the channel width by a minimum of 1.2 times the bankfull width. This presumption is rebuttable and may be overcome by the submittal of credible evidence from a competent source. Notwithstanding the requirement of 310 CMR 10.54(4)(a)5., the impact on bank caused by the installation of a stream crossing is exempt from the*

*requirement to perform a habitat evaluation in accordance with the procedures contained in 310 CMR 10.60.*

*(c) Notwithstanding the provisions of 310 CMR 10.54(4)(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.59.*

At each stream, the banks will be impacted and replaced by box culverts. The culverts are designed to meet the Massachusetts River and Stream Crossing Standards. Additionally, no adverse effects on specified habitat sites of Rare Species will take place. A Wildlife Habitat Evaluation – Appendix B was performed at each crossing to prove this. An Appendix B was used for the impacts on the Banks of each stream because 125 LF of impact is above the 50 LF threshold. The overall habitat at each stream crossing location is a common wetland forest or wetland shrub habitat. As documented in the Appendix B for each crossing area, no important wildlife habitat features are present (i.e. snags, sphagnum moss on water covered rocks, sandy areas for turtle nesting, large vertical banks for swallow nesting, etc). Please refer to the five attached Wildlife Habitat Evaluations (3 for Bank crossings and 2 for combined BVW impact areas) for more details. Once crossings and wetland replication areas are constructed, the wildlife habitat which was once present at these locations will be re-created via the use of downed logs, plantings similar to that which was lost, and the stockpile of existing wetland soils.

The following paragraphs will describe the stream crossing compliance with the MA River and Stream Water Crossing Standards. When applying the standards to a culvert replacement project, the replacement culverts should meet the design guidelines for either general standards or optimal standards. Below are the general standards that will be followed for each stream crossing:

*General standards call for open bottom structures or culverts that span the river/stream channel with natural bottom substrates that generally match undisturbed upstream and downstream substrates. Stream depth and velocities in the crossing structure during low-flow conditions should approximate those in the natural river/stream channel. A critical element of any stream crossing structure or span design involves identifying the proper “openness”. Openness is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units. An openness of 0.82ft (0.25meters) will pass some wildlife species but is unlikely to pass all the wildlife that would be accommodated by the optimum standards.*

#### *Standards*

*1. Spans (bridges, 3-sided box culverts, open-bottom culverts or arches) that preserve the natural stream channel are strongly preferred.*

*The preference for spans is to avoid or minimize disruption to the streambed. The structure’s design and construction should allow the streambed’s natural structure and integrity to remain intact, and work in the stream should be minimized to the greatest extent practicable.*

*Site constraints may make the use of spans impractical and in some cases well-designed culverts may actually perform better than bridges (e.g. areas with deep soft substrate). However, circumstances where culverts are likely to out-perform spans for aquatic organism passage are very uncommon. Experience has demonstrated that the construction of culverts to meet these standards is not easy. In the vast majority of cases it requires a*



*structure large enough to accommodate equipment for the construction of a stream channel and bed within the culvert. Problems in the design and construction of stable and functional stream channels within culverts are common. In areas where site constraints don't limit the usefulness of these structures, spans that preserve the natural stream channel are strongly preferred over culverts.*

The proposed box culverts will not be able to avoid disrupting the stream beds. To remove and install newer, larger box culverts, the streambeds will need to be excavated to make way for the installation. After installation, the stream beds will be recreated at the base of the box culverts to comply with the standards.

*2. If a culvert, then it should be embedded:*

- a minimum of 2 feet for all culverts,*
- a minimum of 2 feet and at least 25 percent for round pipe culverts*
- When embedment material includes elements > 15 inches in diameter, embedment depths should be at least twice the D<sub>84</sub> (particle width larger than 84 % of particles) of the embedment material*

*These minimum embedment depths should be sufficient for many culverts. However, circumstances may dictate a need for deeper substrates that are based on site specific analysis. These include high gradient streams and streams experiencing instability or with potential instability that could result in future adjustments to channel elevation. In these cases long profiles and calculations of potential channel adjustments should be used to determine embedment depth.*

The box culverts will be embedded a minimum of 2 feet with sandy gravel and muck. These materials will mimic each stream's natural substrate.

*3. Spans channel width (a minimum of 1.2 times the bankfull width)*

*It is critical to avoid channel constriction during normal bankfull flows. A width of 1.2 times bankfull width is the minimum width needed to meet these standards. Bankfull width should be determined as the average of at least three typical widths, ideally measured at the proposed structure's location, and then upstream and downstream of the proposed structure (except where stream sections are not representative of conditions where the structure will be located). The stream width should be measured at straight sections of the channel outside the influence of existing structures and unusual channel characteristics. The structure should not be narrower than the bankfull width at the crossing location.*

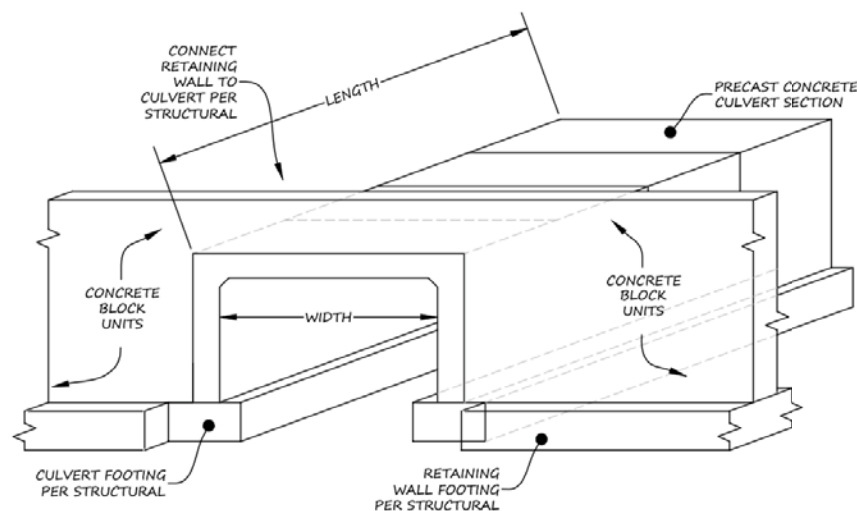
*In naturally constricted channels 1.2 times bankfull may also be adequate for passing large, infrequent storm events and maintaining stability of both the structure and channel. However, this should be verified through standard engineering practices and calculations.*

*A clear span of 1.2 times bankfull may not be sufficient to ensure adequate water conveyance for large, infrequent flood events without destabilizing the stream channel. This is especially true for streams with broad floodplains. In these cases, wider structures or alternative means of conveying flood waters may be necessary. It is critically important that structure design on these streams be based on sound engineering and, to the extent possible, take into account the potential effects of climate change on future storm characteristics (e.g.*

storms are likely to be more severe) and how the hydrology of the stream could change due to development within the watershed.

Bankfull width was measured at three locations upstream of each proposed crossing. For the Banks of Stream 1, bankfull width averaged 9.75'. To comply with the standard, an 11.7' wide culvert needs to be installed. The proposed culvert width will be slightly larger, at 12' wide. **Photo 26** is a cross section of the proposed box culverts that will be constructed at each stream crossing (prepared by Legacy Engineering). The calculation is provided below for Stream 1:

Standard width of culvert = Bankfull Width x 1.2 Standard  
Standard width of culvert = 9.75 feet x 1.2 Standard  
Standard width of culvert = 11.7 feet  
Proposed width of culvert = 12 feet



BOX CULVERT DIMENSIONS

	CULVERT #1	CULVERT #2	CULVERT #3
BOX CULVERT WIDTH	12' MIN.	13' MIN.	13' MIN.
BOX CULVERT HEIGHT	6.5' MIN.	6' MIN.	6' MIN.
CLEARANCE "C"	4.5' MIN.	3.7' MIN.	3.2' MIN.
BOX CULVERT LENGTH	36'	36'	40'

NOTES:

1. CULVERTS SHALL BE DESIGNED BY A REGISTERED STRUCTURAL ENGINEER FOR HS20 TRUCK LOADINGS.

**TYPICAL PRECAST BOX CULVERT STREAM CROSSING**

NOT TO SCALE

**Photo 26:** Proposed box culvert for each stream crossing (prepared by Legacy Engineering).

For the Banks of Stream 2, bankfull width averaged 8'. To comply with the standard, a 9.6' wide culvert needs to be installed. The proposed culvert width will be larger, at 13' wide. The calculation is provided below:

Standard width of culvert = Bankfull Width x 1.2 Standard  
Standard width of culvert = 8 feet x 1.2 Standard  
Standard width of culvert = 9.6 feet  
Proposed width of culvert = 13 feet



For the Banks of Stream 3, bankfull width averaged 10.5' because of the Banks gradual slopes. To comply with the standard, a 12.6' wide culvert needs to be installed. The proposed culvert width will be larger, at 13' wide. The calculation is provided below:

Standard width of culvert = Bankfull Width x 1.2 Standard

Standard width of culvert = 10.5 feet x 1.2 Standard

Standard width of culvert = 12.6 feet

Proposed width of culvert = 13 feet

The width of these culverts complies with the standards and should have no issue with large flood events destabilizing the stream channels.

4. *Natural bottom substrate within the structure*

*Careful attention must be paid to the composition of the substrate within the structure. The movement of benthic aquatic organisms could be obstructed or their necessary life-cycle movements could be substantially disrupted without a natural bottom forming a continuous medium through the structure. Substrate characteristics may be a more important determinant of passability than water depth or velocity for animals that tend to crawl (salamanders, crayfish) rather than swim in streams systems.*

*The substrate within the structure should match the characteristics of the substrate in the natural stream channel (mobility, slope, stability, confinement) at the time of construction and over time as the structure has had the opportunity to pass significant flood events. Substrate should be designed to meet desired characteristics after a period of adjustment likely to occur after construction.*

*The substrate should be designed to resist the complete loss of bed material during large, infrequent storms and to maintain appropriate channel characteristics through natural bed load transport. The goal is to achieve a dynamic equilibrium whereby substrate lost due to bed load transport is balanced by the movement of substrate into the structure from upstream. Sometimes in order to ensure bed stability (stability is not the same as rigidity) at higher than bankfull flows it may be necessary to use larger substrate within the structure than is generally found in the natural stream channel. In these cases the substrate should approximate the natural stream substrate and when possible should fall within the range of variability seen in the natural channel upstream and downstream of the crossing.*

The substrate within the culvert will mimic the natural substrate of the stream. Sandy gravel will be placed as the base material and 6" of muck and leaf litter will be placed above that. Rocks with diameters of 6-8" will be scattered on top to complete the substrate recreation. Mobility, slope, stability, and confinement will be considered during the substrate's construction.

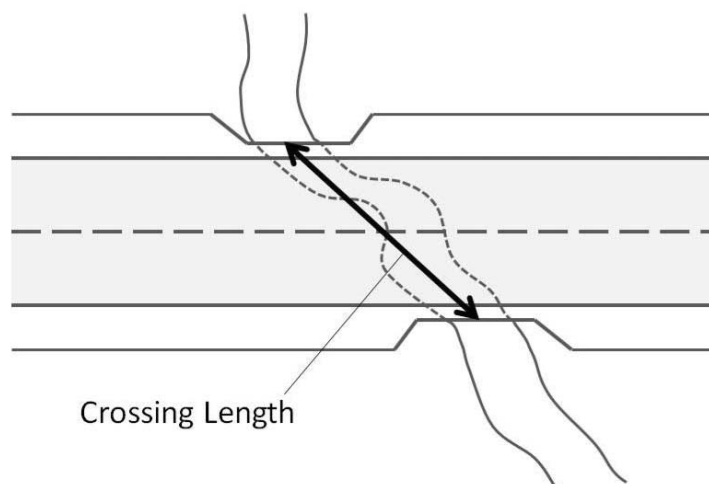
5. *Designed with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows*

*In order to provide appropriate water depths and velocities at a variety of flows and especially low flows it is necessary to preserve or reconstruct the streambed within the structure. Otherwise, the width of the structure needed to accommodate higher flows will*

*create conditions that are too shallow at low flows. The preference is to preserve the existing channel through the use of open-bottom spans wide enough to preserve the entire streambed. It is important that a continuous thalweg (deepest portion of the channel) be maintained through the structure. When constructing the streambed special attention should be paid to the sizing and arrangement of materials within the structure. If only large material is used, without smaller material filling the voids, there is a risk that flows could go subsurface within the structure.*

The streambed in the culverts will be recreated in a way where appropriate depths and velocities of water flow will be maintained. The streams are intermittent, so low flow characteristics will be mimicked in the streambed.

6. *Openness > 0.82 feet (0.25 meters): Openness is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units (e.g. feet). For a box culvert, openness = (height x width)/ length.*



*For calculating openness length is measured as a straight line connecting the channel midpoint where it enters a structure and where it exits the structure.*

*For crossing structures with multiple cells or barrels, openness is calculated separately for each cell or barrel. At least one cell or barrel should meet the appropriate openness standard. The embedded portion of a culvert is not included in the calculation of cross-sectional area for*

*Openness > 0.82 feet is recommended to make the structure more likely to pass small, riverine wildlife such as turtles, mink, muskrat and otter that may tend to avoid structures that appear too constricted (see note at the end of this document). This openness standard is too small to accommodate large wildlife such as deer, bear, and moose. Structures that meet this openness standard are much more likely than traditional culverts to pass flood flows and woody debris that would otherwise obstruct water passage. It is likely that most structures that meet all the other general standards will also meet this openness standard. However, for some very long structures it may be impractical or impossible to meet this standard.*



To meet the required general openness standard of 0.82 feet, the dimensions of each culvert will be specified below. Openness will equal 1.01, 0.82, 0.89 for Stream 1, Stream 2, and Stream 3, respectively. Calculations are provided to demonstrate how each dimension was determined. The cross-sectional area (X-section area) of each culvert has been calculated to exclude the flow-control weir wall. For details on the X-section area of each culvert, refer to sheet C-32 of the site plans, *Emerson Place Definitive Subdivision Plan*, Legacy Engineering, June 5, 2020.

Stream 1 box culvert dimensions:

Length: 36'

X-Section Area: 36.5 SF

Openness: 1.01

Calculation:  $\text{Openness} = \text{x-section area} / \text{length}$   
 $1.01 = 36.5 \text{ SF} / 36'$

Stream 2 box culvert dimensions:

Length: 36'

X-Section Area: 29.6 SF

Openness: 0.82

Calculation:  $\text{Openness} = \text{x-section area} / \text{length}$   
 $0.82 = 29.6 \text{ SF} / 36'$

Stream 3 box culvert dimensions:

Length: 40'

X-Section Area: 35.4 SF

Openness: 0.89

Calculation:  $\text{Openness} = \text{x-section area} / \text{length}$   
 $0.89 = 35.4 \text{ SF} / 40'$

*7. Banks should be present on each side of the stream matching the horizontal profile of the existing stream and banks.*

*To prevent failure, all constructed banks should have a height to width ratio of no greater than 1:1.5 (vertical:horizontal) unless the stream is naturally incised. They should be tied into the up and downstream banks and configured to be stable during a 100-year storm event. The banks should be designed and constructed so as not to hinder riverine wildlife use of the streambed and banks for passage.*

Bank's within each box culvert's footprint will be lost. The Banks outside of the proposed footprints will either be replicated, temporarily altered or remain at their natural horizontal profile. The replicated and temporarily altered banks will be restored to their natural horizontal profile after the box culvert installation is complete.

Overall, each stream crossing will comply with the criteria set forth in the MA River and Stream Crossing Performance Standards. In accordance with Millis Land Subdivision Rules and Regulations (5.12.2.2.f) all culverts shall have a headwall at each end. At each stream crossing, installing a headwall at each end of the proposed culvert will be achievable and therefore will comply with Millis Land Subdivision Rules and Regulations (5.12.2.2.f).

#### 4.4 Proposed Land Under Waterways Impacts

At each proposed stream crossing, Land Under Waterways (LUW) will be impacted by the installation of the box culverts (+/- 425 SF). The project will comply with the LUW general performance standards outlined in 310 CMR 10.56 (4):

*(a) Where the presumption set forth in 310 CMR 10.56(3) is not overcome, any proposed work within Land under Water Bodies and Waterways shall not impair the following:*

- 1. The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;*
- 2. Ground and surface water quality;*
- 3. The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and*
- 4. The capacity of said land to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures established under 310 CMR 10.60.*
- 5. Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.56(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards by consisting of a span or embedded culvert in which, at a minimum, the bottom of a span structure or the upper surface of an embedded culvert is above the elevation of the top of the bank, and the structure spans the channel width by a minimum of 1.2 times the bankfull width. This presumption is rebuttable and may be overcome by the submittal of credible evidence from a competent source. Notwithstanding the requirements of 310 CMR 10.56(4)(a)4., the impact on Land under Water Bodies and Waterways caused by the installation of a stream crossing is exempt from the requirement to perform a habitat evaluation in accordance with the procedures established under 310 CMR 10.60.*

*(c) Notwithstanding the provisions of 310 CMR 10.56(4)(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.*

The impacts to LUW will not impair the water carrying capacity within the defined channels of each stream. The proposed box culverts will actually improve the water carrying capacity by expanding the bankfull width of each stream channel by 0.2 feet. Ground and surface water quality will not be impaired by the installation of box culverts because the surface water will pass through a culvert, which will not degrade surface or ground water quality. Per the threshold detailed in 310 CMR 10.56 (4)(a)5, wildlife habitat will not be impaired by the work on LUW because the project proposed cumulative impacts less than 10% and less than 5,000 SF to the total LUW on site. There are also no specified habitat sites for rare wildlife species. The stream crossings will follow the MA Stream Crossing Standards so it is presumed that compliance with the performance standards for LUW will proficiently be met.



## 5. Conclusion

Goddard Consulting believes this project should be granted an Order of Conditions based on all standards being met for the stream crossings, BVW filling, and bank alterations. The project complies with the MA Wetlands Protection Act, the Millis Wetlands Bylaw, and Stream Crossing Standards. Alternative analysis' have been completed and this is the best possible alternative plan that can be proposed.

If there are any questions concerning this submission, please do not hesitate to contact us.

Very truly yours,  
Goddard Consulting LLC

A handwritten signature in black ink, appearing to read 'Scott Goddard', written over a horizontal line.

Scott Goddard,  
Principal & PWS



# TOWN OF MILLIS

Dr. James A. Lederer, *Chairman*  
Anne Rich, *Vice Chair*  
Edward Chisholm  
Christine Gavin  
Daniel Lee  
Charles Tangerini

## OFFICE OF THE CONSERVATION COMMISSION

900 Main Street • Millis, MA 02054  
Phone: 508-376-7045  
Fax: 508-376-7053

Camille Standley  
Administrative Assistant  
[cstandley@millis.net](mailto:cstandley@millis.net)

March 23, 2018

Ms. Nicole Hayes  
Goddard Consulting, LLC  
291 Main St., Suite 8  
Northborough, MA 01532

**RE: DEP File #CE225-0407**  
**Order of Resource Area Delineation**  
**Ridge St. (Map 20 Parcel 025), Millis, MA**

Dear Ms. Hayes:

Enclosed please find an original and one copy of the Order of Resource Area Delineation for the subject property. Please note you are **required** to file the original of this document at the Norfolk County Registry of Deeds in Dedham, Massachusetts, and provide proof of recording to the Commission

Please do not hesitate to contact us should you have any questions.

Sincerely,

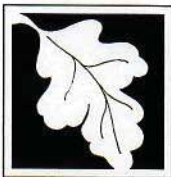
Camille Standley  
Administrative Assistant

Encs.

Cc: Sue Holian, Ridge Street Trust  
Building Dept.  
BOH  
File

0407 Ridge St. ORAD ltr.doc





**Massachusetts Department of Environmental Protection**  
**Bureau of Resource Protection - Wetlands**

**WPA Form 4B – Order of Resource Area Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

CE225-0407

MassDEP File Number

eDEP Transaction Number

MILLIS

City/Town

**A. General Information**

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**Note:** Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: MILLIS  
 1. Conservation Commission

2. This Issuance is for (check one):  
 a. ☒ Order of Resource Area Delineation  
 b. ☐ Amended Order of Resource Area Delineation

3. Applicant:  
Paul Jr. Holian  
 a. First Name b. Last Name  
G, J & K LLC  
 c. Organization  
107 Great Plain Ave.  
 d. Mailing Address  
Wellesley MA 02482  
 e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):  
Sue Holian  
 a. First Name b. Last Name  
Ridge Street Trust  
 c. Organization  
33 Pierview Road  
 d. Mailing Address  
Pocasset MA 02559  
 e. City/Town f. State g. Zip Code

5. Project Location:  
Ridge Street Millis 02038  
 a. Street Address b. City/Town c. Zip Code  
Map 20 Parcel 025  
 d. Assessors Map/Plat Number e. Parcel/Lot Number  
Latitude and Longitude 42d10m19.498s -71d22m11.917s  
 (in degrees, minutes, seconds): f. Latitude g. Longitude

6. Dates: July 6, 2017 March 5, 2018 March 23, 2018  
 a. Date ANRAD filed b. Date Public Hearing Closed c. Date of Issuance



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

**WPA Form 4B – Order of Resource Area  
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

CE225-0407

MassDEP File Number

eDEP Transaction Number

MILLIS

City/Town

**A. General Information (cont.)**

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Ridge Street ANRAD Plan of Land in Millis, MA; signed and stamped by  
Daniel J. Merrikan PE Civil No. 43309 and Paul J. DeSimone PLS No. 30466

03/06/2018

b. Date

c. Title

d. Date

**B. Order of Delineation**

1. The Conservation Commission has determined the following (check whichever is applicable):

a. ☒ **Accurate:** The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☒ Other resource area(s), specifically:

a. Mean High Water boundary to Vernal Pools; The Adjacent Upland Resource Area, a protected Resource Area under the Local Bylaw, is described in the plan notes but is otherwise shown as the 100-foot Buffer Zone on the plan. The AURA to BVW, Bylaw Vegetated Wetland and Mean High Water boundary is confirmed as accurate.

b. ☒ **Modified:** The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

1. ☒ Bordering Vegetated Wetlands

2. ☒ Other resource area(s), specifically:

a. Vegetated Wetland under the Millis Wetlands Protection Bylaw ("the Local Bylaw", Town of Millis - Article XIX); the request for the Commission to confirm streams on site are intermittent was withdrawn by the Applicant and therefore, Riverfront Area to mapped perennial streams exists on the site but are not depicted on the plan-of-record.

c. ☒ **Inaccurate:** The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

1. ☐ Bordering Vegetated Wetlands

2. ☒ Other resource area(s), specifically:

Bordering Land Subject to Flooding; Bank, and 200-foot Riverfront Area





**WPA Form 4B – Order of Resource Area  
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Order of Delineation (cont.)**

3. ☒ The boundaries were determined to be inaccurate because:

Mapped FEMA Zone A (no BFE) exists on the site but has not been depicted on the plan-of-record. Therefore, this boundary has not been confirmed by the Commission. Bank and Mean Annual High Water Boundaries to mapped perennial and on-site intermittent streams are depicted as approximate or not shown and therefore, not confirmed by the Commission.

**C. Findings**

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html>).

**D. Appeals**

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 4B – Order of Resource Area  
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

CE225-0407

MassDEP File Number

eDEP Transaction Number

MILLIS

City/Town

**E. Signatures**

March 23, 2018  
Date of Issuance

Please indicate the number of members who will sign this form.

4  
1. Number of Signers

James A. Lederer

Edward W. Chisholm

Christine Gavin

Daniel Lee

Anne Rich

Charles Tangerini

**This Order is valid for three years from the date of issuance.**

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on \_\_\_\_\_ unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. ☐ By hand delivery on \_\_\_\_\_

a. Date

3. ☒ By certified mail, return receipt requested on \_\_\_\_\_

a. Date

3/23/18





**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

**WPA Form 4B – Order of Resource Area  
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

CE225-0407

MassDEP File Number

eDEP Transaction Number

MILLIS

City/Town

**Recording Information**

Prior to commencement of work, this Order of Resource Area Delineation must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Resource Area Delineation. The recording information on this page shall be submitted to the Conservation Commission listed below.

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

MILLIS

Conservation Commission

Please be advised that the Order of Resource Area Delineation for the Project at:

Ridge Street

Project Location

CE225-0407

MassDEP File Number

Has been recorded at the Registry of Deeds of:

Norfolk

County

Book

Page

For:

Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Resource Area Delineation issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

DEP File Number: \_\_\_\_\_

**Request for Departmental Action Fee  
Transmittal Form**

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**A. Request Information**

1. Location of Project

a. Street Address \_\_\_\_\_

b. City/Town, Zip \_\_\_\_\_

c. Check number \_\_\_\_\_

d. Fee amount \_\_\_\_\_

2. Person or party making request (if appropriate, name the citizen group's representative):

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City/Town \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number (if applicable) \_\_\_\_\_

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City/Town \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number (if applicable) \_\_\_\_\_

4. DEP File Number: \_\_\_\_\_

**B. Instructions**

1. When the Departmental action request is for (check one):

- ☐ Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)
- ☐ Superseding Determination of Applicability – Fee: \$120
- ☐ Superseding Order of Resource Area Delineation – Fee: \$120

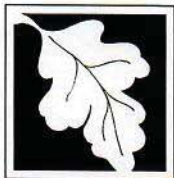
Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection  
Box 4062  
Boston, MA 02211

**Important:**  
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.







**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

DEP File Number: \_\_\_\_\_

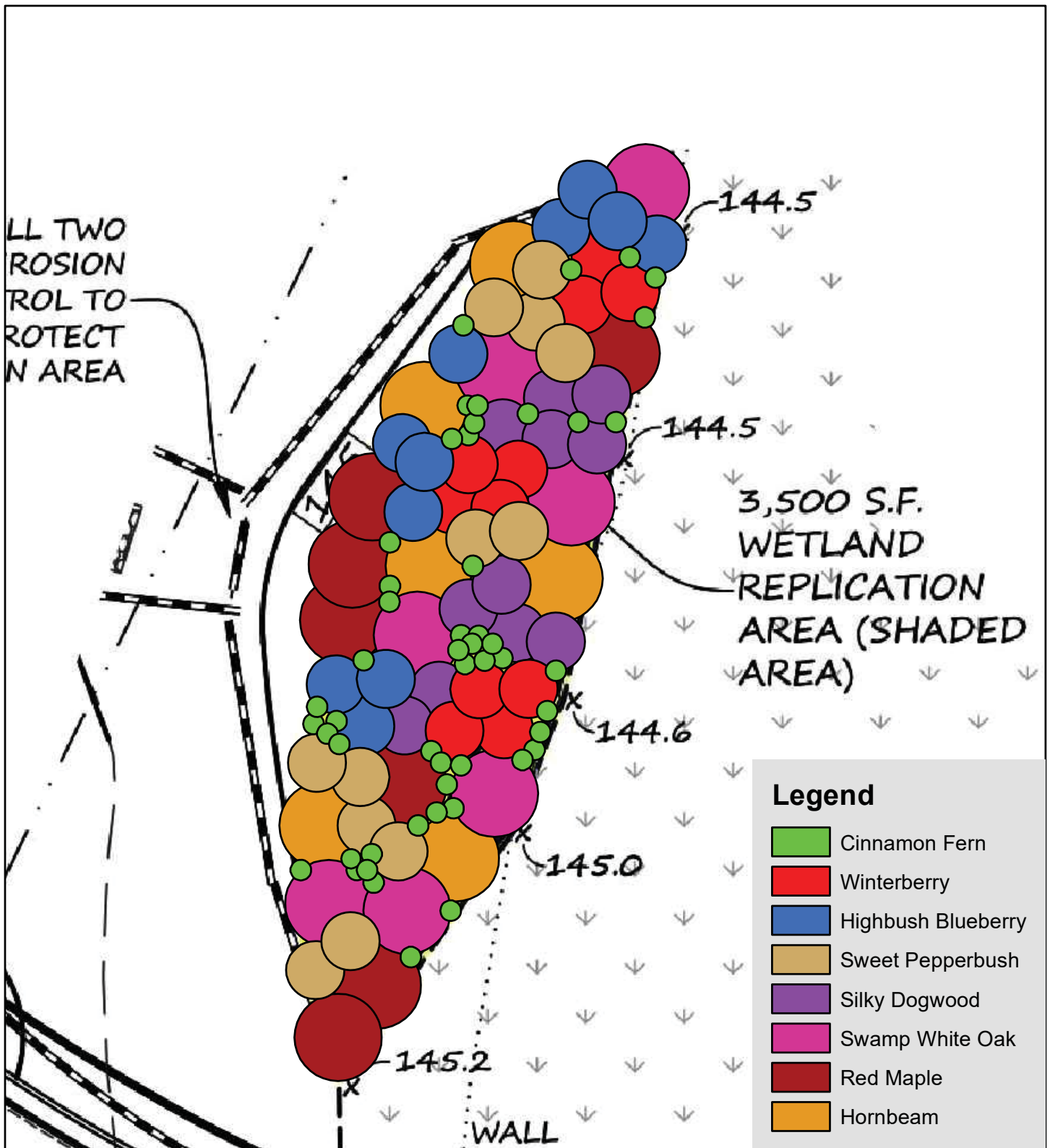
**Request for Departmental Action Fee  
Transmittal Form**

\_\_\_\_\_  
Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

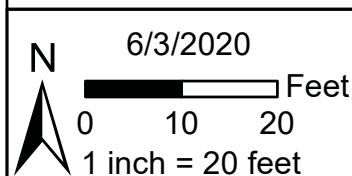
**B. Instructions (cont.)**

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.



## Wetland Replication Area 1

Emerson Place - Millis, MA



### Proposed Plantings

7 x Red Maple	12 x Sweet Pepperbush
7 x Swamp White Oak	11 x Highbush Blueberry
6 x Hornbeam	11 x Winterberry
50 x Cinnamon Fern	11 x Silky Dogwood

GODDARD CONSULTING LLC  
Strategic Wetland Permitting







Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 1. Summary Sheet

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Emerson Place

Project Name

Ridge Street, Millis, MA

Location

100-linear feet of Bank

Size of Area Being Impacted

3-30-2020

Date

Impact Areas (linear feet, square feet, or acres for each of the impact areas within the site)

Name	Waterbody/ Waterway	Wetland	Upland*	Total Area
1. Intermittent stream Bank	100-linear feet			6,600 lf
2. Intermittent stream Bank	100-lf			6,600 lf
3. Intermittent stream Bank	100-lf			6,600 lf
4. Bordering Vegetated Wetland (BVW) area 1		1,768 sf		32.5 acres
5. BVW area 2		1,813 sf		32.5 acres
6. BVW area 3		397 sf		32.5 acres
7.				

\*Riverfront Area/BLSF

Attach Sketch map and/or photos of the Impact Areas

Narrative Description of Site (attach separate page if necessary)

A single family house subdivision.

### Certification

I hereby certify that this project has been designed to avoid, minimize, and mitigate adverse effects on wildlife habitat, and that it will not, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions.

Signature of Wildlife Specialist (per 310 CMR 10.60 (1) (b))

Nicole Hayes, PWS

Typed or Printed Name





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

BVW near wetland flag A40

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

3-30-2020

Person completing form per 310 CMR 10.60(1)(b)

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*

Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine

Subsystem: \_\_\_\_\_

Class: Red maple forested wetland

Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

☐ Permanently flooded

☒ Saturated

☐ Intermittently exposed

☐ Temporarily flooded

☐ Semi-permanently flooded

☐ Intermittently flooded

☐ Seasonally flooded

☐ Artificially flooded

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name \_\_\_\_\_

Vegetation Description \_\_\_\_\_

Physical Description \_\_\_\_\_



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover:      30-40      60-80      0-5      0-10      10-20  
                    Trees (> 20')      Shrubs (< 20')      Woody vines      Mosses      Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "\*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
<u>Tree</u>	<u>Acer rubrum</u>	<u>Tree</u>	<u>Pinus strobus</u>
<u>Tree</u>	<u>Prunus sp.</u> <u>(crabapple)</u>	<u>Tree</u>	<u>Ulmus americana</u>
<u>Shrub</u>	<u>Rhamnus cathartica</u>	<u>Shrub</u>	<u>Vaccinium</u> <u>corymbosum</u>
<u>Shrub</u>	<u>Rosa multiflora</u>	<u>Shrub</u>	<u>Pinus strobus</u>
<u>Shrub</u>	<u>Cornus amomum</u>	<u>Herb</u>	<u>Symplocarpus</u> <u>foetidus</u>
<u>Shrub</u>	<u>Viburnum dentatum</u>	<u>Herb</u>	<u>Upland moss</u>

#### C. Inventory (Soils)

Sudbury fine sandy loam

Soil Survey Unit

Muck

Texture (upper part)

8-12-inches

Depth to Water Table

well

Drainage Class

1-10" Muck, 10-20" 10YR6/1 sand

Depth

#### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant

☐ Present

☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant

☒ Present

☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present

☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present

☒ Absent





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
6-12" dbh	12-18" dbh	18-24" dbh	> 24" dbh

Number of Tree Cavities in trunks or limbs of:

0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)  
*Many down branches/sticks of woody debris not logs or trees*

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☐ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☐ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle

☐ Osprey

☐ Great Blue Heron

Den(s) present of

☐ Otter

☐ Mink

☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

- |   |                     |                              |  |
|---|---------------------|------------------------------|--|
| Is the impact area part of an emergent marsh at least | 1.0 acre in size?   | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| (marsh and waterbirds)                                | 2.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 5.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 10.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

BVW near wetland flag B152

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

Person completing form per 310 CMR 10.60(1)(b)

3-30-2020

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*

Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine

Subsystem: \_\_\_\_\_

Class: Red maple forested wetland

Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

☐ Permanently flooded

☒ Saturated

☐ Intermittently exposed

☐ Temporarily flooded

☐ Semi-permanently flooded

☐ Intermittently flooded

☐ Seasonally flooded

☐ Artificially flooded

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover:	20-30 Trees (> 20')	30-40 Shrubs (< 20')	0-10 Woody vines	0 Mosses	30-50 Herbaceous
Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):					
Strata	Plant Species		Strata	Plant Species	
Tree	Acer rubrum		Shrub	Vaccinium corymbosum	
Tree	Prunus sp. (crabapple)		Herb	Symplocarpus foetidus	
Shrub	Rhamnus cathartica				
Shrub	Lonicera periclymenum				
Shrub	Cornus amomum				
Shrub	Viburnum dentatum				

#### C. Inventory (Soils)

Sudbury with hydric inclusions of walpole	well
Soil Survey Unit	Drainage Class
Muck	1-10" 2.5YR2/1 loam, 10-20" 2.5YR6/1 sand
Texture (upper part)	Depth
10-12-inches	
Depth to Water Table	

#### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant ☒ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

0 0 0 0  
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

*some small branches/stick down in area not large trees or limbs*

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☐ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☐ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle

☐ Osprey

☐ Great Blue Heron

Den(s) present of

☐ Otter

☐ Mink

☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

##### A. Habitat Continuity (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least (marsh and waterbirds)	1.0 acre in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	2.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	5.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	10.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

BVW near wetland flag WW16

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

Person completing form per 310 CMR 10.60(1)(b)

3-30-2020

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*  
Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine

Subsystem: \_\_\_\_\_

Class: Red maple forested wetland

Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

☐ Permanently flooded

☒ Saturated

☐ Intermittently exposed

☐ Temporarily flooded

☐ Semi-permanently flooded

☐ Intermittently flooded

☐ Seasonally flooded

☐ Artificially flooded

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover: 0 30-40 0 0 50-60  
Trees (> 20') Shrubs (< 20') Woody vines Mosses Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "\*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Shrub	<u>Sambucus nigra</u>	Shrub	<u>Vaccinium corymbosum</u>
Herb	<u>Lythrum salicaria</u>	Herb	<u>Symplocarpus foetidus</u>
Shrub	<u>Rhamnus cathartica</u>		
Herb	<u>Typha latifolia</u>		
Herb	<u>Onoclea sensibilis</u>		
Herb	<u>Carex stricta</u>		

#### C. Inventory (Soils)

<u>Sudbury with hydric inclusions of walpole</u>	<u>well</u>
<u>Soil Survey Unit</u>	<u>Drainage Class</u>
<u>Muck</u>	<u>1-10" 2.5YR2/1 loam, 10-20" 2.5YR6/1 sand</u>
<u>Texture (upper part)</u>	<u>Depth</u>
<u>10-12-inches</u>	
<u>Depth to Water Table</u>	

### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

#### Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant ☒ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

0 0 0 0  
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

*Some branches/sticks on ground not large trees or branches*

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☐ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☐ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle

☐ Osprey

☐ Great Blue Heron

Den(s) present of

☐ Otter

☐ Mink

☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least	1.0 acre in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
(marsh and waterbirds)	2.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	5.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	10.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

Intermittent stream channel bank (Crossing near Paddock Lane)

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

Person completing form per 310 CMR 10.60(1)(b)

3-30-2020

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*  
Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine Subsystem: \_\_\_\_\_  
Class: Inland Bank (intermittent) Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

- |   |  |
|---|--|
| <input type="checkbox"/> Permanently flooded      | <input type="checkbox"/> Saturated                         |
| <input type="checkbox"/> Intermittently exposed   | <input type="checkbox"/> Temporarily flooded               |
| <input type="checkbox"/> Semi-permanently flooded | <input checked="" type="checkbox"/> Intermittently flooded |
| <input type="checkbox"/> Seasonally flooded       | <input type="checkbox"/> Artificially flooded              |

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:

- "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))
- "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover:      10-20      40-50      5      0-5      0  
                    Trees (> 20')      Shrubs (< 20')      Woody vines      Mosses      Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "\*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	Acer rubrum	Vine	grape
Tree	Prunus serotina	Moss	Upland species on rocks on upper bank
Shrub	Rhamnus cathartica		
Shrub	Prunus sp. (crabapple)		
Shrub	Cornus amomum		
Shrub	Viburnum dentatum		

#### C. Inventory (Soils)

Sudbury fine sandy loam	well
Soil Survey Unit	Drainage Class
Muck	Muck 1-4", Gravel sand 4-12" (on Bank resource)
Texture (upper part)	
4-inches	
Depth to Water Table	

### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

#### Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant      ☐ Present      ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant      ☒ Present      ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present      ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present      ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

0 0 0 0  
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☐ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☒ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☒ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats *(Narrow area of exposed mud along bank (raccoon, small mammals))*

☒ Present ☐ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle

☐ Osprey

☐ Great Blue Heron

Den(s) present of

☐ Otter

☐ Mink

☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

#### Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leafed emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

##### A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

- |   |                     |                              |  |
|---|---------------------|------------------------------|--|
| Is the impact area part of an emergent marsh at least<br>(marsh and waterbirds) | 1.0 acre in size?   | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 2.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 5.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 10.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☒ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

Intermittent stream channel bank (access road, crossing 1. near Ridge and Curve St )

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

Person completing form per 310 CMR 10.60(1)(b)

3-30-2020

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*

Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine

Subsystem: \_\_\_\_\_

Class: Inland Bank (intermittent)

Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

☐ Permanently flooded

☐ Saturated

☐ Intermittently exposed

☐ Temporarily flooded

☐ Semi-permanently flooded

☒ Intermittently flooded

☐ Seasonally flooded

☐ Artificially flooded

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover: 40-60 40-50 0 0 20-50  
Trees (> 20') Shrubs (< 20') Woody vines Mosses Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "\*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	Acer rubrum	Tree	Pinus strobus
Tree	Prunus serotina	Tree	Ulmus americana
Shrub	Rhamnus cathartica	Shrub	Vaccinium corymbosum
Herb	Onoclea sensibilis	Herb	Carex stricta
Shrub	Cornus amomum		
Shrub	Viburnum dentatum		

#### C. Inventory (Soils)

Sudbury fine sandy loam	well
Soil Survey Unit	Drainage Class
Muck	1-12" Muck, 12-20" 10YR6/1 sand with 10YR5/6 mottles
Texture (upper part)	
6-inches	
Depth to Water Table	

### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

#### Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant ☒ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

0 0 0 0  
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☐ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☒ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☒ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle ☐ Osprey ☐ Great Blue Heron

Den(s) present of

☐ Otter ☐ Mink ☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

- |   |                     |                              |  |
|---|---------------------|------------------------------|--|
| Is the impact area part of an emergent marsh at least | 1.0 acre in size?   | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| (marsh and waterbirds)                                | 2.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 5.0 acres in size?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
|   | 10.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands Program

# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (for each wetland or non-wetland resource area)

#### I. General Information

Ridge Street, Millis, MA

Project Location (from NOI page 1)

Intermittent stream channel bank (access road, second crossing near Ridge and Curve St )

Impact Area (number/name)

2-17-2020

Date(s) of Site Visit(s) and Data Collection

partly sunny, no snow cover, 40 degrees F

Weather Conditions During Site Visit (if snow cover, include depth)

Nicole Hayes

Person completing form per 310 CMR 10.60(1)(b)

3-30-2020

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

*Nicole Hayes*

Signature

#### II. Site Description (complete A or B under Classification - see instructions for full description)

##### A. Classification

##### 1. For Wetland Resource Areas, complete the following:

System: Palustrine

Subsystem: \_\_\_\_\_

Class: Inland Bank (intermittent)

Subclass: \_\_\_\_\_

##### Hydrology/Water Regime

☐ Permanently flooded

☐ Saturated

☐ Intermittently exposed

☐ Temporarily flooded

☐ Semi-permanently flooded

☒ Intermittently flooded

☐ Seasonally flooded

☐ Artificially flooded

##### 2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following. Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### B. Inventory (Plant community)

% Cover:	40-60 Trees (> 20')	50-70 Shrubs (< 20')	5 Woody vines	0 Mosses	20-40 Herbaceous
Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):					
Strata	Plant Species		Strata	Plant Species	
Tree	Acer rubrum		Tree	Pinus strobus	
Tree	Prunus serotina		Tree	Ulmus americana	
Shrub	Rhamnus cathartica		Shrub	Vaccinium corymbosum	
Herb	Onoclea sensibilis		Shrub	Pinus strobus	
Shrub	Cornus amomum				
Shrub	Viburnum dentatum				

#### C. Inventory (Soils)

Sudbury fine sandy loam	well
Soil Survey Unit	Drainage Class
Muck	1-8" Muck, 8-20" 10YR6/1 sand with 10YR5/6 mottles
Texture (upper part)	
6-inches	
Depth to Water Table	

### III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

☐ Abundant ☒ Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: ☒ 0

Number (or density) of Standing Dead Trees (potential for cavities and perches):

☒ 0 ☒ 0 ☒ 0 ☒ 0  
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

☒ 0  
6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

☒ 0  
12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

☒ 0  
>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

☐ Abundant ☐ Present ☒ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

☐ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

☒ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

☐ Rock piles, crevices, or hollow logs suitable for:

☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture

☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

☐ Present ☒ Absent

Standing water present at least part of the growing season, suitable for use by

☐ Breeding amphibians ☒ Non-breeding amphibians (foraging, re-hydration)

☐ Turtles ☐ Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

☐ Present ☒ Absent



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

☐ Present ☒ Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

☐ Present ☒ Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

☐ Present ☒ Absent

Undercut or overhanging banks (small mammals, mink, weasels)

☐ Present ☒ Absent

Vertical sandy banks (bank swallow, kingfisher)

☐ Present ☒ Absent

Areas of ice-free open water in winter

☐ Present ☒ Absent

Mud flats

☐ Present ☒ Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

☐ Present ☒ Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

☐ Present ☒ Absent

Bank swallow colony

☐ Present ☒ Absent

Nest(s) present of

☐ Bald Eagle

☐ Osprey

☐ Great Blue Heron

Den(s) present of

☐ Otter

☐ Mink

☐ Beaver





# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest<sup>1</sup>

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (pied-billed grebe) ☐ Present ☐ Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ Present ☐ Absent

Flooded > 25 cm (least bittern, common moorhen) ☐ Present ☐ Absent

#### IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least	1.0 acre in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
(marsh and waterbirds)	2.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	5.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
	10.0 acres in size?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<sup>1</sup> 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least	2.5 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	10.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	25.0 acres in size?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
For upland resource areas is the impact area part of contiguous forested habitat at least			
(forest interior nesting birds)	50 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	100 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	250 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	500 acres in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(grassland nesting birds)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1.0 acre in size?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

#### B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

#### V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☐ Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- ☐ Disturbance from roads or highways
- ☐ Other human disturbance
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



# Wildlife Habitat Protection Guidance

## Appendix B: Detailed Wildlife Habitat Evaluation

### Part 2. Field Data Form (continued)

#### VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12" dbh	4	12	8
Mud flat	300 sf	20 acres	20 acres



## **Response to BETA Peer Review Letter from March 31, 2020**

### **Response to Introduction and Site Description on page 1 & 2:**

- See Legacy Engineering's response.

### **Response to *Wetland Resource Areas* on pg. 2-4:**

- BETA comment:

**Table 1. Resource Area Summary**

<b>Resource Area</b>	<b>Location</b>	<b>Comment</b>
Bylaw Vegetated Wetlands	New Parcel Added	BETA identified three areas within the new additional parcel that appears to support vegetated wetlands as defined by the Bylaw. 1. The area along the northern boundary of the newly added property. 2. Upslope of flag WF 20X. 3. Upslope of flag WF 67X -70X

#### **Goddard Response:**

BETA identified three areas within the new additional parcel that appears to support vegetated wetlands as defined by the Bylaw. One of the areas was along the northern boundary of the newly added property. Nicole Hayes from Goddard Consulting walked this area on 4/6/2020 and reported that there were no areas of 50% or more wetland species; the area was solely white pine.

- BETA Comment:

**Table 1. Resource Area Summary**

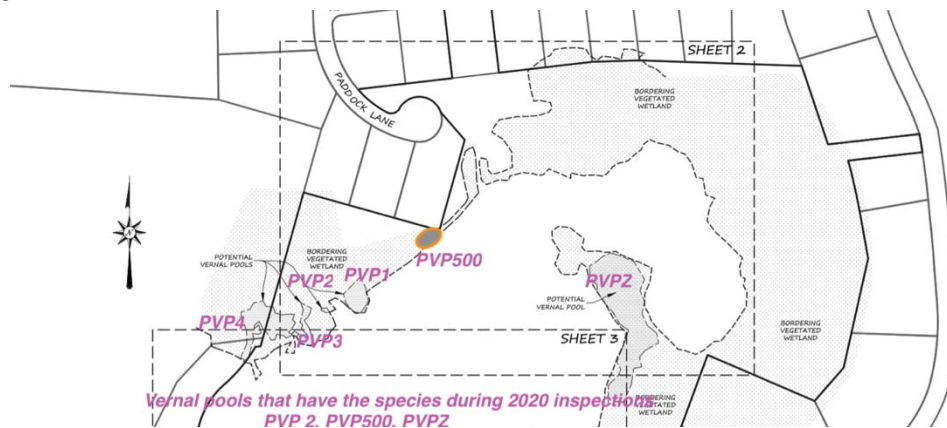
<b>Resource Area</b>	<b>Location</b>	<b>Comment</b>
Potential Vernal Pool (PVP)	C Series Wetlands B Series	Site Plan Sheet C-2, ANRAD Notes, # 2. States incorrectly that no determination was made so to weather the Potential Vernal Pools delineated on the Site qualified as actual vernal pool habitat or vernal pool. These Potential Vernal Pool boundaries were confirmed under the ORAD and as such the note on Plan Sheet C-2 (Notes, # 2) should be revised to reflect the PVP were approved.

#### **Goddard Response:**

Potential Vernal Pools on site were inspected in 2020 to determine if each PVP is under the jurisdiction of the Millis Wetland Bylaw and whether there is vernal pool habitat present:

- PVP1 is not a vernal pool under the bylaw. The bylaw states that a vernal pool is "any confined basin...". The area inspected is not a confined basin because there is an inlet and an outlet. Also, the Bylaw requires the PVP to provide essential habitat functions, which none were found. No vernal pool species or eggs were observed in this area.

- PVP2 is not considered vernal pool under the Bylaw. The area was not basin-like, yet there was 1-2 inches of water along the ground. Also, no vernal pool species or habitat were observed in the area implying that there is no vernal pool habitat present.
- PVP3 is a vernal pool under the Bylaw because 10 egg masses were observed demonstrating that there is vernal pool habitat.
- PVP4 is not jurisdictional under the Bylaw because no vernal pool species were observed in the area.
- PVPZ is jurisdictional because 70 egg masses were found near flag Z-28 and 30 egg masses were found near Z-16, demonstrating that there is vernal pool habitat.
- PVP500 is a vernal pool under the Bylaw because 6 egg masses were found and demonstrates that there is vernal pool habitat.
- Sketch of PVPs:



**Sketch 1:** Potential Vernal Pools are labeled nearby by their location on site.

- **BETA Comment:**  
Generally, BETA found that Bank and associated RA of two perennial streams need to be delineated in the field, depicted on the Site Plans, and included in the NOI application. Since the evidence submitted during the ANRAD process was not sufficient to overcome the burden of proof to reclassify these perennial streams as intermittent, as defined by CMR 310 10.58 of the WPA, the application should demonstrate compliance with additional performance standards associated with LUW, 310 CMR 10.56(4) and RA, 310 CMR 10.58(4). The Project appears to be eligible as a limited project and therefore will be required to meet the performance standards to the extent practicable. In addition, alteration to RA will need to be quantified and provided on the Project Plans.

**Goddard Response:**

Evidence has been submitted in a new document named “Wetland Resource Areas Performance Standards Compliance – Emerson Place Subdivision”, in which evidence has been provided to overcome the requirements for reclassifying the intermittent status of the streams, as defined by 310 CMR 10.58. Banks have been delineated in the vicinity of the work areas and delineation of the rest of the Banks on the site are not required because they are not perennial under the WPA. Compliance with performance standards are explained in the Wetland Resource Areas Performance Standards Compliance report.

- BETA Comment:  
Other items on the Project Plans that should be addressed include changing the BVW Buffer Zone labels to read “Inner 50-foot of the Buffer Zone” and “Outer 50-foot of the Buffer Zone” and provide legible flag labels for all BVW and Bank flags.

Goddard Response

BVW Buffer Zone labels on the site maps used in the Wetland Resource Area Performance Standards Compliance report include “Inner 50-foot of the Buffer Zone” and “Outer 50-foot of the Buffer Zone”. See Legacy Engineering’s response on updating the Project Plans.

**Response to *Resource Area Impacts and Mitigation on page 4-6:***

**Response to *Buffer Zone/ Adjacent Upland Resource Areas (AURA) on page 4:***

- See Legacy Engineering’s response.

**Response to *Bordering Land Subject to Flooding on page 4:***

- See Legacy Engineering’s response.

**Response to *Bank and Bordering Vegetated Wetlands on page 4 & 5:***

- BETA Comment:  
According to the Projects WPA Form 3, the proposed road work for Phases 1A, 2A, and 3A will impact 132 lf of Bank to unnamed intermittent streams and 3,620 sf of BVW will be filled for the roadway construction. According to the NOI, the existing gravel roads were selected as the most appropriate access points into the Site to minimize BVW impacts. The northerly gravel road extends over a perennial stream and associated BVW Series A and B, Bank and RA while the second gravel road, the southerly crossing, extends over BVW Series B1 and Series WF, Bank and RA. The Project proposes wetland replication totaling 5,600 sf. The southerly crossing results in filling 1,911 sf of wetlands and a 2,890 sf replication areas is proposed immediately adjacent to the crossing area. The northerly crossing will result in the filling of 1,709 sf of wetlands and a 2,710 sf replication area is proposed immediately adjacent to the crossing area. BETA will conduct a detailed review of the replication areas and Replication Design Plan once definitely established and provided, respectively.

Goddard Response:

Goddard has provided a detailed replication area plan as part of the Wetland Resource Area Performance Standards Compliance report for BETA to review. See Legacy Engineering’s response for modeling downstream impacts when culvert sizes comply with the MA Stream Crossing Standards.

**Response to *Land Under Waterways and Riverfront Area on page 5:***

- BETA Comment:  
BETA believes two of the Site’s three streams documented on the Site are perennial and include LUW and RA resource areas that have not been quantified on Form 3 or in the NOI. In addition, limits of Bank have not been field delineated and therefore BETA is not



confident the impact calculations are accurate for Bank on Form 3. A Stream Crossing Detail Plan will need to be revised to depict the revised resource boundaries.

Goddard Response:

BETA believes two of the Site's three streams are perennial and include LUW and RA resource areas. See the Wetland Resource Area Performance Standards Compliance report for the evidence of intermittent stream characteristics. Banks have been delineated in the vicinity of the work areas and delineation of the rest of the Banks on the site are not required because they are not perennial under the WPA. A revised Stream Crossing Detail Plan depicts the proper extent of the resource boundaries.

**Response to *Stormwater Summary and River front Area* on page 5:**

- See Legacy Engineering's response.

**Response to *Findings and Recommendations* on page 5 & 6:**

- Response to 1: See Legacy Engineering's response.
- BETA Comment:
  2. Buffer Zone/AURA boundaries need adjusting to reflect moved flags.

Goddard Response:

Buffer Zone/ AURA boundaries need adjusting to reflect moved flags. The following list provides details on the flags that were moved during a March 2020 site walk with BETA and an April 5, 2020 site visit:

- X23 and X24 replaced with XR 23 and XR24
- Old flag X36 to connect to X39 (omit lower flags)
- X44 replaced with XR44 connect to X42 and X46 omit X43 and X45
- X50 to connect to X58 omit lower flags X51-57
- X62 replaced with XR62 connect to X61 and X63
- A few flags in the beginning of the X series were missing but where at the toe of slope- These would need to be surveyed back in.
- An area of 50% wetland veg was observed up-gradient of wetland flag X20. Flag series WB1-5 was added to delineate this bylaw wetland area only. X21 connects to BW1 and BW5 connects to X20
- A potential vernal pool was observed near flag X31 this was delineated with series PVP500-508. 6 sets of frog egg masses were found on 4/5/2020 and is considered vernal pool habitat
- A potential BVW was observed up-gradient of flags X60-70. This was flagged out with series WX1-10 (see **Sketch 2**):



**Sketch 2:** The BVW shown in the sketch is flagged XZ1-WX2-WX3-XZ2.

- Response to 3: See Legacy Engineering's response.
- BETA Comment:
  4. Impacts to Bank, greater than 50 feet, require a wildlife habitat evaluation to determine the Project will have no adverse effect on wildlife habitat (310 CMR 10.54 (4) (a)5).

**Goddard Response:**

Impacts to Bank, greater than 50 feet, require a wildlife habitat evaluation to determine the project will have no adverse effect on wildlife habitat (310 CMR 10.54 (4) (a)5). A Wildlife habitat evaluation (WHE) was completed at each proposed Bank impact area by Nicole Hayes of Goddard Consulting LLC on March 30, 2020. No significant wildlife habitat features were documented at the Banks of Stream 1, Stream 2, or Stream 3 so it is safe to conclude that the project will have no adverse effect on wildlife habitat. The WHE forms are attached to the end of the Wetland Resource Area Performance Standards Compliance report.

- BETA Comment:
  5. Delineate stream bank in the field and plot the flags, boundaries, and RA on the Site Plans.

**Goddard Response:**

Banks have been delineated in the vicinity of the work areas and delineation of the rest of the Banks on the site are not required because they are not perennial under the WPA.

The northerly stream is flagged with the series FF 0-34 and EE 0-34. The H flag series was added along Bank as well (see **Sketch 3**):



**Sketch 3:** The northerly stream Banks have been flagged with the series FF 0-34 and EE 0-34.

- BETA Comment:
  6. Given the streams are classified as perennial this NOI filing will need to demonstrate compliance with WPA 310 CMR 10.56 (LUW) and 10.58 (RA) and the Town of Millis Wetland Bylaws.

Goddard Response:

See the Wetland Resource Area Performance Standards Compliance report for evidence of intermittent stream characteristics and compliance with WPA 310 CMR 10.56 (LUW), 10.58 (RA) and the Town of Millis Wetland Bylaws.

- BETA Comment:
  7. Quantify and qualify RA impacts.

Goddard Response:

Goddard Consulting, LLC and have determined that the streams should be reclassified as intermittent. See the Wetland Resource Area Performance Standards Compliance report for the evidence of intermittent stream characteristics and descriptions of impact areas in regard to RA.



- BETA Comments:

8. Alternatives Analysis needs to be submitted that complies with 310 CMR 10.58.

Goddard Response: The streams on site are intermittent and the alternatives analysis is therefore not required.

- BETA Comment:

9. The Project does not meet, and the burden has not been overcome of Stream Crossing Standard Compliance. BETA recommends that the Applicant clearly quantify and qualify by modeling what the downstream impacts would be by complying with the MA Stream Crossing Standards.

Goddard Response: The project will meet Stormwater Standards. See Wetland Resource Area Performance Standards Compliance report for a discussion on meeting Stream Crossing Standards to the greatest extent possible. See Legacy Engineering's response on modeling the downstream impacts of complying with the MA Stream Crossing Standards.

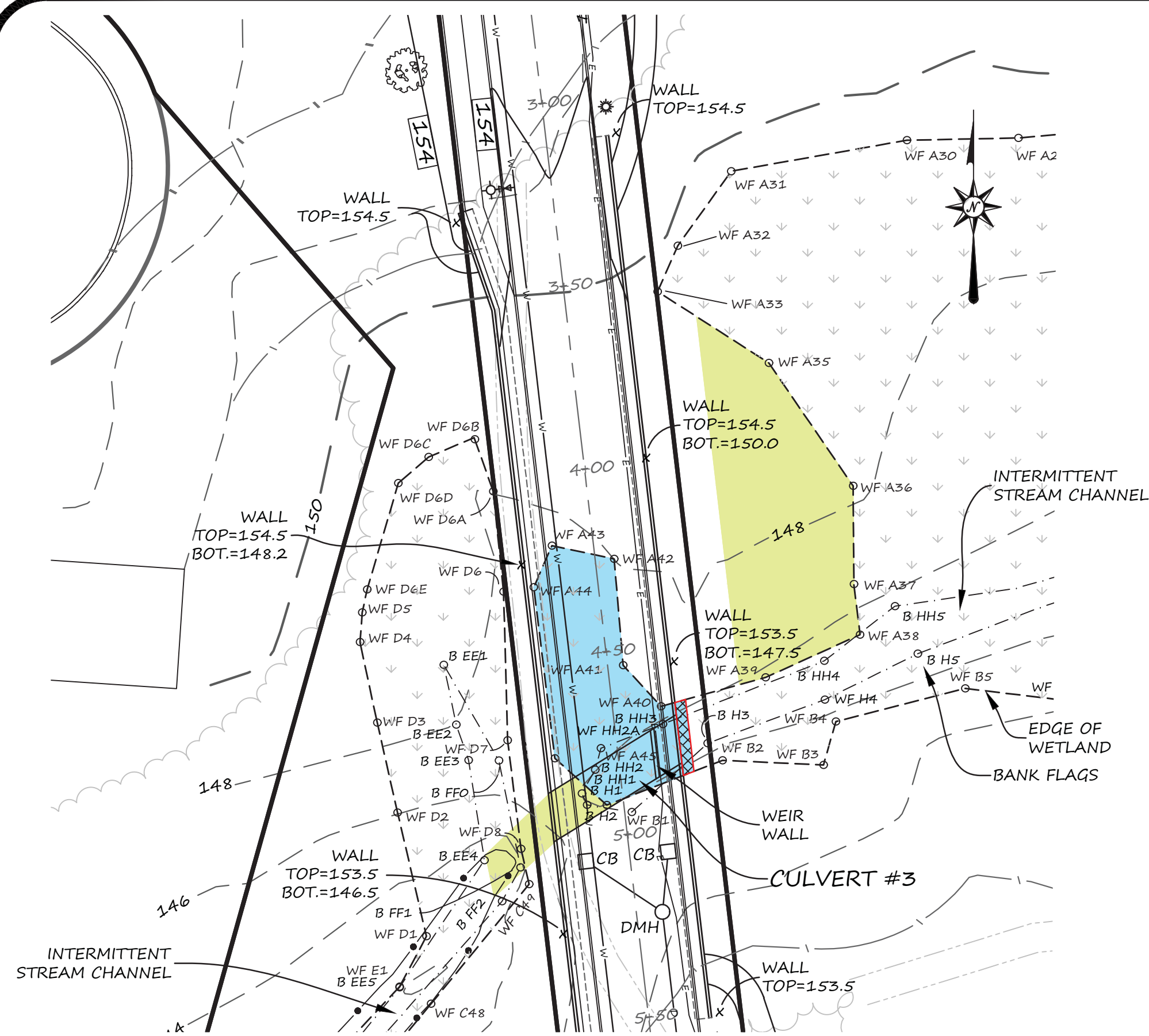
- Response to 10-12: See Legacy Engineering's response.

- BETA Comment:

13. Provide a more detailed vegetated wetland replication design plan that complies with DEP's Inland Wetland Replication Guidelines, 2002. (<https://www.mass.gov/doc/inland-wetland-replication-guidelines-0>)

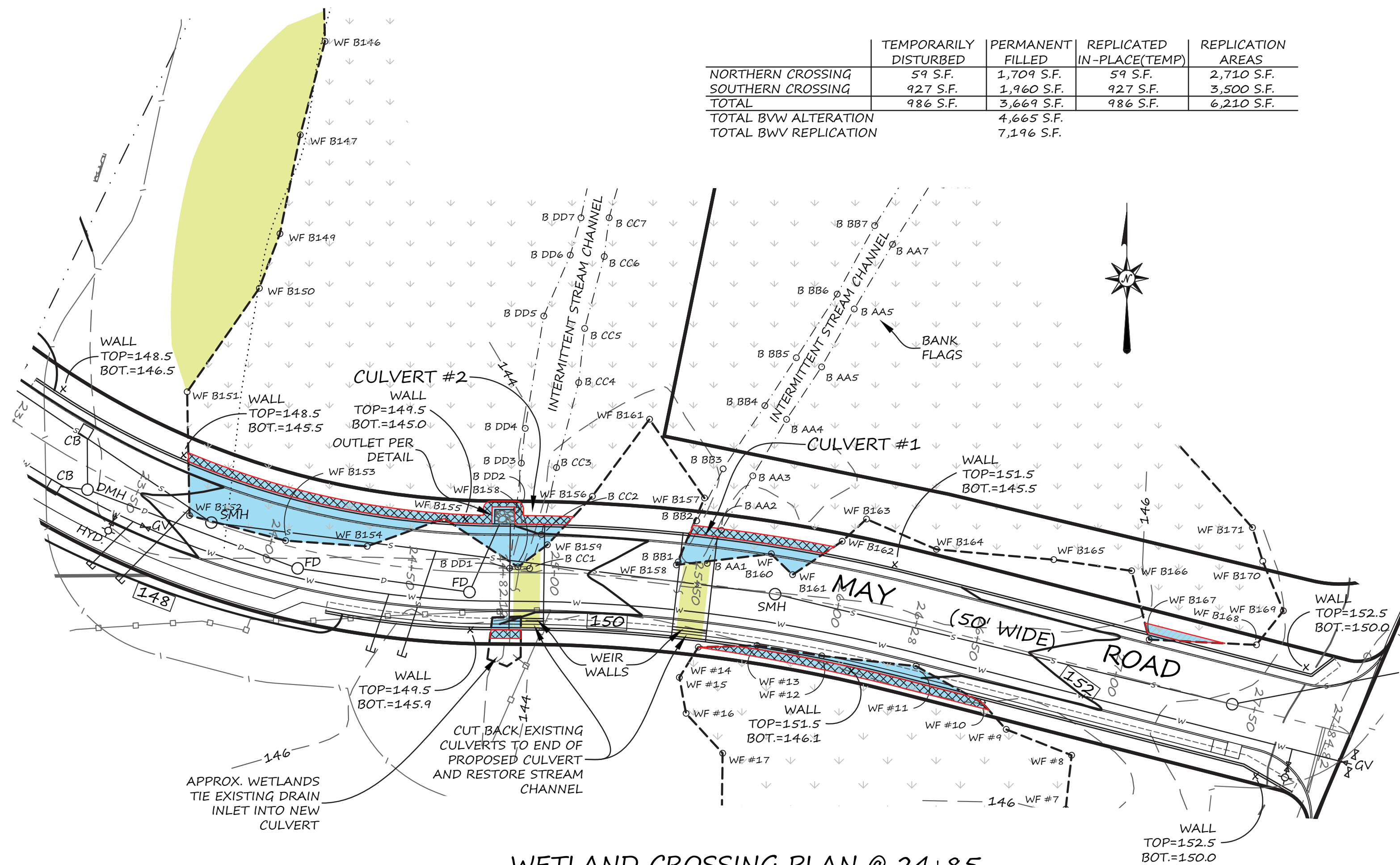
Goddard Response: A detailed vegetated wetland replication design plan that complies with DEP's Inland Wetland Replication Guidelines are detailed in the Wetland Resource Area Performance Standards Compliance report. See the planting maps labeled *Wetland Replication Area 1* and *Wetland Replication Area 2*.





WETLAND CROSSING PLAN @ 4+85

SCALE: 1" = 40'



WETLAND CROSSING PLAN @ 24+85

SCALE: 1" = 40'

	TEMPORARILY DISTURBED	PERMANENT FILLED	REPLICATED IN-PLACE(TEMP)	REPLICATION AREAS
NORTHERN CROSSING	59 S.F.	1,709 S.F.	59 S.F.	2,710 S.F.
SOUTHERN CROSSING	927 S.F.	1,960 S.F.	927 S.F.	3,500 S.F.
TOTAL	986 S.F.	3,669 S.F.	986 S.F.	6,210 S.F.
TOTAL BWV ALTERATION		4,665 S.F.		
TOTAL BWV REPLICATION		7,196 S.F.		

#### ZONING DISTRICTS

RESIDENTIAL R-S  
SPECIAL FLOOD HAZARD (SFH) DISTRICT  
ZONE C  
WATERSHED PROTECTION (WP) DISTRICT

#### ASSESSORS PARCELS & OWNERS

15-66  
GJK LLC  
107 GREAT PLAIN AVENUE  
WELLESLEY, MA 02481

20-25  
RIDGE STREET TRUST  
21 PRENTISS PLACE  
MEDFIELD, MA 02052

20-26, 20-28  
PETER HARCOVITZ  
256 ORCHARD STREET  
MILLIS, MA 02054

20-27 & A PORTION OF 20-53  
TD DEVELOPMENT LLC  
38 BENJAMIN'S GATE  
PLYMOUTH MA, 02360

A PORTION OF 23-04  
JOSEPH FAWKES & AMY FURNIA  
18A RIDGE STREET  
MILLIS, MA 02054

APPLICANT  
TD DEVELOPMENT LLC  
38 BENJAMIN'S GATE  
PLYMOUTH, MA 02360

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

I CERTIFY THAT THIS SURVEY AND PLAN CONFORMS TO THE ETHICAL, PROCEDURAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.

I CERTIFY THAT THE SURVEYS RELATED TO THIS PLAN CONFORM TO THE TECHNICAL STANDARDS FOR PROPERTY SURVEYS OF THE AMERICAN CONGRESS ON SURVEYING AND MAPPING.

#### PROFESSIONAL LAND SURVEYOR

■ INDICATES BOUND TO BE SET

APPROVED BY VOTE ON \_\_\_\_\_ WITH A DECISION FILED WITH THE TOWN CLERK ON \_\_\_\_\_, SUBJECT TO COVENANT CONDITIONS SET FORTH IN A COVENANT EXECUTED BY \_\_\_\_\_, DATED \_\_\_\_\_.

AND RECORDED IN THE NORFOLK COUNTY REGISTRY OF DEEDS SIMULTANEOUSLY HERewith. THE REQUIREMENTS OF THE COVENANT RUN WITH THE LAND.

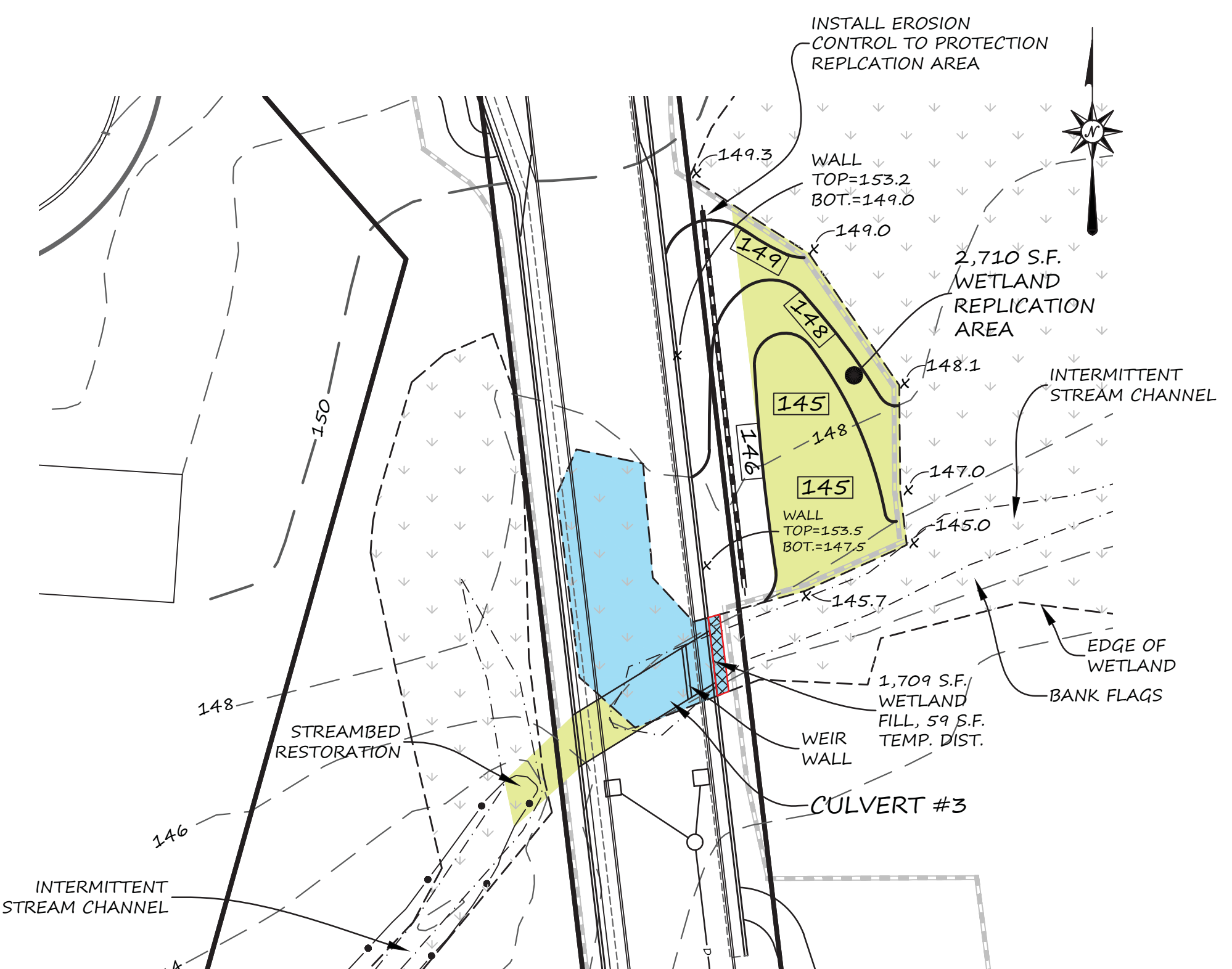
I CERTIFY THAT 20 DAYS HAVE ELAPSED SINCE THE PLANNING BOARD APPROVAL AND NO APPEAL HAS BEEN FILED IN THIS OFFICE.

TOWN CLERK \_\_\_\_\_ DATE \_\_\_\_\_

DATE APPROVED: \_\_\_\_\_

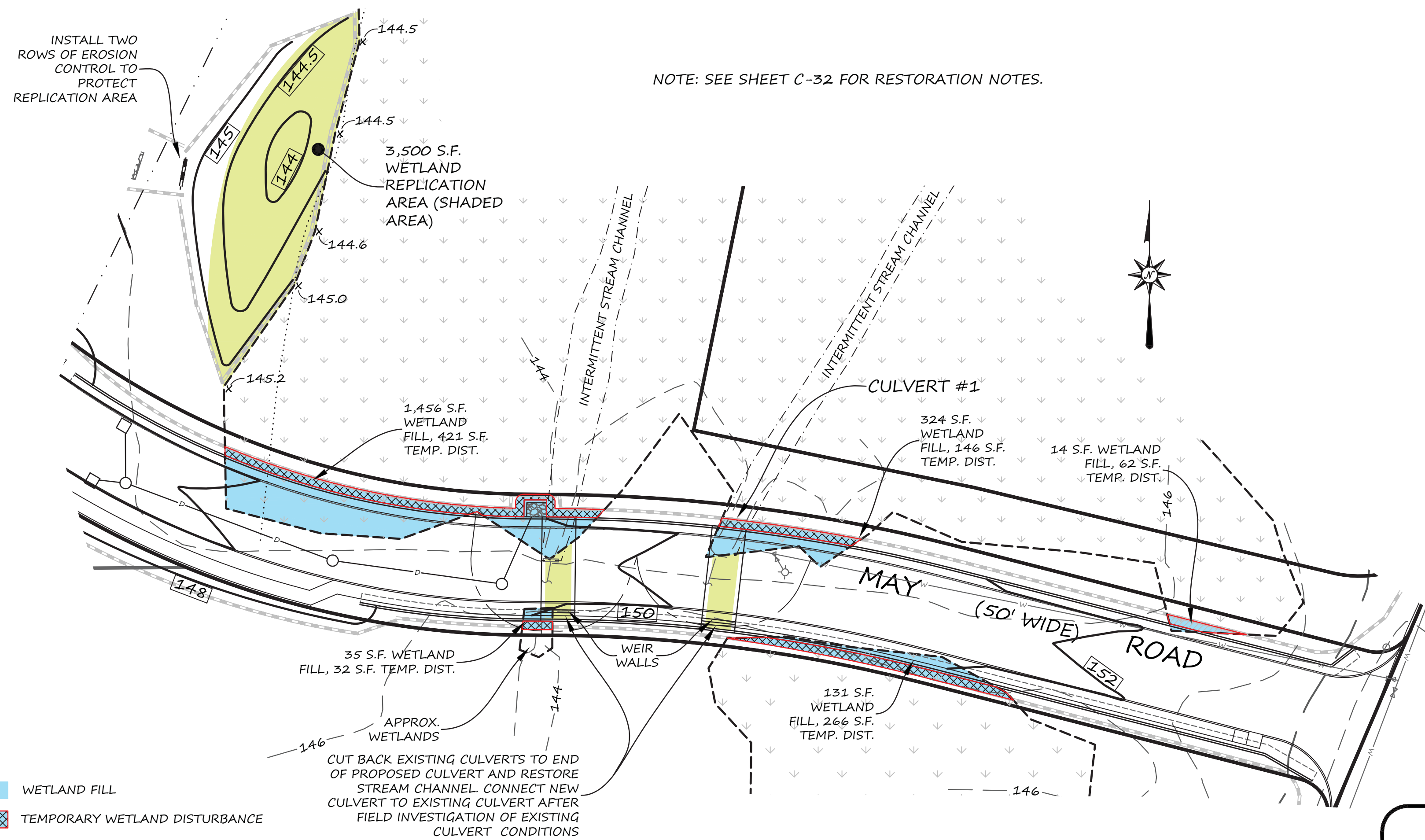
DATE ENDORSED: \_\_\_\_\_

TOWN OF MILLIS PLANNING BOARD



WETLAND DETAIL @ 4+85

SCALE: 1" = 40'



WETLAND DETAIL @ 24+85

SCALE: 1" = 40'

WETLAND FILL  
TEMPORARY WETLAND DISTURBANCE



Digitally signed by Daniel J. Merrikin, P.E.  
Date: 2020.06.07 14:02:14 -0400

PLAN SCALE: NOT TO SCALE

REVISION	DATE	BY
2020-05-20	DJM	
2020-06-05	DJM	
2020-06-05	DJM	

EMERSON PLACE  
DEFINITIVE SUBDIVISION  
DETAILS PLAN 2  
OF LAND IN  
MILLIS, MA

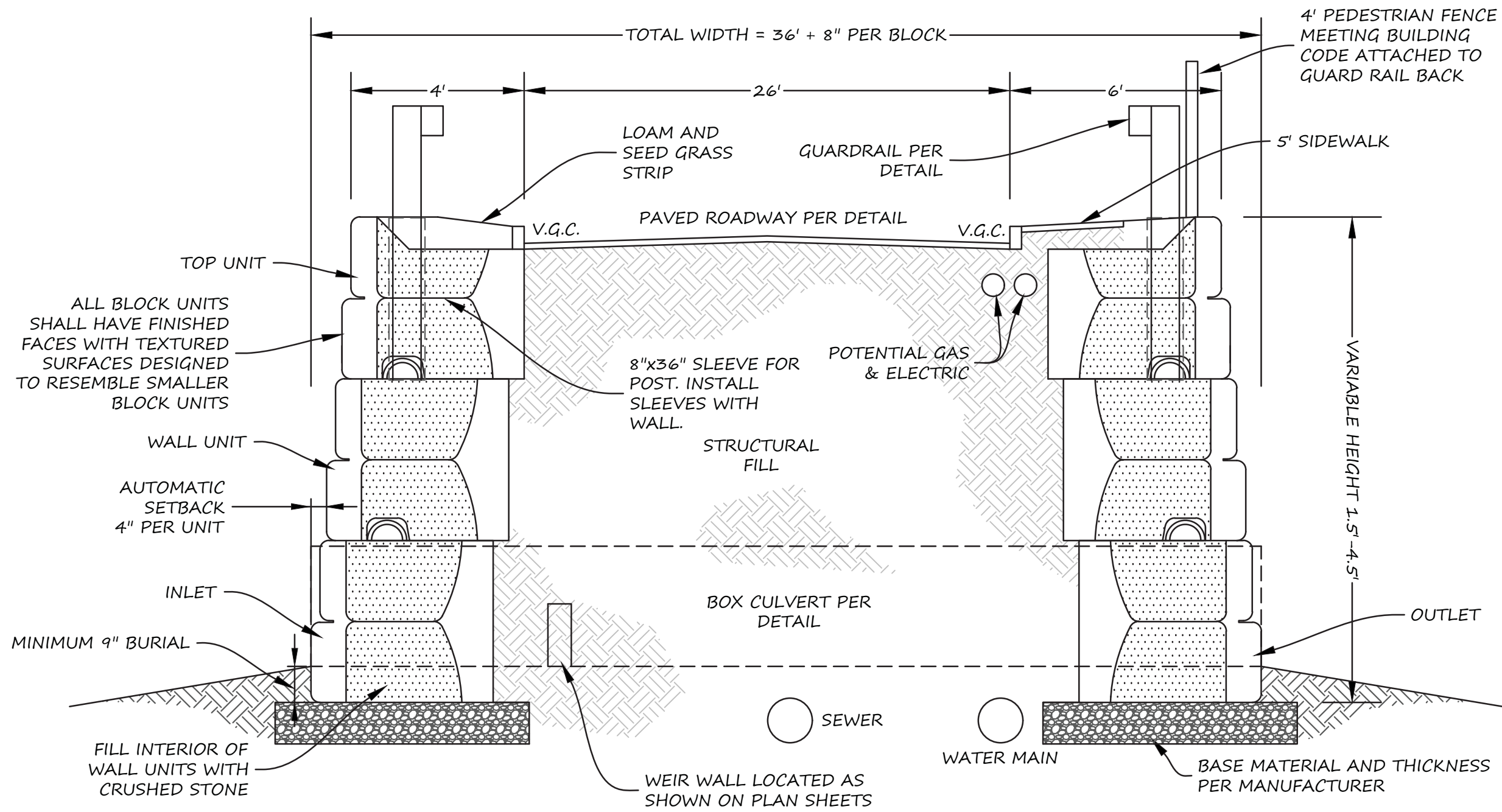
730 MAIN STREET  
SUITE 2C  
MILLIS, MA 02054  
508-376-8883(o)  
C-31



LEGACY  
ENGINEERING

D69-03





#### NOTES:

1. RETAINING WALL SHALL BE OF THE SO-CALLED "BIG-BLOCK" GRAVITY WALL SYSTEMS. THE SYSTEM DEPICTED ON THIS PLAN IS THE "STONE STRONG" SYSTEM MANUFACTURED BY STONE STRONG, LLC. ALTERNATIVE SYSTEMS MAY BE ALLOWED BY THE OWNER.
2. RETAINING WALL SYSTEMS SHALL BE DESIGNED BY THE PRODUCT MANUFACTURER. THE DETAILS ON THIS PLAN ARE APPROXIMATE ONLY AND SUBJECT TO CHANGE BASED ON THE FINAL DESIGN BY A REGISTERED PROFESSIONAL ENGINEER.

### TYPICAL ROADWAY CROSSING SECTION

NOT TO SCALE

#### STREAM CROSSING STANDARDS:

1. CROSSING WIDTH IS AT LEAST 1.2 TIMES THE BANKFULL WIDTH (BFW).
  - 1.1. CULVERT #1: 9.75' AVERAGE BFW \* 1.2 = 11.7' MIN; 12' WIDTH PROVIDED
  - 1.2. CULVERT #2: 8.0' AVERAGE BFW \* 1.2 = 9.6' MIN; 13' WIDTH PROVIDED
  - 1.3. CULVERT #3: 10.5' AVERAGE BFW \* 1.2 = 12.6' MIN; 13' WIDTH PROVIDED
2. THE BOTTOM SUBSTRATE MATCHES THE EXISTING SUBSTRATE.
3. THE PROPOSED WATER DEPTH AND VELOCITY MATCH EXISTING CONDITIONS OVER A RANGE OF FLOWS.
4. OPENNESS (X-SECTION AREA/L) IS MORE THAN 0.82. THE CROSS SECTIONAL AREA OF EACH CULVERT HAS BEEN CALCULATED TO EXCLUDE THE FLOW-CONTROL WEIR WALL.
  - 4.1. CULVERT #1: 36.5 S.F./36'=1.01
  - 4.2. CULVERT #2: 29.6 S.F./36'=0.82
  - 4.3. CULVERT #3: 35.4 S.F./40'=0.89
5. BANKS MATCH THE EXISTING BANKS AND WILL BE CONSTRUCTED SO AS TO NOT HINDER RIVERINE WILDLIFE.

#### WETLAND REPLICATION NOTES:

1. CONSTRUCT WETLAND REPLICATION AREAS IN ACCORDANCE WITH THE REPORT FROM GODDARD CONSULTANTS.
2. STRIP EACH WETLAND REPLICATION AREA TO A DEPTH 6"-12" BELOW PROPOSED GRADES. INSTALL 6"-12" OF ORGANIC SOIL IN THE WETLAND REPLICATION AREAS WITH SALVAGED LOAM FROM THE STRIPPING OF FILLED WETLANDS AREAS. SUPPLEMENT WITH 50:50 MIX OF LOAM AND ORGANIC MATERIAL WITH ORGANIC CONTENT OF 12-20%. DO NOT DRIVE OVER LOAM AFTER INSTALLATION AND PROVIDE MICRO RELIEF PITS AND MOUNDS AS DIRECTED BY THE APPLICANT'S WETLAND SCIENTIST.
3. INSTALL WOODY DEBRIS AND ROCKS THROUGHOUT REPLICATION AREA AS DIRECTED BY APPLICANT'S WETLAND SCIENTIST.
4. PLANT EACH REPLICATION AREA IN ACCORDANCE WITH THE APPROVED WETLAND REPLICATION PLAN BY GODDARD CONSULTANTS.

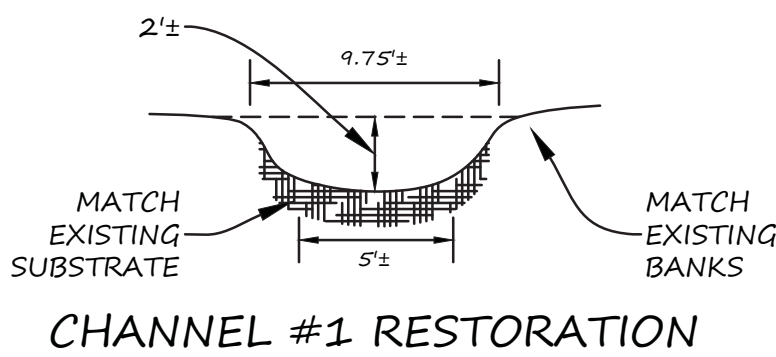
#### BANK/STREAM RESTORATION NOTES:

1. SHOULD THE STREAM BE FLOWING DURING STREAM WORK ACTIVITY, A SMALL TEMPORARY COFFERDAM (E.G. SANDBAGS, SHEET METAL ETC.) SHALL BE INSTALLED ACROSS THE STREAMBED IMMEDIATELY UPGRADIENT OF THE PROPOSED WORK ACTIVITY. CONTAINED WATER WILL BE PUMPED DOWNGRADIENT AROUND THE WORK AREA TO THE STREAM CHANNEL DOWNSTREAM.
2. EFFORT SHALL BE MADE TO SCHEDULE WORK ON THE STREAM DURING PERIODS OF LOW WATER AND WHEN PREDICTED WEATHER CONDITIONS ARE ABSENT OF A SUBSTANTIAL FORECASTED RAIN EVENTS.
3. EROSION CONTROLS WITHIN THE STREAM CHANNEL SHALL BE IMPLEMENTED DURING CONSTRUCTION, INCLUDING STAKED HAY-BALES AND SILT-FENCE INSTALLED ACROSS THE STREAMBED IMMEDIATELY DOWNGRADIENT OF THE PROPOSED WORK.
4. ANY NECESSARY DEWATERING WILL BE PERFORMED USING CONSTRUCTION BEST MANAGEMENT PRACTICES.
5. SIX INCH BIODEGRADABLE COIR FIBER LOGS SHALL BE USED TO RESTORE AND/OR STABILIZE THE STREAM BANKS IMMEDIATELY ADJACENT TO THE RETAINING WALL CONSTRUCTION. THE FIBER LOGS SHALL BE INSTALLED/EMBEDDED DIRECTLY ON THE FACE OF THE BANK AND ANCHORED (E.G. DUCKBILL, EARTH ANCHORS OR WOODEN STAKES).
6. IF NECESSARY, APPROPRIATE BIODEGRADABLE EROSION CONTROL NETTING (E.G. JUTE) SHALL BE INSTALLED AND STAKED ACCORDING TO THE MANUFACTURER OVER ANY DISTURBED AREAS IMMEDIATELY ADJACENT TO THE STREAM CHANNEL SUBJECT TO FLOW OR EROSION, OR AS RECOMMENDED BY THE WETLAND SCIENTIST.
7. THE BOTTOM SUBSTRATE WITHIN THE RESTORED CHANNEL IMMEDIATELY ADJACENT TO THE NEW RETAINING WALLS SHALL BE SIMILAR TO THE COMPOSITION OF THE SUBSTRATE IN THE ADJACENT EXISTING STREAM CHANNEL AND WILL BE DESIGNED TO RESIST DISPLACEMENT.
8. EFFORTS SHALL BE MADE STOCKPILE AND RE-USE EXISTING STREAM SUBSTRATE WHEN APPROPRIATE.

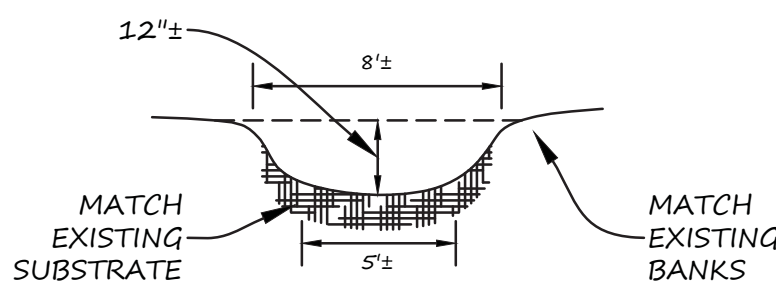
#### CROSSING SEQUENCING NOTES

AFTER EROSION CONTROL INSTALLATION AT THE CROSSINGS, THE INITIAL PHASE OF CLEARING AND GRUBBING ON THE SITE SHALL INCLUDE THE ENTRANCE ROADWAYS, REPLICATION AREAS, AND A STOCKPILE/ STAGING AREA. THE REMAINDER OF THE SITE SHALL BE CLEARED AFTER THE FOLLOWING WORK IS UNDERTAKEN:

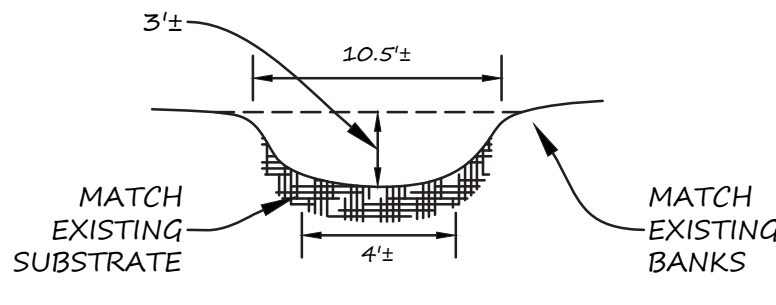
1. INSTALL EROSION CONTROLS AT THE CROSSINGS.
2. IF THERE IS FLOW IN THE STREAM CHANNEL(S), INSTALL COFFERDAM UPSTREAM AND BYPASS PUMP AS NOTED ABOVE.
3. CLEAR THE CROSSINGS, WETLAND REPLICATION AREAS AND STAGING AREAS. GRUB UPLAND AREAS ONLY INITIALLY.
4. INSTALL THE REMAINDER OF EROSION CONTROLS.
5. INSTALL TEMPORARY EARTHEN BERMS ALONG EITHER SIDE OF THE CROSSINGS, INSIDE OF EROSION CONTROL LINES (EXCEPT AT THE STREAM CHANNEL). BERMS SHALL BE AT LEAST THREE FEET HIGH.
6. REMOVE TOPSOIL AND UNSUITABLES AND STOCKPILE IN THE STAGING AREA.
7. INSTALL A MINIMUM OF TWO FEET OF DRIVEWAY FILL THROUGH CROSSING TO STABILIZE THE ENTRANCE, EXCEPT AT THE STREAM CHANNEL AND TO PROVIDE A WORKING SURFACE.
8. INSTALL UTILITIES THROUGH THE CROSSING AREAS.
9. INSTALL CULVERTS.
10. INSTALL BASE LAYERS OF RETAINING WALLS TO A HEIGHT SUFFICIENT TO STABILIZE THE WORK AREA.
11. INSTALL ROADWAY RETAINING WALLS.
12. GRADE AND INSTALL TOPSOIL IN BOTH WETLAND REPLICATION AREAS.
13. RESTORE STREAM CHANNELS IMMEDIATELY ADJACENT TO NEW RETAINING WALLS.
14. PLANT WETLAND REPLICATION AREAS AS SOON AS WEATHER PERMITS AS DIRECTED BY WETLAND SCIENTIST.



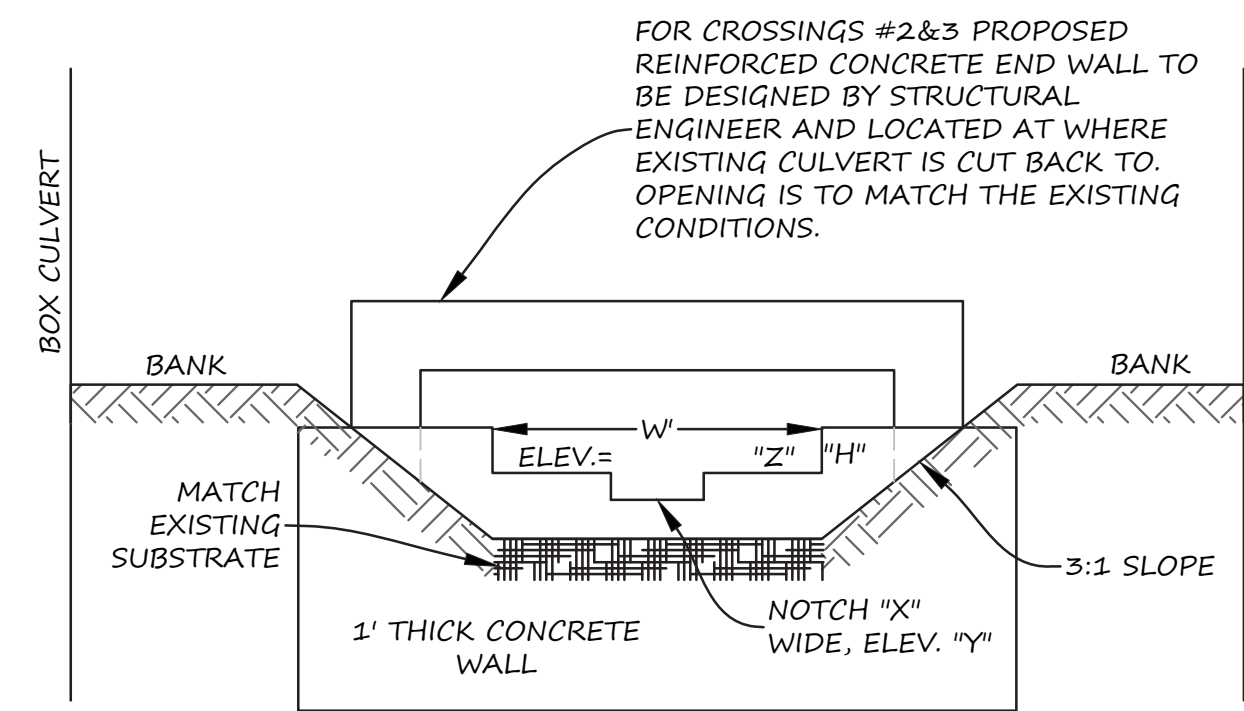
#### CHANNEL #1 RESTORATION



#### CHANNEL #2 RESTORATION



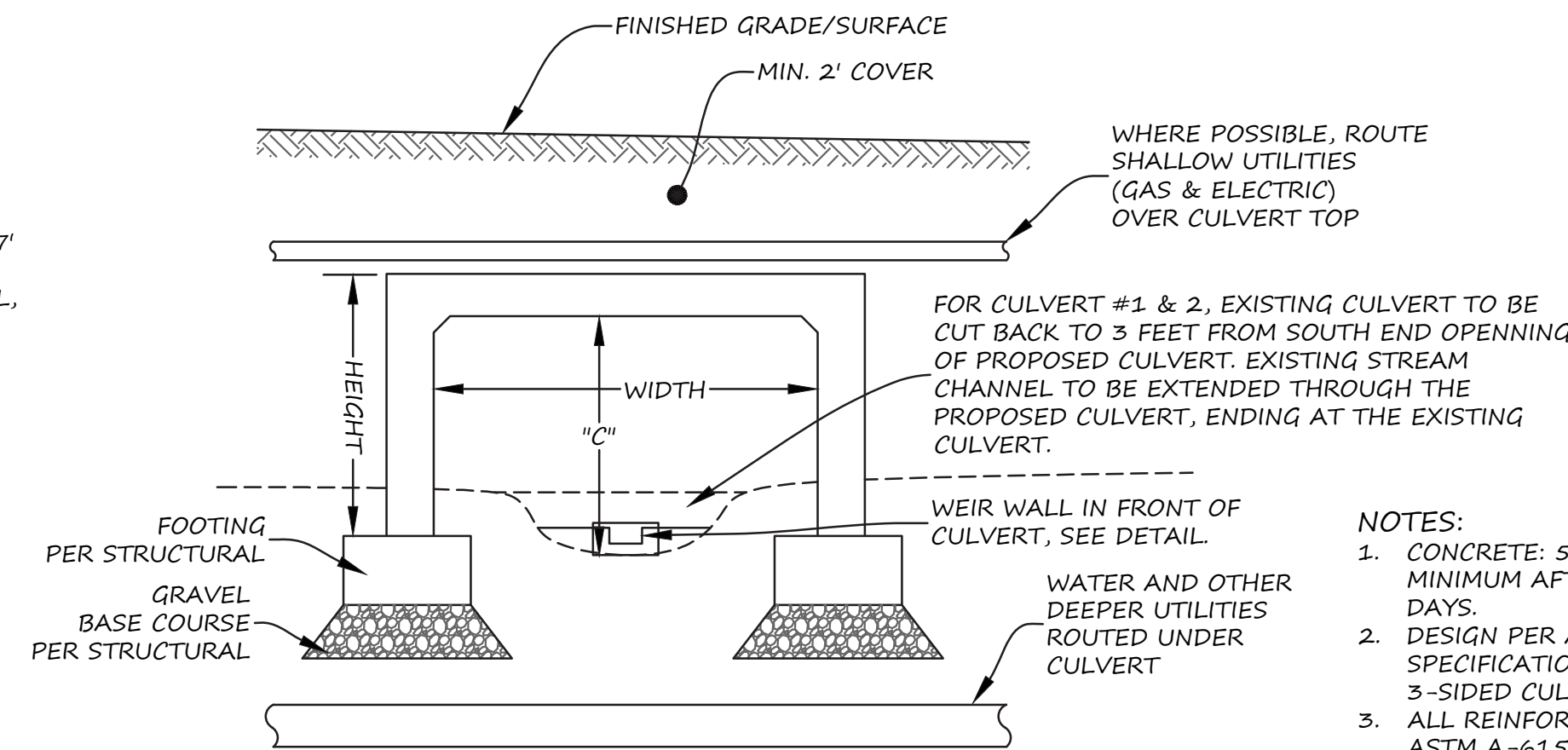
#### CHANNEL #3 RESTORATION



#### SCHEDULE OF DIMENSIONS AND ELEVATIONS

	CULVERT #3	CULVERT #1 & 2
NOTCH WIDTH "X"	2'	1.4'
NOTCH ELEV. "Y"	145.80	143.50
OVERFLOW WIDTH "W"	5'	3'
OVERFLOW ELEV. "Z"	146.00	144.90
OVERFLOW HEIGHT "H"	0.5'	0.1'

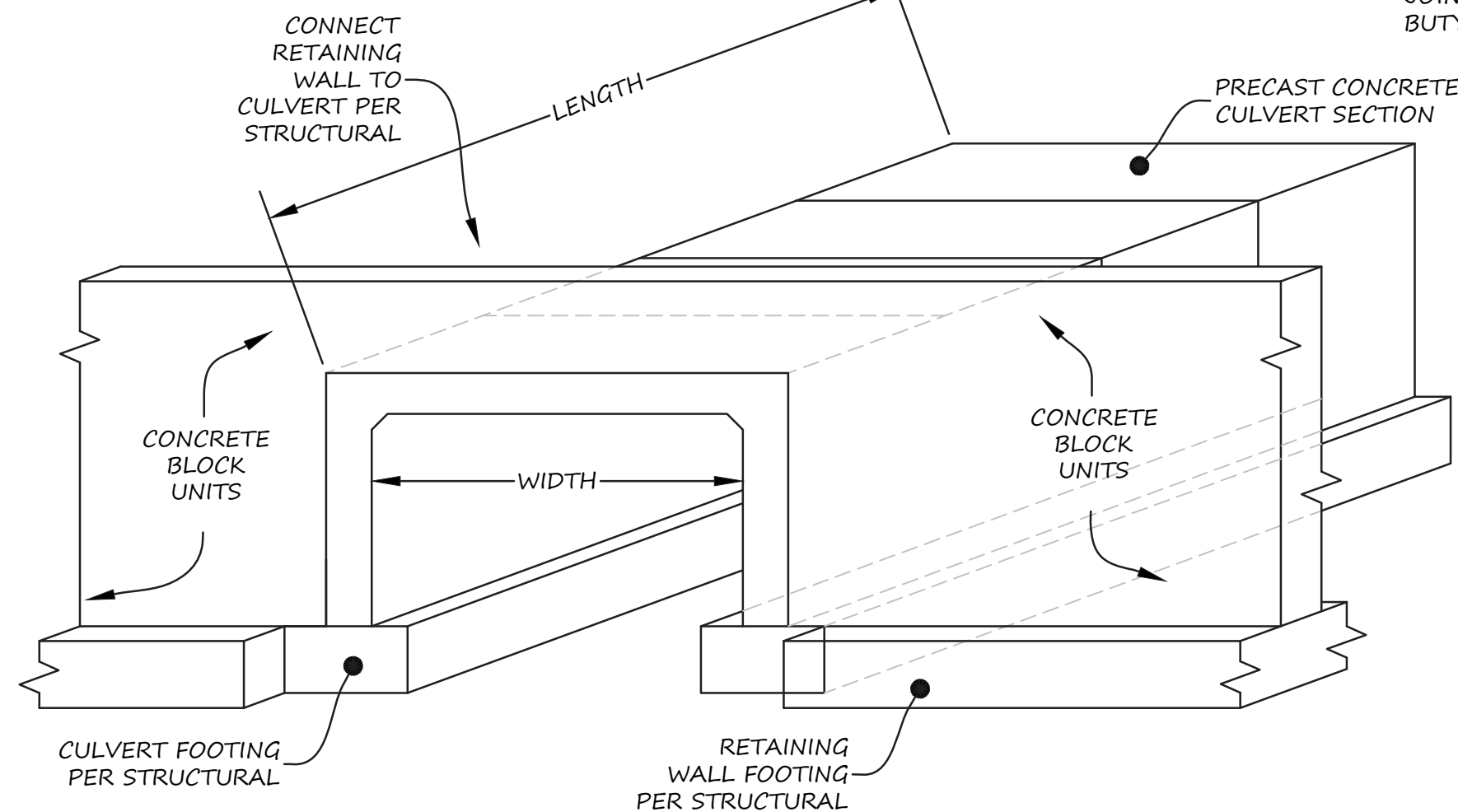
#### WEIR WALL AND EXISTING CULVERT



#### END VIEW

#### NOTES:

1. CONCRETE: 5,000 SF PSI MINIMUM AFTER 28 DAYS.
2. DESIGN PER ASTM C1504 SPECIFICATION FOR 3-SIDED CULVERT.
3. ALL REINFORCEMENT PER ASTM A-615-75.
4. DESIGNED TO AASHTO H-20 LOADING, 1 TO 5 FEET COVER.
5. TONGUE AND GROOVE JOINT SEALED WITH BUTYL RESIN.



#### BOX CULVERT DIMENSIONS

	CULVERT #1	CULVERT #2	CULVERT #3
BOX CULVERT WIDTH	12' MIN.	13' MIN.	13' MIN.
BOX CULVERT HEIGHT	6.5' MIN.	6' MIN.	6' MIN.
CLEARANCE "C"	4.5' MIN.	3.7' MIN.	3.2' MIN.
BOX CULVERT LENGTH	36'	36'	40'

#### NOTES:

1. CULVERTS SHALL BE DESIGNED BY A REGISTERED STRUCTURAL ENGINEER FOR HS20 TRUCK LOADINGS.

### TYPICAL PRECAST BOX CULVERT STREAM CROSSING

NOT TO SCALE

ZONING DISTRICTS  
RESIDENTIAL R-S  
SPECIAL FLOOD HAZARD (SFH) DISTRICT  
ZONE C  
WATERSHED PROTECTION (WP) DISTRICT

#### ASSESSORS PARCELS & OWNERS

15-66  
GJK LLC  
107 GREAT PLAIN AVENUE  
WELLESLEY, MA 02481

20-25  
RIDGE STREET TRUST  
21 PRENTISS PLACE  
MEDFIELD, MA 02052

20-26, 20-28  
PETER HARCOVITZ  
256 ORCHARD STREET  
MILLIS, MA 02054

20-27 & A PORTION OF 20-53  
TD DEVELOPMENT LLC  
38 BENJAMIN'S GATE  
PLYMOUTH MA, 02360

A PORTION OF 23-04  
JOSEPH FAWKES & AMY FURNIA  
18A RIDGE STREET  
MILLIS, MA 02054

#### APPLICANT

TD DEVELOPMENT LLC  
38 BENJAMIN'S GATE  
PLYMOUTH, MA 02360

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

I CERTIFY THAT THIS SURVEY AND PLAN CONFORMS TO THE ETHICAL, PROCEDURAL AND TECHNICAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.

I CERTIFY THAT THE SURVEYS RELATED TO THIS PLAN CONFORM TO THE TECHNICAL STANDARDS FOR PROPERTY SURVEYS OF THE AMERICAN CONGRESS ON SURVEYING AND MAPPING.

#### PROFESSIONAL LAND SURVEYOR

■ INDICATES BOUND TO BE SET

APPROVED BY VOTE ON \_\_\_\_\_ WITH A DECISION FILED WITH THE TOWN CLERK ON \_\_\_\_\_, SUBJECT TO COVENANT CONDITIONS SET FORTH IN A COVENANT EXECUTED BY \_\_\_\_\_, DATED \_\_\_\_\_, AND RECORDED IN THE NORFOLK COUNTY REGISTRY OF DEEDS SIMULTANEOUSLY HEREWITH. THE REQUIREMENTS OF THE COVENANT RUN WITH THE LAND.

I CERTIFY THAT 20 DAYS HAVE ELAPSED SINCE THE PLANNING BOARD APPROVAL AND NO APPEAL HAS BEEN FILED IN THIS OFFICE.

TOWN CLERK \_\_\_\_\_ DATE \_\_\_\_\_

DATE APPROVED: \_\_\_\_\_

DATE ENDORSED: \_\_\_\_\_

TOWN OF MILLIS PLANNING BOARD

730 MAIN STREET  
SUITE 2C  
MILLIS, MA 02054  
508-376-8883(o)  
C-32



LEGACY  
ENGINEERING



Digitally signed by Daniel J. Merrikin, P.E.  
Date: 2020.06.07 14:07:39 -04'00'

PLAN SCALE: NOT TO SCALE

REVISION	DATE	BY
2020-05-20	2020-05-20	DJM
2020-06-05	2020-06-05	DJM

EMERSON PLACE  
DEFINITIVE SUBDIVISION  
DETAILS PLAN 2  
OF LAND IN  
MILLIS, MA