NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION
Monday, June 27, 2022 at 6:45 PM
Virtual Meeting

The Sudbury Conservation Commission will hold a public hearing to review the Notice of Intent filing to stabilize a bank within the 100 Foot Buffer Zone and Inland Resource Areas, pursuant to the Wetlands Protection Act and Sudbury Wetlands Administration Bylaw, at 4 Dawson Drive, Sudbury, MA. Susan Berry, Applicant. The hearing will be held on Monday, June 27, 2022 at 6:45 pm, via remote participation.

Please see the Conservation Commission web page for further information.

https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-june-27-2022/

SUDBURY CONSERVATION COMMISSION
6/13/2022

Notice of Intent:
Sudbury Stream Restoration

JUNE 2022

PREPARED FOR

Susan Berry
4 Dawson Drive
Sudbury, MA

PREPARED BY

SWCA Environmental Consultants

NOTICE OF INTENT
SUDBURY STREAM RESTORATION

Prepared for

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SWCA Project No. 66655

June 2022

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Copy of Abutter Notification Form;
Affidavit of Service.

1 INTRODUCTION

SWCA Environmental Consultants (SWCA) is filing a Notice of Intent (NOI) on behalf of Susan Berry for stream restoration and bank stabilization located along an unnamed intermittent stream flowing on the eastern side of a residential property at 4 Dawson Drive in Sudbury, Massachusetts (the Project). This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act (M.G.L. c.131, §40) (WPA), its implementing regulations (310 CMR 10.00 et seq.), and the Town of Sudbury Wetlands Protection Bylaws (Article XXII) and its implementing regulations. Please refer to Appendix A for the WPA Forms and copies of check.

The NOI proposes stabilization of ±209 linear feet of eroding Bank slope on both sides of an unnamed intermittent stream (the Project). The work is necessary to prevent continued bank erosion and threat to the existing on-site single-family dwelling. The work will alter Bank, Land Under Water, and temporary disturbance within 100-foot Buffer Zone to Bordering Vegetated Wetland (BVW) and Bank. Please refer to Appendix B for the site locus map in Figure 1 and resource area depiction in Figure 2 and Appendix C for wetland data sheets.

Specifically, the Project proposes stabilizing the Bank using several methods, such as installation of coir fiber matting, geo-lifts with live stakes installed, and creating riffles and pools. Each treatment is discussed in detail in the Design Plan in Appendix D. Representative site photographs in Appendix E.

This Project is being filed as an Ecological Restoration Limited Project Resource Project under 310 CMR 10.53(4)(e)5. Two hard copies of this NOI are being submitted to the Sudbury Conservation Commission; and a copy is being mailed to the Massachusetts Department of Environmental Protection (DEP). SWCA is notifying all abutters within 100 feet of the subject parcel. A list of abutters was obtained using the Sudbury SimpliCITY Online Mapping tool. This property is located on the border of the City of Framingham. The abutters on the Framingham line have been verified with the Framingham Board of Assessors and will be notified. List of abutters is attached in Appendix F along with copies of the Abutter Notification Letter and Affidavit of Service.

2 SITE DESCRIPTION

2.1 Existing Conditions

Project activities are proposed on the eastern side of the parcel. The parcel is located within a residential neighborhood, predominantly consisting of single-family homes. The overall parcel consists of open residential lawn on the western side of the parcel and a forested portion on the eastern side. The surrounding forested area is dominated by eastern white pine (*Pinus strobus*), red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), and red maple (*Acer rubrum*) in the overstory with glossy buckthorn (*Frangula alnus*), multiflora rose (*Rosa multiflora*), and winged euonymus (*Euonymus alatus*) in the understory. A patch of Japanese knotweed (*Reynoutria japonica*) follows the banks of Stream 1 (the unnamed intermittent stream) on the property.

Stream 1 (S1) flows from an undersized and unmanaged detention basin located off-site to the southwest of the parcel and from an existing culvert outlet located south of the parcel. Water within the section of the stream flowing through the subject parcel is approximately 2 to 8-inches deep within a bankfull channel approximately 2 to 4-feet wide. Portions of the stream bank are severely eroded with areas of steep, undercut

banks and overhanging roots. Please refer to site photographs of the area in Appendix E. The stream flows from south to north. Near the northern section of the parcel, the stream naturally flows underground for approximately 15 feet before daylighting again. Stream 1 joins another intermittent steam, Stream 2 (S2), off-site. Stream 2 flows northwest and is associated with BVWs (Wetlands A and C), located east of the property. The benthic material of Stream 1 consists primarily of sand, with areas of herbaceous and woody vegetation well established within the channel. Debris, such as steel pipes and tires, is located within the stream channel.

Soils in the vicinity of the Project are mapped as excessively drained Windsor loamy sand with an 8 to 15% slope. Given the erodibility of these loose, sandy soils, as well as flash storm water runoff, the banks are severely eroded and unstable in several locations, with portions of the stream continuing underground under tree roots and forming new channels from flashy storm flows. The adjacent wetland is composed of very poorly drained Swansea muck with a 0-1% slope.

2.2 Regulated Resource Areas

Prior to completing the field delineation, SWCA conducted both a desktop analysis using Massachusetts Geographic Information System (MassGIS) data layers, United Stated Geological Survey (USGS) StreamStats, and other publicly available data. SWCA performed an in-field delineation of jurisdictional resource areas using a multiple parameter method approach following the WPA and its implementing regulations, the methodology described in *Delineating Bordering Vegetated Wetlands Under the Wetlands Protection Act* (MassDEP 1995), and the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and its supplement, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (United States Army Corps of Engineers [USACE] 2011). In accordance with 310 CMR 10.55(2)(c)2, the flagged wetland boundaries include all areas "within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist."

SWCA examined soils, hydrology, and vegetation to identify and delineate areas that meet the federal and state definition of a jurisdictional wetland, and bank indicators to identify limits of the stream bank. Hydric soils and hydrophytic vegetation were able to be evaluated since site investigations occurred during the growing season and evidence of hydrology was able to be observed. During the delineation, SWCA identified and characterized the resource areas including Inland Bank and BVWs. Other wetland resource areas were identified within the bounds of the Assessment Area including Land Under Water (LUW).

SWCA delineated vegetated wetlands and streams within the parcel boundary (the Assessment Area), using a consecutive alphanumeric labeling system with pink and black-flagging tape inscribed with "Wetland Delineation" for all vegetated wetlands, and blue flagging tape for all watercourses. SWCA completed the wetland and stream delineation on October 6, 2021 (Figure 2 in Appendix B). Wetland data forms are included in Appendix C.

2.2.1 Bordering Vegetated Wetland

Three BVW's were identified in the vicinity of the Project. Wetland WA and WB are classified as palustrine forested broad-leaf deciduous (PFO1), as defined by Cowardin et al (1979). Wetland A (offsite) is flagged as A-1 through A-8 and runs parallel to a field stonewall east of Stream 1 and southwest of Stream 2. Wetland B is flagged as B-1 through B-4 and follows the left descending stream bank of Stream 1 at the northern end of the parcel. Vegetation within the A and B-Wetlands consists of red maple and green ash (*Fraxinus pennsylvanica*) in the overstory with northern spice bush (*Lindera benzoin*), glossy buckthorn, and highbush blueberry (*Vaccinium corymbosum*) in the shrub layer, and cinnamon fern (*Osmundastrum*

cinnamomeum) and skunk cabbage (*Symplocarpus foetidus*) in the herbaceous layer. A stone wall separates the BVW from the upland portion of the bank. Wetland C is located east of the property (offsite) and was not flagged in the field. However, SWCA did collect wetland spatial data. Wetland C abuts the right descending stream bank of Streams 1 and 2. For all three wetlands soils consist of a sandy loam material with hydric soil indicators of redox dark surface and evidence of redoximorphic features (e.g., concentrations and depletions) observed within the soil profiles. Primary and secondary indicators of hydrology were observed, including saturated soils, geomorphic position, and FAC-Neutral test.

2.2.2 Inland Bank

Bank is the portion of the land surface which abuts and confines a water body such as an intermittent stream. It occurs between a water body and a BVW and adjacent floodplain, or, in the absence of these, it occurs between a water body and an upland (310 CMR 10.54(2)(a)). The top of the Stream 1 bank is delineated with flags labeled "S1". The flags were placed at the first observable break in slope or the Mean Annual High Water line, whichever is lower in accordance with 310 CMR 10.54(2)(c). Both sides of the bank are proposed for stabilization. The right descending stream bank of Stream 1 is severely undercut with active slumping and bank failures. The bank is approximately from 4 to 8-feet in height throughout the majority of the Project area and contains sandy soils. The bank is vegetated primary with mature trees on either side. Invasive plant species, such as Japanese knotweed, glossy buckthorn, and winged euonymus extending along the left descending bank of Stream 1.

2.2.3 Land Under Water

LUW is the portion of the unnamed intermittent stream flowing south to north. WPA defines the lower boundary of a bank being the mean annual low flow water level. The site investigation was conducted in the Fall season during which time water levels were still extremely low and lower portion of the bank was exposed. The lower boundary of each side of the bank was recorded to determine the extend of LUW. LUW does not have a buffer zone. This NOI proposes to alter approximately 1,942 square feet of LUW in order to stabilize the bank and reduce continual erosion. The intermittent stream varies between 2 to 4-feet in width and approximately 5 to 8-inches in depth. The northern portion of the stream flows underground for approximately 15-feet before daylighting and connecting to another near-by intermittent stream (Stream 2) off-site. The stream bed consists of sandy soils and occasional cobble stones. Stream 1 has two inputs, both located outside the parcel. One input is from a culvert outlet with an eroded channel between the culvert outlet and the restoration site. No active flow from the culvert was observed at the time of the site visit. The second input is from a poorly maintained detention basin with an undersized outlet. The area between the detention outlet and the restoration site is highly eroded with the outlet channel in the area filled with riprap and other debris. Since the two inputs are located off-property, SWCA did not extend the bank delineation beyond proposed for work property boundary.

2.2.4 Buffer Zone

The WPA includes a 100-foot Buffer Zone associated with Bank and BVW. Though the Project is located within the 100-foot Buffer Zone to Wetland WA, Wetland WC, and the Banks of Stream 1. proposed impacts are temporary and will result in increased habitat value. The 100-foot Buffer Zone to WA consists of an upland mixed forest dominated primarily by eastern white pines, red oaks, and red maples in the overstory. Minimal herbaceous vegetation was observed in the understory. The 100-foot buffer west of the western bank to Stream 1 and WC consists primarily of shrub vegetation, such as Japanese knotweed and glossy buckthorn before transitioning to a maintained lawn and residential dwelling.

2.2.5 Intermittent Stream

The Sudbury Bylaw (Section 2.3) recognizes two types of intermittent streams. Type I being: stream segments in which continuous standing water disappears for at least five (5) but not more than thirty (30) consecutive days annually. And Type II being: Streams in which continuous standing water disappears for more than thirty (30) consecutive days annually. SWCA ran a StreamStats analysis using a subwatershed drainage area delineation point immediately downstream (north) of the Stream 1 junction with Stream 2 (approximately 25-feet north of the property boundary), which is the downstream-most location within the Assessment Area. Please refer to Appendix E for StreamStats Data. The drainage area is estimated to be 0.058-square mile and has a mean basin elevation of approximately 221 feet above sea level. As stated at 310 CMR 10.58(2)(a)1.a., Stream 1 meets the definition of intermittent as it is not illustrated on the most recent USGS topographic map or map provided by DEP, and the StreamStats estimated watershed drainage area is <0.5 square miles. However, it is unclear if the Stream 1 is a Type I or Type II stream according to Sudbury Bylaws.

Bankfull statistics estimated with StreamStats show an average bankfull width value of 4.49 feet, the bankfull depth is estimated to be approximately 0.39 feet, the bankfull area is 1.72 square feet, and the bankfull streamflow value is 2.9 cubic feet per second.

2.3 Other Sensitive Resource Areas

SWCA evaluated whether any additional resource areas were located within the Project area, such as Riverfront Area, Areas of Critical Environmental Concern (ACECs) (MassGIS 2009), Outstanding Resource Waters (ORWs), Natural Heritage & Endangered Species Program (NHESP) designated Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife (MassGIS 2021a. and 2021b.), Certified Vernal Pools, Potential Vernal Pools (MassGIS 2021c. and 2021d.), 100-year Federal Emergency Management Agency (FEMA) Floodplain (FEMA 2014), or Department of Fisheries & Wildlife Cold Water Fisheries Resource Areas. No other mapped sensitive resources were identified within the Assessment Area. Please refer to Figures in Appendix B.

3 WILDLIFE HABITAT EVALUATION

This Project is being filed as an Ecological Restoration Limited Project and a Wildlife Habitat Evaluation (WHE) is not required; therefore, it is exempt from 310 CMR 10.60 as stated at 310 CMR 10.53(4). Additionally, the site is not mapped within Habitat of Potential Regional or Statewide Importance (DEP CAPS), certified/documented vernal pool habitat, or NHESP mapped habitat for rare species. The site also does not provide specified important wildlife habitat features such as turtle nesting areas, bald eagle (*Haliaeetus leucocephalus*) nests, or otter (*Lontra canadensis*) dens. Though exempt, a summary of wildlife habitat features has been included in this NOI.

3.1 Important Wildlife Habitat Features

SWCA Certified Wildlife Biologist, Christin McDonough, completed a WHE at the property on October 6, 2021. The in-field WHE was completed based on the principles of 10.60 of the WPA regulations and the 2006 Massachusetts Wildlife Habitat Protection Guidance for Inland Resources (Guidance 2006) for areas resulting in alteration to Bank, but that since the project is exempt, a full WHE is not provided. The Guidance provides a detailed description of various important wildlife habitat features. It is also noted that additional habitat features may be deemed important if they meet the definition of wildlife habitat under

310 CMR 10.04. Such features include stone/rock walls and stream crossings. The following sections provides descriptions of the important wildlife habitat features that occur within the Project Area and in adjacent habitat.

The intention of a WHE is to effectively evaluate whether a Project will result in adverse impacts to wildlife habitat characteristics of inland resource areas detailed in 310 CMR 10.60(2), such that the alterations, after two growing seasons following Project completion, would substantially reduce the capacity of the affected resource areas to provide important wildlife habitat functions (e.g., shelter, breeding areas, food, and nesting sites) and consequently reduce a site's ability to support wildlife. WHEs are not intended to provide a quantitative census of wildlife populations. Potential adverse impacts to important wildlife habitat features that would inhibit the site's capability to provide wildlife habitat functions are accompanied by recommended measures to avoid and mitigate such impacts.

3.1.1 Snags

Dead standing timber, also referred to as snags, were observed along the stream bank at Stream 1 and adjacent habitat. Snags provide several important wildlife habitat functions including cover, breeding areas, nesting, and foraging opportunities. A total of five snags were observed within the Impact Area and adjacent habitat. One 6-inch diameter at breast height (dbh) snag at flag S1-A5, one 6-inch dbh snag at S1-A8, two 10-inch dbh snags at S1-A10 along the stonewall, one 10-inch dbh snag at S1-B14. None of the observed snags contained cavities.

3.1.2 Trees Greater than 30-inches

Several mature trees >24-inch dbh including eastern white pine, red oak, red maple, and ash, are located along Stream S1. Large diameter trees may serve as important wildlife habitat for a variety of species providing wildlife with important habitat features including nesting and breeding areas, shelter, and foraging opportunities. SWCA recommends maintaining mature trees along the stream banks to the greatest extent practicable.

3.1.3 Wildlife Food

Wildlife food sources present adjacent to the Impact Areas include wetland food plants such as skunk cabbage located within the BVW, fruit/berry producers such as low bush blueberry (*Vaccinium angustifolium*), hard mast trees such as mature oaks (*Quercus* spp.) in the area, and other forage such as nectar producing vegetation.

Fruit/berry and hard mast species are utilized by numerous wildlife species including birds, small mammals, raccoons (*Procyon lotor*), and white-tail deer (*Odocoileus virginianus*) and other similar species. Additionally, seedlings and saplings of maples and white pines, provide forage opportunities for eastern gray squirrel (*Sciurus carolinensis*), cottontails (*Sylvilagus floridanus*), white-tail deer, and other small mammals.

3.1.4 Small Mammal Burrows

Though no small mammal burrows were observed within the Impact Area or adjacent habitat, the dense leaf cover, the availability of preferable habitat, and expansive areas present, it is likely that numerous burrows are present in the area and not observed. Furthermore, given the cryptic nature of small mammal

burrows and occasional dense cover, this habitat feature is often accidentally overlooked. Therefore, it is assumed that this habitat feature is likely present within the adjacent habitat.

3.1.5 Large Woody Debris

Large woody debris is defined as fallen timber, logs, limbs, and other similar woody material lying on the forest floor. It can occur as piles or singly as fallen trees or tree limbs. They can be an important habitat feature, as they provide breeding/nesting areas, shelter, and overwintering/hibernation habitat for a variety of wildlife. The impact area contains several downed trees that span across, but are not submerged, LUW.

3.1.6 Rockwall

Rocks pilled together and with sufficient gaps/space between rocks provide important habitat functions including cover, breeding areas, and overwintering habitat. A man-made rock wall is located outside the property and spans from northwest to southeast along the wetland WA western boundary.

3.1.7 Shrub Thickets

Shrub thickets area a dense stand of shrubs which provides an important wildlife habitat features such as cover, shelter, breeding areas, and foraging. The western side of Stream 1 contains a narrow strip of shrubs between the bank and the residential maintained lawn and the detention basin. However, these shrubs mainly consist of invasive plant species such as Japanese knotweed, burning bush, and multiflora rose.

3.1.8 Undercut Banks

Eastern portions of Stream 1 bank are severely undercut with tree roots overhanging the bank. Undercut banks may provide cover and overwintering habitat for wildlife. Stream 1 is an intermittent stream. The undercut portion of the bank consist of sandy soils.

3.2 Finding of No Adverse Effect

The proposed bank restoration will temporarily impact some wildlife features such as undercut banks, large woody debris, and potential small mammal burrows. However, the proposed work will not result in an adverse effect on wildlife habitat (i.e., no adverse effect). As defined in the WPA regulations, Adverse Effect is as any impact that would alter habitat characteristics listed in 310 CMR 10.60(2), such that the alternation will substantially reduce the capacity of the area to provide wildlife habitat functions following two growing seasons after project completion. The 2006 Guidance specifically notes that it is insufficient to find that a project will result in adverse impacts to wildlife habitat simply because alterations to habitat are proposed. In addition, impacts to wildlife habitat only become adverse if they significantly reduce a site's capacity to provide important wildlife habitat functions (i.e., shelter, forage, breeding areas, etc.) and consequently impair the ability of the site to support wildlife.

A project may demonstrate No Adverse Effect through four methods: (1) demonstrating that the site lacks any important wildlife habitat features; (2) demonstrating that important habitat features exist on a site but are not important or will not be impacted; (3) important habitat features exist, but impacts will have a negligible effect on wildlife habitat; or (4) important habitat features exist, but will be sufficiently preserved, restored, or mitigated.

Projects that impact important habitat features must demonstrate that adverse effects will be avoided because the Project will not substantially reduce the capacity of the site to provide important wildlife habitat

functions. The proposed work impacts will result in minimal impacts to the collective wildlife habitat features on the parcel leaving abundant amounts of undisturbed forested habitat for wildlife use as well as enhancing the current habitat to allow for more opportunities for sheltering, foraging, breeding, and nesting. Additionally, the habitat features that are proposed to be impacted are numerous and plentiful throughout the parcel and immediate surrounding area. Impacts to these minor features will not diminish the capacity of the site to support wildlife and do not represent a significant impact to any wildlife habitat features present. Therefore, the capacity of the parcel site to provide important wildlife habitat functions will not be impaired, and there will be No Adverse Effect as a result of this Project.

4 PROPOSED WORK

The purpose of the proposed Project is to stabilize the eroding bank along either side of Stream 1 by stabilizing the existing slope and protecting against future risk of bank erosion. No work is proposed within the jurisdictional wetlands; however, portions of the 100-foot Buffer Zone to BVW and bank may be temporarily affected as a result of the restoration. The proposed restoration plan and details are depicted in Appendix D.

4.1 Bank Stabilization

A combination of stabilization methods will be applied in different stretches of the stream in order to be most effective in correcting the current bank degradation and prevent future degradation. One of such methods is using coir fiber matting which involves installation of a durable biodegradable mat that will be placed over the slope surface that was cleared of rocks, sticks, and grasses in order to ensure matting has proper soil contact. The mat will be placed over a designated portion of the bank and staked into position. Prior to installation of the matting, exposed soils will be seeded with a native herbaceous plant species seed mix specific for erosion control and restoration in moist areas. Seed mix details and installation notes are listed on Sheet 5 of the Design Plan in Appendix D. Coir fiber matting allows plants to grow and establish roots, stabilizing the bank while the matting provides soil moisture and heat retention thereby increasing germination success, reducing soil erosion, and preventing predation of seed. At the toe of slope, root wads from native trees removed from site will be used to reduce flow velocity, decrease sheer stress, and increase bank stability. If on site root wads are not available, log toes will be placed.

Geo-lifts and installation of live fascine slopes are also proposed to improve bank stability. Geo-lifts consist of overlapping soil and/or mulch wraps stabilized with live stakes. For this Project 2 to 3 foot Red-osier dogwood (*Cornus alba*) is proposed as live stakes. At the toe of slope, root wads from removed native trees species will be used or anchor logs if root wads are not available. The area will be seeded with a variety of New England native herbaceous plant species specific for erosion control and restoration in moist areas, specifically New England Erosional Control/ Restoration Mix for Detention Basins and Moist Site seed. Seed mix details and installation notes are listed on Sheet 5 of the Design Plan. If during construction, it is determined that plant plugs will be required, a list of suggested herbaceous plants are listed on Sheet 7 of the Design Plan. In areas that require additional bank support, boulders will be applied. Live fascine stabilization method is similar in design to both geo-lifts and coir fiber matting and are used to protect banks for washout and seepage especially in areas where water tends to fluctuate. Live fascines include the installation of coir fiber matting secured with 2 to 3 foot live stakes. Shallow trenches, parallel to the stream, will be filled with live branch cuttings in order to reduce erosion and shallow sliding. Toe of slope will include rocks which are approximately 2 to 3 feet in diameter. The existing slope will be graded back to a minimum slope achievable without disturbing any existing trees/ tree roots located at the top of the bank.

Though this site contains an intermittent stream, the area receives uncontrolled flow from the nearby detention basin and culvert. To reduce the damage caused by the rush of water, it is important to create an environment that would help reduce flow velocities. The creation of step pools constructed with stone or logs will help reduce flow velocities and create habitat for wildlife. The stone and logs located on site will be used prior to bringing in new material. Please refer to Sheet 6 of the Design Plan.

The proposed work was designed to cause minimal disturbance to the surrounding area. However, a severely undercut portion of the western bank will require regrading. Two trees, a 16-inch dbh red oak and a 5-inch dbh American beech (*Fagus grandifolia*), are located on the edge of the bank and are anticipated to be removed in order for work to be completed. These trees and stumps will be incorporated along the stream channel. Presently, urban refuse, in the form of tires, cement blocks, and metal pipes, are located within the stream channel. As part of the restoration process, all debris will be removed and appropriately disposed off site. The restored area will be re-vegetated with native plant species listed above, further improving the area by providing shelter and foraging habitat for wildlife, as previously, there were few areas for shelter and foraging along bank.

4.2 Avoidance, Minimization, and Mitigation

The proposed restoration is along an intermittent stream which ceases to flow in very dry periods. Work is proposed during the low flow summer months when water is not likely to be flowing within the stream channel. Straw wattles will be placed along either side of the bank to reduce sediment migrating to other portions of the property as well as establishing a limit of work area. Please refer to Site Plan on Sheet 3 for straw wattle location. Staked in straw bales are proposed to span across the northern portion of the stream channel, during the construction phase, to reduce the risk of sediment entering Stream 2 channel.

Sedimentation controls would be inspected daily and repaired as needed. The controls will remain in place until bank is permanently stabilized. If soils are expected to be left exposed for more than 7 consecutive days, the exposed soils will be temporarily stabilized with straw mulch, stabilization blanket, or another adequate stabilization method determined by the contractor.

Trees on site will be protected by identifying their dripline, which is the outermost circumference of the tree's canopy, and avoiding conducting activities that would cause damage to the tree and roots as much as practicable. These activities include, but not limited to parking of vehicles, stockpiling construction materials, excavation, skinning bark.

The temporary construction entrance location shall be determined by the contractor. Work is proposed east of the existing paved roadway and separated by maintained lawn and a residential dwelling. The temporary construction entrance will consist of gravel tracking surface on top of filter fabric. Public roadways will be swept at the end of each work day. This will reduce sediment tracking onto the public roadway. The majority of the parcel is located within 100-foot Buffer Zone to Bank. Storage and staging areas will be determined by the contractor. Storage and stockpiling of materials will occur outside the 100-foot Buffer Zone when practicable. As there is limited room for storage outside the 100-foot Buffer Zone, storage and stockpiling may occur within the Buffer Zone, but with appropriate Best Management Practices, such as storing hazardous materials (e.g., fuel, lubricants, etc.) and refueling outside the Buffer Zone, no adverse impacts are anticipated to Stream 1 or 100-foot Buffer Zone.

4.3 Site Maintenance and Monitoring

During construction all sediment and erosion controls will be inspected daily, maintained per the manufacturer’s specifications, and repaired as needed. Additional controls will be installed if site conditions

warrant them as determined by the contractor. Exposed soils will not be left un-stabilized for more than 7 consecutive days without proper stabilization. Proper stabilization may include the disturbed areas to be covered with 6-inches of mulch or an erosion control blanket installed.

During construction, a weekly visual inspection will be conducted of the coir logs, channel protection, coir blankets and planted vegetation. Any damaged or displaced materials will be repaired and/or replaced. When necessary, area will be reseeded and weeded. If seeding is not taking, planting plugs will be installed. Please refer to maintenance Chart for stabilization devices and suggested list of plantings used for planting plugs on sheet 7 of the Design Plan. It is recommended that the area is monitored for two full growing seasons to ensure the planting have sufficiently established.

5 GENERAL PROVISIONS AND PERFORMACE STANDARDS

5.1 WPA General Provisions and Performance Standards

Limited projects and resource improvement projects must meet the requirements under 310 CMR 10.53. This Project is being filed under 10.53(4)(e)(5), Other Restoration Project "that will improve the natural capacity of a resource area(s) to protect the interests identified in [the WPA], may be permitted as an Ecological Restoration Limited Project provided that the Project meets the eligibility criteria set forth in 310 CMR 10.54(4)(a) though (d)." As a limited project, work within WPA regulated areas can proceed without fully meeting resource area performance standards. However, performance standards at this site will be met to the greatest extent practicable. Table 1 and the following sections detail the general provisions and performance standards under the WPA associated with the regulated wetland resource area in which the proposed work would occur. In addition, this Project meets the general provisions of 10.03 in regard to filing a NOI. The site does not have a Restriction Order and meets the general provisions of section 10.53(1-2) regarding activities within the Buffer Zone

Table 1. General Provisions of all Wetlands and Inland Wetlands (310 CMR 10.03)

Citation	Regulation	Compliance
310 CMR 10.03(1)(a)1.	The area is not significant to the protection of any of the interests identified in the WPA.	The proposed work is located within an intermittent stream which is not located within a NHESP priority or estimated rare species habitat and does not contain shellfish or fish. The proposed work will improve the degraded bank of the intermittent stream and overall improve the resource area.
310 CMR 10.03(1)(a)2.	Work within a resource area will contribute to the protection of the interests of the WPA.	The proposed work that is the subject of this NOI will be located within an area subject to regulation but will not adversely affect any resource areas. The proposed work will improve the eroding bank and in turn reduce sedimentation into the resource area and allow for improvement of the overall habitat.
310 CMR 10.03(1)(a)3.	Work within the buffer zone will contribute to the protection of the interests of the WPA.	Temporary impact of the buffer zone is necessary to in order to access and conduct proposed work along the Bank. All work within the buffer zone will be temporary in nature and disturbed areas will be revegetated and, where needed, restored to pre-

Citation	Regulation	Compliance
		existing conditions. Proposed work will not result in any adverse impacts to regulated wetland resource areas and will not diminish the ability of the project area to contribute to the interests of the WPA.
310 CMR 10.03(1)(b)	Claims of work outside of any jurisdictional area impacting a jurisdictional area must demonstrate the work has had an adverse impact.	Not applicable.
310 CMR 10.03(2)	Credible evidence from a competent source to support the position taken when contesting DEP's position.	Not applicable.
310 CMR 10.03(3)	Installation of subsurface sewage disposal systems.	Not applicable.
310 CMR 10.03(4)	Presumption concerning point-source discharges.	Not applicable.
310 CMR 10.03(5)	Each resource area is presumed to be significant to the interests of the WPA.	The proposed work is designed to stabilize the eroding bank and to improve the water flow through the area, and therefore enhance a degraded area. Temporary impacts will occur within the 100-foot buffer zone to BVW and no work is proposed within the BVW. Proposed work will not result in any adverse impacts to regulated wetland resource areas and will not diminish the ability of the project area to contribute to the interests of the WPA.
310 CMR 10.03(6)	Presumption concerning the application of herbicides.	Not applicable.
310 CMR 10.03(7)(a)	Filing fees for NOIs pursuant to the WPA.	Copies of checks are included in Appendix A.

5.2 Bank (310 CMR 10.54(4))

Work is proposed on both sides of the intermittent stream bank and will consist of regrading and planting native vegetation to stabilize the bank and reduce the risk of future degradation of the site. The proposed work will not limit the Bank's ability to protect the interests specified in 310 CMR 10.54. Please refer to Table 2 for general performance standards for Inland Bank under 310 CMR 10.54(4).

Table 2. General Performance Standards for Inland Bank 310 CMR 10.54(4)

Citation	Regulation	Compliance
310 CMR 10.54(4)(a)(1)	(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;	The Project is proposing to improve bank stability.
310 CMR 10.54(4)(a)(2)	The water carrying capacity of the existing channel within the Bank;	No change in water carrying capacity of the channel is proposed. The existing channel line will not be changed.

Citation	Regulation	Compliance
310 CMR 10.54(4)(a)(3)	Ground water and surface water quality;	The banks are proposed to be vegetated with native shrubs and herbaceous vegetation. The newly vegetated buffer between the stream and top of bank will reduce sedimentation of downstream resource areas
310 CMR 10.54(4)(a)(4)	The capacity of the Bank to provide breeding habitat, escape cover and food for fisheries;	This is an intermittent stream and unlikely to be effectively used by fish. However, as part of the proposed work, riffles and pools will be created providing habitat for wildlife.
310 CMR 10.54(4)(a)(5)	The capacity of the Bank to provide important wildlife habitat functions.	Currently the bank is slumping and caving with little vegetation. The proposed work will stabilize and re-vegetate the bank with shrubs and herbaceous vegetation. The shrubs will provide an area for nesting, perching, foraging, and refuge while the herbaceous vegetation will provide nectar and refuge.
310 CMR 10.54(4)(a)(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…	No stream crossings are proposed as part of this Project.
310 CMR 10.54(4)(b)	Notwithstanding the provisions of 310 CMR 10.54(4)(a), structures may be permitted in or on a Bank when required to prevent flood damage to facilities, buildings and roads…	No structures required to prevent flood damage to facilities, buildings, or roads are proposed as part of this Project.
310 CMR 10.54(4)(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.	The proposed project is outside of NHESP mapped habitat for rare species.

5.3 Land under Water Bodies and Waterways (310 CMR 10.56(4))

Impacts to LUW consist of step pool construction out of stone or logs. While proposed work will impact LUW, the work will help reduce flow velocities and create habitat for wildlife. Project activities are not anticipated to limit LUW's ability to protect the interests specified in 310 CMR 10.56. Table 3 lists the general performance standards for LUW.

Table 3. General Performance Standards for Land under Water Bodies and Waterways 310 CMR 10.56(4)

Citation	Regulation	Compliance
310 CMR 10.56(4)(a)(1)	The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;	No change in water carrying capacity of the channel is proposed. The existing channel line will not be changed.
310 CMR 10.56(4)(a)(2)	Ground and surface water quality;	The Project proposed to enhance the banks by vegetating them with native shrubs and herbaceous vegetation. The newly vegetated buffer between the stream and top of bank will reduce sedimentation of downstream resource areas
310 CMR 10.56(4)(a)(3)	The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and	This is an intermittent stream and unlikely to be effectively used by fish. However, as part of the proposed installation of riffles and pools will provide habitat for aquatic organisms if any are in the area.
310 CMR 10.56(4)(a)(4)	The capacity of said land to provide important wildlife habitat functions…	The work is proposed within an intermittent stream. As part of the proposed work, riffles and pools will be created providing habitat for wildlife.
310 CMR 10.56(4)(a)(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…	No culvert installation, replacement, or stream crossing is proposed.
310 CMR 10.56(4)(b)	Notwithstanding the provisions of 310 CMR 10.56(4)(a), the issuing authority may issue an Order in accordance with M.G.L. c. 131, § 40 to maintain or improve boat channels within Land under Water Bodies and Waterways…	This is an intermittent stream and is not a navigable waterbody.
310 CMR 10.56(4)(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 proposed project is outside of NHESP mapped habitat for rare species.

5.4 Sudbury Bylaw Performance Standards

The proposed activities are located within 100-foot Buffer Zone to Inland Bank of intermittent stream and BVW and within Bank and LUW only. The work area is not proposed within or in the vicinity of NHESP priority and estimated habitats of rare species. The proposed work is not anticipated to have an adverse impact on the resource areas. In addition, two trees are anticipated to be removed as part of this Project.

5.4.1 Tree Removal Performance Standards

As part of Section 7.14, "Property owners wishing to remove trees that are not imminent threats and show no signs of being compromised will be required to submit a restoration planting plan to preserve and enhance the wetland and adjacent upland values and functions."

The two trees proposed for removal are a 16-inch dbh red oak and a 5-inch dbh American beech located near the existing top of bank with their roots exposed. In order to stabilize the bank, the bank would need to be graded to apply the appropriate stabilization method. The tree roots would therefore need to be cut back which would damage the tree. The two trees proposed for removal will be incorporated in the stream restoration design. In addition, as part of bank stabilization, the newly stabilized bank will be revegetated with live red-osier dogwood and native seed mix. Please refer to Design Plan in Appendix D.

5.4.2 Alternative Analysis for Activities within Adjacent Upland Areas

The proposed work is not within Riverfront Area and therefore does not require an alternative analysis under the WPA. However, an alternative analysis is required for work falling within the adjacent upland areas which includes "all lands within 100 feet of wetland resource areas as enumerated in Section 2". Three alternatives were reviewed in accordance with the Bylaw. The proposed work is a bank restoration /stabilization Project occurring at the site of erosion, there is no alternative location for the work

5.4.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no work to restore the ecological integrity and functions of the stream would occur. The stream would continue to erode and degrade the banks. This alternative does not meet the Project's objectives and was not selected.

5.4.2.2 HARD ARMORING OF THE BANK

The Hard engineering alternative would include armoring the walls of the existing stream bank with rip rap. This is an expensive option which will require the use of heavy machinery to set the large stones and will require greater amount of onsite disturbance in order to properly access the site. This option will also not construct an area for additional vegetation planting and habitat enhancement. Therefore, this alternative was not selected as the preferred alternative.

5.4.2.3 BIORESTORATION OF THE BANK

The third alternative is the preferred option that is proposed in this NOI, which is a more natural approach that ensures that no impact will occur to BVW and maximizes the potential for stability and habitat diversity while still allowing to proceed in an efficient manner.

6 CONCLUSION

The work proposed in this NOI is designed to stabilize the eroding embankment on both the eastern and western bank along an unnamed intermittent stream (Stream 1) flowing through the residential property at

4 Dawson Drive, Sudbury. Presently, both banks are unstable with active bank slumping and failures due to flashy storm events. The proposed work will stabilize the bank, reduce the risk of future degradation of the site and habitat and improve stream connectivity by removing excessive sediment buildup and man-made debris. Restoration plantings will help increase the presence of native plant species in the area and increase nectar producing plants. This work is filed as a resource improvement project under CMR 10.53(4) and meets the provisions under that section of the WPA as well as the Sudbury Wetlands Protection Bylaw Regulations. The proposed Project will result in a net ecological uplift and protects the interests of the WPA. Therefore, we respectfully request the Sudbury Conservation Commission to issue an Order of Conditions in support of this Project.

7 REFERENCES CITED/LITERATURE CITED

Cowardin, L. M. (1979). Classification of wetlands and deepwater habitats of the United States. Washington, D.C., Fish and Wildlife Service, U.S. Dept. of the Interior.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Federal Emergency Management Agency (FEMA). 2014. Flood Insurance Rate Map (FIRM), Middlesex County, Massachusetts, Map No. 25017C0508F.

Guidance. 2006. Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands. MassDEP, Bureau of Resource Protection, Wetlands and Waterways Program, Boston, MA. 19 pp.

Massachusetts Department of Environmental Protection (MassDEP). 1995. Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act, A Handbook. March 1995.

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MassGIS. 2021a. NHESP Priority Habitats of Rare Wildlife. Available online at https://docs.digital.mass.gov/dataset/massgis-data-nhesp-priority-habitats-rare-species. Accessed February 2022.

MassGIS. 2021b. NHESP Estimated Habitats of Rare Wildlife. Available online at https://docs.digital.mass.gov/dataset/massgis-data-nhesp-estimated-habitats-rare-wildlife. Accessed February 2022.

MassGIS. 2021c. NHESP Certified Vernal Pools. Available online at https://www.mass.gov/info-details/massgis-data-nhesp-certified-vernal-pools . Accessed February 2022.

MassGIS 2021d. NHESP Potential Vernal Pools. Available online at https://www.mass.gov/info-details/massgis-data-nhesp-potential-vernal-pools . Accessed February 2022.

U.S. Army Corps of Engineers. 2011. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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APPENDIX A

WPA Form 3

Ecological Restoration Checklist Form 3A

Copies of Checks

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

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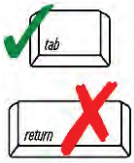
Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



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

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

4 Dawson Drive — a. Street Address
Sudbury — b. City/Town
01776 — c. Zip Code

Latitude and Longitude:
42.342662 — d. Latitude
-71.406998 — e. Longitude

M10 — f. Assessors Map/Plat Number
0601 — g. Parcel /Lot Number

2. Applicant:

Susan — a. First Name
Berry — b. Last Name
c. Organization
4 Dawson Drive — d. Street Address
Sudbury — e. City/Town
MA — f. State
01776 — g. Zip Code
h. Phone Number
i. Fax Number
namaberry@gmail.com — j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name
b. Last Name
c. Organization
d. Street Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Polina — a. First Name
Safran — b. Last Name
SWCA Environmental Consultants — c. Company
1900 West Park Drvie — d. Street Address
Westborough — e. City/Town
MA — f. State
01581 — g. Zip Code
781-801-4973 — h. Phone Number
i. Fax Number
polina.safran@swca.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

110 — a. Total Fee Paid
42.50 — b. State Fee Paid
67.50 — c. City/Town Fee Paid

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A. General Information (continued)

6. General Project Description:

Stabalization of bank associated with an unnamed intermittent stream located behind a residential dwelling. Stabilization involves coir fiber matting installation, geo-lifts, and construction of step pools. Work will take place in Lund Under Water, Inland Bank, and within 100-ft Buffer Zone to Bordering Vegeted Wetland.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.53(4) Resource Improvement
2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex
a. County

b. Certificate # (if registered land)

74055
c. Book

222
d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☒ Bank	209 (1. linear feet)	209 (2. linear feet)
b. ☐ Bordering Vegetated Wetland	(1. square feet)	(2. square feet)
c. ☒ Land Under Waterbodies and Waterways	1,942 (1. square feet); 0 (3. cubic yards dredged)	1,942 (2. square feet)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	(1. square feet); (3. cubic feet of flood storage lost)	(2. square feet); (4. cubic feet replaced)
e. ☐ Isolated Land Subject to Flooding	(1. square feet); (2. cubic feet of flood storage lost)	(3. cubic feet replaced)
f. ☐ Riverfront Area	(1. Name of Waterway (if available) - **specify coastal or inland**)	

2. Width of Riverfront Area (check one):

   ☐ 25 ft. - Designated Densely Developed Areas only

   ☐ 100 ft. - New agricultural projects only

   ☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: ____ square feet

4. Proposed alteration of the Riverfront Area:

   a. total square feet ____ b. square feet within 100 ft. ____ c. square feet between 100 ft. and 200 ft. ____

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☒ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW	b. square feet of Salt Marsh
0	0

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings	b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

☒ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☒ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   2021
   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-review).
Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review).
Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☒ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

c. ☐ Is this an aquaculture project? d. ☐ Yes ☐ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).

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C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☐ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☒ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☒ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Stream Bank Ecological Restoration
a. Plan Title

Paula Green, SWCA Environmental Consultants
b. Prepared By

c. Signed and Stamped by

1/24/2022
d. Final Revision Date

1"= 10'
e. Scale

Fig. 2 Environmental Resource Map
f. Additional Plan or Document Title

4/6/2022
g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☐ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

1794
2. Municipal Check Number

4/18/2022
3. Check date

1793
4. State Check Number

4/18/2022
5. Check date

Susan
6. Payor name on check: First Name

Berry
7. Payor name on check: Last Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Susanna I. Swig
1. Signature of Applicant

6/9/2022
2. Date

3. Signature of Property Owner (if different)

4. Date

Polina Safran
5. Signature of Representative (if any)

6/9/2022
6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

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

A. Applicant Information

1. Location of Project:

4 Dawson Drive a. Street Address	Sudbury b. City/Town
1793 c. Check number	$42.50 d. Fee amount

2. Applicant Mailing Address:

Susan a. First Name	Berry b. Last Name

c. Organization

4 Dawson Drive
d. Mailing Address

Sudbury e. City/Town	MA f. State	01776 g. Zip Code

h. Phone Number	i. Fax Number	namaberry@gmail.com j. Email Address

3. Property Owner (if different):

a. First Name	b. Last Name

c. Organization

d. Mailing Address

e. City/Town	f. State	g. Zip Code

h. Phone Number	i. Fax Number	j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

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NOI Wetland Fee Transmittal Form

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 1d	1	$110	$110

Step 5/Total Project Fee: $110

Step 6/Fee Payments:

Total Project Fee:	$110 (a. Total Fee from Step 5)
State share of filing Fee:	42.50 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	67.50 (c. 1/2 Total Fee **plus** $12.50)

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

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

Eligibility Checklist

Provided by MassDEP:

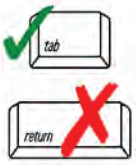
MassDEP File Number

Document Transaction Number

Sudbury
City/Town

This Ecological Restoration Limited Project Eligibility Checklist guides the applicant in determining if their project is eligible to file as an Inland or Coastal Ecological Restoration Limited Project (310 CMR 10.53(4) or 310 CMR 10.24(8) respectively). These criteria must be met when submitting the Ecological Restoration Limited Project Notice of Intent to ensure that the restoration and improvement of the natural capacity of a Resource Area(s) to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

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



Regulatory Features of All Coastal and Inland Ecological Restoration Limited Projects

(a) May result in the temporary or permanent loss of/or conversion of Resource Area: An Ecological Restoration Limited Project that meets the requirements of 310 CMR 10.24(8) may result in the temporary or permanent loss of Resource Areas and/or the conversion of one Resource Area to another when such loss is necessary to the achievement of the project's ecological restoration goals.

(b) Exemption from wildlife habitat evaluation: A NOI for an Ecological Restoration Limited Project that meets the minimum requirements for Ecological Restoration Projects and for a MassDEP Combined Application outlined in 310 CMR 10.12(1) and (2) is exempt from providing a wildlife habitat evaluation (310 CMR 10.60).

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

(c) The following are considerations for applicants filing an Ecological Restoration Limited Project NOI and for the issuing authority approving a project as an Ecological Restoration Limited Project:

☒ The condition of existing and historic Resource Areas proposed for restoration.

☒ Evidence of the extent and severity of the impairment(s) that reduce the capacity of the Resource Areas to protect and sustain the interests identified in M.G.L. c. 131, § 40.

☒ The magnitude and significance of the benefits of the Ecological Restoration Project in improving the capacity of the affected Resource Areas to protect and sustain the other interests identified in M.G.L. c. 131, § 40.

☒ The magnitude and significance of the impacts of the Ecological Restoration Project on existing Resource Areas that may be modified, converted and/or lost and the interests for which said Resource Areas are presumed significant in 310 CMR 10.00, and the extent to which the project will:

a. avoid adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that can be avoided without impeding the achievement of the project's ecological restoration goals.

b. minimize adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that are necessary to the achievement of the project's ecological restoration goals.

c. utilize best management practices such as erosion and siltation controls and proper construction sequencing to avoid and minimize adverse construction impacts to resource areas and the interests identified in M.G.L. c. 131, § 40.

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WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

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

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Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8))

Complete this Eligibility Criteria Checklist ***before*** filling out a Notice of Intent Application to determine if your project qualifies as a Coastal Ecological Restoration Limited Project. (310 CMR 10.24(8)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects

Notwithstanding the requirements of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and the Wildlife Habitat evaluations in 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.24(8)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in the WPA M.G.L. provided that the project meets all the requirements in 310 CMR 10.24 (8).

☒ The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.24(8)(e)].

☐ Tidal Restoration.

☐ Shellfish Habitat Restoration.

☒ Other Ecological Restoration Limited Project Type.

☒ The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.

- ☐ Protection of public or private water supply.
- ☐ Protection of ground water supply.
- ☐ Flood control.
- ☒ Storm damage prevention.
- ☒ Prevention of pollution.
- ☐ Protection of land containing shellfish.
- ☐ Protection of fisheries.
- ☒ Protection of wildlife habitat.

☐ If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will not have any adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

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

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Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects (cont.)

☐ If the project is located in a Coastal Dune or Barrier Beach, the project avoids and minimizes armoring of the Coastal Dune or Barrier Beach to the maximum extent practicable.

☐ The project complies with all applicable provisions of 310 CMR 10.24(1) through (6) and 310 CMR 10.24(9) and (10).

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

☐ This Ecological Restoration Limited Project application meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.24(8)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below.

☐ **Tidal Restoration Projects**

☐ A project to restore tidal flow that will not significantly increase flooding or storm damage impacts to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.

☐ **Shellfish Habitat Restoration Projects**

☐ The project has received a Special Projects Permit from the Division of Marine Fisheries or, if a municipality, has received a shellfish propagation permit.

☐ The project is made of cultch (e.g., shellfish shells from oyster, surf or ocean clam) or is a structure manufactured specifically for shellfish enhancement (e.g., reef blocks, reef balls, racks, floats, rafts, suspended gear).

☐ **Other Ecological Restoration Projects** that meet the criteria set forth in 310 CMR 10.24(8)(a) through (d).

☐ Restoration, enhancement, or management of Rare Species habitat.

☐ Restoration of hydrologic and habitat connectivity.

☐ Removal of aquatic nuisance vegetation to impede eutrophication.

☐ Thinning or planting of vegetation to improve habitat value.

☐ Fill removal and re-grading.

☐ Riparian corridor re-naturalization.

☐ River floodplain re-connection.

Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- ☐ In-stream habitat enhancement.
- ☐ Remediation of historic tidal wetland ditching.
- ☐ Eelgrass restoration.
- ☐ Invasive species management.
- ☐ Installation of fish passage structures.
- ☐ Other. Describe: _____

☐ This project involves the construction, repair, replacement or expansion of public or private infrastructure (310 CMR 10.24(9).

- ☐ The NOI attachment labeled _____ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
- ☐ The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.
- ☐ This project proposes to replace an existing stream crossing (310 CMR 10.24(10). The crossing complies with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI. The crossing type:
  - ☐ Replaces an existing non-tidal crossing that is part of an Anadromous/Catadromous Fish Run (310 CMR 10.35)
  - ☐ Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.
- ☐ At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:
  - ☐ The potential for downstream flooding;
  - ☐ Upstream and downstream habitat (in-stream habitat, wetlands);
  - ☐ Potential for erosion and head-cutting;
  - ☐ Stream stability;
  - ☐ Habitat fragmentation caused by the crossing;
  - ☐ The amount of stream mileage made accessible by the improvements;
  - ☐ Storm flow conveyance;

Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- ☐ Engineering design constraints specific to the crossing;
- ☐ Hydrologic constraints specific to the crossing;
- ☐ Impacts to wetlands that would occur by improving the crossing;
- ☐ Potential to affect property and infrastructure; and
- ☐ Cost of replacement.

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4))

Complete this Eligibility Criteria Checklist ***before*** filling out a Notice of Intent Application to determine if your project qualifies as an Inland Ecological Restoration Limited Project. (310 CMR 10.53(4)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

General Eligibility Criteria for All Inland Ecological Restoration Limited Projects

Notwithstanding the requirements of any other provision of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.53(4)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in M.G.L. c. 131, § 40, provided that:

☒ The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.53(4)(e)].

- ☐ Dam Removal
- ☐ Freshwater Stream Crossing Repair and Replacement
- ☐ Stream Daylighting
- ☐ Tidal Restoration
- ☐ Rare Species Habitat Restoration
- ☐ Restoring Fish Passageways
- ☒ Other (describe project type): Intermittent stream bank stabilization

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

General Eligibility Criteria for All Inland Ecological Restoration Limited Projects

☒ The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.

- ☐ Protection of public or private water supply
- ☐ Protection of ground water supply
- ☐ Flood control
- ☒ Storm damage prevention
- ☒ Prevention of pollution
- ☐ Protection of land containing shellfish
- ☐ Protection of fisheries
- ☒ Protection of wildlife habitat

☐ If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will have no adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.

☐ The project will be carried out in accordance with any time of year restrictions or other conditions recommended by the Division of Marine Fisheries for coastal waters and the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3).

☐ If the project involves the dredging of 100 cubic yards of sediment or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification has been applied for or obtained.

☒ The project complies with all applicable provisions of 310 CMR 10.53(1), (2), (7), and (8).

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

Additional Eligibility Criteria for Specific Inland Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

☒ This project application meets the eligibility criteria for Ecological Restoration Limited Project in accordance with [310 CMR 10.53(4)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below:

☐ **Dam Removal**

☐ Project is consistent with MassDEP's 2007 Dam Removal Guidance.

☐ **Freshwater Stream Crossing Repair and Replacement**. The project as proposed and the NOI describes how:

☐ Meeting the eligibility criteria set forth in 310 CMR 10.13 would result in significant stream instability or flooding hazard that cannot otherwise be mitigated, and site constraints make it impossible to meet said criteria.

☐ The project design ensures that the stability of the bank is NOT impaired.

☐ To the maximum extent practicable, the project provides for the restoration of the stream upstream and downstream of the structure as needed to restore stream continuity and eliminate barriers to aquatic organism movement.

☐ The project complies with the requirements of 310 CMR 10.53(7) and (8).

☐ **Stream Daylighting Projects**

☐ The project meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.53(4)(a) through (d)] and as proposed the NOI describes how the proposed project meets to the maximum extent practicable, consistent with the project's ecological restoration goals, all the performance standards for Bank and Land Under Water Bodies and Waterways.

☐ The project meets the requirements of 310 CMR 10.12(1) and (2) and a wildlife habitat evaluation is not included in the NOI.

☐ **Tidal Restoration Project**

☐ Restores tidal flow.

☐ the project, including any proposed flood mitigation measures, will not significantly increase flooding or storm damage to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.

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Appendix A: Ecological Restoration Limited Project Checklists

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

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Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

☒ **Other Ecological Restoration Projects** that meet the criteria set forth in 310 CMR 10.53 (4) (a) through (d).

- ☐ Restoration, enhancement, or management of Rare Species habitat.
- ☐ Restoration of hydrologic and habitat connectivity.
- ☐ Removal of aquatic nuisance vegetation to impede eutrophication.
- ☐ Thinning or planting of vegetation to improve habitat value.
- ☐ Riparian corridor re-naturalization.
- ☐ River floodplain re-connection.
- ☒ In-stream habitat enhancement.
- ☒ Fill removal and re-grading.
- ☐ Flow restoration.
- ☐ Installation of fish passage structures.
- ☒ Invasive species management.
- ☐ Other. Describe: _____

☐ This project involves the construction, repair, replacement or expansion of public or private infrastructure. (310 CMR 10.53(7))

- ☐ The NOI attachment labeled _____ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
- ☐ The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.

☐ This project replaces an existing stream crossing (310 CMR 10.53(8)). The crossing type:

- ☐ Replaces an existing non-tidal crossing designed to comply with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI.
- ☐ Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

☒ At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:

- ☐ The potential for downstream flooding;
- ☒ Upstream and downstream habitat (in-stream habitat, wetlands);
- ☐ Potential for erosion and head-cutting;
- ☒ Stream stability;
- ☐ Habitat fragmentation caused by the crossing;
- ☒ The amount of stream mileage made accessible by the improvements;
- ☐ Storm flow conveyance;
- ☐ Engineering design constraints specific to the crossing;
- ☐ Hydrologic constraints specific to the crossing;
- ☐ Impacts to wetlands that would occur by improving the crossing;
- ☐ Potential to affect property and infrastructure; and
- ☐ Cost of replacement.

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Required Actions (310 CMR 10.11)

Complete the Required Actions before submitting a Notice of Intent Application for an Ecological Restoration Project and submit a completed copy of this Checklist with the Notice of Intent.

☒ **Massachusetts Environmental Policy Act (MEPA) / Environmental Monitor**
http://www.mass.gov/eea/agencies/mepa/submitting-notices-to-the-environmental-monitor.html

For Ecological Restoration Limited Projects, there are no changes to MEPA requirements.

☒ Submit written notification at least 14 days prior to the filing of a Notice of Intent (NOI) to the Environmental Monitor for publication. A copy of the written notification is attached and provides at minimum:

- ☒ A brief description of the proposed project.
- ☒ The anticipated NOI submission date to the conservation commission.
- ☒ The name and address of the conservation commission that will review the NOI.
- ☒ Specific details as to where copies of the NOI may be examined or acquired and where to obtain the date, time, and location of the public hearing.

☐ **Massachusetts Endangered Species Act (MESA) /Wetlands Protection Act Review**

☐ Preliminary Massachusetts Endangered Species Act Review from the Natural Heritage and Endangered Species Program (NHESP) has been met and the written determination is attached.

☐ Supplemental Information for Endangered Species Review has been submitted.

1. ☐ Percentage/acreage of property to be altered:
   a. Within Wetland Resource Area _____ Percentage/acreage
   b. Outside Wetland Resource Area _____ Percentage/acreage
2. ☐ Assessor's Map or right-of-way plan of site
3. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work.
4. ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)
5. ☐ Photographs representative of the site
6. ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm)

Required Actions (310 CMR 10.11) (cont.)

Make check payable to "Commonwealth of Massachusetts - NHESP" and mail to NHESP:

Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

7. Projects altering 10 or more acres of land, also submit:

   a. ☐ Vegetation cover type map of site

   b. ☐ Project plans showing Priority & Estimated Habitat boundaries

OR Check One of the Following:

1. ☐ Project is exempt from MESA review.

Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59 – see C4 below)

2. ☐ Separate MESA review ongoing.

a. NHESP Tracking # _____ b. Date submitted to NHESP _____

3. ☐ Separate MESA review completed. Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

☐ **Estimated Habitat Map of State-Listed Rare Wetlands Wildlife**

If a portion of the proposed project is located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP), complete the portion below. To view habitat maps, see the **Massachusetts Natural Heritage Atlas** or view the maps electronically at: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review

☐ A preliminary written determination from Natural Heritage and Endangered Species Program (NHESP) must be obtained indicating that:

☐ Project will NOT have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP.

☐ Project will have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP. A copy of NHESP's written preliminary determination in accordance with 310 CMR 10.11(2) is attached. This specifies:

☐ Date of the map: _____

Required Actions (310 CMR 10.11) (cont.)

☐ If the Rare Species identified is/are likely to continue to be located on or near the project, and if so, whether the Resource Area to be altered is in fact part of the habitat of the Rare Species.

☐ That if the project alters Resource Area(s) within the habitat of a Rare Species:

☐ The Rare Species is identified;

☐ NHESP's recommended changes or conditions necessary to ensure that the project will have no short or long term adverse effect on the habitat of the local population of the Rare Species is provided; or

☐ An approved NHESP habitat management plan is attached with this Notice of Intent.

Send the request for a preliminary determination to:
Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

☐ **Division of Marine Fisheries**

☐ If the project will occur within a coastal waterbody with a restricted Time of Year, [see Appendix B of the Division of Marine Fisheries (DMF) Technical Report TR 47 "Marine Fisheries Time of Year Restrictions (TOYs) for Coastal Alteration Projects" dated April 2011 http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/NEGP/MADMFTR-47.pdf].

☐ Obtain a DMF written determination stating:

☐ The proposed work does NOT require a TOY restriction.

☐ The proposed work requires a TOY restriction. Specific recommended TOY restriction and recommended conditions on the proposed work is attached.

☐ If the project may affect a diadromous fish run [re: Division of Marine Fisheries (DMF) Technical Reports TR 15 through 18, dated 2004: http://www.mass.gov/eea/agencies/dfg/dmf/publications/technical.html]

☐ Obtain a DMF written determination stating:

☐ The design specifications and operational plan for the project are compatible with the passage requirements of the fish run.

☐ The design specifications and operational plan for the project are not compatible with the passage requirements of the fish run.

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Required Actions (310 CMR 10.11) (cont.)

Send the request for a written or electronic determination to:

South Shore – Cohasset to Rhode Island border, and the Cape & Islands:
Division of Marine Fisheries –
South Coast Field Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore – Hull to New Hampshire border:
Division of Marine Fisheries –
North Shore Field Station
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

☐ **Division of Fisheries and Wildlife –** http://www.mass.gov/eea/agencies/dfg/dfw/

☐ Projects that involve silt-generating, in-water work that will impact a non-tidal perennial river or stream and the in-water work will not occur between May 1 and August 30.

☐ Obtain a written determination from the Division of Fisheries and Wildlife (DFW) as to whether the proposed work requires a TOY restriction.

☐ The proposed work does NOT require a TOY restriction.

☐ The proposed work requires a TOY restriction. The DFW determination with TOY restriction and other conditions is attached.

☐ **MassDEP Water Quality Certification**

☐ Project involves dredging of 100 cubic yards or more in a Resource Area or dredging of any amount in an Outstanding Resource Water (ORW). A copy and proof of the MassDEP Water Quality Certification pursuant to 314 CMR 9.00 is attached to the NOI.

☐ This project is a Combined Permit Application for 401 Dredging and Restoration (BRP WW 26).

☒ **MassDEP Wetlands Restriction Order**

Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

☐ Yes ☒ No

☐ **Department of Conservation and Recreation**

Office of Dam Safety

☐ For Dam Removal Projects, obtain a written determination from the Department of Conservation and Recreation Office of Dam Safety that the dam is not subject to the jurisdiction of the Office under 302 CMR 10.00, a written determination that the dam removal does not require a permit under 302 CMR 10.00 or a permit authorizing the dam removal in accordance with 302 CMR 10.00 has been issued.

WPA Form 3 – Notice of Intent Appendix A: Ecological Restoration Limited Project Checklists

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

Required Actions (310 CMR 10.11) (cont.)

Areas of Critical Environmental Concern (ACECs)

Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations).

Name of ACEC

Minimum Required Documents (310 CMR 10.12)

Complete the Required Documents Checklist below and provide supporting materials before submitting a Notice of Intent Application for an Ecological Restoration Project.

☒ This Notice of Intent meets all applicable requirements outlined in for Ecological Restoration Projects in 310 CMR 10.12. Use the checklist below to insure that all documentation is included with the NOI.

At a minimum, a Notice of Intent for an Ecological Restoration Project shall include the following:

☒ Description of the project's ecological restoration goals;

☒ The location of the Ecological Restoration Project;

☒ Description of the construction sequence for completing the project;

☒ A map of the Areas Subject to Protection Under M.G.L. c. 131, § 40, that will be temporarily or permanently altered by the project or include habitat for Rare Species, Habitat of Potential Regional and Statewide Importance, eel grass beds, or Shellfish Suitability Areas.

☒ The method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.) is attached with documentation methodology.

☒ List the titles and dates for all plans and other materials submitted with this NOI.

Stream Bank Ecological Restoration
a. Plan Title

Paula Green, SWCA Environmental Consultants
b. Prepared by

c. Signed and Stamped by

1/24/2022
d. Final Revision Date

1"=10'
e. Scale

Fig. 2 Environmental Resource Map
f. Additional Plan or Document Title

4/6/2022
g. Date

☐ If there is more than one property owner, attach a list of these property owners not listed on this form.

☒ Attach NOI Wetland Fee Transmittal Form.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

Minimum Required Documents (310 CMR 10.12)

- ☐ An evaluation of any flood impacts that may affect the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure as well as any proposed flood impact mitigation measures;
- ☐ A plan for invasive species prevention and control;
- ☐ The Natural Heritage and Endangered Species Program written determination in accordance with 310 CMR 10.11(2), if needed;
- ☐ Any Time of Year restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3), (4), (5), if needed;
- ☒ Proof that notice was published in the Environmental Monitor as required by 310 CMR 10.11(1;
- ☒ A certification by the applicant under the penalties of perjury that the project meets the eligibility criteria set forth in 310 CMR 10.13;
- ☐ If the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan to ensure that the infrastructure will continue to function as designed;
- ☐ If the project involves dredging of 100 cubic yards or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00;
- ☐ If the Ecological Restoration Project involves work on a stream crossing, information sufficient to make the showing required by 310 CMR 10.24(10) for work in a coastal resource area and 310 CMR 10.53(8) for work in an inland resource area; and
- ☐ If the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.
- ☐ This project is subject to provisions of the MassDEP Stormwater Management Standards. A copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) is attached.
- ☐ Provide information as the whether the project has the potential to impact private water supply wells including agricultural or aquacultural wells or surface water withdrawal points.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

Certification that the Ecological Restoration Project Meets the Eligibility Criteria

I hereby certify under penalties of perjury that the Ecological Restoration Project Notice of Intent application does not meet the Eligibility criteria for an Ecological Restoration Order of Conditions set forth in 310 CMR 10.13, but does meet the Eligibility Criteria for a Ecological Restoration Limited Project set forth in 10.24(8) or 10.53(4) whichever is applicable. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

Susan L. Berry

Signature of Applicant or Authorized Agent

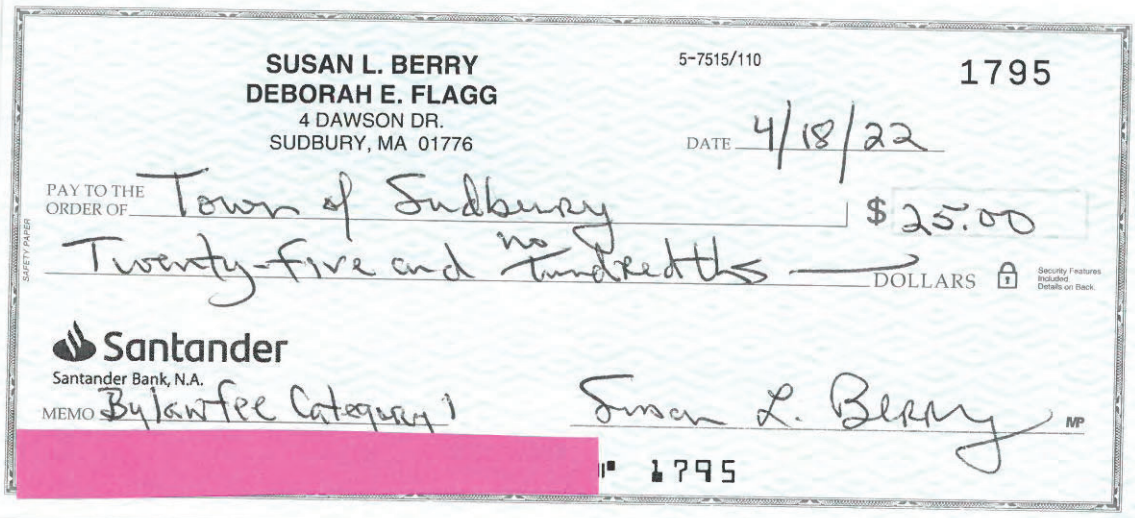
Susan Berry

Printed Name of Applicant or Authorized Agent

6/9/2022

Date

The certification must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 2) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.



SUSAN L. BERRY
DEBORAH E. FLAGG
4 DAWSON DR.
SUDBURY, MA 01776

5-7515/110

1795

DATE 4/18/22

PAY TO THE ORDER OF Town of Sudbury $ 25.00

Twenty-five and no hundredths DOLLARS

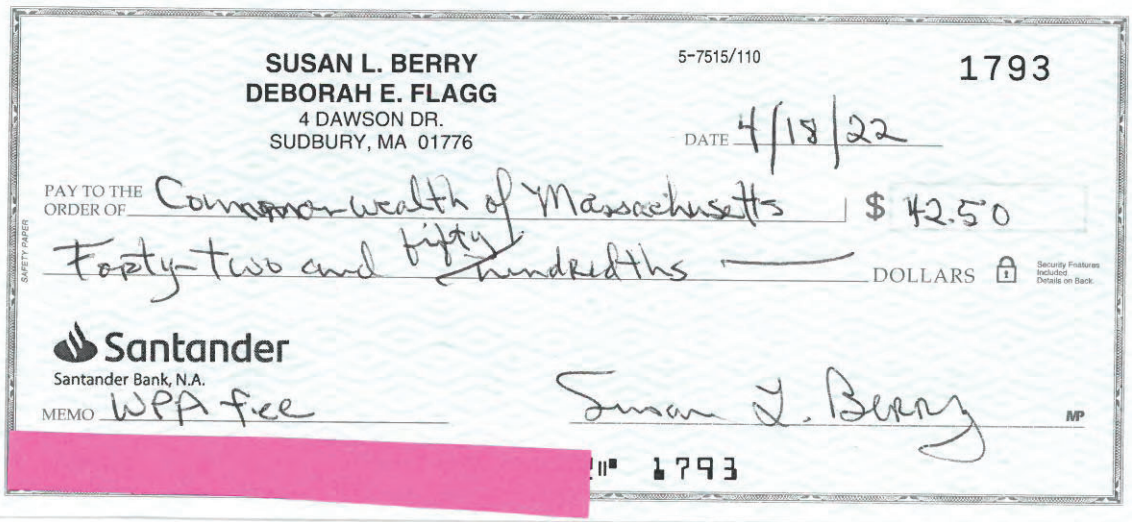
Security Features Included Details on Back.

Santander
Santander Bank, N.A.

MEMO Bylaw fee Category 1

Susan L. Berry MP

[redacted] 1795



SUSAN L. BERRY
DEBORAH E. FLAGG
4 DAWSON DR.
SUDBURY, MA 01776

5-7515/110

1793

DATE 4/18/22

PAY TO THE ORDER OF Commonwealth of Massachusetts $ 42.50

Forty-two and fifty hundredths DOLLARS

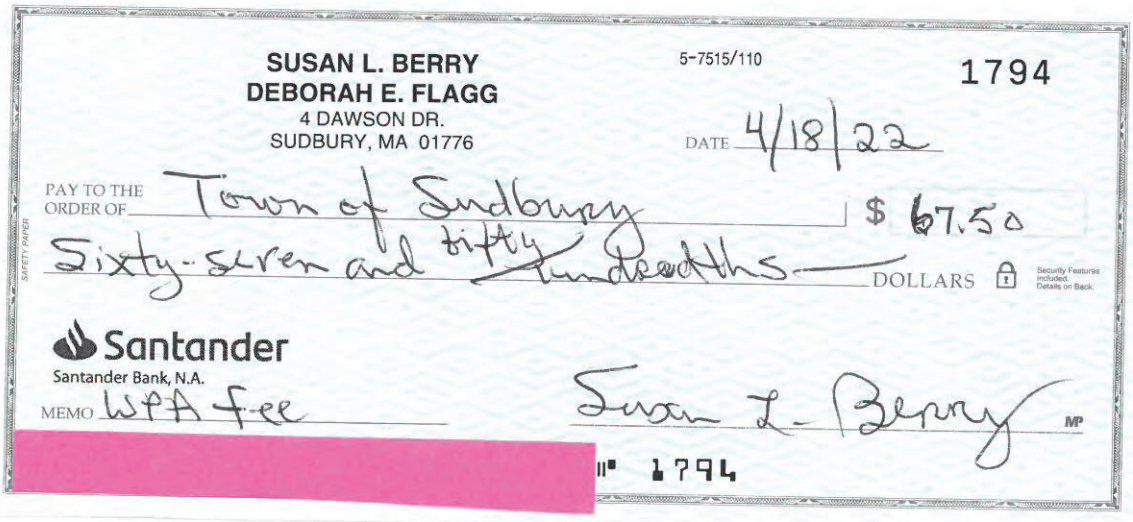
Security Features Included Details on Back.

Santander
Santander Bank, N.A.

MEMO WPA fee

Susan L. Berry MP

[redacted] 1793



SUSAN L. BERRY
DEBORAH E. FLAGG
4 DAWSON DR.
SUDBURY, MA 01776

5-7515/110

1794

DATE 4/18/22

PAY TO THE ORDER OF Town of Sudbury $ 67.50

Sixty-seven and fifty hundredths DOLLARS

Security Features Included Details on Back.

Santander
Santander Bank, N.A.

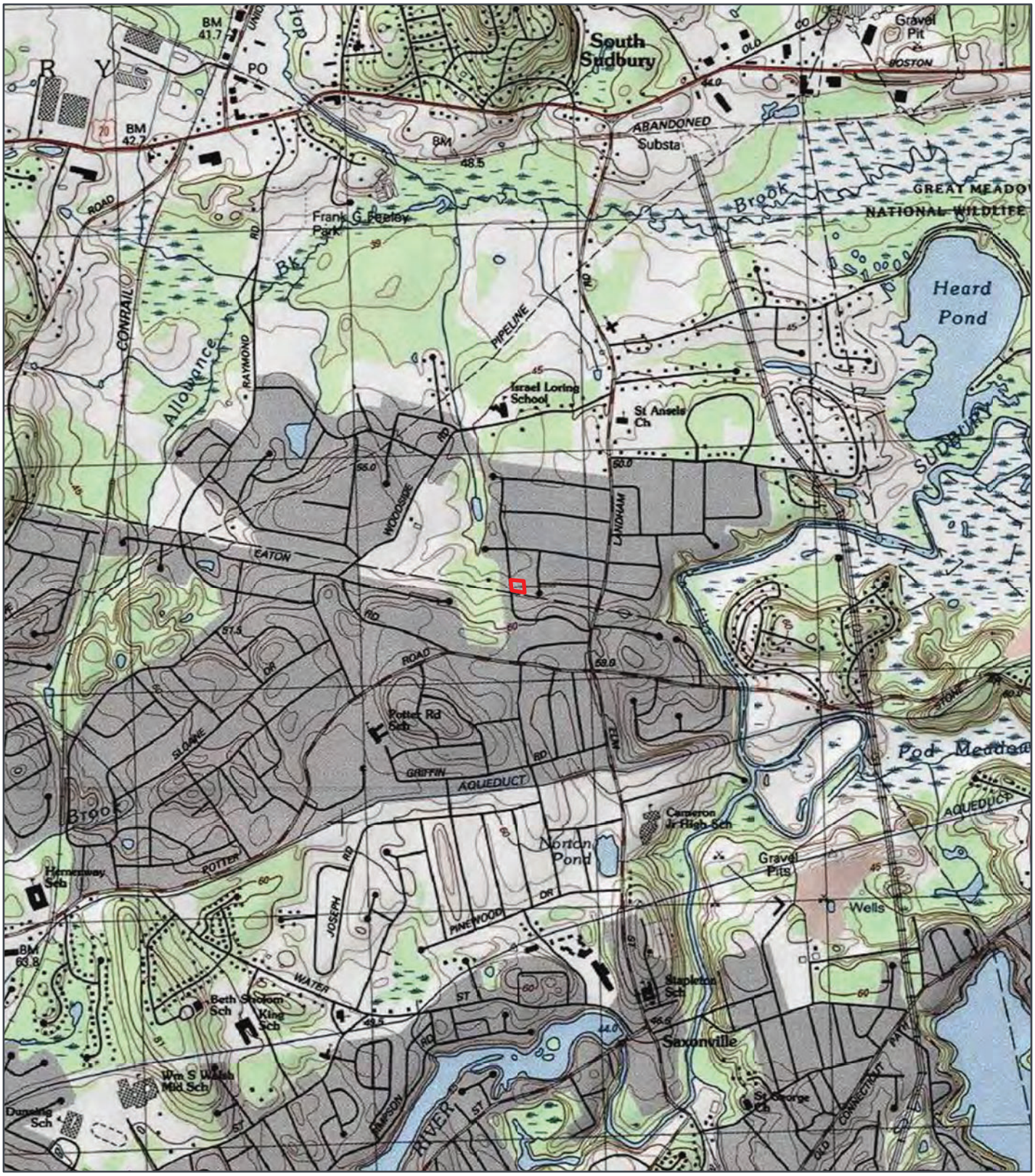
MEMO WPA fee

Susan L. Berry MP

[redacted] 1794

APPENDIX B

Figures



STREAM BANK RESTORATION PROJECT
4 DAWSON DRIVE
SUDBURY, MA

Figure 1. USGS Topographic Map

Parcel Boundary

Sudbury, MA
USGS 7.5' Quadrangle:
Framingham, MA
71.4068°W 42.3426°N

N

1:24,000

Base Map: ESRI ArcGIS Online, accessed January 2022

Updated: 1/18/2022
Project No. 66655

0 1,000 2,000 Feet
0 250 500 Meters

SWCA®
ENVIRONMENTAL CONSULTANTS

STREAM BANK RESTORATION PROJECT
4 DAWSON DRIVE
SUDBURY, MA

Figure 2. Wetland Delineation

SWCA ENVIRONMENTAL CONSULTANTS

- Culvert
- 100' Buffer Zone
- Delineated Stream Bank
- Delineated Wetland Line
- Estimated Wetland Line
- Estimated Storm Drainage Flow
- Estimated Stream Bank
- Estimated Detention Basin
- Delineated Stream
- Delineated Wetland
- Parcel Boundary
- Town Boundary

Sudbury, MA
USGS 7.5' Quadrangle: Framingham, MA
71.4068°W 42.3426°N

Delineation conducted by SWCA Wetland Scientist on October 6, 2021

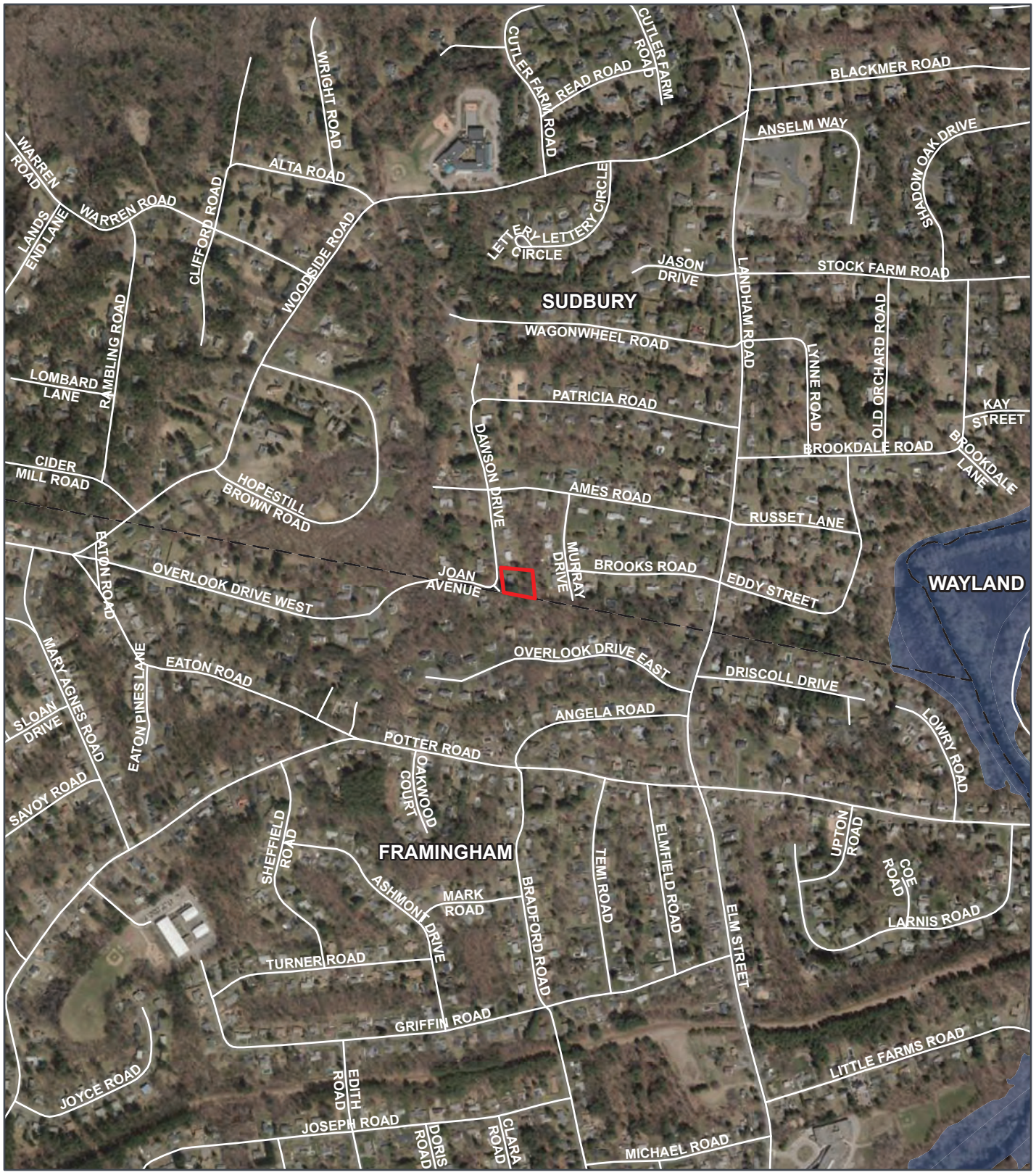
Base Map: ESRI ArcGIS Online, accessed April 2022

Updated: 4/6/2022
Project No. 66655

N

1:550

0 25 50 Feet
0 5 10 Meters



STREAM BANK RESTORATION PROJECT
4 DAWSON DRIVE
SUDBURY, MA

Figure 3. FEMA Floodplain Map

SWCA ENVIRONMENTAL CONSULTANTS

Bordering Land Subject to Flooding
Parcel Boundary
Town Boundary

Sudbury, MA
USGS 7.5' Quadrangle:
Framingham, MA
71.4068°W 42.3426°N

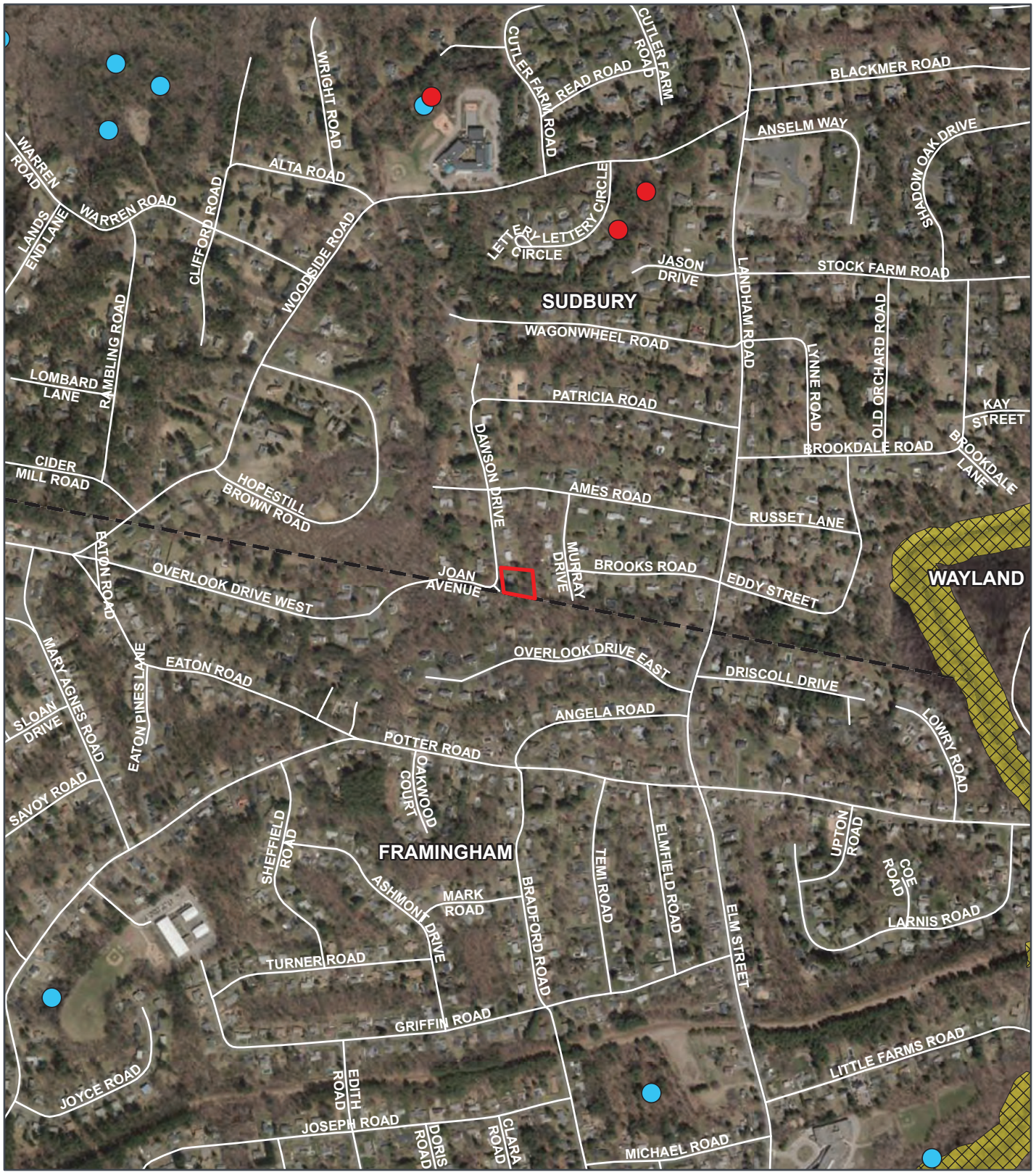
N

1:10,000

Base Map: ESRI ArcGIS Online, accessed April 2022

Updated: 4/6/2022
Project No. 66655

0 250 500 Feet
0 100 200 Meters



STREAM BANK RESTORATION PROJECT
4 DAWSON DRIVE
SUDBURY, MA

Figure 4. NHESP

- Certified Vernal Pool
- Potential Vernal Pool
- Estimated Habitats of Rare Wildlife
- Priority Habitats of Rare Species
- Parcel Boundary
- Town Boundary

Sudbury, MA
USGS 7.5' Quadrangle:
Framingham, MA
71.4068°W 42.3426°N

N

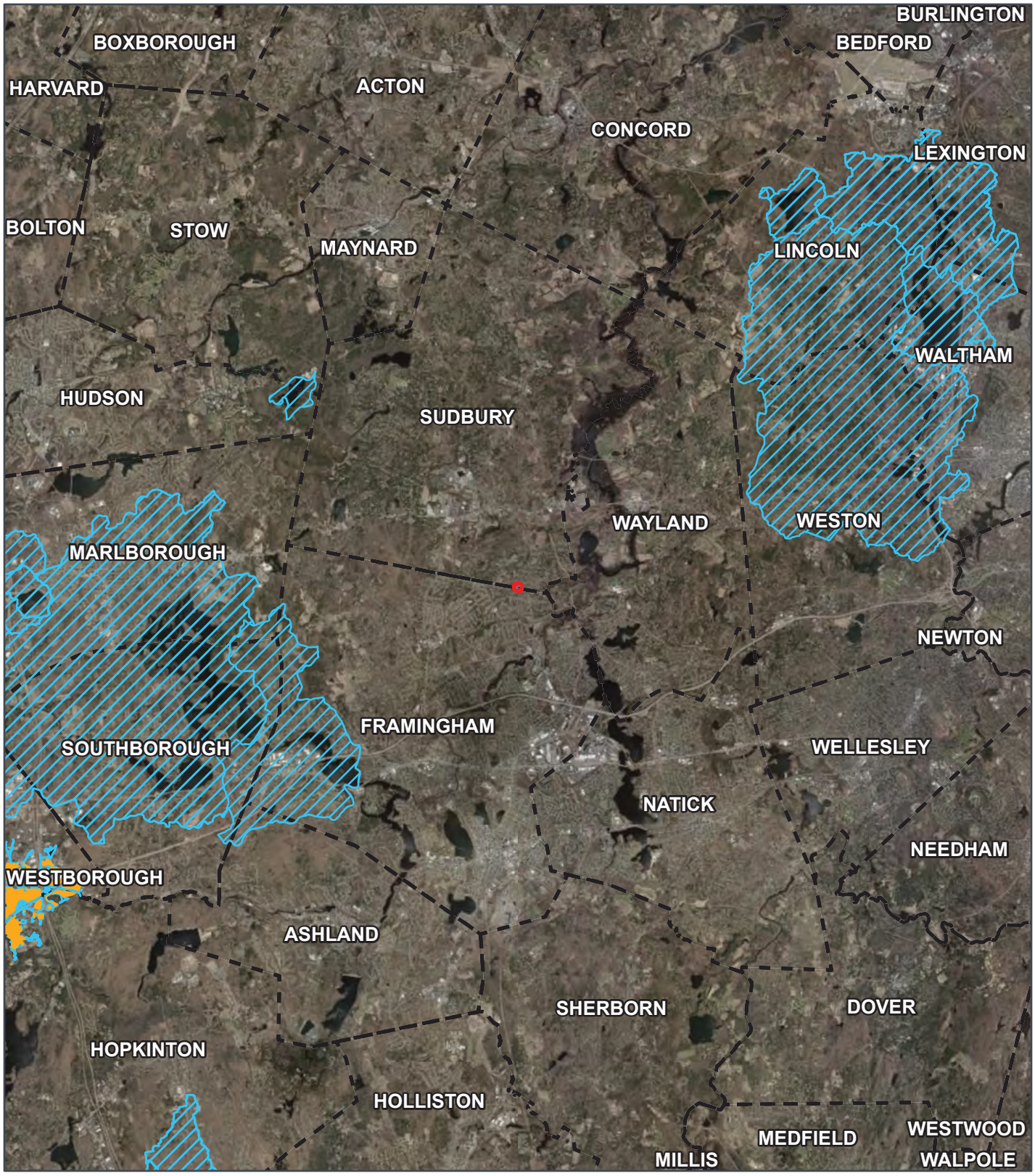
1:10,000

Base Map: ESRI ArcGIS Online, accessed January 2022

Updated: 1/18/2022
Project No. 66655

0 250 500 Feet
0 100 200 Meters

SWCA®
ENVIRONMENTAL CONSULTANTS



STREAM BANK RESTORATION PROJECT
4 DAWSON DRIVE
SUDBURY, MA

Figure 5. ACEC and ORW

SWCA ENVIRONMENTAL CONSULTANTS

- Areas of Critical Environmental Concern
- Outstanding Resource Waters
- Parcel Boundary
- Town Boundary

Sudbury, MA
USGS 7.5' Quadrangle:
Framingham, MA
71.4068°W 42.3426°N

N

1:150,000

Base Map: ESRI ArcGIS Online, accessed January 2022

Updated: 1/18/2022
Project No. 66655

0 1 2 Miles
0 1 2 Kilometers

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Massachusetts State Plane Mainland Zone (FIPS zone 2001). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from orthophotography provided by MassGIS at a scale of 1:500 from photography dated April 2008.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

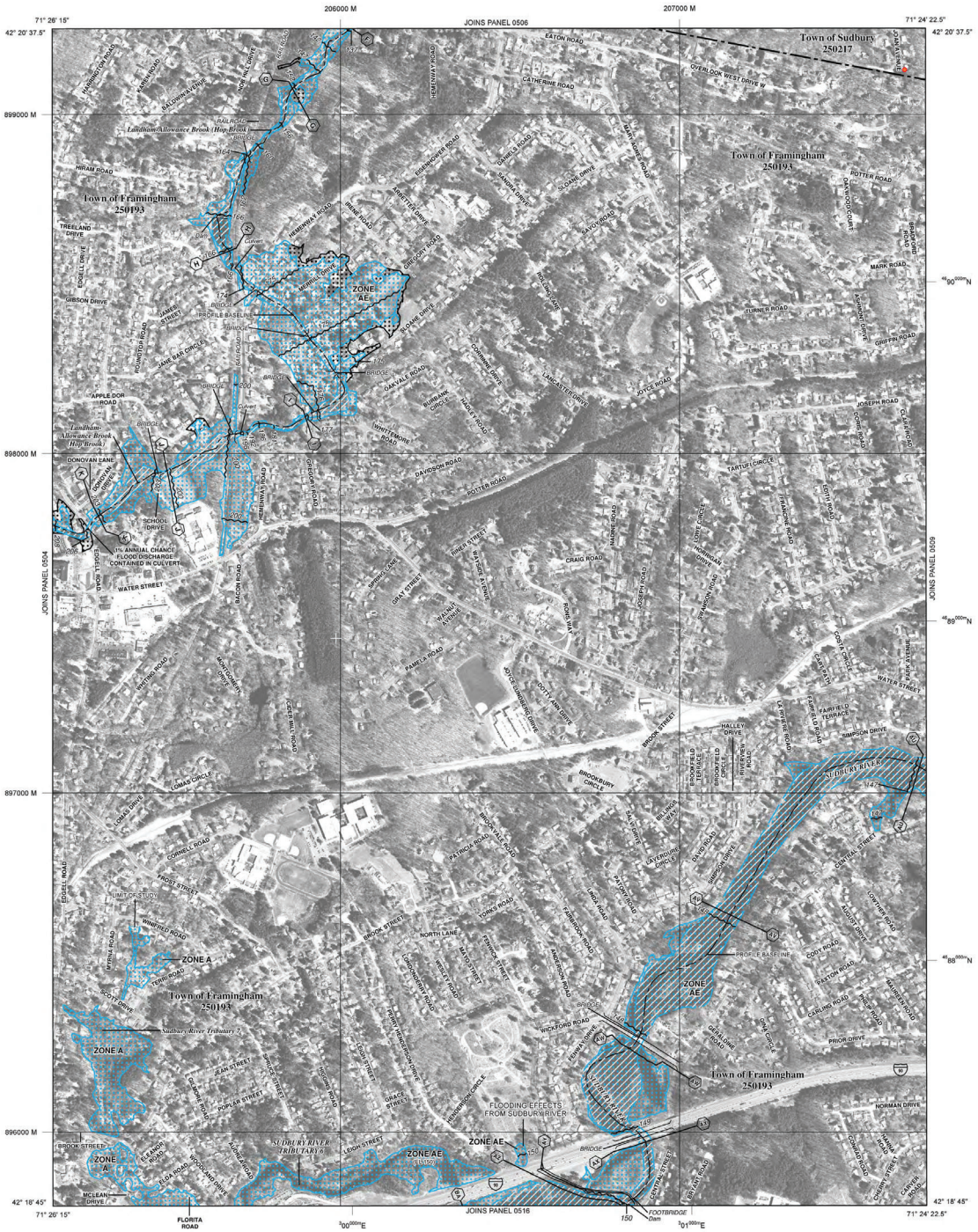
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary
0.2% Annual Chance Floodplain Boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513 Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line
Transect line
45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M 1000-meter ticks: Massachusetts State Plane Mainland Zone (FIPS Zone 2001), Lambert Conformal Conic projection
5000mN 1000-meter Universal Transverse Mercator grid values, zone 19
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 4, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

July 7, 2014 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0508F

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 508 OF 656
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRAMINGHAM, TOWN OF	250193	0508	F
SUDBURY, TOWN OF	250217	0508	F

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

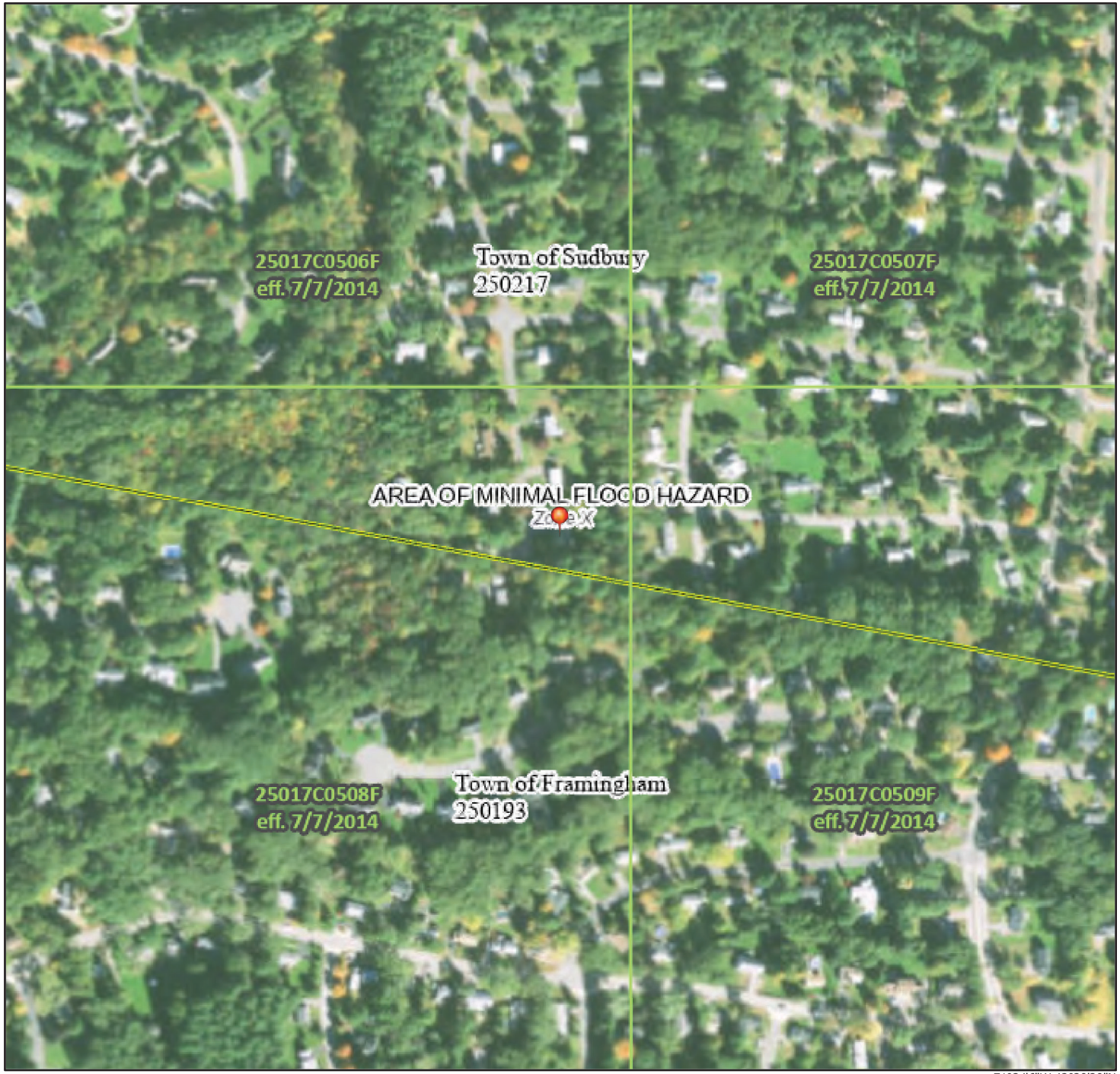
MAP NUMBER
25017C0508F
MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

71°24'44"W 42°20'47"N



71°24'6"W 42°20'20"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/5/2022 at 4:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C

Wetland Data Sheets

Stream Stats Report

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 4 Dawson Drive City/County: Sudbury (Middlesex County) Sampling Date: 10/6/2021

Applicant/Owner: Susan Berry State: MA Sampling Point: WA-3 Wetland

Investigator(s): C. Mcdonough Section, Township, Range:

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.34250000 Long: -71.40638889 Datum: NAD 88

Soil Map Unit Name: Swansea muck NWI classification: PFO

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

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	If yes, optional Wetland Site ID: WA-3

Remarks: (Explain alternative procedures here or in a separate report.)
WA-3 (Wet) consists of a palulstrine forested wetland adjacent to an intermittent stream. The plot was determined to be located within a wetland due to the presence of all three wetland criteria, including hydric soil, evidence of hydrology, and hydrophytic vegetation dominates at the plot.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____	
Water Table Present?	Yes X	No _____	Depth (inches): 16	
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 12	**Wetland Hydrology Present?** **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:
Both primary and secondary indicators of hydrology were observed at the WA-3 (Wet) plot.

Surrounding area consists of residential development, impervious surface area, and is assumed to have been previously disturbed.

VEGETATION – Use scientific names of plants.

Sampling Point: WA-3 Wetland

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	70	Yes	FACW
2. Acer rubrum	35	Yes	FAC
3. Quercus rubra	5	No	FACU
4. Pinus strobus	5	No	FACU
5.			
6.			
7.			
	115	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus pennsylvanica	10	Yes	FACW
2. Lindera benzoin	10	Yes	FACW
3. Frangula alnus	5	Yes	FAC
4.			
5.			
6.			
7.			
	25	= Total Cover	

Herb Stratum (Plot size: 5' radius)			
1. Osmundastrum cinnamomeum	5	Yes	FACW
2. Impatiens capensis	5	Yes	FACW
3. Symplocarpus foetidus	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	= Total Cover	

Woody Vine Stratum (Plot size: 30' radius)			
1. Absent			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation dominates WA-3 Wetland plot.

SOIL

Sampling Point: WA-3 Wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	95	5YR 4/6	5	C	M	Loamy/clayey	Mucky fine sandy loam
10-12	10YR 2/1	47	5YR 4/6	3	C	M	Loamy/clayey	Concentrations & depletions in matrix
			7.5YR 5/1	50	D	M		
12-15	10YR 2/1	30	7.5YR 5/1	65	D	M	Loamy/clayey	Saturated
			5YR 4/6	5	C	M		
15-19	7.5YR 5/1	75	7.5YR 4/1	20	D	M	Sand	Saturated
			5YR 4/6	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

A positive indication of hydric soil was observed at WA-3 Wetland plot. Prominant redoximorphic features (concentrations and depletions) were observed within the profile.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 4 Dawson Drive City/County: Sudbury (Middlesex County) Sampling Date: 10/6/2021

Applicant/Owner: Susan Berry State: MA Sampling Point: WA-3 Upland

Investigator(s): C. Mcdonough Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5-8%

Subregion (LRR or MLRA): LRR R Lat: 42.342720 Long: -71.406581 Datum: NAD 88

Soil Map Unit Name: Windsor loamy sand NWI classification: n/a

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

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

WA-3 Upland was determined to be located within an upland area due to the absence of wetland criteria.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

n/a

Remarks:

No wetland hydrology primary or secondary indicators observed at WA-3 upland plot.

VEGETATION – Use scientific names of plants.

Sampling Point: WA-3 Upland

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus rubra	70	Yes	FACU
2. Pinus strobus	20	No	FACU
3. Fagus grandifolia	10	No	FACU
4. Acer rubrum	10	No	FAC
5.			
6.			
7.			
	110	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fagus grandifolia	15	Yes	FACU
2. Frangula alnus	10	Yes	FAC
3. Pinus strobus	7	No	FACU
4. Vaccinium angustifolium	5	No	FACU
5. Lindera benzoin	3	No	FACW
6. Lyonia ligustrina	3	No	FACW
7.			
	43	= Total Cover	

Herb Stratum (Plot size: 5' radius)			
1.	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15	= Total Cover	

Woody Vine Stratum (Plot size: 30' radius)			
1. Absent			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	6	x 2 =	12	
FAC species	20	x 3 =	60	
FACU species	142	x 4 =	568	
UPL species	0	x 5 =	0	
Column Totals:	168	(A)	640	(B)

Prevalence Index = B/A = 3.81

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation at WA-3 Upland plot does not meet any hydrophytic vegetation indicator tests.

SOIL

Sampling Point: WA-3 upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	7.5YR 3/4	90	-	-	-	-	Loamy/clayey	Mixed matrix
	7.5YR 4/4	10	-	-	-	-		
5-14	10YR 5/6	80	-	-	-	-	Loamy/clayey	Mixed matrix
	7.5YR 4/4	20	-	-	-	-		
14-19	10YR 3/6	100	-	-	-	-	Loamy/clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): ____

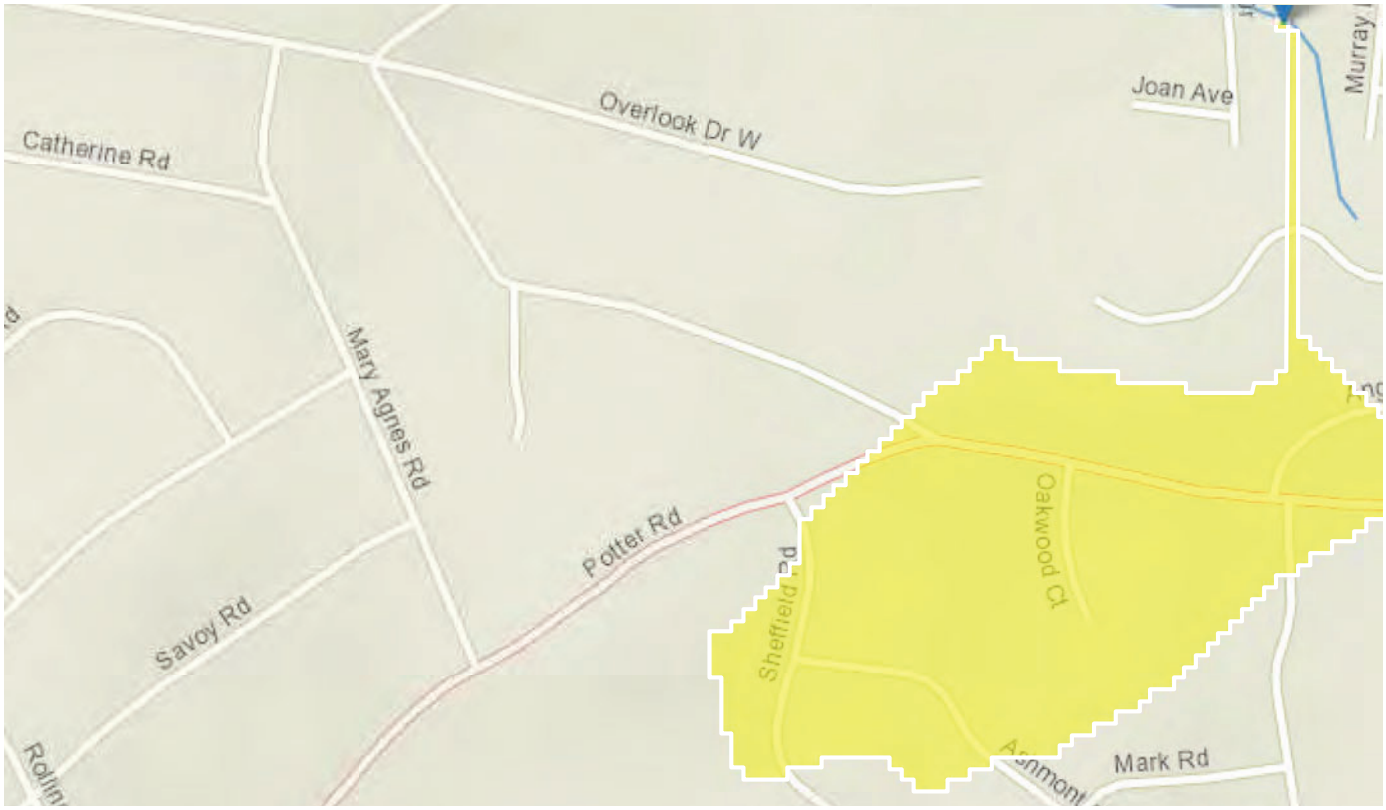
Hydric Soil Present? **Yes** ____ **No** X

Remarks:

No hydric soil indicators observed at WA-3 Upland plot.

StreamStats Report

Region ID: MA
Workspace ID: MA20211013183912961000
Clicked Point (Latitude, Longitude): 42.34338, -71.40671
Time: 2021-10-13 14:39:31 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0587	square miles
ELEV	Mean Basin Elevation	221	feet
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	0	percent
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.934	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile

Parameter Code	Parameter Description	Value	Unit
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless
BSLDEM10M	Mean basin slope computed from 10 m DEM	4.177	percent
PCTSNDGRV	Percentage of land surface underlain by sand and gravel deposits	70.16	percent
FOREST	Percentage of area covered by forest	0	percent
ACRSDFT	Area underlain by stratified drift	0.0388	square miles
CAT1ROADS	Length of interstates lmtd access highways and ramps for lmtd access highways, includes cloverleaf interchanges (USGS Ntl Transp Dataset)	0	miles
CAT2ROADS	Length of sec hwy or maj connecting roads; main arteries & hwys not lmtd access, usually in the US Hwy or State Hwy systems (USGS Ntl Transp Dataset)	0	miles
CAT3ROADS	Length of local connecting roads; roads that collect traffic from local roads & connect towns, subdivisions & neighborhoods (USGS Nat Transp Dataset)	0	miles
CAT4ROADS	Length of local roads; generally paved street, road, or byway that usually have single lane of traffic in each direction (USGS Ntnl Transp Dataset)	0.83	miles
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	207478.6	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	898749	meters
CROSCOUNT1	Number of intersections between streams and roads, where the roads are interstate, limited access highway, or ramp (CAT1ROADS)	0	dimensionless
CROSCOUNT2	Number of intersections between streams and roads, where the roads are secondary highway or major connecting road (CAT2ROADS)	0	dimensionless
CROSCOUNT3	Number of intersections between streams and roads, where roads are local conecting roads (CAT3ROADS)	0	dimensionless
CROSCOUNT4	Number of intersections between streams and roads, where roads are local roads (CAT4ROADS)	0	dimensionless

Parameter Code	Parameter Description	Value	Unit
CRSDFT	Percentage of area of coarse-grained stratified drift	70.16	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	123	feet per mi
LAKEAREA	Percentage of Lakes and Ponds	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	92.2	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	34	percent
LFPLENGTH	Length of longest flow path	0.73	miles
MAXTEMPC	Mean annual maximum air temperature over basin area, in degrees Centigrade	15.3	degrees C
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	207685	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	899215	feet
PRECPRIS00	Basin average mean annual precipitation for 1971 to 2000 from PRISM	46.8	inches
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	0	miles
WETLAND	Percentage of Wetlands	0	percent

Peak-Flow Statistics Parameters [Peak Statewide 2016 5156]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	0.16	512
ELEV	Mean Basin Elevation	221	feet	80.6	1948
LC06STOR	Percent Storage from NLCD2006	0	percent	0	32.3

Peak-Flow Statistics Disclaimers [Peak Statewide 2016 5156]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [Peak Statewide 2016 5156]

Statistic	Value	Unit
50-percent AEP flood	4.83	ft^3/s
20-percent AEP flood	8.37	ft^3/s
10-percent AEP flood	11.3	ft^3/s
4-percent AEP flood	15.6	ft^3/s
2-percent AEP flood	19.2	ft^3/s
1-percent AEP flood	23.2	ft^3/s
0.5-percent AEP flood	27.5	ft^3/s
0.2-percent AEP flood	33.8	ft^3/s

Peak-Flow Statistics Citations

Zarriello, P.J.,2017, Magnitude of flood flows at selected annual exceedance probabilities for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2016–5156, 99 p. (https://dx.doi.org/10.3133/sir20165156)

Low-Flow Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.934	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

Low-Flow Statistics Citations

Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	2.934	percent	0.32	24.6

Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

Flow-Duration Statistics Citations

August Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.934	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

August Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

August Flow-Duration Statistics Citations

Bankfull Statistics Parameters [Bankfull Statewide SIR2013 5155]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	0.6	329
BSLDEM10M	Mean Basin Slope from 10m DEM	4.177	percent	2.2	23.9

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	0.07722	59927.7393

Bankfull Statistics Disclaimers [Bankfull Statewide SIR2013 5155]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [Bankfull Statewide SIR2013 5155]

Statistic	Value	Unit
Bankfull Width	4.49	ft
Bankfull Depth	0.391	ft
Bankfull Area	1.72	ft^2
Bankfull Streamflow	2.9	ft^3/s

Bankfull Statistics Disclaimers [Appalachian Highlands D Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	4.68	ft
Bieger_D_channel_depth	0.497	ft
Bieger_D_channel_cross_sectional_area	2.34	ft^2

Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	11.4	ft
Bieger_P_channel_depth	0.737	ft
Bieger_P_channel_cross_sectional_area	8.15	ft^2

Bankfull Statistics Disclaimers [USA Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	4.56	ft
Bieger_USA_channel_depth	0.659	ft
Bieger_USA_channel_cross_sectional_area	3.7	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bankfull Width	4.49	ft
Bankfull Depth	0.391	ft
Bankfull Area	1.72	ft^2
Bankfull Streamflow	2.9	ft^3/s
Bieger_D_channel_width	4.68	ft
Bieger_D_channel_depth	0.497	ft

Statistic	Value	Unit
Bieger_D_channel_cross_sectional_area	2.34	ft^2
Bieger_P_channel_width	11.4	ft
Bieger_P_channel_depth	0.737	ft
Bieger_P_channel_cross_sectional_area	8.15	ft^2
Bieger_USA_channel_width	4.56	ft
Bieger_USA_channel_depth	0.659	ft
Bieger_USA_channel_cross_sectional_area	3.7	ft^2

Bankfull Statistics Citations

Bent, G.C., and Waite, A.M.,2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013–5155, 62 p., (http://pubs.usgs.gov/sir/2013/5155/)
Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_can

Probability Statistics Parameters [Perennial Flow Probability]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	0.01	1.99
PCTSNDGRV	Percent Underlain By Sand And Gravel	70.16	percent	0	100
FOREST	Percent Forest	0	percent	0	100
MAREGION	Massachusetts Region	0	dimensionless	0	1

Probability Statistics Flow Report [Perennial Flow Probability]

PIl: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PC
Probability Stream Flowing Perennially	0.687	dim	71

Probability Statistics Citations

Bent, G.C., and Steeves, P.A.,2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006–5031, 107 p. (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

APPENDIX D

Design Plans

STREAM BANK ECOLOGICAL RESTORATION

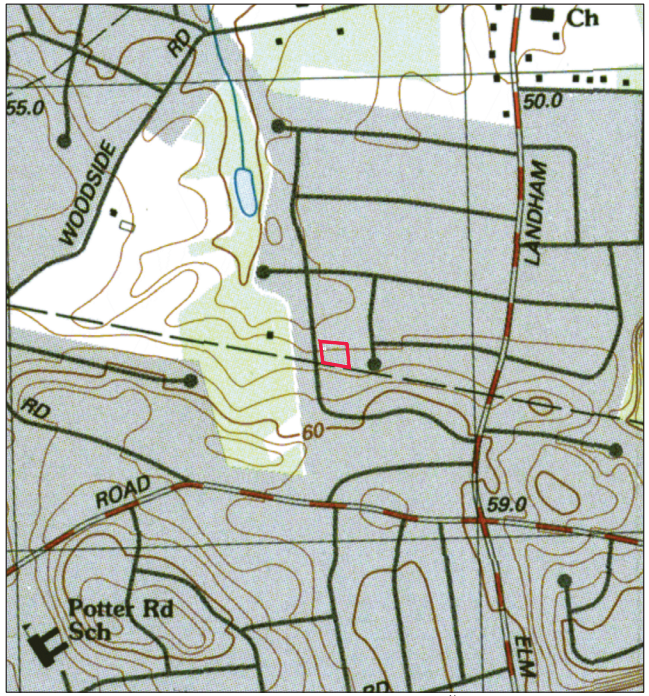
4 DAWSON DRIVE, SUDBURY, MASSACHUSETTS, 01776

978-618-1686

PERMITTING PLAN SET

TOWN OF SUDBURY, MASSACHUSETTS

JANUARY 24, 2022



1 SITE LOCUS PLAN

LOCUS MAP SOURCE: MASSGIS DATA:USGS TOPOGRAPHIC QUADRANGLE IMAGES

N

SCALE IN FEET

0 1000 5000 10000

2 ORTHO-PHOTOGRAPH

BASE MAP SOURCE: MASSGIS DATA-USGS COLOR ORTHO IMAGERY (2013/2014)

N

SCALE IN FEET

0 50 100 200

SHEET INDEX

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SWCA ENVIRONMENTAL CONSULTANTS

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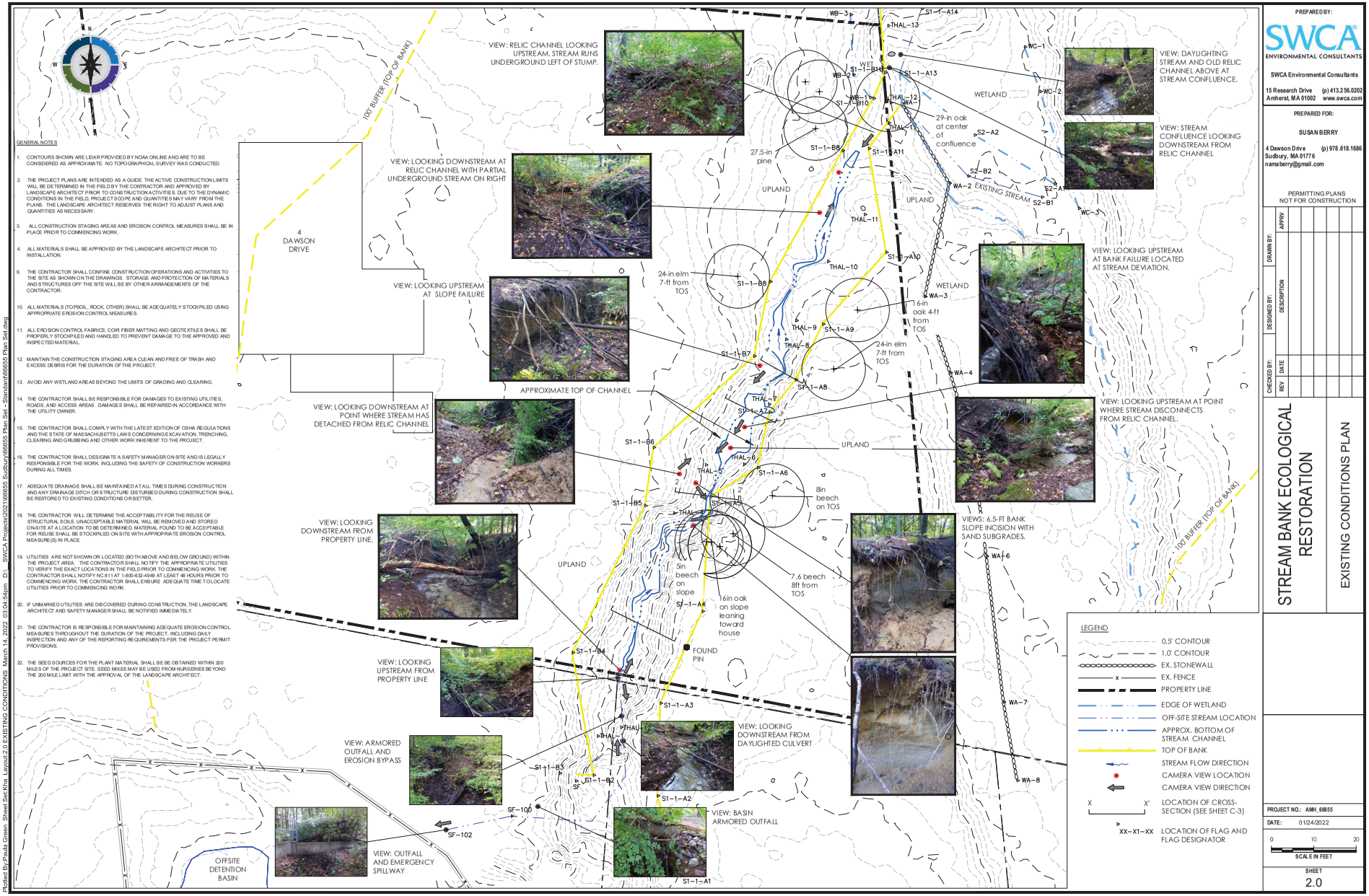
STREAM BANK ECOLOGICAL RESTORATION

COVER SHEET

PROJECT NO.: AMH_66655

01/24/2022

1.0


GENERAL NOTES
1. CONTOURS SHOWN ARE LIDAR PROVIDED BY NOAA ONLINE AND ARE TO BE CONSIDERED AS APPROXIMATE. NO TOPOGRAPHICAL SURVEY WAS CONDUCTED.
2. THE PROJECT PLANS ARE INTENDED AS A GUIDE. THE ACTIVE CONSTRUCTION LIMITS WILL BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION ACTIVITIES. DUE TO THE DYNAMIC CONDITIONS IN THE FIELD, PROJECT SCOPE AND QUANTITIES MAY VARY FROM THE PLANS. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ADJUST PLANS AND QUANTITIES AS NECESSARY.
3. ALL CONSTRUCTION STAGING AREAS AND EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCING WORK.
4. ALL MATERIALS SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
9. THE CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATIONS AND ACTIVITIES TO THE SITE AS SHOWN ON THE DRAWINGS. STORAGE AND PROTECTION OF MATERIALS AND STRUCTURES OFF THE SITE WILL BE BY OTHER ARRANGEMENTS OF THE CONTRACTOR.
10. ALL MATERIALS (TOPSOIL, ROCK, OTHER) SHALL BE ADEQUATELY STOCKPILED USING APPROPRIATE EROSION CONTROL MEASURES.
11. ALL EROSION CONTROL FABRICS, COIR FIBER MATTING AND GEOTEXTILES SHALL BE PROPERLY STOCKPILED AND HANDLED TO PREVENT DAMAGE TO THE APPROVED AND INSPECTED MATERIAL.
12. MAINTAIN THE CONSTRUCTION STAGING AREA CLEAN AND FREE OF TRASH AND EXCESS DEBRIS FOR THE DURATION OF THE PROJECT.
13. AVOID ANY WETLAND AREAS BEYOND THE LIMITS OF GRADING AND CLEARING.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING UTILITIES, ROADS, AND ACCESS AREAS. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE UTILITY OWNER.
15. THE CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF MASSACHUSETTS LAWS CONCERNING EXCAVATION, TRENCHING, CLEARING AND GRUBBING AND OTHER WORK INHERENT TO THE PROJECT.
16. THE CONTRACTOR SHALL DESIGNATE A SAFETY MANAGER ON SITE AND IS LEGALLY RESPONSIBLE FOR THE WORK, INCLUDING THE SAFETY OF CONSTRUCTION WORKERS DURING ALL TIMES.
17. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
18. THE CONTRACTOR WILL DETERMINE THE ACCEPTABILITY FOR THE REUSE OF STRUCTURAL SOILS. UNACCEPTABLE MATERIAL WILL BE REMOVED AND STORED ON-SITE AT A LOCATION TO BE DETERMINED. MATERIAL FOUND TO BE ACCEPTABLE FOR REUSE SHALL BE STOCKPILED ON SITE WITH APPROPRIATE EROSION CONTROL MEASURE(S) IN PLACE.
19. UTILITIES ARE NOT SHOWN OR LOCATED (BOTH ABOVE AND BELOW GROUND) WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITIES TO VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL NOTIFY NC811 AT 1-800-432-4949 AT LEAST 48 HOURS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL ENSURE ADEQUATE TIME TO LOCATE UTILITIES PRIOR TO COMMENCING.
20. IF UNMARKED UTILITIES ARE DISCOVERED DURING CONSTRUCTION, THE LANDSCAPE ARCHITECT AND SAFETY MANAGER SHALL BE NOTIFIED IMMEDIATELY.
21. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ADEQUATE EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT, INCLUDING DAILY INSPECTION AND ANY OF THE REPORTING REQUIREMENTS PER THE PROJECT PERMIT PROVISIONS.
22. THE SEED SOURCES FOR THE PLANT MATERIAL SHALL BE BE OBTAINED WITHIN 200 MILES OF THE PROJECT SITE. SEED MIXES MAY BE USED FROM NURSERIES BEYOND THE 200 MILE LIMIT WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT.
100' BUFFER (TOP OF BANK)
4 DAWSON DRIVE
VIEW: RELIC CHANNEL LOOKING UPSTREAM. STREAM RUNS UNDERGROUND LEFT OF STUMP.
VIEW: LOOKING DOWNSTREAM AT RELIC CHANNEL WITH PARTIAL UNDERGROUND STREAM ON RIGHT
VIEW: LOOKING UPSTREAM AT SLOPE FAILURE
VIEW: LOOKING DOWNSTREAM AT POINT WHERE STREAM HAS DETACHED FROM RELIC CHANNEL
APPROXIMATE TOP OF CHANNEL
VIEW: LOOKING DOWNSTREAM FROM PROPERTY LINE.
VIEW: LOOKING UPSTREAM FROM PROPERTY LINE
VIEW: ARMORED OUTFALL AND EROSION BYPASS
VIEW: OUTFALL AND EMERGENCY SPILLWAY
OFFSITE DETENTION BASIN
VIEW: BASIN ARMORED OUTFALL
VIEW: LOOKING DOWNSTREAM FROM DAYLIGHTED CULVERT
VIEW: DAYLIGHTING STREAM AND OLD RELIC CHANNEL ABOVE AT STREAM CONFLUENCE.
VIEW: STREAM CONFLUENCE LOOKING DOWNSTREAM FROM RELIC CHANNEL
VIEW: LOOKING UPSTREAM AT BANK FAILURE LOCATED AT STREAM DEVIATION.
VIEW: LOOKING UPSTREAM AT POINT WHERE STREAM DISCONNECTS FROM RELIC CHANNEL.
VIEWS: 6.5-FT BANK SLOPE INCISION WITH SAND SUBGRADES.
WETLAND
UPLAND
FOUND PIN
29-in oak at center of confluence
27.5-in pine
24-in elm 7-ft from TOS
16-in oak 4-ft from TOS
8in beech on TOS
5in beech on slope
16in oak on slope leaning toward house
7.6 beech 8ft from TOS
EXISTING STREAM
LEGEND
0.5' CONTOUR
1.0' CONTOUR
EX. STONEWALL
EX. FENCE
PROPERTY LINE
EDGE OF WETLAND
OFF-SITE STREAM LOCATION
APPROX. BOTTOM OF STREAM CHANNEL
TOP OF BANK
STREAM FLOW DIRECTION
CAMERA VIEW LOCATION
CAMERA VIEW DIRECTION
LOCATION OF CROSS-SECTION (SEE SHEET C-3)
LOCATION OF FLAG AND FLAG DESIGNATOR
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PERMITTING PLANS NOT FOR CONSTRUCTION
DRAWN BY:
DESIGNED BY:
CHECKED BY:
APPRV
DESCRIPTION
DATE
REV
STREAM BANK ECOLOGICAL RESTORATION
EXISTING CONDITIONS PLAN
PROJECT NO.: AMH_68655
DATE: 01/24/2022
SCALE IN FEET
SHEET 2.0
Plotted By: Paula Green, Sheet Set: Xtra Layout 2.0 EXISTING CONDITIONS, March 14, 2022 - 03:04:54pm, D:\...SWCA Projects\2021\68655 Sudbury\68655 Plan Set - Standard\68655 Plan Set.dwg
D:\...SWCA Projects\2021\68655 Sudbury\68655 Plan Set - Standard\68655 Plan Set.dwg, 2.0 EXISTING CONDITIONS, 3/14/2022 3:04:45 PM, Paula Green

SITE PREPARATION NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL LOCAL AND STATE PERMITS HAVE BEEN OBTAINED PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
3. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND MATERIAL TO COMPLETE THE WORK AS SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN. THE PREPARATION OF NEW PLANTING EXCAVATIONS, DISPOSAL OF UNUSABLE PLANTS, PLANT DEBRIS AND LEFT-OVER SOIL ON OR OFF THE SITE AS DIRECTED BY THE OWNER; FURNISHING TOPSOIL, PEAT MOSS, FERTILIZERS AND WOOD CHIPS; WATERING AND MAINTENANCE OF WORK UNTIL FINAL ACCEPTANCE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OFF THE SITE OF ROOTS, STUMPS, EXCESS SOIL AND OTHER DEBRIS RESULTING FROM EXCAVATIONS FOR CONTRACTOR'S OPERATIONS. DEBRIS SHALL BE HAULED TO LOCATIONS DESIGNATED BY THE OWNER.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXCAVATION FOR ALL INSTALLATIONS AND IMMEDIATE DISPOSAL OF ALL EXCAVATED SUBSOIL ON OR OFF SITE AS DIRECTED BY THE OWNER.
6. WARRANTY: WATERING AND MAINTENANCE OF WORK FOR TWO YEARS FROM SUBSTANTIAL COMPLETION OF THE CONTRACT. REPLACEMENT OF DEAD, DYING OR SICKLY PLANTS THROUGHOUT A PERIOD OF TWO YEARS AS REQUIRED UNDER REPLACEMENT.
7. THE CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATIONS TO THE LIMITS OF THE STREAM BANK STABILIZATION APPLICATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EROSION CONTROL MEASURES AS DESCRIBED IN CONSTRUCTION NOTES AND SHOWN ON THE PLANS PRIOR TO THE START OF ANY CONSTRUCTION.
9. COORDINATE WITH LANDSCAPE ARCHITECT TO FLAG PLANTINGS TO BE PROTECTED AND MAINTAINED AND VEGETATION TO BE REMOVED.
10. ALL REFUSE AND DEBRIS TO BE REMOVED SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
11. COORDINATE WITH OWNER LOCATION OF STAGING AND STOCKPILING. LOCATION MUST BE LEVEL AND AT LEAST 50' FROM TOP OF STREAM BANK.
12. WORK WITH OWNER TO IDENTIFY ON-SITE LOCATION TO STOCKPILE TREES/LOGS TO BE REMOVED AND ANY WOODY DEBRIS TO BE USED IN THE BANK RESTORATION TREATMENT MEASURES. AREA SHALL BE LEVEL AND LOCATED AT LEAST 50' FROM ANY PORTION OF THE STREAM CHANNEL.
13. CONTRACTOR TO BE AWARE AND CAUTIOUS OF STREAM BANK EDGES AS MANY HAVE BEEN UNDERMINED DUE TO EROSION. IN ADDITION, PORTIONS OF THE STREAM ARE HIDDEN DUE TO MIGRATING UNDER THE LAND. CONTRACTOR TO FIELD DETERMINE AREAS FOR SAFE TRAVERSE, STREAM CROSSING AND WORK STAGING/STOCKPILING.

MINIMIZE DISTURBANCE:

1. MINIMIZE DISTURBANCE THROUGH: SELECTION OF THE NARROWEST CROSSING LOCATION; LIMITING THE NUMBER OF EQUIPMENT TRIPS ACROSS A STREAM DURING CONSTRUCTION; AND, MINIMIZING THE NUMBER AND SIZE OF WORK AREAS (EQUIPMENT STAGING AREAS , STOCKPILING, AND SPOIL STORAGE AREAS).
2. PLACE WORK AREAS AT LEAST 50 FT FROM STREAM CHANNEL.
3. FIELD RECONNAISSANCE SHOULD BE CONDUCTED DURING THE PLANNING STAGE TO IDENTIFY WORK AREAS. WORK AREAS TO BE SECTIONED SO THAT FINISHED BANK STABILIZATION MEASURES CAN BE INSTALLED WITHIN 1 DAY OF OPENING THE SOILS UP TO FURTHER EROSION.
4. WORK SHALL BE PERFORMED IN LATE SUMMER OR EARLY FALL WHEN WATER LEVELS ARE AT LOWEST LEVELS.

CONSTRUCTION SEQUENCING NOTES:

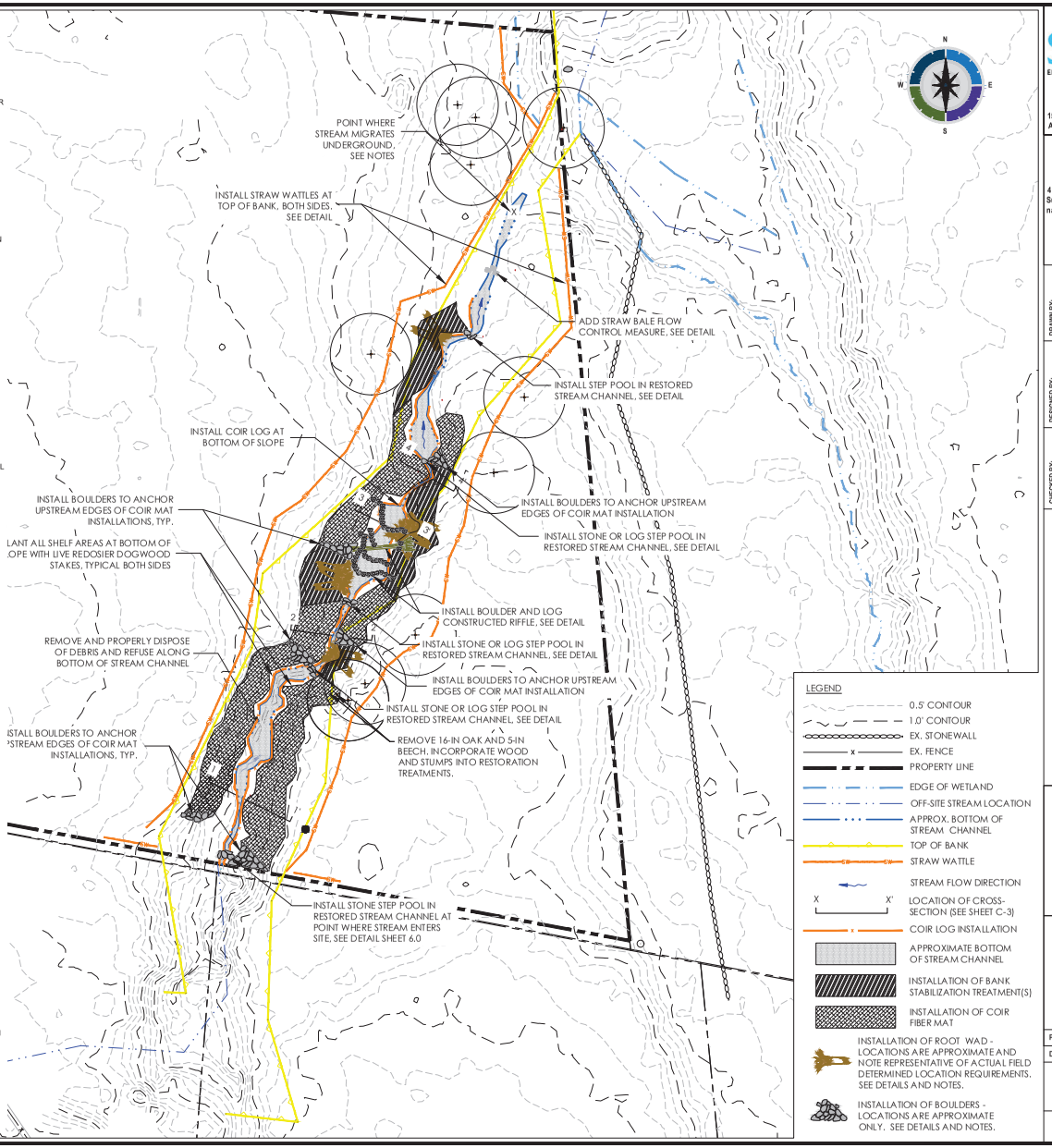
1. ESTABLISH ALL CONTROL FOR PROPER LAYOUT OF WORK TO BE PERFORMED. DELINEATE LIMITS OF DISTURBANCE WITH CONTINUOUS CONSTRUCTION FENCE OR FLAGGING.
2. ERECT SILT FENCE, AND/OR REINFORCED SILT FENCE AS SHOWN ON THE PLAN AND AS MAY BE FURTHER REQUIRED IN THE FIELD.
3. INSTALL STONE STABILIZED CONSTRUCTION ENTRANCE AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING THE CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA.
4. STABILIZE WORK AND STAGING AREAS AS REQUIRED, INCLUDING SAFETY AND HEALTH MEASURES REQUIRED BY OSHA. ERECT ADDITIONAL EROSION CONTROL MEASURES AS REQUIRED.
5. INSTALL COIR LOGS AS SHOWN ON PLAN AND DETAILED ON SHEET 7.0.
6. REMOVE ALL EVASIVE SPECIES EVIDENCED TO BE ON THE SITE. RESTORE DISTURBED AREAS OF PLANT REMOVAL WITH SEED MIXTURE INDICATED IN TABLE LOCATED ON THIS SHEET. MULCH
   6.1. PROPERLY DISPOSE OF INVASIVE PLANT MATERIAL THAT HAS BEEN REMOVED TO AN OFF-SITE LOCATION AND USING PROPER METHODOLOGY SO AS TO ASSURE THAT THE REMNANTS OF THE PLANTS CANNOT RE-ROOT AGAIN EITHER ON SITE OR OFF SITE.
7. INSTALL TREE PROTECTION MEASURES AS SHOWN IN DETAIL ON SHEET C-4.
8. REMOVE REFUSE AND DEBRIS FROM STREAM CHANNEL AND PROPERLY DISPOSE OF FOUND MATERIALS.
9. CLEAN CHANNEL OF STUMPS, FALLEN TREES, DEBRIS AND BARS WHICH FORCE THE STREAM FLOW INTO THE STREAM BANK. STOCKPILE ANY LOGS, WOODY DEBRIS, AND ROCKS FOUND FOR USE IN STABILIZATION INSTALLATIONS.
10. REMOVE TREES AND STUMPS IDENTIFIED AND FLAGGED BY LANDSCAPE ARCHITECT. DO NOT REMOVE ANY TREE NOT SPECIFIED BY LANDSCAPE ARCHITECT. COORDINATE WITH LANDSCAPE ARCHITECT TO FLAG PLANTINGS TO BE PROTECTED AND MAINTAINED AND VEGETATION TO BE REMOVED. STOCKPILE LOGS AND ROOT WADS FOR USE IN STABILIZATION EFFORTS.
11. CONSTRUCT STONE STEP POOL AT POINT WHERE STREAM ENTERS SITE AS SHOWN ON PLANS AND DETAIL:
   11.1. REMOVE ANY EXISTING VEGETATION AND SCARIFY OR BENCH ADJACENT SOILS PRIOR TO INSTALLING STONE..
   11.2. ADJACENT BANKS MUST BE ADEQUATELY COMPACTED AND STABILIZED.
   11.3. SEED AN MULCH ALL DISTURBED AREAS USING MOIST SEED MIXTURE AS DESCRIBED IN TABLE ON THIS SHEET.
12. WORKING IN SECTIONS, REPAIR/REGRADE DENUDED AREAS AS SPECIFIED ON PLANS:
   12.1. LIMITS OF SPECIFIC STABILIZATION APPLICATIONS SHOWN ON THE PLAN ARE APPROXIMATE. ACTUAL STABILIZATION INSTALLATION OPTIONS AND LIMITS OF THOSE OPTIONS TO BE DETERMINED IN THE FIELD AS EXISTING CONDITIONS DICTATE AND REQUIRE FOR BEST CHANCE FOR LONG TERM STABILIZATION.
   12.2. COORDINATE OPTION CHOICE WITH LANDSCAPE ARCHITECT AS NECESSARY TO DETERMINE INSTALLATION APPLICATION BEST SUITED FOR SUCCESSFUL LONG-TERM STABILIZATION BASED ON SPECIFIC CONDITIONS.
13. STABILIZE AND RENOVATE ALL DISTURBED AREAS. REMOVE ALL TEMPORARY WATER AND EROSION CONTROL MEASURES.

SITE CONSTRUCTION NOTES:

1. SOILS ARE HIGHLY UNSTABLE AND WORK SHALL BE PERFORMED BY HAND WHEREVER POSSIBLE. WHEN MACHINERY IS NECESSARY UTILIZE EQUIPMENT DESIGNED FOR SOFT SOILS. STAGING AREA FOR THE EQUIPMENT SHALL BE LOCATED AT LEAST 50' FROM EXISTING STREAM BANKS. COORDINATE LOCATIONS WITH OWNER.
2. STREAM BANK PROTECTION MUST BE STARTED AT A STABILIZED OR CONTROLLED POINT AND ENDED AT A STABILIZED OR CONTROLLED POINT ON THE STREAM.
3. PROTECT EXISTING TREES AND OTHER VEGETATION TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, SKINNING OF ROOTS, SKINNING AND BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE AND EXCESS FOOT OR VEHICULAR TRAFFIC OR PARKING OF VEHICLES WITHIN DRIP LINE.
4. ENSURE THAT THE CHANNEL BOTTOM IS STABLE OR STABILIZED BY STRUCTURAL INSTALLATION AS INDICATED ON THIS PLAN AND DETAILED ON SHEETS 5.0 AND 6.0 BEFORE INSTALLING PERMANENT BANK PROTECTION.
5. BANK RESHAPING AND DISTURBANCE SHOULD BE KEPT TO A MINIMUM EXCEPT AS NECESSARY TO INSTALL THE PRACTICE. WHERE BANK RESHAPING IS NECESSARY, RESHAPING SHOULD RESULT IN A BANK SLOPE OF 1:1.5 MAX, ACHIEVING A SLOPE OF 2:1 OR GREATER WHERE POSSIBLE. CONSULT WITH LANDSCAPE ARCHITECT IF ANY BANK STABILIZATION MEASURE REQUIRES FURTHER DISTURBANCE OF EXISTING TREES AND VEGETATION AT TOP OF BANK PRIOR TO ANY ADDITIONAL DISTURBANCE OTHER THAN THE INITIAL FIELD EVALUATION AND FLAGGING.
6. CONTRACTOR TO WORK ON AREAS IN TURN SO AS TO ASSURE THAT WORK IS COMPLETED TO A LEVEL THAT CAN BE STABILIZED AT THE END OF EACH DAY.
7. DO NOT DISTURB TREES OR VEGETATION LOCATED ABOVE WHERE THE STREAM HAS MIGRATED BELOW GROUND.
8. DO NOT DISTURB ANY STREAM BANK WHICH IS NOT CURRENTLY UNDERMINED BY EROSION.

STABILIZATION AND PLANTING NOTES:

1. REMOVE OBSTRUCTIONS, AS REQUIRED, TO PERMIT INSTALLATION OF NEW CONSTRUCTION. CUT MINOR ROOTS OF TREES INDICATED TO REMAIN IN A CLEAN AND CAREFUL MANNER WHERE SUCH ROOTS AND BRANCHES OBSTRUCT INSTALLATION OF NEW CONSTRUCTION.
2. LIVE STAKES SHALL CONSIST OF REDOSIER DOGWOOD.
3. LIVE STAKES SHALL BE INSTALLED IN ROWS THAT RUN PARALLEL TO THE FLOW AND ROWS THAT RUN PERPENDICULAR TO THE FLOW 1'-3' SPACING, UNLESS OTHERWISE SHOWN ON THE DETAIL INCLUDED ON THIS SHEET.
4. THE LIVE STAKES SHALL BE INSTALLED TO PIN THE OVERLAP OF THE COIR MAT ON A MAX. 1.0' SPACING, AS APPROPRIATE AND AS SHOWN ON THE DETAIL INCLUDED ON THIS SHEET.
5. WOODEN STAKES SHALL BE 1 X 2" AND A MIN. OF 18" LONG. WOODEN STAKES SHALL BE INSTALLED TO ANCHOR COIR MATTING AS SHOWN ON THE DETAIL INCLUDED ON THIS SHEET.
6. SEED SHALL BE A MIX OF SHADE TOLERANT PERENNIALS (SEE PLANT LIST SHEET 7.0).
7. INSTALL COIR MAT DURING LAST SUMMER ASSURING THAT SUFFICIENT TIME FOR SEED GERMINATION IS PROVIDED SO THAT PLANTS MAY BE ESTABLISHED PRIOR TO WINTER. SEEDED AREAS THAT HAVE NOT TAKEN TO BE OVER-PLANTED WITH PLANT PLUGS IN LATE FALL (SEE PLANT LIST SHEET 7.0).
8. REPAIR OR REPLACE TREES AND VEGETATION INDICATED TO REMAIN THAT ARE DAMAGED BY CONSTRUCTION OPERATIONS IN A MANNER ACCEPTABLE TO THE LANDSCAPE ARCHITECT. EMPLOY A LICENSED ARBORIST TO REPAIR DAMAGE TO TREES AND SHRUBS. REPLACE TREES THAT CANNOT BE REPAIRED AND RESTORED TO FULL-GROWTH STATUS, AS DETERMINED BY ARBORIST.



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PERMITTING PLANS
NOT FOR CONSTRUCTION

REV	DATE	CHECKED BY:	DESCRIPTION	DESIGNED BY:	APPRV	DRAWN BY:

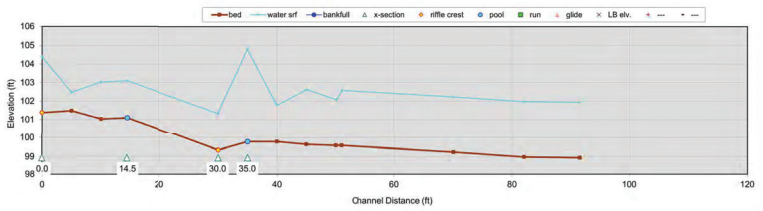
STREAM BANK ECOLOGICAL RESTORATION

RESTORATION PLAN

PROJECT NO.: AMH_68655
DATE: 01/05/2022
0 10 20
SCALE IN FEET
SHEET
3.0

Longitudinal Slope Profile

Unnamed Intermittent Stream

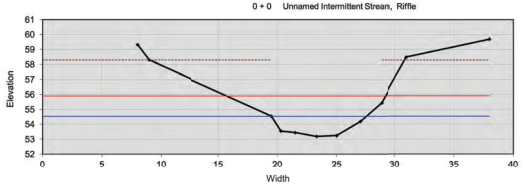


	slope (%)	slope ratio	length (ft)	length ratio	pool-pool spacing (ft)	p-p ratio
reach	---	---	114.0 (0 9 channel widths)	---	---	---
riffle	-30 (0 - 8.8)	---	9.8 (5 - 14.5)	0.1 (0 - 0.1)	---	---
pool	11	---	15.5	0.1	20.5	0.2
	---	---	---	---	---	---
	---	---	---	---	---	---

notes	cross section ID	bed feature	station	station	Benchmark Elevation 100 Turning Points BS	HI	FS	FS bed	water	FS bankfull	user defined FS LB elev.	FS	FS	azimuth AZ	ELEV bed	ELEV water srf	ELEV bankfull	ELEV LB elv.	ELEV ---	ELEV ---
back sight to benchmark					10.33	110.33														
Cross section #1	1	R	0			110.33		8.95	3						101.38	104.38				
riffle			5			110.33		8.85	1						101.48	102.48				
riffle			10			110.33		9.29	2						101.04	103.04				
Cross section #2	2	P	14.5			110.33		9.23	2						101.1	103.1				
Cross section #3	3	R	30			110.33		10.99	2						99.34	101.34				
Cross section #4	4	P	35			110.33		10.55	5						99.78	104.78				
			40			110.33		10.55	2						99.78	101.78				
run			45			110.33		10.7	3						99.63	102.63				
			50			110.33		10.75	2.5						99.58	102.08				
water cont underground (bank)			51			110.33		10.75	3						99.58	102.58				
stream daylights			70			110.33		11.1	3						99.23	102.23				
water cont underground			82			110.33		11.35	3						98.98	101.98				
stream daylights			91.5			110.33		11.39	3						98.94	101.94				

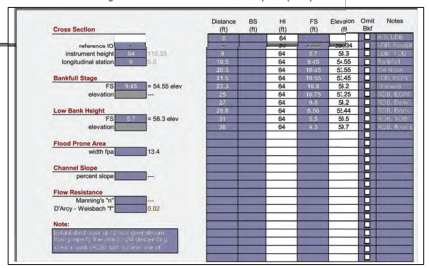
Cross Section 1

0 + 0 Unnamed Intermittent Stream, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
7.9	x-section area (ft.sq.)	#N/A	W flood prone area (ft)	035	D50 Riffle (mm)
8.0	width (ft)	---	entrenchment ratio	064	D84 Riffle (mm)
1.0	mean depth (ft)	5.1	low bank height (ft)	---	threshold grain size (mm):
1.3	max depth (ft)	3.8	low bank height ratio		
8.8	wetted perimeter (ft)				
0.9	hyd radi (ft)				
8.2	width-depth ratio				

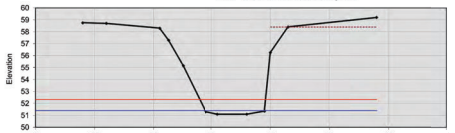
Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.014	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.02	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	18.3	resistance factor u/u*	---	shear velocity (ft/s)
		467.2	relative roughness	---	unit strm power (lb/ft/s)



Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		64				
5		64	6	58		
9		64	9.7	54.3		
10.3		64	9.45	54.55		
20.3		64	10.45	53.55		
21.5		64	10.55	53.45		
23.3		64	10.8	53.2		
25		64	10.75	53.25		
27		64	9.8	54.2		
28.8		64	8.56	55.44		
33		64	8.8	55.2		
38		64	9.3	54.7		

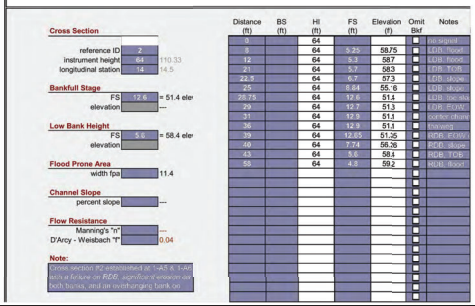
Cross Section 2

0 + 14 Unnamed Intermittent Stream, Pool



Bankfull Dimensions		Flood Dimensions		Materials	
2.4	x-section area (ft.sq.)	#N/A	W flood prone area (ft)	0.35	D50 Riffle (mm)
10.3	width (ft)	---	entrenchment ratio	0.64	D84 Riffle (mm)
0.2	mean depth (ft)	7.3	low bank height (ft)	---	threshold grain size (mm):
0.3	max depth (ft)	24.3	low bank height ratio		
10.3	wetted perimeter (ft)				
0.2	hyd radi (ft)				
43.2	width-depth ratio				

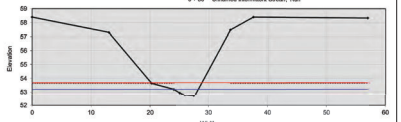
Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.014	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.04	D'Arcy-Weisbach fric.	---	shearstress (lb/sq.ft.)
---	Froude number	14.9	resistance factor u/u*	---	shearvelocity (ft/s)
		113.1	relative roughness	---	unit strm power (lb/ft/s)



Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		64				
8		64	5.25	58.75		
12		64	5.3	587		
21		64	5.7	583		
22.5		64	6.7	57.3		
25		64	8.64	55.36		
28.75		64	12.6	51.4		
29		64	12.7	51.3		
31		64	12.9	51.1		
36		64	12.9	51.1		
39		64	12.85	51.25		
40		64	7.74	56.26		
45		64	5.6	58.4		
50		64	4.9	59.2		

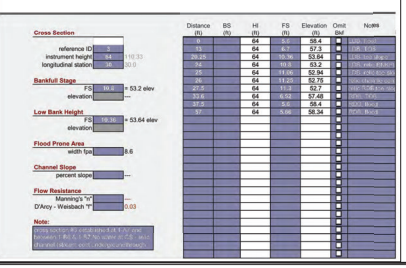
Cross Section 3

0 + 30 Unnamed Intermittent Stream, Run



Bankfull Dimensions		Flood Dimensions		Materials	
1.4	x-section area (ft.sq.)	8.6	W flood prone area (ft)	0.35	D50 Riffle (mm)
4.1	width (ft)	2.1	entrenchment ratio	0.64	D84 Riffle (mm)
0.3	mean depth (ft)	0.9	low bank height (ft)	---	threshold grain size (mm):
0.5	max depth (ft)	1.9	low bank height ratio		
4.4	wetted perimeter (ft)				
0.3	hyd radi (ft)				
12.8	width-depth ratio				

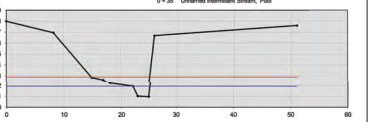
Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.014	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.03	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	15.7	resistance factor u/u*	---	shear velocity (ft/s)
		156.2	relative roughness	---	unit strm power (lb/ft/s)



Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		64	6	58.4		
15		64	6.7	57.3		
20.25		64	10.36	53.64		
24		64	10.8	53.2		
25		64	11.46	52.54		
26		64	11.25	52.75		
27.8		64	11.3	52.7		
33.6		64	6.52	57.48		
37.2		64	5.6	58.4		
37		64	5.66	58.34		

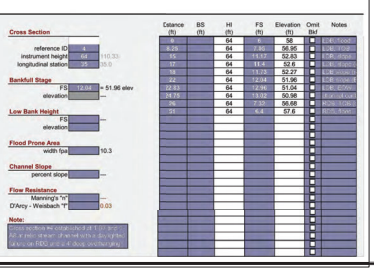
Cross Section 4

0 + 35 Unnamed Intermittent Stream, Pool



Bankfull Dimensions		Flood Dimensions		Materials	
2.3	x-section area (ft.sq.)	10.3	Wflood prone area (ft)	0.35	D50 Riffle (mm)
3.6	width (ft)	3.5	entrenchment ratio	0.64	D84 Riffle (mm)
0.8	mean depth (ft)	---	lor bank height (ft)	---	threshold grain size (mm):
1.0	max depth (ft)	---	lor bank height ratio		
4.2	wetted perimeter (ft)				
0.6	hyd radi (ft)				
3.8	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.014	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.03	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	17.3	resistance factor u/u*	---	shear velocity (ft/s)
		371.2	relative roughness	---	unit strm power (lb/ft/s)



Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		64	6	58		
4.25		64	5.86	58.95		
15		64	11.52	52.83		
17		64	11.4	52.6		
18		64	11.73	52.27		
22		64	12.04	51.96		
23.83		64	12.96	51.04		
24.75		64	13.02	50.98		
26		64	7.35	56.65		
31		64	6.4	57.6		

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PERMITTING PLANS
NOT FOR CONSTRUCTION

CHECKED BY:	DESIGNED BY:	DRAWN BY:	APPRV
REV DATE	DESCRIPTION		

STREAM BANK ECOLOGICAL RESTORATION

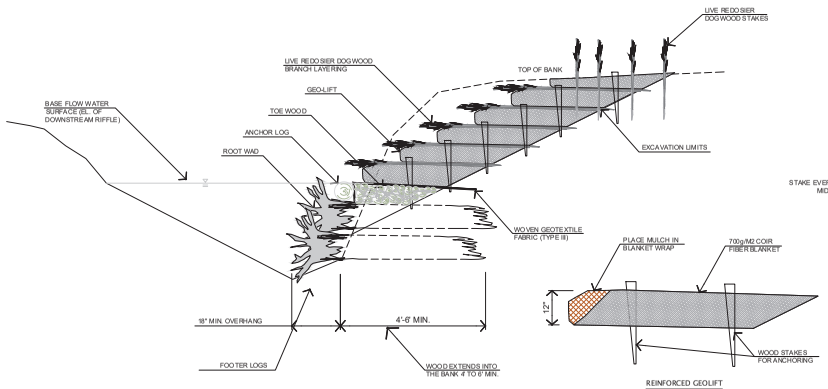
LONGITUDINAL PROFILE AND CROSS-SECTIONS

PROJECT NO.: AMH_66655

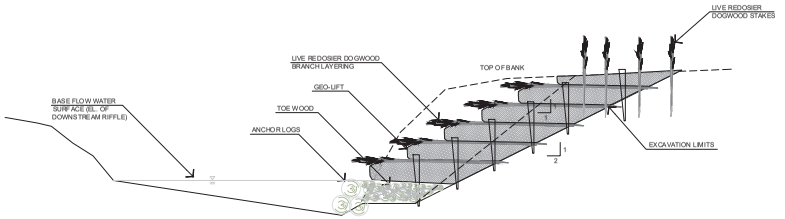
DATE: 01/24/2022

0
SCALE IN FEET

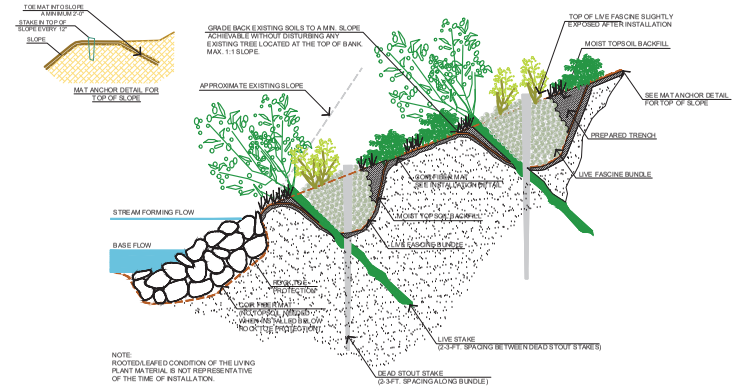
SHEET
4.0



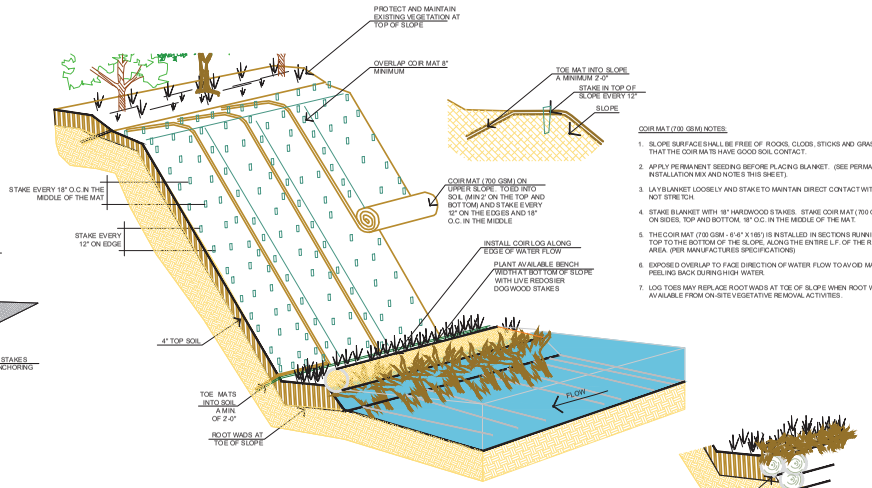
1A INSTALLATION OF GEOLIFT USING ROOT WADS
Scale: NTS



1B INSTALLATION OF GEOLIFT USING WOOD TOE WITH ANCHOR LOGS
Scale: NTS



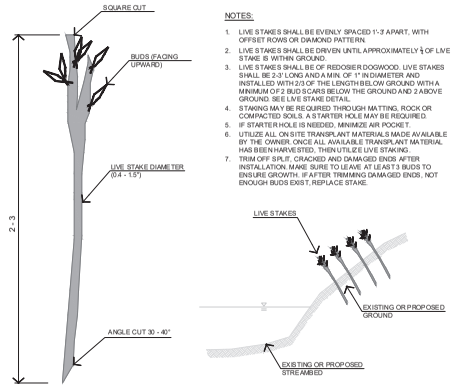
1C INSTALLATION OF LIVE FASCINE SLOPE STABILIZATION WITH ROCK TOE
Scale: NTS



COIR MAT (700 GSM) NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS TO ENSURE THAT THE COIR MATS HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKET. (SEE PERMANENT SEED INSTALLATION MIX AND NOTES THIS SHEET).
3. LAY BLANKET LOOSELY AND STAKE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. STAKE BLANKET WITH 18" HARDWOOD STAKES. STAKE COIR MAT (700 GSM) EVERY 12" ON SIDES, TOP AND BOTTOM, 18" O.C. IN THE MIDDLE OF THE MAT.
5. THE COIR MAT (700 GSM - 6'-6" X 185') IS INSTALLED IN SECTIONS RUNNING FROM THE TOP TO THE BOTTOM OF THE SLOPE, ALONG THE ENTIRE L.F. OF THE RESTORATION AREA. (PER MANUFACTURES SPECIFICATIONS)
6. EXPOSED OVERLAP TO FACE DIRECTION OF WATER FLOW TO AVOID MATS FROM PEELING BACK DURING HIGH WATER.
7. LOG TOES MAY REPLACE ROOT WADS AT TOE OF SLOPE WHEN ROOT WADS ARE NOT AVAILABLE FROM ON-SITE VEGETATIVE REMOVAL ACTIVITIES.

2 INSTALLATION OF COIR FIBER MAT
Scale: NTS



NOTES:

1. LIVE STAKES SHALL BE EVENLY SPACED 1'-3' APART, WITH OFFSET ROWS OR DIAMOND PATTERN.
2. LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY ¼ OF LIVE STAKE IS WITHIN GROUND.
3. LIVE STAKES SHALL BE OF REDOSIER DOGWOOD. LIVE STAKES SHALL BE 2-3' LONG AND A MIN. OF 1" IN DIAMETER AND INSTALLED WITH 2/3 OF THE LENGTH BELOW GROUND WITH A MINIMUM OF 2 BUD SCARS BELOW THE GROUND AND 2 ABOVE GROUND. SEE LIVE STAKE DETAIL.
4. STAKING MAY BE REQUIRED THROUGH MATTING, ROCK OR COMPACTED SOILS. A STARTER HOLE MAY BE REQUIRED.
5. IF STARTER HOLE IS NEEDED, MINIMIZE AIR POCKET.
6. UTILIZE ALL ON SITE TRANSPLANT MATERIALS MADE AVAILABLE BY THE OWNER. ONCE ALL AVAILABLE TRANSPLANT MATERIAL HAS BEEN HARVESTED, THEN UTILIZE LIVE STAKING.
7. TRIM OFF SPLIT, CRACKED AND DAMAGED ENDS AFTER INSTALLATION. MAKE SURE TO LEAVE AT LEAST 3 BUDS TO ENSURE GROWTH. IF AFTER TRIMMING DAMAGED ENDS, NOT ENOUGH BUDS EXIST, REPLACE STAKE.

3 LIVE STAKE REDOSIER SHRUB INSTALLATION DETAIL
Scale: NTS

PERMANENT SEED MIX

New England Erosion Control/Restoration MixFor Detention Basins and Moist Sites

Botanical Name	Common Name	Indicator
Elymus riparius	Riverbank Wild Rye	FACW
Schizachyrium scoparium	Little Bluestem	FACU
Festuca rubra	Red Fescue	FACU
Andropogon gerardii	Big Bluestem	FAC
Panicum virgatum	Switch Grass	FAC
Vernonia noveboracensis	New York Ironweed	FACW+
Agrostis perennans	Upland Bentgrass	FACU
Bidens frondosa	Beggar Ticks	FACW
Eupatorium maculatum (Eutrochium maculatum)	Spotted Joe Pye Weed	OBL
Eupatorium perfoliatum	Boneset	FACW
Aster novae-angliae (Symphyotrichum novae-angla	New England Aster	FACW-
Scirpus cyperinus	Wool Grass	FACW
Juncus effusus	Soft Rush	FACW+

Apply: 35 lbs/acre

SEEDING INSTALLATION NOTES

- SEEDING TIMELINE: MID-OCTOBER
- COVER CROP: BECAUSE THIS IS A PERENNIAL SEED MIX THAT WILL BE SLOWER TO ESTABLISH, THE CONTRACTOR SHALL USE A COVER CROP CONSISTING OF GRAIN RYE (LATE OCTOBER TO DECEMBER 31).
- PERMANENT SEED MIX SHALL CONTAIN A MINIMUM 98% PURITY RATE.
- ANY COMPACTION OR RILLING OF THE SOIL SHALL TO BE ADDRESSED PRIOR TO SEEDING.
- NO NITROGEN FERTILIZER SHOULD BE USED WITH THIS MIX.
- DURING THE FIRST GROWING SEASON THE STREAM BANKS SHALL BE TRIMMED TO 8" ANYTIME IT REACHES 18" TO 24" TO KEEP ANY FAST GROWING WEEDS FROM SMOTHERING THE NATIVE PERENNIAL SPECIES.

4 PERMANENT SEED INSTALLATION
Scale: NTS

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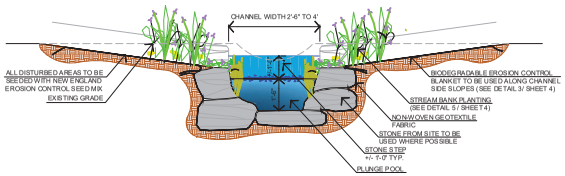
PERMITTING PLANS NOT FOR CONSTRUCTION

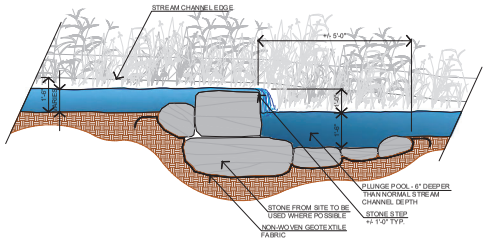
CHECKED BY:	DESIGNED BY:	DRAWN BY:
REV / DATE	DESCRIPTION	APPRV

STREAM BANK ECOLOGICAL RESTORATION

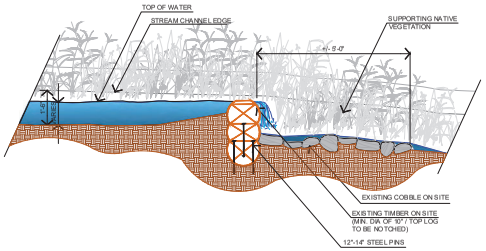
BANK STABILIZATION DETAILS

PROJECT NO.: AMH_66655
DATE: 01/24/2022
0
SCALE IN FEET
SHEET
5.0

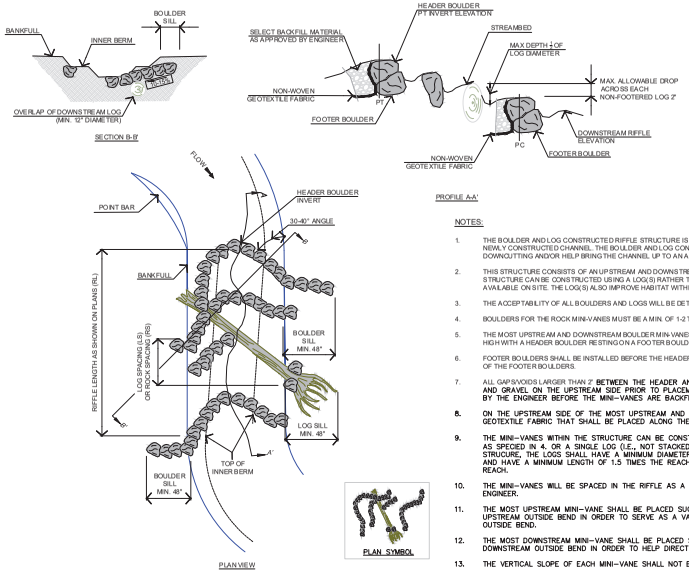




1 STONE STEP POOL IN RESTORED STREAM CHANNEL
Scale: NTS



1A LOG STEP POOL IN RESTORED STREAM CHANNEL
Scale: NTS



2 BOULDER AND LOG CONSTRUCTED RIFFLE
Scale: NTS

NOTES:

1. THE BOULDER AND LOG CONSTRUCTED RIFFLE STRUCTURE IS USED TO PROVIDE GRADE CONTROL IN A DEGRADED CHANNEL OR A NEWLY CONSTRUCTED CHANNEL. THE BOULDER AND LOG CONSTRUCTED RIFFLE IS INSTALLED TO PREVENT ANY FURTHER DOWNCUTTING AND/OR HELP BRING THE CHANNEL UP TO AN APPROPRIATE GRADE.
2. THIS STRUCTURE CONSISTS OF AN UPSTREAM AND DOWNSTREAM BOULDER MINI-VANE. ONE OR MORE OF THE MINI-VANES WITHIN THE STRUCTURE CAN BE CONSTRUCTED USING A LOG(S) RATHER THAN BOULDERS AS A WAY OF SAVING MONEY BY USING MATERIAL AVAILABLE ON SITE. THE LOG(S) ALSO IMPROVE HABITAT WITHIN THE CHANNEL.
3. THE ACCEPTABILITY OF ALL BOULDERS AND LOGS WILL BE DETERMINED BY THE ENGINEER.
4. BOULDERS FOR THE ROCK MINI-VANES MUST BE A MIN. OF 1-2 TONS WITH A MIN. DIAMETER OF 2-3'.
5. THE MOST UPSTREAM AND DOWNSTREAM BOULDER MINI-VANES SHALL CONSIST OF ROWS OF BOULDERS STACKED TWO BOULDERS HIGH WITH A HEADER BOULDER RESTING ON A FOOTER BOULDER UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. FOOTER BOULDERS SHALL BE INSTALLED BEFORE THE HEADER BOULDERS. HEADER BOULDERS SHALL BE OFFSET SLIGHTLY UPSTREAM OF THE FOOTER BOULDERS.
7. ALL GAPS/VOIDS LARGER THAN 3" BETWEEN THE HEADER AND FOOTER BOULDERS SHALL BE HANDED CHINKED WITH COBBLE AND GRAVEL ON THE UPSTREAM SIDE PRIOR TO PLACEMENT OF THE GEOTEXTILE. ALL CHINKING SHALL BE APPROVED BY THE ENGINEER BEFORE THE MINI-VANES ARE BACKFILLED.
8. ON THE UPSTREAM SIDE OF THE MOST UPSTREAM AND DOWNSTREAM MINI-VANE INSTALL A LAYER OF NON-WOVEN GEOTEXTILE FABRIC THAT SHALL BE PLACED ALONG THE ENTIRE LENGTH OF THE MINI-VANE AS SHOWN IN THE DRAWING.
9. THE MINI-VANES WITHIN THE STRUCTURE CAN BE CONSTRUCTED OF A SINGLE ROW OF BOULDERS (I.E., NOT STACKED) AS SPECIED IN 4, OR A SINGLE LOG (I.E., NOT STACKED). IF LOGS ARE USED TO CONSTRUCT MINI-VANES WITHIN STRUCURE, THE LOGS SHALL HAVE A MINIMUM DIAMETER OF 12", BE RELATIVELY STRAIGHT WITH LIMBS TRIMMED FLUSH AND HAVE A MINIMUM LENGTH OF 1.5 TIMES THE REACH BANKFULL WIDTH. THE MINIMUM LOG LENGTH WILL VARY BY REACH.
10. THE MINI-VANES WILL BE SPACED IN THE RIFFLE AS A FUNCTION OF THE RIFFLE LENGTH AND WILL BE DICATED BY THE ENGINEER.
11. THE MOST UPSTREAM MINI-VANE SHALL BE PLACED SUCH THAT THE BANK TIE IN IS ON THE SAME SIDE AS THE NEXT UPSTREAM OUTSIDE BEND IN ORDER TO SERVE AS A VANE AND HELP DIRECT STREAM FLOW AWAY FROM THE PREVIOUS OUTSIDE BEND.
12. THE MOST DOWNSTREAM MINI-VANE SHALL BE PLACED SUCH THAT THE HIGH POINT IS ON THE SAME SIDE AS THE NEXT DOWNSTREAM OUTSIDE BEND IN ORDER TO HELP DIRECT STREAM FLOW AWAY FROM THE NEXT OUTSIDE BEND.
13. THE VERTICAL SLOPE OF EACH MINI-VANE SHALL NOT EXCEED 10% UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
14. SET INVERTS AT ELEVATIONS AS SHOWN ON THE PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE. THE ELEVATIONS OF THE MIN-VANES SHALL NOT VARY FROM THOSE SPECIFIED IN THE PLANS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
15. THE DROP IN ELEVATION ACROSS THE ENTIRE STRUCTURE SHALL NOT EXCEED 1.0' UNLESS OTHERWISE DIRECTED BY THE ENGINEER.THE DROP ALONG A ROCK MINI-VANE WILL NOT EXCEED 0.2'. THE DROP ACROSS A LOG MINI-VANE SHALL NOT EXCEED 0.1'.
16. BACKFILL THE MINI-VANES WITH SELECT BACKFILL MATERIAL PER AUGMENTED RIFFLE DETAIL. WHEN THE STRUCTURE IS COMPLETE, THE HEADER BOULDERS/LOGS SHALL ONLY BE VISIBLE BETWEEN THE INNER BERMS.
17. SELECT BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL WILL BE MINIMAL.
18. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE FINISHED ELEVATIONS SHALL BE +/- 0.1' OF THE GRADES AND ELEVATIONS SPECIFIED IN THE PLANS.
19. DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
20. THE ANGLES SHOWN IN THE PLAN/VIEW IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE.

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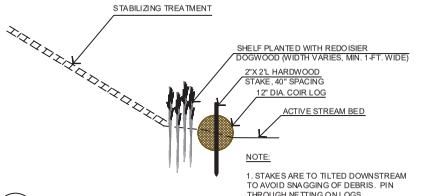
PERMITTING PLANS
NOT FOR CONSTRUCTION

CHECKED BY:	DESIGNED BY:	DRAWN BY:
REV / DATE	DESCRIPTION	APPRV

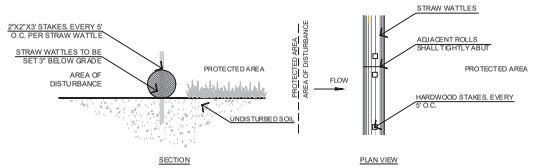
STREAM BANK ECOLOGICAL RESTORATION

RESTORATION TREATMENT DETAILS

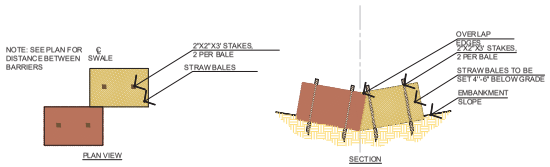
PROJECT NO.: AMH_66655
DATE: 01/24/2022
0
SCALE IN FEET
SHEET
6.0



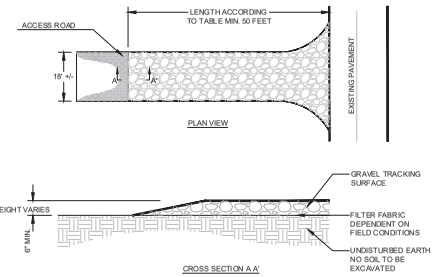
1 INSTALLATION OF COIR LOGS
Scale: NTS



2 STRAW WATTLE DETAIL
Scale: NTS



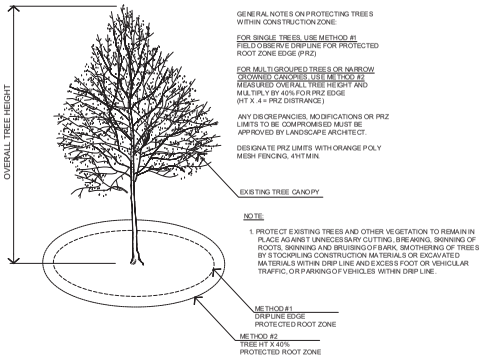
3 EROSION CONTROL BARRIER (STRAW BALE) – CHANNEL FLOW
Scale: NTS



PERCENT SLOPE OF ROADWAY	LENGTH OF ROAD REQUIRED	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0 TO 2%	50 FT.	100 FT.
2 TO 5%	100 FT.	200 FT.
OVER 5%	ENTIRE SURFACE STABILIZED WITH FABC BASE COURSE (AS PRESCRIBED BY LOCAL ORDINANCE OR OTHER COVERNING AUTHORITY	

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY OFF-ROAD STORAGE OR STAGING AREAS. THE CONTRACTOR SHALL PROVIDE A STABILIZED CONSTRUCTION ENTRANCE FOR EACH OFF-ROAD STORAGE AREA.
2. STONE SIZE TO BE 2" to 3-1/2" DIA.
3. DEPTH OF GRAVEL TO BE BASED ON SOILS BUT BE A MINIMUM DEPTH OF 3".
4. THE ABOVE-INDICATED STABILIZATION CONSTRUCTION ENTRANCE TO BE USED AT OFF-SITE STORAGE OR STAGING AREA, IF REQUIRED, AND OBTAINED BY THE CONTRACTOR.

4 STABILIZED CONSTRUCTION ENTRANCE
Scale: NTS



GENERAL NOTES ON PROTECTING TREES WITHIN CONSTRUCTION ZONE:

FOR SINGLE TREES, USE METHOD #1 FIELD OBSERVE DRIPLINE FOR PROTECTED ROOT ZONE EDGE (PRZ)

FOR MULTI GROUPED TREES OR NARROW GROWING CANOPIES, USE METHOD #2 MEASURED OVERALL TREE HEIGHT AND MULTIPLY BY 40% FOR PRZ EDGE (HT X .4 = PRZ DISTRANCE)

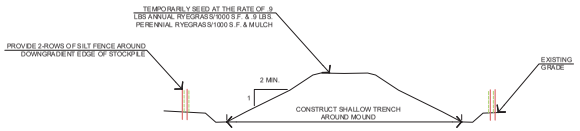
ANY DISCREPANCIES, MODIFICATIONS OR PRZ LIMITS TO BE COMPROMISED MUST BE APPROVED BY LANDSCAPE ARCHITECT.

DESIGNATE PRZ LIMITS WITH ORANGE POLY MESH FENCING, 4'HT MIN.

NOTE:

1. PROTECT EXISTING TREES AND OTHER VEGETATION TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, SKINNING OF ROOTS, SKINNING AND BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE AND EXCESS FOOT OR VEHICULAR TRAFFIC, OR PARKING OF VEHICLES WITHIN DRIP LINE.

5 EXISTING TREE PROTECTION DETAIL
Scale: NTS



6 STOCKPILE MOUND
Scale: NTS

NOTE: THE ADDITION OF PLANT PLUGS ARE OPTIONAL UNLESS CONDITIONS DETERMINED IN THE FIELD DURING CONSTRUCTION FIND THAT SEED AND LIVE STAKE PLANTING WILL NOT BE SUFFICIENT FOR LONG TERM STABILIZATION OF SOME BANK SECTIONS. IF THE ADDITION OF PLANT PLUGS ARE REQUIRED, PLANT SPECIES, QUANTITIES, AND PLACEMENT SHALL BE DETERMINED AND SPECIFIED BY LANDSCAPE ARCHITECT AND/OR ENGINEER PRIOR TO PLANTING.

		SUGGESTED OPTIONAL PLANT LIST				
		COMMON NAME	SCIENTIFIC NAME	SPACING THROUGHOUT	GROUPING	SIZE LBS
DEPTH						
FENCE	CF	Cardinal Flower	Lobelia cardinalis	1' on center	groups of 5,7,&9	2" plugs
	MM	Marsh Marigold	Caltha palustris	1' o.c.	groups of 5,7,&9	2" plugs
	NE	New England Aster	Aster novi-angliae	1' o.c.	groups of 5,7,&9	2" plugs
	MF	Monkey Flower	Mimulus ringens	1' o.c.	groups of 5,7,&9	2" plugs
	BS	Boneset	Eupatorium perfoliatum	1' o.c.	groups of 5,7,&9	2" plugs
TOE	SC	Sweetflag	Acorus calamus	1' o.c.	groups of 5 & 7	2" plugs
	BI	Blue Flag Iris	Iris versicolor	1' o.c.	groups of 5 & 7	2" plugs
	WG	Woolgrass	Scirpus validus	1' o.c.	groups of 5 & 7	2" plugs

7 OTIONAL PLANT LIST
Scale: NTS

Maintenance Chart
Stabilization Devices

Control Device*	Action	Frequency: Weekly	After: Storm Event**	When Necessary
Vegetation	Visual Inspection	△	△	
	Reseed and replenish weed control			△
Coir Blankets	Visual Inspection	△	△	
	Add stakes if material has moved. Repair water erosion behind damage.			△
Channel Protection	Visual Inspection	△	△	
	Add stakes if material has moved. Repair water erosion behind damage.			△
Coir Logs	Visual Inspection	△	△	
	Replace/Add Stakes if log has moved. Replace damaged sections.		△	△

*Control devices as shown on plans are to be considered a minimum and may be supplmented by request of engineer
** Inspect all stabilization measures as soon as possible but no later than 24 hours after any storm event that generates runoff from the site.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE EROSION AND SEDIMENT CONTROL MEASURES INDICATED ON THE PLANS SHALL BE CONSIDERED A MINIMUM AND SHALL BE REVISED AS CONSTRUCTION CONDITIONS WARRANT.
2. THE CONTRACTOR SHALL MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES AND TREE PROTECTION FOR THE DURATION OF THE PROJECT. REMOVAL OF ANY EROSION AND SEDIMENT CONTROL MEASURES OR TREE PROTECTION PRIOR TO THE END OF CONSTRUCTION SHALL ONLY BE AT THE DIRECTION OF THE LANDSCAPE ARCHITECT.
3. STABILIZE EACH DISTURBED AREA AS IT IS CLEARED AND REGRADED. DUE TO THE INSTABILITY OF THE EXISTING SOILS NO REGRADED SLOPE SHALL BE LEFT UNPROTECTED FOR MORE THAN 24 HOURS. IF RAIN IS FORECAST OVERNIGHT THAN STABILIZATION MEASURES MUST BE INSTALLED ON THE SAME DAY.
4. INSPECT EROSION AND SEDIMENT CONTROL MEASURES PROTECTING THE STREAM FOR DAMAGE ON A DAILY BASIS. SOME STREAM BANK STABILIZATION MEASURES ARE INTENDED TO REMAIN IN PLACE AS VEGETATION MATURES (E.G. COIR MATTING PROTECTING SEEDED STREAM BANKS). FOR EROSION AND SEDIMENT CONTROL MEASURES THAT ARE NOT TO REMAIN IN PLACE AS A PART OF FINAL STABILIZATION SHOULD BE REMOVED WHEN ALL LAND DISTURBING ACTIVITIES HAVE CEASED AND AREAS HAVE BEEN PERMANENTLY STABILIZED.
5. THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
6. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED FOR THE SHORTEST PRACTICAL PERIOD AT ANY GIVEN TIME DURING THE DEVELOPMENT. EXPOSED AREAS SHALL BE PERMANENTLY STABILIZED WITHIN 48 HOURS OF FINISH GRADING.

MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES:

1. SILT FENCES ARE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE A HEALTHY STAND OF VEGETATION. WHEN SEDIMENT ACCUMULATION REACHES A DEPTH OF 12" BEHIND THE SILT FENCE, THE SEDIMENT SHALL BE REMOVED AND PROPERLY DISPOSED OF. OBTAIN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO REMOVAL.
2. REINFORCE COIR MATTING AND BANK STABILIZATION INSTALLATIONS WITH ADDITIONALSTAKES IF THEY HAVE MOVED. REPAIR DAMAGE CAUSED BY WATER EROSION OR WIND AT THE END OF EACH DAY.
3. REPAIR ALL DAMAGES CAUSED BY SOIL EROSION OR CONSTRUCTION ACTIVITIES AT OR BEFORE THE END OF EACH WORKING DAY. DAMAGE TO ANY EROSION CONTROL MEASURE AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPAIRED IMMEDIATELY.

MATERIALS:

1. SILT FENCE: SILT FENCE SHALL BE MARAFI WITH PREFABRICATED 36-INCH POSTS OR APPROVED EQUIVALENT. IT SHALL BE INSTALLED IN ACCORDANCE WITH THE PLAN DETAILS.
2. MULCH: MULCH SHALL BE DRY MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH, FREE OF NOXIOUS WEEDS OR WOODY STEMS. NO SALT HAY SHALL BE USED.
3. TOPSOIL SHALL BE FERTILE, FRIABLE, NATURAL LOAM, SURFACE SOIL, REASONABLY FREE OF SUBSOIL, CLAY LUMPS, BRUSH, WEEDS AND OTHER LITTER, AND FREE OF ROOTS, STUMPS, STONES LARGER THAT 3/4 INCHES IN ANY DIMENSION, AND OTHER EXTRANEOUS OR TOXIC MATTER HARMFUL TO PLANT GROWTH. TOPSOIL FURNISHED SHALL BE LOAM OR SANDY LOAM WITH GREATER THAN 2% ORGANIC MATTER (NOT MORE THAN 20%) PH BETWEEN 6 AND 7, MINIMUM P205 LEVEL/ACRE OF 10#, MINIMUM K20 LEVEL/ACRE OF 100#.
4. OBTAIN TOPSOIL FROM LOCAL SOURCES OR FROM AREAS HAVING SIMILAR SOIL CHARACTERISTICS TO THAT FOUND AT PROJECT SITE. OBTAIN TOPSOIL ONLY FROM NATURALLY, WELL-DRAINED SITES WHERE TOPSOIL OCCURS IN A DEPTH OF NOT LESS THAN FOUR INCHES. DO NOT OBTAIN FROM BOGS OR MARSHES.
   4.1. TOPSOIL SHALL NOT BE DELIVERED UNTIL REPRESENTATIVE SAMPLES PROPOSED FOR USE HAVE BEEN FURNISHED BY THE CONTRACTOR AND APPROVED BY THE OWNER. WHEN REQUESTED TO DO SO, THE CONTRACTOR SHALL FURNISH AT HIS OWN EXPENSE, A CERTIFIED ANALYSIS OF THE TOPSOIL MADE BY AN APPROVED SOIL TESTING LABORATORY.
5. COIR MATTING: MATTING SHALL BE INSTALLED ON ANY SLOPES STEEPER THAN 2(H) TO 1(V).
   5.1. PHYSICAL SPECIFICATION (ROLL): MATERIAL 100% COIR TWINE WOVEN INTO HIGH STRENGTH MAT; THICKNESS 0.30IN; TENSILE STRENGTH (DRY) 1348 X 826 LB/FT; ELONGATION (DRY) 34% X 38%; FLEXIBILITY 6503 X 2959 0 MG/CM; FLOW VELOCITY OBSERVED 11 FT/SEC; WEIGHT 1.25 LB/SY; SIZE 6.6 X 164 FT (120 SY); "C" FACTOR 0.002; OPEN AREA (MEASURED)50%.
   5.2. STAKES: PROVIDE STAKES MADE OF TWO-FOOT LONG, 2"X2" WOOD STAKES. STAKE OUTSIDE EDGES AT LIMITS OF INSTALLATION AT 12" INTERVALS. STAKE ALONG OVERLAPPING MATS AT 4" INTERVALS. THERE SHOULD BE NO MORE THAN 3' BETWEEN ANY TWO STAKES AS INDICATED IN THE DETAILS.
6. COIR FIBER LOG:
   6.1. PHYSICAL SPECIFICATIONS: DIAMETER 12 IN; DENSITY 7 LBS/FT3; LENGTH 10 FT; WEIGHT 5.5 LB/FT; OUTER NET 80 LBS - 3 PLY COIR; INNER CORE COIR MATTRESS FIBER; MESH OPENING 2" X 2"1.1.A.1
   6.2. STAKES: PROVIDE STAKES MADE OF TWO-FOOT LONG, 1"X2" WOOD STAKES STAKES SHALL BE INSTALLED IN MESH OPENING PRECUT HOLES AT A 3-4 FOOT SPACING AND AS INDICATED IN THE DETAILS.
7. WHEN TEMPORARY SEEDING CANNOT BE ACCOMPLISHED TO HAVE ESTABLISHED OR VISIBLE GROWTH BY OCTOBER 15, THE DISTURBED AREAS SHALL BE COVERED WITH 6 INCHES OF MULCH AND ANCHORED OR EROSION CONTROL BLANKETS FOR THE DURATION OF THE WINTER.

PREPARED BY:
SWCA ENVIRONMENTAL CONSULTANTS
SWCA Environmental Consultants
15 Research Drive (p) 413.256.0202
Amherst, MA 01002 www.swca.com

PREPARED FOR:
SUSAN BERRY
4 Dawes on Drive (p) 978.618.1686
Sudbury, MA 01776
namaberry@gmail.com

PERMITTING PLANS
NOT FOR CONSTRUCTION

CHECKED BY:	DESIGNED BY:	DRAWN BY:	APPRV
REV DATE	DESCRIPTION		

STREAM BANK ECOLOGICAL RESTORATION

MISCELLANEOUS DETAILS

PROJECT NO.: AMH_66655
DATE: 01/24/2022
0
SCALE IN FEET
SHEET
7.0

APPENDIX E

Site Photographs

Photo #1: View of existing stream conditions at the southern end of the property. Western (left) bank is eroding, and eastern (right) bank is undercut. Debris, in the form of tires, cement blocks, and metal pipes is found within the stream. *Facing north*

Photo #2: View of the eastern side of the stream bank. Due to undercutting of the bank, portion of the upland has fallen into the stream (indicated with arrow). *Facing north.*

Photo #3: View of another section of the bank where the ground surface has collapsed into the stream due to severe undercutting . *Facing south.*

Photo #4: View of section of undercut stream bank. Ground surface collapsing into stream. *Facing southeast.*

Photo #5: View of top of bank facing the residential dwelling. Both sides of the bank are upland areas. Eastern bank consists mainly of mature trees while the western bank consists of primarily of shrubs and invasive plant species. *Facing west.*

Photo #6: View of stream S1, proposed for restoration (indicated with arrow), merging with intermittent stream S2. The sparsely vegetated wetland is adjacent to the intermittent stream and is located in the foreground. *Facing south.*

APPENDIX F

List of Abutters

Copy of Abutter Notification Form

Affidavit of Service


Quick Zooms
Find Properties
Find Abutters
Find Abutters to Single Parcel
Parcel ID: M10-0601
Distance (ft): 100 Go Clear
Find Abutters to Abutters
Distance (ft): 0 Go Clear
XLS
Parcel ID: M10-0601
Location: 4 DAWSON DR
Owner(s): BERRY SUSAN L& FLAGG DEBORAH E BERRY JAMES E & BERRY MOLLY K
Mailing Address: 4 DAWSON DR SUDBURY, MA 01776
Parcel ID: M09-0619
Location: 5 DAWSON DR
Owner(s): WILLETTE EUGENE R & JOYCE C
Mailing Address: 5 DAWSON DR SUDBURY, MA 01776
Parcel ID: M09-0623
Location: JOAN AVE
Owner(s): CAHN WHITNEY B TRUSTEES MURPHY-CAHN MAURA K &
Mailing Address: 1 DAWSON DR SUDBURY, MA 01776
Parcel ID: M10-0235
Location: 11 MURRAY DR
Owner(s): MACDONOUGH TIMOTHY M & KIMBERL Y
Mailing Address: 11 MURRAY DR SUDBURY, MA 01776
Parcel ID: M10-0236
Location: 21 MURRAY DR
Owner(s): POOLE JESSICA A & MICHAEL J TR MURRAY REALTY TRUST
Mailing Address: 21 MURRAY DR SUDBURY, MA 01776
Parcel ID: M10-0602
Location: 8 DAWSON DR
Owner(s): GOLLAPALLI DEVIPRASAD R & SESHADRI HEMALATHA G
Mailing Address: 8 DAWSON DR SUDBURY, MA 01776
About
Layers
Find
DAWSON DRIVE
MURRAY DRIVE
JOAN AVENUE
BROOKS ROAD
#14
#11
#8
#5
#4
#21
#34
#28
#31
#23
Map Info
SimpliCITY by PeopleGIS
50 m
100 ft
State Plane, NAD 83 Ft
681444, 2950163

Abutters List print this list
Date: January 25, 2022

Subject Property Address: 4 DAWSON DR Sudbury, MA
Subject Property ID: M10-0601

Search Distance: 100 Feet

Prop ID: M09-0619
Prop Location: 5 DAWSON DR Sudbury, MA
Owner: WILLETTE EUGENE R & JOYCE C
Co-Owner:
Mailing Address:

5 DAWSON DR
SUDBURY, MA 01776

Prop ID: M09-0623
Prop Location: JOAN AVE Sudbury, MA
Owner: CAHN WHITNEY B TRUSTEES
Co-Owner: MURPHY-CAHN MAURA K &
Mailing Address:
1 DAWSON DR
SUDBURY, MA 01776

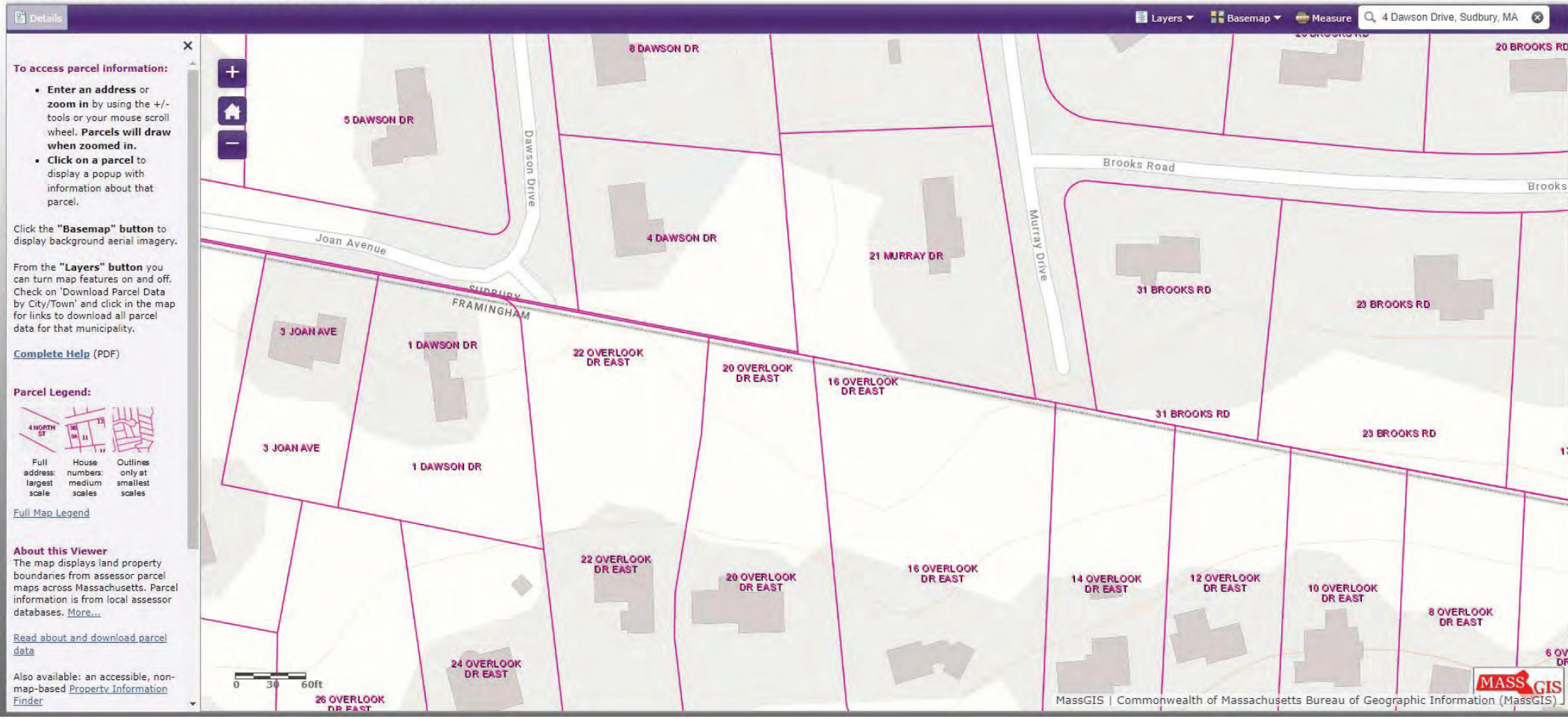
Prop ID: M10-0235
Prop Location: 11 MURRAY DR Sudbury, MA
Owner: MACDONOUGH TIMOTHY M & KIMBERL Y
Co-Owner:
Mailing Address:
11 MURRAY DR
SUDBURY, MA 01776

Prop ID: M10-0236
Prop Location: 21 MURRAY DR Sudbury, MA
Owner: POOLE JESSICA A & MICHAEL J TR
Co-Owner: MURRAY REALTY TRUST
Mailing Address:
21 MURRAY DR
SUDBURY, MA 01776

Prop ID: M10-0602
Prop Location: 8 DAWSON DR Sudbury, MA
Owner: GOLLAPALLI DEVIPRASAD R &
Co-Owner: SESHADRI HEMALATHA G
Mailing Address:
8 DAWSON DR
SUDBURY, MA 01776

Prop ID: M10-0650
Prop Location: 0 JOAN AVE Sudbury, MA
Owner: AGHASSI BADRI M
Co-Owner:
Mailing Address:
22 OVERLOOK DRIVE
FRAMINGHAM, MA 01701

Massachusetts Interactive Property Map



Polina Safran

From: Valerie Leonardo <vl@framinghamma.gov>
Sent: Tuesday, January 25, 2022 3:41 PM
To: Polina Safran
Subject: RE: Confirming property address and the most current property owners

---

Hi Polina,

Yes, the information we reviewed and outlined in your email is correct.

Best regards,

Valerie

Valerie Leonardo, MAA
Field Assessor
City of Framingham
150 Concord St., #101
Framingham, MA 01702
Web: Framinghamma.gov
Phone: 508-532-5415

From: Polina Safran <Polina.Safran@swca.com>
Sent: Tuesday, January 25, 2022 2:00 PM
To: Valerie Leonardo <vl@framinghamma.gov>
Subject: Confirming property address and the most current property owners

Hi Valerie,

Thank you for taking the time to confirm the property owners with me.

Below I have listed out the properties and associated owners that we went over. If you don't mind replying to this email confirming the below information is correct, I would greatly appreciate it.

Framingham Property Owner Information

Property Address	Owner	Owners Address

1 Dawson Drive, Framingham	Whitney Cahn and Maura Murphy-Cahn	1 Dawson Drive, Framingham, MA 01701
22 Overlook Drive East, Framingham	Badri M. Aghassi	22 Overlook Drive East, Framingham, MA 0170
20 Overlook Drive East, Framingham	Eamon and Mary Michele Delaney	20 Overlook Drive East, Framingham, MA 0170
16 Overlook Drive East, Framingham	John and Marilyn Pugh TRS	16 Overlook Drive East, Framingham, MA 0170

Thank you,

Polina

Polina Safran
Lead Wetland Scientist

SWCA Environmental Consultants
1900 West Park Dr. Suite 280
Westborough, MA 01581
P 413-992-5114
C 781-801-4973

One Framingham - Focused on the Future

Notification to Abutters
Under the Massachusetts Wetlands Protection Act
and the Sudbury Wetlands Administrative Bylaw

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

A. The name of the **Applicant** is Susan Berry

B. The Applicant has filed a Notice of Intent with the Sudbury Conservation Commission seeking permission to work in an Area Subject to Protection (Wetland Resource Area and/or Buffer Zone) under the Massachusetts Wetlands Protection Act (General Laws Chapter 131, Sec.40) and the Town of Sudbury Wetlands Administrative Bylaw.

C. The **address** of the lot where the activity is proposed: 4 Dawson Drive, Sudbury, MA

D. The **proposed activity** is: Stream bank restoration behind a residential dwelling.

E. A **Public Hearing** regarding this Notice of Intent will be held on:
Monday, June 27, 2022 at 6:45 PM.

F. **Public Participation will be via Virtual Means Only** - In light of the ongoing COVID-19 coronavirus outbreak, Governor Baker issued an emergency Order on March 12, 2020, allowing public bodies greater flexibility in utilizing technology in the conduct of meetings under the Open Meeting Law. The Town of Sudbury Conservation Commission greatly values the participation of its citizens in the public meeting process, but given the current circumstances and recommendations at both the state and federal levels to limit or avoid public gatherings, including Governor Baker's ban on gatherings of more than 10 people, together with the present closure of Sudbury Town Hall and other public buildings to the public, the Town has decided to implement the "remote participation" procedures allowed under Governor Baker's emergency Order for all boards, committees, and commissions.

G The public may participate in this meeting via Remote Participation:

From your computer, smart phone or tablet:

- Please go to Sudbury Conservation Website for link to virtual meeting: https://www.sudburytv.org/
- Meeting ID: n/a
- From your phone: **978-639-3366** or **470 250 9358**

H Copies of the Notice of Intent may be examined by visiting this Website:
https://sudbury.ma.us/conservationcommission/meetings/

I. Copies of the Notice of Intent may be obtained from either The Applicant, or the Applicant's representative Polina Safran, by calling this telephone number: 781-801-4973 between the hours of 9am - 5pm

Note: Public Hearing Notice, including its date, time, and place, will be published at least 5 days in advance in either the Sudbury Crier or MetroWest newspapers (at the applicant's expense).

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

2136

Amherst Office
15 Research Drive
Amherst, Massachusetts 01002
Tel 413.256.0202 Fax 413.256.1092

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, Maygan Barber, hereby certify under the pains and penalties of perjury that on June 10, 2022, I gave notification to abutters in compliance with the Massachusetts Wetlands Protection Act and the Sudbury Wetlands Protection Rules and Regulations in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act and the Sudbury Wetlands Protection By-law by Susan Berry with the Sudbury Conservation Commission on June 13, 2022. The form of notification, and a list of the abutters to whom it was given and their addresses, are attached to the Affidavit of Service.

Name Maygan Barber Date June 10, 2022

SWCA
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

2136

Amherst Office
15 Research Drive
Amherst, Massachusetts 01002
Tel 413.256.0202 Fax 413.256.1092

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, Maygan Barber, hereby certify under the pains and penalties of perjury that on June 13, 2022, I gave notification to abutters in compliance with the Massachusetts Wetlands Protection Act and the Sudbury Wetlands Protection Rules and Regulations in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act and the Sudbury Wetlands Protection By-law by Susan Berry with the Sudbury Conservation Commission on June 13, 2022. The form of notification, and a list of the abutters to whom it was given and their addresses, are attached to the Affidavit of Service.

Name _____ Date June 13, 2022

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender

SWCA, Incorporated
15 Research Drive
Amherst, MA 01002

TOTAL NO. of Pieces Listed by Sender: 6

TOTAL NO. of Pieces Received at Post Office™: AMHERST MA JUN 10 2022

Postmaster, per *(name of receiving employee)*

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Postmark with Date of Receipt. Ldd.SS

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JUN 10, 22
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$9.30
R2304N116749-02

USPS® Tracking Number / Firm-specific Identifier		Postage	Fee	Special Handling	Parcel Airlift
1.	WILLETTE EUGENE R & JOYCE C 5 DAWSON DR SUDBURY, MA 01776	.53	1.55 ~~1.65~~		
2.	CAHN WHITNEY B TRUSTEES 1 DAWSON DR SUDBURY, MA 01776	.53	1.65		
3.	MACDONOUGH TIMOTHY M & KIMBERLY 11 MURRAY DR SUDBURY, MA 01776	.53	1.65		
4.	POOLE JESSICA A & MICHAEL J TR 21 MURRAY DR SUDBURY, MA 01776	.53	1.65		
5.	GOLLAPALLI DEVIPRASAD R & SESHADRI HEMALATHA G 8 DAWSON DR SUDBURY, MA 01776	.53	1.65		
6.	AGHASSI BADRI M 22 OVERLOOK DRIVE FRAMINGHAM, MA 01701	.53	1.65		

PS Form **3665**, January 2017 (Page ___ of ___) PSN 7530-17-0(

See Reverse for Instructions

UNITED STATES POSTAL SERVICE®

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US POSTAGE $006.20⁰
ZIP 01002
041L10425547

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
SWCA, Incorporated 15 Research Drive Amherst, MA 01002	4		JUN 13 2022
	Postmaster, per *(name of receiving employee)* Jessica Jackson		

66655 6.20

	USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		Whitney Cann & Maura Murphy-Cann 1 Dawson Drive Framingham, MA 01701	.53	1.55 1.65		
2.		Badri M. Agnassi 22 Overlook Drive East, Framingham, MA 01701	.53	1.65		
3.		Eamon and Mary Michele Delaney 20 Overlook Drive East, Framingham, MA 01701	.53	1.65		
4.		John and Marilyn Pugh TRS 16 Overlook Drive East Framingham, MA 01701	.53	1.65		
5.			.53	1.65		
6.			.53	1.65		